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Determination of Sex by Osteometry of Third Metatarsal

Arthy1, Rohit Goel2, Sreenivas M3

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Abstract

In forensic anthropology and bio archaeology, sex determination is considered to be a primary step, as accurate identification of one sex eliminates half of the population of other sex. Though pelvis, cranium and long bones are considered more accurate indicators for sex determination, they are often not available or fragmented. The aim of this study is to specify the relation between prediction of sex of an individual and osteometry (length and mid shaft diameter) of third metatarsal and to assess the reliability of these morphometric traits in predicting the sex of the individual. Sample used in the study were 100 cases (50 males and 50 females) presenting for post mortem examination in the mortuary of Lok Nayak Hospital and Maulana Azad Medical College. The present study found sex determination accuracy of third metatarsal to be 67% to 72%, which rose to 75% on combination of variables from both sides. The results suggest that metatarsal bones can be used for sex determination when remains are fragmented or incomplete.

Key words: Metatarsal, Sex determination, Morphometric traits.

Introduction

Forensic anthropology in 1979 was defined by Stewart as “the branch of physical anthropology, which for forensic purposes, deals with the identification of more-or-less skeletonized remains known to be, or suspected of being human”. Modern anthropology is not restricted to skeletonized remains but includes identification of alive humans too. An anthropologist faces challenges with respect to identification of race, age, sex and stature in cases where the complete remains are not available.

Sex determination is the first and important step before age, ancestry and stature estimations as sex of the individual influences all these attributes. Examination methods include visual assessment (i.e. identification of special characters on skeleton) and metric analyses (i.e. measurement of bone trait). Metric based analysis is superior being examiner independent and relies largely upon statistical analysis. The most accurate sex indicators are pelvis and cranium followed by long bones. But when these bones are not available, fragmented or have been rendered unexaminable, then the small bones like metatarsals come to play a significant role.

The shafts of long bones often survive exhumation but the epiphysis bear a thin layer of compact bone on fragile cancellous bone, which is prone to damage. The smaller long bones of the hands and feet often remain intact/complete. Metatarsals being resistant to post-mortem changes and external trauma, are usually intact in comparison to long bones in mass disasters particularly explosions, aircraft and railway accidents. Shoe/boot protects the foot to some extent preserving the bones even in severely mutilated bodies. Though size variation due to activity or stress related robusticity is documented for the upper limbs, but this cannot be considered a factor to the same extent for metatarsals.

To the best of our knowledge, metatarsals remain unstudied in Asian population and studies on sex determination using cadaver metatarsals was not found even after extensive search.

The aims of this study were:

1. To specify the relation between prediction of sex of an individual and osteometry (length and mid shaft diameter) of third metatarsal.

2. To assess the reliability of these morphometric traits in predicting the sex of the individual.

MATERIALS AND METHODS

The study was conducted on autopsy cases
coming for medico-legal postmortem examination to the Department of Forensic medicine, Maulana Azad Medical College and Associated Hospitals, New Delhi. We studied a sample of 100 cases (50 males; 50 females) above 18 years of age as the data for the purpose of sample calculation was deficient.

Metatarsals with fractures, disease, deformity, surgical repairs were excluded from the study. Also cases with conditions affecting the stature were excluded.

**Method**

After explaining the study to the next of kin of deceased and consent was taken to participate in study, the case was included in the study. Autopsy was performed using standard autopsy techniques. Rigor mortis, if present, was released and the length was taken. The cadaver length (vertex of head to the base of heel) was measured with a measuring tape (in centimetres). After making an incision on right and left foot in midline over the dorsal aspect, soft tissue attachments were released and third metatarsal was dissected out. The metatarsal was prepared by placing it in boiling water, cleaned and washed for taking measurements. The following measurements from metatarsal were taken:

- The length of both (left and right) third metatarsal bone was taken from the highest point to the lowest point.
- The mid-shaft diameter (cranio-caudal) was measured from the middle of metatarsal taking the thickness of cortex into consideration.

Each linear measurement was taken three times, in anatomical position using vernier calipers (in centimetres to the nearest millimetre) and their average was recorded. The metatarsal after its measurement was put back in its place in the body before handing over the body to the relatives of deceased.

The data obtained was entered in excel spreadsheet and appropriate statistical analysis were done using SPSS 20 software.

**Observations and Results**

Of the 100 individuals used in this study, 50 are male (50%) and 50 are female (50%). The data belonged to north Indian Population.

The Kolmogorov-Smirnov and Shapiro-Wilk test revealed that the data was normally distributed. The Wilcoxon signed ranks test for bilateral asymmetry found no statistically significant difference between the right and left metatarsals.

**Determination of Sex**

Table 1 shows the descriptive statistics of measured values of metatarsal grouped by sex and side. All measurements were higher in males.

<table>
<thead>
<tr>
<th>Sex</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Std. Error of Mean</th>
<th>Range</th>
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</thead>
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<td></td>
<td>RML</td>
<td>50</td>
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<td>0.5053</td>
<td>5.80</td>
<td>7.60</td>
<td>0.0715</td>
</tr>
<tr>
<td>F</td>
<td>RMS</td>
<td>50</td>
<td>0.8260</td>
<td>0.0487</td>
<td>0.70</td>
<td>0.90</td>
<td>0.0069</td>
</tr>
<tr>
<td></td>
<td>LML</td>
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<td>6.7020</td>
<td>0.5077</td>
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<td>0.0066</td>
</tr>
<tr>
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<tr>
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<td>RMS</td>
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<td>0.0832</td>
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<tr>
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<tr>
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</tr>
<tr>
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<td>1.10</td>
<td>0.0081</td>
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Demarking point analysis finds a point at which the one sex is excluded. In the study population, the demarking point for metatarsal length was 7.6 cm for females and 6.2 cm for males. That is, metatarsal length > 7.6 cm definitively excludes the female sex and indicates a male and metatarsal length being < 6.2 cm definitively excluded the male sex and indicates a female. The demarking point for mid-shaft diameter was 0.8 cm for females and 0.9 cm for males. Meaning that metatarsal with mid-shaft diameter of < 0.8 cm cannot be a male and hence will be female and > 0.9 cm cannot be a female and hence will be male.

Wilcoxon signed rank test and Wilk’s Lambda test showed that there was a statistically significant difference between the values obtained from male and female populations. Spearman’s rho correlation for the total population showed significant correlation with all metric parameters for sex determination with p-value being < 0.001. Mid-shaft diameter (Right- 0.497, Left -0.500) showed better correlation than the metatarsal length (Right- 0.398, Left -0.376). Sexual Dimorphism Index \[SDI = (X_m - X_f/X_m)*100\] where \(X\) represents the sample mean for each measurement. The mid-shaft diameter (pooled SDI 17.30) has better SDI as compared to metatarsal length (pooled SDI 11.62) as shown in table 2.

**Table 2: Sexual Dimorphism Index**

<table>
<thead>
<tr>
<th>Side</th>
<th>ML</th>
<th>MSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>R</td>
<td>5.85</td>
<td>8.23</td>
</tr>
<tr>
<td>L</td>
<td>5.77</td>
<td>9.07</td>
</tr>
<tr>
<td>Pooled</td>
<td>11.62</td>
<td>17.30</td>
</tr>
</tbody>
</table>

Receiver operator curve showed that area under the curve was higher for mid-shaft diameter than for metatarsal length indicating higher accuracy of mid-shaft diameter in predicting the sex of the individual. The co-ordinate of the curve showed that when metatarsal length is \(\leq 6.05\) cm the sensitivity will be 98 % and specificity will be 100% in assuming the sex to be female. Whereas, if metatarsal length is \(\geq 7.7\) cm, sensitivity will be 84 % and specificity will be 100% in assuming the male sex. For mid-shaft diameter, the co-ordinate of the curve showed that when the diameter is \(\leq 0.75\) cm the sensitivity will be 98 % and specificity will be 100% in for female sex. At the upper end when mid-shaft diameter is \(\geq 0.95\) cm, sensitivity will be 28% and specificity will be 100% in assuming the male sex.

Predicted percentage for sex determination using univariate logistic linear regression showed that mid-shaft diameter is better predictor than metatarsal length. Multivariate logistic analysis considering all the variables of both sides increased the prediction to 74%. With females (76%) having a higher sex prediction than males (72%).

However, the rise in the prediction using multivariate regression was not significant \((p > 0.05)\). Thereby indicating that the measurements taken from the metatarsals are individually significant in identifying the sex of an individual; though the prediction accuracy increased by combining these parameters, it was not a significant rise.

**Discussion**

**Side symmetry:**

The metatarsal measurements of right and left side did not show any significant difference indicating the uniform distribution of physical stress between the lower limbs unlike in upper limbs where the difference is expected. Researchers suggest that the dimorphism in foot bones are most likely due to the difference in body size between males and females indicating that the intrinsic factors of sexual dimorphism by gonadal and pituitary hormones plays a major role.

**Measurements from metatarsal:**

On comparing metatarsals measurements reported by different researchers, mean values obtained in this study are consistent with the reports of Mountrakis but mean metatarsal length was higher and mean shaft diameter was lower than values reported by Abdel. The population studied by C. Mountrakis and Abdel are expected to have a taller stature and bigger metatarsals than the Indian population. As the present study examines freshly dissected metatarsals where intact articulation capsule the measurement are likely to be higher. Also in radiological study by Abdel, the angulation of the bone appears to make a difference.

**Determination of Sex**

Sexual dimorphic index calculated for metatarsal length and mid shaft diameter were 11.62 % and 17.30% respectively. It confirms the sexual dimorphic property
of 3rd metatarsal morphometry. SDI obtained in our study was indeed higher than calculated by C. Mountrakis as 7.92 % and 9.08 % for metatarsal length and mid-shaft diameter respectively.\(^5\)

The present study found sex determination accuracy of third metatarsal to be 67% to 72%, which rose to 75 % on combination of variables from both sides. This accuracy is consistent with report of Alicia K Wilbur but lower than the reports of Roblin, Smith, Abdel and C. Mountrakis.\(^5, 7-10\) This variation in accuracy can be attributed to different ancestry of the study population, sample collection techniques and processing. For example, Abdel studied the radiological measurements of metatarsal from the highest point to the lowest point with the bones in angulated state. Although his study gave 100 % accuracy in predicting original study samples of 160, but when tested on a sample of 80, the accuracy fell to 96.25 %. Mountrakis obtained accuracy ranging 80.7% - 90.1% after measuring the maximum length of archaeological metatarsals along with other measurements as medio-lateral and dorso-plantar width of base, mid-shaft and head.\(^5\) He noted that metatarsal length may change slightly at proximal and distal ends due to activity and remodelling related changes, but with limited effect. Case and Ross obtained correct classification rates exceeding 80% with a stepwise analysis model based on phalangeal and metatarsal measurements.\(^11\) Kautilya observed that foot breadth correlates best with sex of the person instead of foot length that is consistent with our findings on studying the metatarsal bone.\(^12\)

### Table 3: Comparison of the corrected prediction with other studies

<table>
<thead>
<tr>
<th>STUDY BY</th>
<th>SAMPLE SIZE</th>
<th>SAMPLE</th>
<th>CORRECT CLASSIFICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robling AG and Ubelaker DH9</td>
<td>200</td>
<td>Archaeological</td>
<td>83 – 100%</td>
</tr>
<tr>
<td>Smith10</td>
<td>40</td>
<td>Archaeological</td>
<td>77 – 84 %</td>
</tr>
<tr>
<td>C. Mountrakis5</td>
<td>225</td>
<td>Archaeological</td>
<td>80.7% - 90.1%</td>
</tr>
<tr>
<td>Abdel Moneim7</td>
<td>160</td>
<td>Radiology of living</td>
<td>100 %</td>
</tr>
<tr>
<td>Alicia K Wilbur8</td>
<td></td>
<td>Archaeological</td>
<td>72 %</td>
</tr>
<tr>
<td>Present Study</td>
<td>100</td>
<td>Cadaver</td>
<td>67 – 72 %</td>
</tr>
</tbody>
</table>

### Comparison of sex prediction of metatarsal with other bones

Different studies give different prediction percentage for the same variable observed, as shown in table 4. This variability can be due to population ancestry, experience of the author, variation in techniques employed by them and special circumstances peculiar to study. For example, Krogman’s samples were from a medical school where the ratio of male to female cadaver was 15:1.\(^2\) Thus, Krogman with his experience while predicting the sex, in cases of dilemma had to roll the dice towards male where he had 15 to 1 chance of being correct. The prediction variability due to ancestry is appreciated by Flanders. He studied 200 sacri and reported the accuracy varying from 84% in whites to 91% in blacks in absence of bias arising out of observer and technical differences.\(^13\) Pelvis is the best bone for sex prediction, the accuracy of correct classification as per Krogman is 95%.\(^2\) Abdel’s testing of metatarsals gave a prediction of 96.25%, which has been as high as that of the studies done on pelvis.\(^7\) Indeed, it was higher than the prediction value obtained from skull (Krogman 92% and Stewart 80%).\(^1, 2\) Though the prediction percentage obtained in present study are significantly lower than pelvis and skull
but importance of metatarsal needs emphasis in situations where fragments of long bones or destroyed axial skeleton are available for examination. When fragments are available like the lower end of the humerus, the prediction with those fragmented bones has been equal to that of the metatarsals.\textsuperscript{14,15}

Table 4: COMPARISON THE CORRECT CLASSIFICATION WITH OTHER BONES

<table>
<thead>
<tr>
<th>BONE</th>
<th>STUDY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Entire Skeleton</td>
<td>Krogman2 100%</td>
<td></td>
</tr>
<tr>
<td>Skull</td>
<td>Krogman2 92%</td>
<td></td>
</tr>
<tr>
<td>Mandible</td>
<td>Hu16 93% (Males)</td>
<td></td>
</tr>
<tr>
<td>Ramus Flexure in Mandible</td>
<td>Loth17 94%</td>
<td></td>
</tr>
<tr>
<td>Pelvis (Phenice method)</td>
<td>Phenice19 96%</td>
<td></td>
</tr>
<tr>
<td>Sacra</td>
<td>Flander13 84% (Whites)</td>
<td></td>
</tr>
<tr>
<td>Lower end of humerus</td>
<td>Falys14 79.1%</td>
<td></td>
</tr>
</tbody>
</table>

The data suggest that metatarsals cannot substitute a primary bone for sex determination but it can be used to determine sex where skeletal remains are fragmented or incomplete, which is a frequent occurrence in medicolegal cases. The accuracy of prediction is expected to increases further when metatarsal is combined with other bones. However, further studies are needed for the testing the applicability of this model to archaeological remains, an effort that presents a range of theoretical and methodological challenges, primarily in terms of population continuity, secular and behavioural changes.

**Conclusion**

This study demonstrates that third metatarsal showed correlation with sex determination. Mid-shaft diameter proves to be a better pointer to the sex of individual rather than the length of metatarsal. The maximum prediction accuracy obtained for sex determination was 75% after combination of length and mid-shaft diameter of one side which was almost equivalent to those obtained by examination of long fragmented bones. The specificity was high when the bones of extremes of measurements were encountered where mid-shaft diameter of <0.75cm has a specificity of 100% for females and a diameter of >0.95 cm is 100% specific for being a male.

We recommend that this study be carried out more extensively on larger samples in different populations (as in different regions of our own country) separately and in combination with other bones to arrive at a final conclusion regarding the validity of this method in prediction of sex and stature of the individual. The standards of the study should not be applied to archeological samples and skeletonized dried remains where shrinkage is a known phenomenon.

**Conflict of Interest:** Nil

**Source of Funding:** Not Applicable

**Ethical Clearance:** Given by Institutional Ethics Committee, Maulana Azad Medical College, New Delhi.

**References**


Incidence of Tuberculosis in Unidentified Dead Bodies amongst Autopsy Conducted at Government Stanley Medical College and Hospital, Chennai

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Abstract

A autopsy based prospective study on incidence of tuberculosis was conducted at government Stanley medical college for two year from June 2016 –June 2018 in that 425 cases of unidentified bodies were subjected for postmortem in that 376 cases were taken for the present study these based on exclusion criteria during autopsy in that 201 cases were male and 175 cases were female, in all the cases sterile swabs were taken from intra bronchial region and directly from caseous necrosed sites and lung tissues from pathological sites are subjected for histopathological examination during autopsy and sterile swabs were subjected for acid fast staining and culture by lowenstein Jensen medium medium among the376 cases studied 52 cases had pulmonary tuberculosis and 2 cases had milliary and intestinal tuberculosis respectively.

Key words – unidentified bodies, pulmonary tuberculosis, Milliary tuberculosis and intestinal tuberculosis.

Introduction

“Unidentified body” refers to a person who dies in a public place or hospital, which has not been claimed by any near relatives or personal friends within such time period as may be prescribed¹.

Tamil nadu is India’s third most populous state and Chennai stands for fifth-most populous urban agglomeration. With a huge migrant population who came down in search of job opportunities or take up any menial works to eke out a living and 10% of chennai population lives in slums further the migrants who are illiterates and do not possess any identification proofs and upon death either natural or unnatural, establishing their identity or even informing their relatives becomes very difficult.

At least 10 bodies are recovered every day in Tamil Nadu, most of which remain unidentified and unclaimed². The latest National Crime Records Bureau statistics show the state has the second highest number of unidentified bodies at 3,739, after Maharashtra with 6,185 corpses. As per the same report, 2,795 bodies were recovered around the State in 2010, thus showing a more-than-significant rise in body count of 60 per cent. Ironically³.

India is the country with the highest burden of TB. The World Health Organisation (WHO) TB statistics for India for 2016 give an estimated incidence figure of 2.79 million cases of TB for India. The TB incidence is the number of new cases of active TB disease during a certain time period¹. 

Tuberculosis (TB) remains a major respiratory cause of morbidity and mortality worldwide and has been identified as a ‘global emergency’ by the WHO. One third of the world’s current population has been infected with M.tuberculosis, and new infections occur at a rate of one per second⁴. Latent infection is however, most common and about 10% of it eventually progresses to active disease, which, if left untreated, kills more than half of its victims⁵.

It is estimated that about 40% of the Indian population is infected with TB bacteria, the vast majority of whom have latent TB rather than TB disease.

In 2004, mortality and morbidity statistics included 14.6 million chronic active cases, 8.9 million new
cases, and 1.6 million deaths, mostly in developing countries. The national average of tuberculosis per 100,000 populations in India was 168 in the year 2006. Worldwide problem status is presented in Table 17. India has the largest number of infections, with over 1.8 million reported cases. In March 2017 the Government of India (GoI) announced that the new aim with regard to TB in India was the elimination of TB by 2025 by National Strategic Plan 2017 – 2025.

India also has more than a million “missing” cases every year that are not notified and most remain either undiagnosed or unaccountably and inadequately diagnosed and treated in the private sector.

Reasons for increasing incidence of this treatable disease in unidentified cases were due to lack of access to health care, ineffective preventive and control programmes and comorbid condition like HIV infection, drug abuse and alcoholism, etc.

Tuberculous elimination program was started by the government of India, the present study was taken up to highlight the missed population in the community who are suffering from severe form of this disease and left untreated and cause death due to complication of tuberculosis.

**Materials and Method**

**Source of Data**

Unidentified cases subjected for medico legal autopsy at Department of Forensic Medicine, government stanley Medical College and Hospital, chennai.

**Method of Collection of samples**

A two year prospective study on unidentified dead bodies were started from June 2016 in that unidentified cases without any external or internal injury were taken up for study in all cases two sterile swabs were taken from intra bronchial region from both the lungs (image 1a and 1b) in certain cases directly from the caseous necrosed sites (image 2a and b) for acid fast staining and culture by Lowenstein Jensen medium and lung tissues from pathological sites were subjected for histopathological examination.

**Exclusion Criteria**

Unidentified bodies with external and internal injuries due to road traffic accident, railway injuries, assaults, poisoning cases, decomposed dead bodies and abandoned new born babies were excluded from the study group.

**Results and Discussion**

**Table No. 1: Total Number of unidentified cases during study period.**

<table>
<thead>
<tr>
<th>Total No of Autopsies during study period</th>
<th>No of Unidentified bodies studied</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>3516</td>
<td>376</td>
<td>10.08%</td>
</tr>
</tbody>
</table>

Of the 3516 cases subjected for medico legal autopsy, 376 were unidentified (10.08%). This increased number of unidentified cases is because the department of forensic medicine caters to the population of north chennai, which has its fair share of slums and as well as migrant population working in market places, also the proximity of railway station with constant influx of passengers.

In a similar study conducted by Lucinda et al in Pretoria (South Africa), unidentified bodies constituted for about 7-10% of total autopsies.

In another study conducted by Kumar S et al in Lucknow, unidentified bodies constituted for about 15% of total autopsies.

**Table No. 2: Sex distribution among unidentified cases.**

<table>
<thead>
<tr>
<th>Sex</th>
<th>Total no. of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>201 (53.45%)</td>
</tr>
<tr>
<td>Female</td>
<td>175 (46.54%)</td>
</tr>
<tr>
<td>Total</td>
<td>376 (100%)</td>
</tr>
</tbody>
</table>

Among 140 unidentified cases, 201 (53.45%) were males and 175 (46.54%) were females. Males being more as commonly the males constitute the crux of migrant population who came in search of job opportunities.
In a study conducted by Kumar S et al in Lucknow on unidentified bodies, majority of cases were males (2218, 69.99%) as compared to females (951, 30.01%).

Table No. 3: Age group in cases studied for incidence of tuberculosis.

<table>
<thead>
<tr>
<th>Age group</th>
<th>No of unidentified cases</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 20 yr</td>
<td>4</td>
<td>1.06%</td>
</tr>
<tr>
<td>21 – 40 yr</td>
<td>92</td>
<td>24.4%</td>
</tr>
<tr>
<td>41 – 60 yr</td>
<td>159</td>
<td>42.2%</td>
</tr>
<tr>
<td>61 – 80 yr</td>
<td>121</td>
<td>32.1%</td>
</tr>
</tbody>
</table>

In our study, most of the unidentified cases (42.2%) were in the age group of 41 to 60 years, 32.1% were in the age group of 61-80yrs, 24.4% were in the age group of 21 – 40yrs and 1.06% were in the age group of 0 – 20yrs.

Due to the diminished family ties, abandoning of parents by their children in the modern society, illiteracy, and low socio economic status were the most common reasons for higher incidence in the age group 41 to 60 years.

In a similar study conducted by Kumar S et al in Lucknow on unidentified bodies, 47.24% were in the age group of 41-60 years. 8.36% were in the age group of 0 – 20yrs. Observations were similar to those in our study.

Table no 4: Types of tuberculosis in unidentified cases.

<table>
<thead>
<tr>
<th>Type of tuberculosis</th>
<th>No of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmonary tuberculosis</td>
<td>52</td>
<td>96.2%</td>
</tr>
<tr>
<td>Milliary tuberculosis</td>
<td>01</td>
<td>1.8%</td>
</tr>
<tr>
<td>Intestinal tuberculosis</td>
<td>01</td>
<td>1.8%</td>
</tr>
</tbody>
</table>

Among 376 unidentified cases in that 52 cases showed presence of mycobacterium tuberculosis through culture and by acid fast staining and 2 cases showed extra pulmonary tuberculosis by histopathological examination.

Of 54 cases of tuberculosis, most (n=52, 96.2%) cases were presented as pulmonary tuberculosis(image 3). 1 ( 1.8%) cases were presented as Milliary tuberculosis and 1( 1.8%) case were presented as Intestinal tuberculosis(image 4a and 4b).

And the pulmonary tuberculosis were further classified based on number of acid fast bacilli seen per field. In 34 cases 4+ (>9 bacilli /field) is seen due to lack of access to health care, ineffective preventive and control programmes and comorbid condition like HIV infection, drug abuse and alcoholism, 13 cases 3+ (1-9 bacilli /field) seen, 02 cases 2+ (1-9 bacilli /10 fields) seen, 02 cases 1+ (1-9 bacilli /100 fields) seen, 01 case +/- (1-2 bacilli /300 fields) is seen (image 5a and 5b).

In a retrospective study conducted by Buyuk Y et al in Istanbul on unidentified bodies, (n=138, 60.2%) cases were died naturally. Remaining (n=91, 39.4%) cases were died unnaturally. Approximately 1/3 of natural
death cases were revealed evidence of pulmonary tuberculosis, but only in 32 cases tuberculosis was primary cause of death\textsuperscript{10}.

**Conclusion**

“Study of incidence of tuberculosis in unidentified dead bodies amongst Autopsies” conducted at Government Stanley Medical College and hospital, Chennai, between Jun 2016 to Jun 2018, the results of the study have been concluded as follows.

- Of the 3516 cases subjected for medico legal autopsy, 376 unidentified cases were full filled the criteria (10.98%).
  - 201 (53.4%) were males, 175 (46.5%) were females.
  - 159 (42.2%) of the cases were in the age group of 41 to 60 years.
- Of 376 cases 52 cases had pulmonary tuberculosis.
and 2 cases had miliary and intestinal tuberculosis respectively.

- Pulmonary tuberculosis was most commonly seen and showed (4+ / > 9 bacilli per field) smear classification in most of the cases due to lack of treatment.
- In 13 cases 3+ (1-9 bacilli /field) seen, 02 cases 2+ (1-9 bacilli /10 fields) seen, 02 cases 1+ (1-9 bacilli /100 fields) seen, 01 case +/- (1-2 bacilli /300 fields) is seen.
- Based on the above results it indicates
  - the present study highlights the missed population in the community who are suffering from severe form of this disease and remains latent reservoir for constant source of infection in the community.
- Most of the cases were left untreated and cause death due to complication of tuberculosis.
- Identifying and treating these community will only leads to eradication of tuberculosis in India by 2020.

**Ethical Clearance** – Taken from medical education committee of Government Stanley medical college and hospital

**Source of Funding** – Self

**Conflict of Interest** - Nil

**References**


Study of Lip Print Pattern among Young Individuals in Bangalore City

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Abstract

Chieloscopy or study of pattern of lip print is one of the easiest tools available for the identification of an individual in a medico legal investigation. The present study involves evaluating the pattern of lip prints among hundred individuals with 50 male and 50 female subjects. Lip prints are obtained on a white bond paper and studied involving all four quadrants. It was observed that Type I pattern was commonest lip print pattern among all the individuals and in female subjects, whereas Type II pattern was common among males. No two individuals had the same lip print pattern.

Key words: Chieloscopy, quadrant, reticular, lip print.

Introduction

Chieloscopy is one of the most emerging methods of human identification that deals with study of lip prints. Lip prints are formed by the pattern of grooves present on the labial mucosa. Lip prints are unique to particular individual and do not change during life of a person. They were first studied by anthropologist; R Fisher in 1902. In 1950, two Japanese scientists Kazuo Suzuki, Yasuo Tsuchihashi reported the arrangement of furrows on lip is unique and proposed a classification.1

Lip prints are classified into following types:

Type I: Clear cut grooves running vertically over the length of lip.

Type II: Grooves running vertically over partial length of the lip.

Type II: Grooves branch in their course.

Type III: Intersected grooves.

Type IV: Reticular grooves.

Type V: Irregular nonclassified pattern.

The dissimilarity among individuals is influenced by hereditary factors, seasonal effects and age. This could be a hurdle in lip print being used as lifelong constant identification feature2. Lip prints are similar to finger prints and foot prints in that individual characteristics are used for identification. They recover after undergoing alterations like trauma, inflammation and disease3. Lip prints of parents, children and siblings show some similarities which can establish relationships to limited extent. Variations in pattern among males and females could help in sex determination. Apart from standard types, 24 individual characteristics are distinguished. To simplify the study lip prints are classified into 4 quadrants and each quadrant is studied separately. Establishing 7 to 9 characteristics leads to positive identification. Substance forming print saliva and cosmetics can be identified which act as corroborative evidence4.

Identification of person and a suspect in crime is becoming more difficult for investigators as criminals are using sophisticated techniques while committing crime. Lip prints though a less recognized forensic investigating technique can be silent important evidence in a scene of crime to nail the culprit. The significance of Chieloscopy is linked to the fact that lip prints are inherent, develops at 6th month of intrauterine life. They are permanent, unalterable even after death unique to each person except for monozygotic twins5.

Aim

To study the pattern of lip prints among fifty young males and fifty young females.
Material and Method

Materials required are white bond papers, transparent foil of adhesive tape or cello tape, red lip stick and magnifying lens. Lip prints are collected from young individuals between 18 to 22 years of age. A total of 100 individuals are studied among which 50 are males and 50 females. Lips are first cleaned with tissue paper, red lip stick is applied over cleaned lips. Lip print is obtained by applying cello tape over the lips and pasting the same over white bond paper. Lip prints thus obtained are studied manually using magnifying lens.

Exclusive criteria: Persons with lip lesions, scars, and fissures.

Results

Lip prints are classified into 4 quadrants namely I\textsuperscript{st} quadrant which is right upper quadrant, II\textsuperscript{nd} quadrant is left upper quadrant, III\textsuperscript{rd} quadrant is left lower quadrant and right lower quadrant being the IV\textsuperscript{th} quadrant. Lip print pattern are studied in all four quadrants. A total of 50 male lip prints and 50 female lip prints were obtained. Type I lip print was commonest among all individuals and among females, whereas type II pattern was common among males. No two individual had the same pattern of lip print. Results are tabulated as follows:

Table 1: Distribution of Lip print pattern among individuals.

<table>
<thead>
<tr>
<th>Pattern</th>
<th>No of Quadrants</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>126</td>
<td>31.5%</td>
</tr>
<tr>
<td>II</td>
<td>83</td>
<td>20.75%</td>
</tr>
<tr>
<td>II</td>
<td>110</td>
<td>27.5%</td>
</tr>
<tr>
<td>III</td>
<td>48</td>
<td>12%</td>
</tr>
<tr>
<td>IV</td>
<td>33</td>
<td>8.25%</td>
</tr>
<tr>
<td>V</td>
<td>0</td>
<td>0%</td>
</tr>
</tbody>
</table>

Table 2: Distribution of Lip print pattern among Males.

<table>
<thead>
<tr>
<th>Pattern</th>
<th>I Quadrant</th>
<th>II Quadrant</th>
<th>III Quadrant</th>
<th>IV Quadrant</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>22</td>
<td>19</td>
<td>10</td>
<td>07</td>
<td>58</td>
</tr>
<tr>
<td>II</td>
<td>08</td>
<td>10</td>
<td>06</td>
<td>06</td>
<td>30</td>
</tr>
<tr>
<td>II</td>
<td>10</td>
<td>09</td>
<td>28</td>
<td>25</td>
<td>72</td>
</tr>
<tr>
<td>III</td>
<td>01</td>
<td>01</td>
<td>01</td>
<td>05</td>
<td>08</td>
</tr>
<tr>
<td>IV</td>
<td>10</td>
<td>10</td>
<td>06</td>
<td>06</td>
<td>32</td>
</tr>
<tr>
<td>V</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
</tr>
</tbody>
</table>
Table 3: Distribution of Lip print pattern among Females.

<table>
<thead>
<tr>
<th>Pattern</th>
<th>I Quadrant</th>
<th>II Quadrant</th>
<th>III Quadrant</th>
<th>IV Quadrant</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>18</td>
<td>19</td>
<td>16</td>
<td>15</td>
<td>69</td>
</tr>
<tr>
<td>II</td>
<td>17</td>
<td>15</td>
<td>10</td>
<td>11</td>
<td>54</td>
</tr>
<tr>
<td>II</td>
<td>05</td>
<td>04</td>
<td>15</td>
<td>14</td>
<td>38</td>
</tr>
<tr>
<td>III</td>
<td>10</td>
<td>11</td>
<td>09</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>IV</td>
<td>01</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>01</td>
</tr>
<tr>
<td>V</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
<td>00</td>
</tr>
</tbody>
</table>

Discussion

The study of lip prints among 100 individuals revealed that no two individuals had same pattern of lip print which enhances the effectiveness of lip print as a tool for identification of an individual. In this study Type I was the commonest pattern occurring among individuals in contrast to the study done by Umesh Babu\(^6\) where type IV was most commonly occurring lip print pattern. The study showed the least common type of lip print was type IV and type V in contrast to the other study\(^6\) where type II was least occurring pattern. In the present study, type II pattern was the commonest occurring lip print in males followed by type I, while in females type I was commonest followed by type II. Our study result was in contrast to study done at Wardha\(^7\) where type III pattern was more common in males and type II was commonest in females. The present study is in agreement with previous study\(^8\) where type I was common in females.

In males there were five subjects with all four quadrants having similar pattern. There were fifteen female subjects having similar pattern in all four quadrants which is in agreement with study at Wardha\(^7\) where more females had similar pattern in all four quadrants than males. In our study majority of them had two quadrants with similar lip print i.e, 15 in males and 20 in females. Least occurring pattern in males was type III and in females was type IV. The study is in contrast to results obtained by Sivapathasundaram\(^9\) study which showed type III as the commonest pattern where as type I pattern is more common in our study.

Conclusion

Chieloscopy remains a credible, non invasive and economically viable tool for identification of an individual. The study concludes that no two individuals have same lip print pattern. Type I is the commonest lip print pattern among all individuals. Type II in males and type I in females are the commonest pattern observed respectively. The result obtained varies with other studies done in similar field as various factors have a role in deciding the pattern of lip print in an individual. Hence a particular pattern of lip print cannot be attributed to a particular gender or region. The present study involving 100 subjects is a small sample size for generalizing the results. This study should be helpful in initiating further studies with larger amount of subjects providing enhanced results.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Obtained from institutional ethical committee

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Effectiveness of Educational Intervention on Knowledge & Attitude about MTP Act 1971 among Apparently Healthy Reproductive Age Group Population Visiting A Tertiary Care Centre, Puducherry

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Abstract
Medical termination of Pregnancy Act is one such Act which was brought by the Indian Government to streamline the process of abortions conducted in India. Its rules were framed for the first time in 1972, amended in 1975, 1977, 2003, and 2009 and recently in October 2014. The main motive of passing such bills was to decrease the female foeticide rate, decrease the maternal mortality rate, improve the health of the mother and the newborn and to avoid unwanted and illegal abortion practises. In spite of these measures from the government, more than 5000 deaths due to unsafe abortions take place every year in our country. The main cause of such death related to abortion is mainly due to the ignorance of the general public towards abortion. Majority of the women, not only in the rural parts, but also in the urban regions does not know about the mere existence of the MTP law. Hence this study was aimed to estimate the level of awareness about the MTP Act among the apparently healthy reproductive age group public, visiting the hospital and apart from it, we also educate them regarding the MTP Act and its uses. Among our participants the minimum age reported was 20 and the maximum age was 45. Out of total 220, female accounted to 63.2% and male 36.8%. Among them married people accounted for 69.5%, unmarried 28.2% and others were 2.3%. 42.3% of people had history of abortion their family but 64% of people doesn’t know whether the conducted abortion was a legal or a illegal one. Eleven questions were asked to the participants and an initial assessment of their knowledge was done with the help of a questionnaire. After this immediately, educational intervention was carried out about the law and after a gap period of one month the participants were asked the same questions as before using telecommunication device and their knowledge was tested.

Key Words: MTP Act, Abortion, Educational intervention, Knowledge & Attitude.

Introduction
Many acts & bills are constantly passed and amended respectively for the welfare of the people of India, but the real question is whether these acts and laws reach the people concerned? Medical termination of Pregnancy Act is one such Act which was brought by the Indian Government to streamline the process of abortions conducted in India. Its rules were framed for the first time in 1972, amended in 1975, 1977, 2003, and 2009 and recently in October 2014(1). The main motive of passing such bills is to decrease the female foeticide rate, to decrease the maternal mortality rate, improve the health of the mother and the newborn and to avoid unwanted and illegal abortion practises.

In spite of these measures from the government to reduce the maternal mortality rates, female foeticide and other illegal abortion deaths, more than 5000 deaths due to unsafe abortions take place every year in our country(2). Unsafe abortions are killing one woman every two hours in India. A lancet paper in 2007 reported
that there were 6.4 million abortions, out of which 3.6 million (56%) were unsafe. According to census 2011 abortions taking place in institutions varies from 32.0% in Chhattisgarh to 73.9% in Assam\textsuperscript{(3,4,5)}.

The main causes of such deaths related to abortions are mainly due to the ignorance of the general public towards the Abortion procedures carried out in India. Majority of the women not only in the rural parts, but also in the urban regions does not know about the mere existence of the law. This ignorance related to abortion like, when it has to be conducted, the indications, the place, who has to conduct the procedure etc..remain unknown to them. Hence this study is aimed to estimate the level of awareness about the MTP Act among the apparently healthy public visiting the hospital and apart from it, we also educate them regarding the MTP Act and its uses.

**Materials and Method**

This is a quasi experimental study / Before-after intervention study, carried out in the medicine Out Patient Department (OPD) of Sri Venkateshwara Medical College Hospital and Research Center, where on an average of 75 patients visit OPD per day. The sample size was 220. Sampling Procedure followed was that all the eligible participants available during the study period were included in the study.

**Inclusion Criteria:**

- The study subjects are those who are apparently healthy people who accompany the patients to the Medicine OPD.
- They may be a relative/friend/guardian, irrespective of the sex.
- Age group of 15 – 45yrs, of either gender.
- Who own/ use telecommunication devices

**Exclusion Criteria:**

- Persons less than 15 years and more than 45 years will not be included in the study.
- Persons who don’t have telecommunication devices or who don’t know to use one will not be included in the study.

We assumed that 20 eligible participants will be available at the OPD, each day during the visit of the investigator.

**Phase I:** The investigator visited Medicine OPD on all days from Monday-Friday. A pre-tested self-designed questionnaire was used for data collection after obtaining informed written consent. Contact numbers of the study participants was collected. The study participants were given educational intervention on MTP Act, 1971. In this educational intervention, all the details like the latest updates, the merits and usefulness of the MTP Act was explained to them. Informative charts, attractive and thought provoking PPTs presentations were used as a tool to educate them.

**Phase II:** One month after the intervention period, the study participants were contacted through phone and post intervention assessment was done. Pre and Post test results were analysed using SPSS 23.0

**Study tool and study variables:** A pre-tested self-designed questionnaire comprising two parts will be used for data collection. **Part A-** Socio demographic details (Age, gender, education, occupation, income, marital status, religion, number of children, use of contraceptives, obstetric index.) **Part B-** The Investigator will assess the knowledge and attitude by using structured questionnaire regarding MTP Act 1971.

**Observation and Results**

Distribution of the study population based on age is shown in table 1. The minimum age reported was 20 and the maximum age was 45. Distribution of study population based on gender and education is shown in table 2. In this study female participants accounted for 63.2% and male 36.8%. Among the total participants, 77.4% of people have completed high school and have graduated and 8.6% of people have never attended even primary school. Distribution of study population based on socio – economic status is shown in table 3. Modified Kuppusamy scale was used to assess the socio-economic status and based on this 64% of people are middle and above middle class with maximum number of people fall under upper middle class 37.7%. Out of 220, 93 participants reported past history of abortion and among them 67 doesn’t know whether it was a legal or an illegal abortion (Table 4). While analysing the pre and post test results, majority of the persons have answered many of the post intervention questions correctly and overall it was statistically significant for all the questions. Pre and post test results and analysis is shown in table 5.
<table>
<thead>
<tr>
<th>Table 1: Distribution of Study population based on (n=220)</th>
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</thead>
<tbody>
<tr>
<td><strong>N</strong></td>
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<tr>
<td>AG(E)</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2: Distribution of study population based on gender &amp; education (n=220)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td><strong>Education</strong></td>
</tr>
<tr>
<td>Professional, PG &amp; Above</td>
</tr>
<tr>
<td>Graduation</td>
</tr>
<tr>
<td>Intermediate or Post High school</td>
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<tr>
<td>High school Certification</td>
</tr>
<tr>
<td>Middle school Certification</td>
</tr>
<tr>
<td>Primary school Certification</td>
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</table>

<table>
<thead>
<tr>
<th>Table 3: Distribution of study population based on socio economic status (n=220)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Socio Economic Status</strong></td>
</tr>
<tr>
<td>Lower</td>
</tr>
<tr>
<td>Upper Lower</td>
</tr>
<tr>
<td>Lower Middle</td>
</tr>
<tr>
<td>Upper Middle</td>
</tr>
<tr>
<td>Upper</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 4: Distribution of Study population based on past history of abortion&amp; the type of abortion (n=220)</th>
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</thead>
<tbody>
<tr>
<td><strong>Past history of abortion</strong></td>
</tr>
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<td>No History</td>
</tr>
<tr>
<td>Once</td>
</tr>
<tr>
<td>Twice</td>
</tr>
<tr>
<td>Thrice</td>
</tr>
<tr>
<td><strong>Type of abortion</strong></td>
</tr>
<tr>
<td>Not Applicable</td>
</tr>
<tr>
<td>Legal</td>
</tr>
<tr>
<td>Illegal</td>
</tr>
<tr>
<td>Don’t know</td>
</tr>
</tbody>
</table>
Table 5: Distribution and analysis of the pre and post test answers (n=220)

<table>
<thead>
<tr>
<th>Question Number</th>
<th>Option 1</th>
<th>Option 2</th>
<th>Option 3</th>
<th>Option 4</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>58 (26.4)</td>
<td>0</td>
<td>162 (73.6)</td>
<td>NA</td>
<td>0.001*</td>
</tr>
<tr>
<td>P1</td>
<td>216 (98.2)</td>
<td>0</td>
<td>4 (1.8)</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>62 (28.2)</td>
<td>158 (71.8)</td>
<td>NA</td>
<td>NA</td>
<td>0.001*</td>
</tr>
<tr>
<td>P2</td>
<td>216 (93.1)</td>
<td>4 (6.9)</td>
<td>NA</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>20 (9.1)</td>
<td>48 (21.8)</td>
<td>152 (69.1)</td>
<td>NA</td>
<td>0.001*</td>
</tr>
<tr>
<td>P3</td>
<td>177 (80.5)</td>
<td>2 (0.9)</td>
<td>41 (18.6)</td>
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<td></td>
</tr>
<tr>
<td>4</td>
<td>13 (5.9)</td>
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<td>170 (77.3)</td>
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<td>0.000*</td>
</tr>
<tr>
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<td>71 (32.3)</td>
<td>6 (2.7)</td>
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<td></td>
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<tr>
<td>P5</td>
<td>193 (87.7)</td>
<td>27 (12.3)</td>
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<td>NA</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>42 (19.1)</td>
<td>130 (59.1)</td>
<td>48 (21.8)</td>
<td>NA</td>
<td>0.001*</td>
</tr>
<tr>
<td>P6</td>
<td>202 (91.9)</td>
<td>12 (8.1)</td>
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</tr>
<tr>
<td>7</td>
<td>203 (92.3)</td>
<td>0</td>
<td>17 (7.7)</td>
<td>NA</td>
<td>0.000*</td>
</tr>
<tr>
<td>P7</td>
<td>24 (10.9)</td>
<td>155 (70.5)</td>
<td>41 (18.6)</td>
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<td></td>
</tr>
<tr>
<td>8</td>
<td>124 (56.4)</td>
<td>0</td>
<td>96 (43.6)</td>
<td>NA</td>
<td>0.000*</td>
</tr>
<tr>
<td>P8</td>
<td>5 (2.3)</td>
<td>182 (82.7)</td>
<td>33 (15.0)</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>43 (19.5)</td>
<td>93 (42.3)</td>
<td>62 (28.2)</td>
<td>22 (10)</td>
<td>0.000*</td>
</tr>
<tr>
<td>P9</td>
<td>4 (1.8)</td>
<td>2 (0.9)</td>
<td>46 (20.9)</td>
<td>168 (76.4)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>34 (15.5)</td>
<td>50 (22.7)</td>
<td>38 (17.3)</td>
<td>98 (44.5)</td>
<td>0.000*</td>
</tr>
<tr>
<td>P10</td>
<td>199 (90.5)</td>
<td>21 (9.5)</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>141 (64.1)</td>
<td>22 (10)</td>
<td>57 (27.9)</td>
<td>NA</td>
<td>0.000*</td>
</tr>
<tr>
<td>P11</td>
<td>19 (8.6)</td>
<td>191(86.8)</td>
<td>19(8.6)</td>
<td>NA</td>
<td></td>
</tr>
</tbody>
</table>

P – Post test questions  NA – Not Applicable  * - Statistically Significant

Discussion

This study was conducted among reproductive age group individuals of either sex in a tertiary medical college in Puducherry. The total numbers of participants were 220. Among the participants, the minimum age reported was 20 and the maximum age was 45. Mean age group participated 33. In this study female participants accounted for 63.2% and male 36.8%. Among the total participants, 77.4% of people have completed high school and have graduated and 8.6% of people have never attended even primary school. The basic demographic details were collected to avoid the bias in the study subjects. Equivalent to females, males also play a major role in decision making with relation to conduct of abortion. This was the reason both male and female were included in this study were as in the study conducted in Kerala(6) as well as in South Africa(7), only females were included but the awareness study...
conducted in New Delhi\(^{(8)}\), both male and female were included. In this study both rural and urban people were included and more than 75% of people have completed their schooling and also some under graduate courses. All the other studies also included both rural and urban population.

When compared to all the three studies which have evaluated the knowledge aspect alone of the people, in this study we have evaluated about their self experience about the abortion and their knowledge in it. Among the participants, 127 people had no personal history or family history of abortion. 93 participants reported either personal history or a family history of abortion. Among the 93, 67 participants don’t know the type (legal or illegal) of abortion conducted. 10 persons reported as legal, done in a hospital set up and 16 reported as illegal, done in home.

Regarding the awareness of MTP Act, the pre intervention answers denote that the public are totally unaware of the mere existence of such an act in India. The same conclusion was driven from the studies conducted in Kerala \(^{(6)}\), South Africa \(^{(7)}\) & New Delhi \(^{(8)}\). All the three studies conducted only a survey regarding the awareness of the act among them, but we also conducted an educational intervention. We also evaluated the knowledge of the public by contacting them through phone after a period of one month and re evaluated them with the set of same questionnaire. Each question was evaluated for pre and post intervention and for all the questions, they have mostly answered correctly and upon analysing statistically, all the 11 post intervention answers were statistically significant.

The first question was about the knowledge of mere existence of the MTP Act in which 26.4% gave correct answer in the initial test, while 98.2% gave correct answers after the educational intervention. The second question was about the awareness on MTP Act in which initially 28.2% gave the correct answer, while after 93.1% gave the correct answers. The third to sixth questions were regarding the termination of a pregnancy with respect to mother, baby, rape and contraception failure. In these the initial percentage of correct answers were 9.1%, 5.9%, 54.1 & 19.1% respectively, while the post intervention answers were 80.5%, 65%, 87.7% & 91.9% respectively. The seventh question was on husbands’ consent, the eighth & ninth was on doctors qualification, the tenth was on gestation week for termination and the eleventh was regarding hospitals for MTP. Initially the percentage of correct answers were 0%, 0%, 10%, 15.5% & 10% respectively, while after educational intervention it was 70.5%, 82.7%, 76.4%, 90.5% and 86.8% respectively.

**Conclusion**

A study to assess the effectiveness of educational intervention on knowledge & attitude about MTP Act 1971 among apparently healthy reproductive age group population visiting a tertiary care centre, Puducherry was carried out, in which the following observation was made:

- The minimum age of participant reported was 20 and the maximum age was 45 with a mean age of 33.
- Female participants accounted for 63.2% and male 36.8%. Among the total participants, 77.4% of people have completed high school and have graduated and 8.6% of people have never attended even primary school.
- Analysing the socio economic status, 64% of people are middle and above middle class with maximum number of people fall under upper middle class 37.7%.
- 93 participants reported past history of abortion and among them 67 doesn’t know whether it was a legal or an illegal abortion.
- Analysing the pre and post test results, majority of the persons have answered many of the post intervention questions correctly and overall it was statistically significant for all the eleven questions.
- The results were that, there is a need to expand awareness about when, where and under what circumstances legal abortion can be availed. This awareness was poor not only among women but also among the gatekeepers of the decision making process in the family as well. Women also need to know their rights and study concluded that they should also know, what are safe quality services, in order to ask for information or question poor quality care Providers
- From this study we like to expose to the government about the lack of knowledge of the general public about the MTP Act.
- We believe the knowledge which we feed them about the MPT Act1972 will help them know the correct methods and indications and provide them overall
knowledge about illegal abortions.

Conflict of Interest: Nil

Source of Funding: Nil

Ethical Clearance: The study was approved by the Ethics committee of the institute.

References


Study of Profile of Motor Vehicle Accidents in Thiruvanmiyur Traffic Police Station

G.Shivani1, V.Dekal2

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Abstract

Accidents are an intentional act which is not a voluntary act done by the people. Accidents, tragically, are not often due to ignorance, but are due to carelessness, thoughtlessness and over confidence [1]. Human, vehicle and environmental factors play roles before, during and after a trauma event. Accidents, therefore, can be studied in terms of agent, host and environmental factors and epidemiologically classified into time, place and nature of injury.

Keywords: Accidents, Ignorance, Carelessness, Environmental factors

Introduction

We all know how difficult it is to cope up with a sudden loss of life of a near and dear one; moreover, if the person who died was the bread earner, then the lives of the dependents turn topsy-turvy. One of the major reasons for sudden or unexpected deaths in India is road accidents. The irony is that, most of the road accidents could have easily been avoided. A Motor Vehicle Accident can be defined as an event that occurs on a way or street open to public traffic; resulting in one or more persons being injured or killed, where at least one moving vehicle is involved [1]. Thus it can be due to collision between vehicles, between vehicles and pedestrians, between vehicle and animal or between vehicle and geographical or architectural obstacles.

Road traffic accidents are a human tragedy. They involve high human suffering and socioeconomic costs in terms of premature deaths, injuries, loss of productivity and so on. The situation that leads to improper interactions could be the result of the complex interplay of a number of factors such as pavement characteristics, geometric features, traffic characteristics, road user’s behaviour, vehicle design, driver’s characteristics and environmental aspects. Thus, the whole system of accident occurrence is a complex phenomenon. The problem of deaths and injuries as a result of road accidents is now acknowledged to be a global phenomenon. The authorities in all countries of the world feel concerned about the growth in the number of people killed and seriously injured on their roads.

The major human factors that contribute to the potency of road accidents causation include drunken drivers, indecisiveness, fatigue, distraction, and confusion. In addition most of the drunken drivers are found to be inexperienced, risk takers, impulsive, aggressive, casual and unaware of the road signals. In India, the motor vehicle population is growing at a faster rate than the economic and population growth. According to WHO, motor vehicle injuries are the sixth leading cause of accidents in our country [2].

Materials and Method

The study on the profile of Motor vehicle accidents for the year January 2017 - December 2017 at Thiruvanmiyur Police Station which comes under South Chennai division, Taramani subdivision, Adyar Traffic Police Station and Thiruvanmiyur police Station covers the areas starting from Indira nagar, Kamarajar nagar, Radhakrishnan nagar, Thiruvalluvar salai,
my study was analyzed in accordance to the data given by the Thiruvanmiyur Police Station for J6 limit control areas and on the basis of Sex of the victim and accused ; Type of injury either fatal/ non-fatal ; Date of occurrence ; Time of occurrence ; Type of area whether it was nearby a recreational area, nearby hospital , an office , market , bazaar ; Total number of vehicles involved either one or two or three ; Accused vehicle ; Victim involved either a vehicle or pedestrian ; Accused wearing helmet or not ; Nature of injury / death ; Nature of accident due to over speed , rash driving, bad overtaking , sudden breaks , close following , inattentive turn and others[3].

Thus the nature and severity of the problem though vary to a great extent in the different parts of the world but has posed a serious menace for every society in the recent years. Therefore it needs an in-depth study so as to suggest the preventive and curative measures. In this descriptive work, efforts have been made to study and analyse the problem of motor vehicle accidents with special focus on the time, months and place of occurrence and so on. The design structured for this study is descriptive. This purpose of this research design is to provide description of the individuals, nature and causes of the problem under investigation.

**Result and Discussions**

**According to the type of injury**

Whenever a road accident occurs on the road, mainly two types of accidents i.e. fatal injury and non-fatal injury are said to happen, depending upon the severity of injury.

Out of total 39 motor vehicle accidents that occurred under the limit of Thiruvanmiyur Traffic Police Station [fig1], 34 where non-fatal (87%) and 5 where fatal (13%). It is observed that maximum injuries where non-fatal which can be serious, severe or minor injuries.

In the similar studies made during the year 2008, nearly 1.3 million people died every year in Indian roads and 20 to 50 million people suffered from non-fatal injuries [4]. When we compare this data with the study made, there is huge reduction in the rate of fatal injuries during 2017 in a particular area.

**Figure 1: Type of Injury**

According to the type of vehicles involved in accident

The severity of accident depends upon the type of vehicle involved in the accident. There are more chances of fatal accident taking place in case of van, car, motor cycle, auto rickshaw, MTC bus, jeep and other vehicles.

Out of total 39 cases that was registered, 16 accidents was due to car (41%), 11 by Motor Cycle (28%),4 due to van (10%), 2 was due to auto and MTC bus each(5%) and 1 due to jeep (3%) [fig2].

Previous studies showed that cars contributes to about 46% of the total accidents occurred followed by truck, bus, tempo up to 38% and the least 6% by auto[4]. Hence there is a reduction in rate of car accidents in this study of a small area.

**Figure 2: Vehicles Involved**
According to time of accident

Mainly, we divide road accidents according to 24hrs time period in the interval of three hours i.e., 00:00 - 03:00, 03:00 - 06:00 and 06:00 - 09:00 and so on.

From the total of 39 cases about 9 accidents took place during 09:00 - 12:00 (23.07%) then followed by 7 during 21:00 - 24:00 (17.9%). It is also clear that there was no accident occurred during 03:00 - 06:00 (0%) and the least 2 accidents during 00:00 - 03:00 (5.1%). It is also evident that during 06:00 - 09:00 and 18:00 - 21:00 there were equal percentage of accidents (15%) occurred [Table1].

According to the similar studies we can observe that in 2012, 16.7% of the cases of road accidents were reported to have occurred between 1500 and 1800 hours followed by 16.6% between 1800 and 2100 hours [4]. But in this study the maximum number of accidents occurred during 0900 and 1200 hours which is working hour’s daytime.

According to the nature of accident

The nature of road accidents that occur on the road can be due to vehicle overtaking, head on/rear end collision, rash driving, sudden turn without collision, inattentive turn, wrong turn, close following and sudden break, over speed, negligent and careless driving.

From the study, out of 39 road traffic accidents, 12 were due to over speed (30%), 8 due to inattentive turn (20.5%) and rash driving (15%) whereas careless driving (2.5%) and wrong turn (2.5%) [Table3].

According to the month of occurrence

The number of accidents differs in each month due to change in climatic conditions and other physiological conditions.

From the study of 39 accidents [Table2], maximum of 8 accidents occurred during the month of April (20.5%), 7 during the month of September (18%) and the least about 1 occurred in the month of February (2.5%), June (2.5%), October (2.5%) and December (2.5%). There was no evidence of accident during the month of August.

When we compare with previous study done in Tamilnadu during the year 2012, the month wise distribution of road accidents has also shown more accidents during the month of May (8.8%) followed by the month of April (8.74%) and January (8.72%) while the least number of accidents were reported in the month of September [4]. Hence my study shows maximum occurrence of accidents during the month of April (20.5%) and the minimum during February, June, October and December (2.5%) each.

Table 2: Month of Occurrence

<table>
<thead>
<tr>
<th>Month</th>
<th>Accidents</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>2</td>
</tr>
<tr>
<td>February</td>
<td>1</td>
</tr>
<tr>
<td>March</td>
<td>4</td>
</tr>
<tr>
<td>April</td>
<td>8</td>
</tr>
<tr>
<td>May</td>
<td>7</td>
</tr>
<tr>
<td>June</td>
<td>3</td>
</tr>
<tr>
<td>July</td>
<td>1</td>
</tr>
<tr>
<td>August</td>
<td>1</td>
</tr>
<tr>
<td>September</td>
<td>6</td>
</tr>
<tr>
<td>October</td>
<td>3</td>
</tr>
<tr>
<td>November</td>
<td>1</td>
</tr>
<tr>
<td>December</td>
<td>1</td>
</tr>
</tbody>
</table>

According to the similar studies made showed that the major reason was rash driving (30%), over speeding (28%) and rear end collision (5%) being the least reason for occurrence of accidents [5]. When we compare this with the present study made maximum number of accidents was due to over speeding and there is decrease in the number of accidents due to rash driving.
Table 3: Nature of Accident

<table>
<thead>
<tr>
<th>Nature of Accident</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head</td>
<td>14</td>
</tr>
<tr>
<td>Face</td>
<td>13</td>
</tr>
<tr>
<td>Hand</td>
<td>0</td>
</tr>
<tr>
<td>Hip</td>
<td>1</td>
</tr>
<tr>
<td>Leg</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
</tr>
</tbody>
</table>

According to the nature of Injury / Death

There are certain sites where injury is more common like the legs, hand, face etc.

According to the road traffic accident data, out of 39 cases [fig3], 13 injuries was on the head (33%), 15 were on legs (38%), 2 was on the hip (5%) and 1 injury on face (3%).

A similar study showed the commonest site of injury was the head (23%) and the least common site was the hip (8%) [6]. But in this study the more common site is the leg and head injury is relatively lower when compared.

Nature of Injury

Conclusion

When we were young, we were taught “precaution is better than cure”, and so many other things like “one should help a person in need”, etc. but as we grow old we almost forget these things and seldom follow them and by the time we realize that what was taught to us is really true and worthwhile, it gets too late. People need to be convinced that following rules and being in discipline is also cool and it is in their interest to follow traffic rules. Some of the rules to be followed in order to prevent motor vehicle accidents:

Overspeeding- Excess speeding is always unsafe, and excess speed means running vehicle more than the safe limit. Excess and inappropriate speed can result in crash, injuries to occupants and pedestrians, and damage to others as well.

Drunk or Driving under Influence of Drugs - Driving under the effect of alcohol or drugs is one of the causes of RTAs and mortality associated with it. Hence proper measures have to be taken in order to prevent accidents.

Teenage Driving- Teens as drivers are known for rash driving impulsively and also to get away reasons. They cause accidents due to inexperience and speed.

Night Driving- Night driving is a potential risk for travelers. Lack of street lights results in glare of the incoming vehicles especially on high beam. The speed must be under control. Night driving should be avoided on long routes as far as possible.

Overtaking and Wrong Driving- It is common in our country to drive on the wrong lane or driving in wrong opposite direction, not keeping to left, which may result in head-on collision.

Poor Construction of Roads and Bad Planning- About 400 people die on our roads daily. The roads we plan and make are substandard, constructed without due attention, and with disregard to mandatory super-vision.

Conflict of Issue - Nil

Fund – Self

Ethical Clearance – Obtained

References


Demographic Profile of Poisoning Cases in a Tertiary Care Center in South India – An Observational Study

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Abstract

The word ‘poison’ has been evolved from the Latin word ‘potion’ i.e. ‘to drink for health’, but in the due course of time the definition of ‘poison’ has changed reversibly to its present form i.e. any substance which when administered, inhaled or ingested is capable of acting deleteriously on the human body. In the current study we have aimed at determining the demographic profile of poison cases reporting to our institute. This prospective study was carried out involving 353 cases of poisoning admitted in Sri Ramachandra Medical College & Research Institute, Sri Ramachandra University, Porur, Chennai, during the period of June 2014-June 2015. Age-wise distribution of poisoning cases revealed that the maximum cases are in the age group of 20-29 years and the incidence decreased as the age increases. It is evident that the incidence of poisoning is more in case of females when compared to males. Occupation-wise distribution revealed poisoning is more common among people who are skilled workers contributing 167 cases. Socio economic status wise distribution revealed poisoning is more common among the people who belong to Upper middle (52%), followed by 33% of cases belong to Middle class. Poisoning is more common among married people when compared to unmarried people. Out of 353 cases, 203 cases were married, which accounts for 58%, 150 cases were unmarried, which accounts for 48%. Distribution of the study population based on the type of family revealed that out of total 353 cases, 299 cases belonged to nuclear family. Persons who belong to joint family were 46 in number.

Key Words: Poisoning in South India, demographic profile, age-wise distribution, marital status.

Introduction

The word ‘poison’ has been evolved from the Latin word ‘potion’ i.e. ‘to drink for health’, but in the due course of time the definition of ‘poison’ has changed reversibly to its present form i.e. any substance which when administered, inhaled or ingested is capable of acting deleteriously on the human body. Thus, almost anything is poisonous and there is really no boundary between medicine and poison.1 The way a poison is controlled depends on its potential for harm, its usefulness and the reasons for its use. The law has a right and a duty pursuant to the police power of a state to control substances that can do great harm.1

Poisoning as a mode of death is known from antiquity. Poisoning among all age groups and both sexes is seen everywhere and the incidence of poisoning with reference to insecticides, pesticides, hair dye, cleaning acids and rodenticides has become more common than the others in the recent times because...
of increased availability and indiscriminate use of the various pesticides in agricultural areas.\textsuperscript{2}

The incidence of poisoning in India is among the highest in the world, it is estimated that more than 50,000 people die every year from toxic exposure. Among children the common culprits include kerosene, household chemicals, drugs, and garden plants.\textsuperscript{3}

The trend in poisoning show a change due to introduction of newer pesticides under different classes. At one point historically arsenic was the most popular besides Copper Sulphate, and Barbiturates. In the recent past DDT, Benzene Hexa Chloride, Endrin, Organochlorines and Organophosphorous compounds took the toll. Of late Aluminum Phosphide, Alcohol, hair dye and Carbamates are in vogue. Interestingly, incidences of snake strike deaths are still prevalent and not receding.\textsuperscript{2}

Arising out of a growing concern over the burgeoning incidence of poisoning worldwide, coupled with a lack of public awareness about its seriousness, Poisons Information Services made their first appearance in the Netherlands in 1949, there are 75 such certified centers in the USA alone, providing almost any information within a matter of seconds through the use of an intricate, computer information resource system (POISINDEX) on more than 800,000 poisonous products. India made a belated foray with the establishment of the National Poisons Information Centre at the All India Institute of Medical Sciences, New Delhi in December, 1994.\textsuperscript{2} The World Health Organization has released its Computer Software on Poisons (INTOX) for use by the centre.\textsuperscript{2} In this study we have aimed at determining the demographic profile of poison cases reporting to our institute.

Materials and Method

This prospective study was carried out involving 353 cases of poisoning admitted in Sri Ramachandra Medical College & Research Institute, Sri Ramachandra University, Porur, Chennai, during the period of June 2014- June 2015. The study was approved by scientific and ethics committee of the institute.

Inclusion Criteria

- All cases of Poisoning either suicidal or accidental, both directly admitted and referral cases during the period of June 2014 – June 2015.
- Snake Strike and Scorpion stings.
- Domestic as well as Commercial Poisoning.

Exclusion Criteria

- Cases without proper diagnosis (undetermined).
- Outside body brought to SRMC mortuary with history of poisoning.

Methodology

The demographic details like age, socioeconomic status by modified Kuppusamy scale (Annexure 1), marital status, time of the day during which poisoning has occurred, type of family were acquired from the patient, relatives, friends or the investigating officer and by going through the medical records and the inquest report. Among the admitted cases, if some turn out to be fatal, in those cases post mortem examination is done. All the data collected in the Performa were complied and analyzed statistically using SPSS software version 15.

Observation and Results

Distribution of the study population based on age, gender, marital status and type of family is shown in table 1. The minimum age affected was 1 year old and maximum age affected was 80 years. Mean age of the study population was 28 years. Incidence of poisoning was also reported to be more in case of females when compared to males. The incidence of poisoning was also reported to be more in number among married individuals and in nuclear families. Modified Kuppusamy scale (Annexure 1) was used to assess the socio-economic status and based on this distribution of the poisoning cases bases on occupation, education status and socio economic status are mentioned in Table 2, 3 and 4 respectively. And based on the above observation it is also evident that the incidence of poisoning is more in upper middle class group.
Table 1: Distribution of Study population based on age, gender, marital status, and type of family (n=353)

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – 9</td>
<td>39 (11.0)</td>
</tr>
<tr>
<td>10 - 19</td>
<td>57 (16.1)</td>
</tr>
<tr>
<td>20 – 29</td>
<td>127 (36.0)</td>
</tr>
<tr>
<td>30 – 39</td>
<td>55 (15.6)</td>
</tr>
<tr>
<td>40 – 49</td>
<td>34 (9.6)</td>
</tr>
<tr>
<td>50 – 59</td>
<td>27 (7.6)</td>
</tr>
<tr>
<td>60 – 69</td>
<td>9 (2.5)</td>
</tr>
<tr>
<td>70 – 79</td>
<td>4 (1.1)</td>
</tr>
<tr>
<td>80 - 89</td>
<td>1 (0.3)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>160 (45.3)</td>
</tr>
<tr>
<td>Female</td>
<td>193 (54.7)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Marital status</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>203 (57.5)</td>
</tr>
<tr>
<td>Unmarried</td>
<td>150 (42.5)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type of family</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nuclear</td>
<td>299 (84.7)</td>
</tr>
<tr>
<td>Joint</td>
<td>46 (13.0)</td>
</tr>
<tr>
<td>Extended</td>
<td>8 (2.3)</td>
</tr>
</tbody>
</table>

Table 2: Distribution of study population based on occupation (n=353)

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unemployed</td>
<td>58 (16.4)</td>
</tr>
<tr>
<td>Unskilled Worker</td>
<td>8 (2.3)</td>
</tr>
<tr>
<td>Semi skilled worker</td>
<td>94 (26.6)</td>
</tr>
<tr>
<td>Skilled worker</td>
<td>163 (47.3)</td>
</tr>
<tr>
<td>Farmer</td>
<td>23 (6.5)</td>
</tr>
<tr>
<td>Semi professional</td>
<td>3 (0.8)</td>
</tr>
<tr>
<td>Professional</td>
<td>0 (0.0)</td>
</tr>
</tbody>
</table>

Table 3: Distribution of study population based on education status (n=353)

<table>
<thead>
<tr>
<th>Education</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non literate</td>
<td>2 (0.6)</td>
</tr>
<tr>
<td>Primary school</td>
<td>27 (7.6)</td>
</tr>
<tr>
<td>Middle school</td>
<td>25 (7.1)</td>
</tr>
<tr>
<td>High school</td>
<td>118 (33.4)</td>
</tr>
<tr>
<td>Intermediate</td>
<td>172 (48.7)</td>
</tr>
<tr>
<td>Graduate</td>
<td>9 (2.5)</td>
</tr>
</tbody>
</table>

Table 4: Distribution of study population based on Socioeconomic status (n=353)

<table>
<thead>
<tr>
<th>Class</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td>Upper middle</td>
<td>182 (51.6)</td>
</tr>
<tr>
<td>Middle</td>
<td>117 (33.1)</td>
</tr>
<tr>
<td>Upper lower</td>
<td>54 (15.3)</td>
</tr>
<tr>
<td>Lower</td>
<td>1 (0)</td>
</tr>
</tbody>
</table>

Discussion

The total number of cases admitted in Sri Ramachandra Medical College and Research Institute from June 2014 to June 2015 was 26,190 cases, out of which 4,498 cases were Medico-Legal Cases (MLC). Among the MLC, poisoning accounts for 353 cases. As the institute is a tertiary care centre, the numbers of cases are more when compared to most of the other studies to which this research work is compared. When compared to the studies done by mani et al which was a retrospective study for a period of three years, the total number of poisoning cases was 365 and other studies done by Bharath K Guntheti Udaypal Singh, Unnikrishnan B, Singh B, Rajeev A, Ansam F Sawalha., Waleed M Sweilah., Maysoon T Tufaha. and Dua Y Al-jabi, the number of cases were considerably more in our study.

In the current study age-wise distribution of poisoning cases revealed that the maximum cases are in the age group of 20-29 years and the incidence decreased as the age increases (Table 1). Young adults are affected more as they are more exposed to stressors.
like job, marital issues, financial problems etc. The results of the studies conducted by, Bharath K Guntheti Udaypal Singh 4, Shreemanta Kumar Dash, Manoj Kumar Mohanthy, Kiran Kumar Patnaik, Sachidananda Mohanthy 8, Ramanath K.V. Naveen Kumar H.D 8, Shoaib Zaheer.M, Aslam.M, Vibanshu Gupta, Vibhor Sharma and Shadab Ahmad Khan 10, Dr. Gargi.J, Dr. Hakumat Rai, Dr. Ashok Chhana, Dr. Gurmanjit Rai et al 9, Tejas Prajapati, Kartik Prajapati, Rakesh Tandon, Saumil Merchant 11.

Sex-wise distribution of poisoning cases in our study revealed that out of the total 353 cases, 160 cases i.e (45.3%) were males and 193 cases i.e (54.7%) were females and it is evident that the incidence of poisoning is more in case of females when compared to males (Table 1). Similar findings were also noted in the study conducted by Deepak Pokhrel, Sirjana pant, Anupama Pradhan, Saffar Mansoor 7. However, male dominance is noted in the studies conducted by Shreemanta Kumar Dash, Manoj Kumar Mohanthy, Kiran Kumar Patnaik, Sachidananda Mohanthy 6, Ramanath K.V. Naveen Kumar H.D.8 Shoaib Zaheer.M, Aslam.M, Vibanshu Gupta, Vibhor Sharma and Shadab Ahmad Khan 10, Dr. Gargi.J, Dr. Hakumat Rai, Dr. Ashok Chhana, Dr. Gurmanjit Rai et al.14 Unnikrishnan B, Singh B, Rajeev A 5 Ansam F Sawalha., Waleed M Sweileh., Maysoon T Tufaha. and Dua Y Al-jabi 7.

In the present study occupation-wise distribution showed that poisoning is more common among people who are skilled workers contributing 167 cases, followed by Semi – Skilled workers 94 and 58 Unemployed. The second least was Semi – Profession with 3 people. This is due to the fact that middle class people are subjected to more stress from the developing world (Table 2). In the study conducted by mani et al showed similar results with farmers (29.86%) followed by housewives (23.38%) and least common among businessmen (0.54%). Study conducted by Ramanath K.V. Naveen Kumar H.D 9 also showed similar results i.e. commonly involved groups are farmers (38.4%), followed by housewives (21.9%). Study conducted by Shreemanta Kumar Dash, Manoj Kumar Mohanthy, Kiran Kumar Patnaik, Sachidananda Mohanthy 8 Vinay B shetty, Gurudatta S Pawar., Inamadar 13 also reveals that, skilled workers topped the list. However, in their studies housewives occupied 3rd position.

In the current study among the 353 cases, people who have graduated till Post High School/ Diploma/ College (Intermediate) are the common victims in poisoning, amounting to 172 cases which indirectly denotes the people who are skilled workers, followed by 118 high school people, who are semi – skilled workers and Non – literate and graduates are very less, together counting 11. These findings of the study go in hand with other studies.

In our study, socio economic status wise distribution revealed poisoning is more common among the people who belong to Upper middle (52%), followed by 33% of cases belong to Middle class. As per the Monthly Income distribution, people who earn between Rs. 16,020 – Rs. 32,049 are most commonly affected with the maximum count of 176, followed by people who earn between Rs12,020 – Rs16,019, which includes 110 poisoning .People earning above Rs. 32,050 and below Rs. 4,810 are least affected. The system used in calculating the socio-economic status was modified Kuppuswamys classification (Table 4). The inference which other studies have obtained is almost the same, as middle class people are the most commonly affected ones and the variation in the upper middle and lower middle may be due to the status of the hospital and the affordability. Similar studies with similar classification of economic strata was done by Shoaib Zaheer.M, Aslam.M, Vibanshu Gupta, Vibhor Sharma and Shadab Ahmad Khan 10 reveals that majority of cases belongs to Class iii and Class iv, followed by class v and vi and least among class i and ii. (57.69%, 32.69% and 9.61%), which is similar to our study (79.44%, 14.78% and 5.74%).

Marital status wise distribution of our study population revealed that poisoning is more among married people when compared to unmarried people. Out of 353 cases, 203 cases were married, which accounts for 58%, 150 cases were unmarried, which accounts for 48% (Table 1). In the study conducted by Mani et al yielded the same type of results that Married males (41.36%) are more affected, followed by married females (22.19%). Unmarried males (20.00%) and unmarried females (16.43%) are the least. Study conducted by Bharath K Guntheti Udaypal Singh 4 also yielded the same kind of results that poisoning was more common in married men (67.92%), followed by unmarried males (17.92%), married females (12.74%) and unmarried females forms only (1.39%) of poisoning cases.

In the current study distribution of the study population based on the type of family revealed that out
of total 353 cases, 299 cases belonged to nuclear family. Persons who belong to joint family were 46 in number and only 8 persons who live in extended families were affected (Table 1). Except four studies, many of the studies did not use this family pattern as a parameter in their study. This is one of the important parameter to consider as in the current developing and busy life many forget the elementary aspects and basic morals of life and the advantages of being in a joint family are missed in the current era. The studies of Unnikrishnan B, Singh B, Rajeev 5, Dr. Gargi J, Dr. Hakumat Rai, Dr. Ashok Chanana, Dr. Gurmanjit Rai et al14 also revealed the same kind of results to help the physician in the treatment aspect and I also like to state the public awareness on producing the proof of poisoning is amazing. As the substances consumed were produced it was easy and confident to proceed with the treatment aspect for the physician and it would have been as an important reason for the overall less mortality rate.

Conclusion

A study of the demographic profile of poisoning cases admitted in the casualty was carried out in the department of Forensic Medicine & Toxicology of Sri Ramachandra Medical College and Research Institute, Porur, Chennai. The following observation was made:

- Poisoning is more common among the adult (20 to 29 years) age group, with a mean of 28 years.
- 70 Children (20%) are also affected, which are mainly accidental in nature.
- Poisoning was more common among females (54.7%) when compared to males (45.3%).
- Profession wise skilled workers are affected the most (167 cases). They form the major part of the middle class. Semi skilled and unemployed are also affected more.
- Education wise people who have graduated from college with a diploma and other post high school courses are affected more as these people usually form the middle class society.
- Married persons (58%) are more affected more when compared to unmarried persons (42%).
- Family pattern wise, people who live in nuclear families are affected more (299 cases) when compared to people who live as joint families (46 cases).

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: The study was approved by the Ethics committee of the institute

References

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Estimation of Age through Elbow Joint in children of Karnataka

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Abstract

70(35 male and 35 females) children aged between 11 to 18 years were studied for ossification of elbow joint radiologically, 4(11.4%) were 11 years 5(14.2%) were 12 years, 7 (20%) were 13 years of age, 5(14.2%) were 14 years, 3(8.57%) were 15 years were 16 years, 3 (8.57%) were 17 years and 4 (11.4%) were 18 years old. The radiological study of elbow joint was Appearance of trochlea was observed only in female at 11 year. Fusion of trochlea was in males at 14 to 15 years of age and in 12 to 14 years in females. Appearance of lateral Epicondyle in male was 11 to 12 years but in females at 11 years only. Fusion of lat epicondyle in males was between 13 to 16 years and in females 13 to 14 years. Fusion of medial epicondyle in males was between 14 to 16 years but in females between 11 to 15 years. Fusion of head of Radius in males between 14 to 16 years of age but in females between 11 to 13 years only. Appearance of olecranon process in males between 11 to 13 years and in females between at 11 years only. Fusion of olecranon process in males was between 17 to 18 years of age in females between 15 to 16 years only.

This study of elbow appearance and joint in which early appearance and ossification of females bones will be helpful to medico-legal expert, orthopedician, radiologist, anthropologist and anatomist. Moreover this study has ethnic and regional importance because morphometric values of mesodermal derivatives are uncertain

Key words: Olecranon process, epicondyle, trochlea, Karnataka

Introduction

There are many criteria for estimation age required for medico-legal export in day today legal practice like eruption of teeth. Closure of cranial sutures, symphysis of menti of mandible, graying of hair in temporal region, despite of the facts that, the birth and death are registered by the government officials globally. Ossification centre are seen earlier in the tropical countries and females, variations in the appearance and union of ossification centers mainly attributed to various factors like climate, hereditary, race nutrition, dietary habits of gender and socio-economic status (2)(3)(4) . Hence attempt was made to study the age in the children of Karnataka as the habit and habitat of Karnataka differs from other states of country and abroad as well.

Material and Method

35 boys and 35 girls aged between 11 to 18 years were visiting to Subbaiah medical college hospital along with patients as attendant or visitors were selected for study. Whoever volunteers came forward. Their elbow joint ossification was studied radiologically A P and lat view of elbow joint was studied.

A P view was taken by placing the upper limb in full extension and supine position to visualize medial, lateral epicondyle and radio- capitular joint. Lateral view was taken by flexing the elbow at 90° degree and forearm in semi-pronated poison to visualize olecranon process and Humero-ulnar joint.

The mal- nutritious, previous fractured of elbow joints and having chronic illness like osteoporosis or Rickets were excluded from the study.

The duration of study was about 2 years.
Observation and Results

Table-1 – Boys and girls were classified 4 (11.4%) were 11 years 5 (14.2%) were 12 years 7 (20%) were 13 years 5 (14.2%) were 14 years, 3 (8.57%) were 15 years, 4 (11.4%) 16 years, 3 (8.57%) were 17 years, 4 (11.4%) were 18 years in both sexes.

Table-2- Radiological study of elbow joint in sex-

1. Appearance of Trochlea - (a) Not observed in males (b) observed in females at 11 years.

2. Fusion of Trochlea – (a) observed in females in 12 to 14 years and at 14 to 15 years in males show process of fusion (b) observed in females at 12 year but process of fusion completes at 14 years only

3. Appearance of Lateral Epicondyle in males it appeared at 11 to 12 and in females at 11 years only

4. Fusion of lateral epicondyle In males between 13 to 16 years but in females 13 to 14 years only

5. Fusion of medial epicondyle fusion occurs at 14 to 16 years but in females 11 to 15 years only

6. Fusion of Head of Radius – In males fusion completed between 14 to 16 years but in females 11 to 13 years only

7. Appearance of olecranon process In males between 11 to 13 but in females at 11 years only

8. Fusion of olecranon process In males fusion occurred between 17 to 18 years of age but in females between 15 to 16 years only.

Table-1: Classifications of Boys and Girls as per their age with percentage No of Patients – 70

| Age (Years) | Boys-35 | | | | | | Girls-35 | | | | | Total-70 | | |
|-------------|---------|--||--||--||--|---------|--||--||--||--||--|
| | No | % | | No | % | | NO | % | |
| 11 year | 4 | 11.4 | | 4 | 11.4 | | 08 | 11.4 | |
| 12 year | 5 | 14.2 | | 5 | 14.2 | | 10 | 14.2 | |
| 13 year | 7 | 20.0 | | 7 | 20.0 | | 14 | 20.0 | |
| 14 year | 5 | 14.2 | | 5 | 14.2 | | 10 | 14.2 | |
| 15 year | 3 | 8.57 | | 3 | 8.75 | | 06 | 8.75 | |
| 16 year | 4 | 11.4 | | 4 | 11.4 | | 08 | 11.4 | |
| 17 year | 3 | 8.57 | | 3 | 8.75 | | 06 | 8.57 | |
| 18 year | 4 | 11.4 | | 4 | 11.4 | | 08 | 11.4 | |

Table-2: Radiological view of elbow joint ossification in both male and female at different age groups.

<table>
<thead>
<tr>
<th>Appearance of Trochlea</th>
<th>Fusion of Trochlea</th>
<th>Appearance of Lateral Epicondyle</th>
<th>Fusion of Lateral Epicondyle</th>
<th>Fusion of medial Epicondyle</th>
<th>Fusion of Head radius</th>
<th>Appearance of olecranon</th>
<th>Fusion of olecranon</th>
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</thead>
<tbody>
<tr>
<td>Male</td>
<td>female</td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>11 year</td>
<td>14 to 15</td>
<td>12 to 14</td>
<td>11 to 12</td>
<td>11 year</td>
<td>13 to 16</td>
<td>13 to 14</td>
<td>14 to 16</td>
</tr>
</tbody>
</table>
Discussion

In the present study of estimation of age from elbow joint in children of Karnataka, 4 (11.4%) boys and 4 (11.4%) girls of 11 years old, 5 (14.2%) boys and 5 (14.2%) girls of 12 years old, 7 (20%) boys and 7 (20%) girls 13 years old, 5 (14.2%) boys and 5 (14.2%) girls of 14 years old. 3 (8.57%) boys 3 (8.57%) girls of 15 years old 4 (11.4%) boys and 4 (11.4%) girls of 16 years old 3 (8.57%) boys and 3 (8.57%) girls belonged of 17 years old (Table-1). In the Radiological study. Appearance of trochlea was at 11 years of females only. Fusion of trochlea was observed 14 to 15 years of male and 11 to 12 years of females. Appearance of lat epicondyle was at 11 to 12 years in males, at 11 years in females, fusion of lat epicondyle was observed at 13 to 16 years in males and 13 to 14 years of age in females, Fusion of medial epicondyle was 14 to 16 years of age in males and 11 to 15 years in females, fusion of head of Radius was 14 to 16 years of age in males, 11 to 13 years in females Appearance of Olecranon process was observed at 11 to 13 years in males and years in females fusion of olecranon process was at 17 to 18 years at males and 15 to 16 years in females (Table-2). These findings were more less in agreement with previous studies (5)(6)(7)

These findings of ossification varies in the study of western population (8)(9). However in both studies of India and abroad females bones have earlier Ossification than males. It could be due to higher secretion of endocrine glands, nutritional status un doubtfully there are racial, geographical and hereditary difference play vital role for earlier ossification in females bones (10). Apart from the secretion of local enzyme called phosphatase is largely influenced by degree of ossification (11). Moreover biochemical phenomenon includes deposition of calcium salts, metabolism of cellular elements also decide the duration of ossification

Summary and Conclusion

The present radiological study to estimate the age by elbow joint in Karnataka children will be useful to medico-legal expert, orthopedician, radiologist, anthropologist and anatomist But this study further demands genetic, embryological, hormonal, nutrition studies because the factors which determine the ossification is still obscure

This research paper was approved by Ethical committee of Subbaiah Medical college Shivamogga- (Karnataka)

Conflict of Interest: No

Funding : No

References

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Identification of Sex of Sacrum in Karnataka Population

Manjunatha A

Abstract

35 male and 35 females adult, non pathological dried sacra were studied. The height and width was measured with vernier caliper. In comparison of height of sacrum, the mean value of male was 106.4 (SD±0.30) and female 90.1 (SD±0.16) ‘t’ test was 395, and P value was highly significant (P<0.01). In the comparative study of width of the sacrum mean value of males was 99.3 (SD±0.44) and female was 112 (SD±0.08) ‘t’ test was 122.65 and P value was highly significant (P<0.01). The sacral Index of male was 93.3 and female was 124.27. This significant value to differentiate the male and female genders will be quite useful to medico-legal expert anthropologist and anatomist because these obtained value represent the regional or ethnic study of sacra. Moreover morphometric values of mesodermal derivatives are un-certain.

Key words: Sacral Index, vernire caliper, gender, Karnataka

Introduction

Sacrum or sacra is constituent of hipbone form sacra-iliac joint. It takes parts in locomotion and child bearing. Sacrum name derived as sacred bone because it is considered as last bone to get decay when buried. Identification of sex, from sacra is on well established factor (1). But the regional or ethnic environmental, socio-economic status, genetic makes up different dietary, habits play vital role in the morphometric values (2). Moreover degrees of locomotion, stress during parturition also have contributory role in the variation of length and breadth of sacra. Apart from this the hormones secreted by anterior pituitary hormone will also decide the morphometric values in both sexes at different ethnicity and regions. Nevertheless Ossification centers of bone may express their morphological individuality may create variations in the morpho-metric values in bones of sexes. Hence attempt was made to study the sacra in both sexes.

Material and Method

35 Male and 35 Female sacrum were selected for study. These sacral bones were collected from Anatomy and Forensic medicine department of Subbaiah medical college Shivamogga-577002 (Karnataka)

Each sacrum was put in a Anatomical position. The length and breadth of sacrum was measured by vernire caliper. The obtained value were studied statistically by SPSS 2007 software. The sacral Index of both male and females were studied and compared.

Pathological and broken sacrum was excluded from the study.

The duration of study was about two years.

Observation and Results

Table-1-Comparison of length of sacrum in male and females mean value of male sacrum was 106.4mm (SD±0.30) and females was 90.19mm (SD±0.16) ‘t’ test was 395. (P<0.01) and P value was highly significant.

Table-2-Comparison of width of sacrum in both male and females. The mean value of male was 99.36mm (SD±0.44) and females was 112.09mm (SD±0.08) ‘t’ test value was 122.65 (P<0.01) P value

Table-3-(a) Sacral index of male was 93.37 (b) Sacral Index of female was 124.27 (SD±0.44)

Discussion

In the present study of identification of sex from sacrum in Karnataka population. In the comparative study of height of sacra. The mean value of male was 106.4 (SD±0.30) and females was 90.1(SD±0.16) ‘t’ test was 395 and P value was highly significant (P<0.01).
sexes. The mean value of male was 99.3 (SD±0.44) and females was 112 (SD±0.08) ‘t’ was 122.65 and P value was highly significant (P<0.01) (Table-2). The sacral Index of male was 93.37 and female was 124.27 (Table-3). This study was more or less in agreement with previous studies(3)(4)(5).

In the present study the sacrum index of male was 93.3 which falls under dolichoieric group (narrow sacrum) and females sacral index was 124.27 falls under platyehric group. The present finding of male sacred index 93.3 (dolichoieric) was more or less in agreement with previous studies of west Bengal(6) and Jammu region(7) sacral Index of female was 124.27 of present study was more less in agreement with previous North Indian studied(8). These similar parameters of present studies with other region indicate that, there is a migration of population and intermixing races in India and abroad. However sexual dimorphism of sacra is highly significant in present study, as it was observed in previous studies in abroad population also(9)(10).

These gender differences of sacra was quite natural because bone is a plastic tissue next to blood whenever exposed to any stress and strain. (11). It is but natural that, the stress and strain differs from male to female. Moreover before quadrupeds adopted the erect posture of bipedalism the vertebral column was like cantilever bridge, which modified into pillar to transmit the body weight of erect posture, hence there is a re-orientation of sacrum occurred(12). Which may lead to obstetrical problem which was un-known to quadrupeds. Hence due to adaptation of erect posture against antigravity stress sacra have adopted as per their functional and bio-mechanical status.

**Summary and Conclusion**

The present study of Identification of sex from sacrum will be useful to medico legal expert anatomist and anthropologist because apart- from sexual dimorphism, it indicates regional and ethnic significance but this study further demands embryological, genetic nutrition and hormonal study because the factors which decide the ossification of sacral vertebrae is still un-clear.

This research paper was approved by Ethical committee of Subbaiah Institute of Medical science Purle, Shivamogga(Karnataka).

**Table-1: Comparison of male and female height of sacrum**

<table>
<thead>
<tr>
<th>Length</th>
<th>Male sacrum (n=35)</th>
<th>Female sacrum (n=35)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>106.41</td>
<td>90.19</td>
</tr>
<tr>
<td>SD</td>
<td>0.30</td>
<td>0.16</td>
</tr>
<tr>
<td>Test Statistic</td>
<td>T=395.07, P&lt;0.01</td>
<td></td>
</tr>
</tbody>
</table>

Statistically length of male sacrum is highly significantly more than female sacrum (P<0.01)

**Table-2: Comparison of male and female width of sacrum**

<table>
<thead>
<tr>
<th>Length</th>
<th>Male sacrum (n=35)</th>
<th>Female sacrum (n=35)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>99.36</td>
<td>112.09</td>
</tr>
<tr>
<td>SD</td>
<td>0.44</td>
<td>0.08</td>
</tr>
<tr>
<td>Test Statistic</td>
<td>T=122.65, P&lt;0.01</td>
<td></td>
</tr>
</tbody>
</table>

Statistically width of male sacrum is highly significantly more than female sacrum (P<0.01)
Table-3

For Male

Sacral Index = (mean value of width of sacrum/mean value of length of sacrum) * 100

= (99.36/106.41) * 100

= 93.37

For Female

Sacral Index = (Mean value of width of sacrum/mean value of length of sacrum) * 100

= (112.09/90.19) * 100

= 124.27

References

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Demographic Profile and Pattern of Presentation of Organophosphorus Poisoning at Tertiary Care Hospital Agra

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¹Assistant Professor, Forensic Medicine & Toxicology Department, MLB Medical College, Jhansi (UP),
²Prof & HOD, Forensic Medicine & Toxicology Department, S. N. Medical college, Agra (UP)

Abstract
India is agriculture dominant country and organophosphorus commonly used by former in agriculture field. Therefore, Organophosphorus poisoning is common India. Study done at emergency department to know the pattern of sign and symptoms presentation at the time of admission. Total number of cases was 160, out of them 102 (64%) were males and only 58 (36%) were females. Male to female ratio was 1.75:1. farmers 61 (38%) were commonly affected, followed by 35 (22%) of patients were housewives and 26 (16%) of patients were students. symptoms presented were vomiting 150 (93.75%) and salivation 150 (93.75%), followed by sweating 147 (91.88%), lacrimation 102 (63.75%) and blurring of vision 80 (50%), breathlessness (40%), faecal incontinence (31.88%), urinary incontinence (18.13%), headache (18.13%) and convulsion (10%). commonest signs were smell of poison 150 (93.75%), followed by tachypnoea 134 (83.75%), altered consciousness 115 (71.88%), miosis 86 (53.75%), fasciculation 70 (43.75%), tachycardia (36.25%), bradycardia (28.13) and pulmonary oedema (06.25%). Increased body secretions were the commonest presentation then other symptoms followed were blurring vision, tachypnoea altered consciousness, and respiratory symptoms. It can be helpful to make diagnosis and take awareness, preventive measures about organophosphorus poisoning.

Key words: Organophosphorus, Lacrimation, Tachycardia, Convulsion, Altered Consciousness, Respiratory symptoms.

Introduction
Organophosphorus compounds poisoning is not only the Indian problem but it’s a global problem seen high number cases reported in other country died due to organophosphorus poisoning. Agricultural pesticide poisoning is a major public health problem in the developing world, killing at least 250,000-370,000 people each year.¹ Hospital-based studies from five major hospitals across the country in 1999-2000 showed OP compounds were the most common form of poisoning comprising 52% of total cases in Nepal.² Organophosphate poisoning is a major public health problem in South Africa. Individuals get exposed to organophosphate in both the domestic and industrial spheres.³ Organophosphorus poisoning is a familiar medical emergency which is associated with high rate of mortality if not diagnosed and treated in time. Acute organophosphate (OP) poisoning can be deadlier than any other type of chemical poisoning.⁴ Organophosphorus compounds are used extensively in India to control insects so as to increase production of agricultural commodities. In addition to the accidental exposure from use of these compounds as agricultural insecticides these agents are frequently used for suicidal and homicidal purposes because of their low cost and easy availability.

Organophosphorus (OP) compounds are used as pesticides, herbicides, and chemical warfare agents in the form of new gases. Some have also been used in the medical treatment of myasthenia gravis’s and glaucoma. ⁵ An estimated 3 million or more people worldwide are exposed to organophosphates each year, accounting for about 300,000 deaths. In the United States, there
are around 8000 exposures per year with very few deaths. While most often the exposure occurs from an agricultural pesticide, there are household items, such as ant and roach spray, that also contain organophosphate compounds. Commonly used organophosphates have included monocrotophos, dimethoate, parathion, malathion, diazinon, etc. Organophosphorus pesticides can be absorbed by all routes, including inhalation, ingestion, and dermal absorption. Their toxicity is not limited to the acute phase, however, and chronic effects have been noted. Organophosphorus insecticides inhibit the enzyme acetyl cholinesterase leading to accumulation of acetylcholine, which binds to muscarinic and nicotinic receptors throughout nervous system. Signs and symptoms of poisoning are due to persistent acetylcholine hyperstimulation at muscarinic and nicotinic receptors sites. Signs of organophosphate poisoning include salivation, lacrimation, urinary incontinence, defecation, GI-upset / diarrhoea, emesis and miosis.

Material and Method

The study was conducted at S.N. Medical College & Hospital, Agra from February 2011 to July 2012. There were 240 patients of OP Compound poisoning admitting to the Department of Medicine during the study period. After applying inclusion and exclusion criteria, 160 patients were chosen as study subjects. It was Hospital based prospective study. All organophosphorus poisoning patient coming to SN Medical College Agra were considered as working unit and information collected from their Close relatives of victim, victim himself and police records. Following Inclusion criteria were taken in consideration were

1. A known case of organophosphorus poisoning
2. Patient with clinical signs and symptoms suggestive of organophosphorus poisoning
3. Patient showing evidence of organophosphorus poisoning after being investigated

And following Exclusion Criteria: were taken in consideration

1. Patient brought dead in emergency department of S.N.M.C. Agra
2. Cases in which causes of poisoning is not known
3. Patient on Ventilator.
4. Patient with double insecticidal/ multiple poisoning with other drug such as opioids, diazepam, barbiturates etc.
5. Patients who received partial treatment outside and referred later to our hospital were excluded.
6. Patients who absconded or referred to higher centre.

Data collected by Thorough history and clinical examination was carried out with reference to vital parameters, pupil size, assessment of central nervous system, respiratory system, cardiovascular system as per prescribed proforma. This examination took place during initial resuscitation and treatment of the patient. Data processing and analysis: Required information is collected on open ended semi-structural scheduled and compiled analysis with the help of MS Excel software.

Observation and Discussion

Study done at Sarojini Naidu medical college and tertiary hospital Agra, in our study majority 62 (38.75%) of patients was in the age group of 21-30 years, followed 39 (24.37%) by the age group of 31-40 years. In the present study, youngest patient was 10 years old and oldest patient is 64 years old. (Table No.02) commonly affected age group was middle age 21-50 years of age affected other study done by other researcher they also reported middle age group was commonly affected age group. study done in Tshwane district south Africa researcher reported same age group profile as our study maximum number of cases 21-30 years age group 23.7% cases and 31-40 year age group 16.9 %, significant almost equal number cases as age group 21-30 years which was 23.2 % . in our study only 02 case reported in this age group. (3) study done at Turkeyo The most affected age group was 15-24 years (40.5%), in both sexes. (7) organophosphorus and carbamates poisoning patient admitted to a North Jordan Teaching Hospital over a five-year period were reviewed and found that The most cases occurred in the 15-19 year-old age group which is not correctly associated with our study our study reported maximum patient seen in age group 21-30 years(8) max number
case seen in age group 16-30 years were 66.15% south India. (9)

Sex wise distribution we observe that exposure of organophosphorus poisoning male predominant male affected 102 (64%) and female patient contributed 58 (36%). (Table no.03) Sex wise distribution compare with other studies and seen that almost all the study reported male predominantly affected than the female. There were 131 (59.5%) female and 89 (40.5%) male patients (7) out of the 25 patients, 14 (56%) were male and 11 (44%) were female with a mean age of 34.8 + 17.66 years (Range: 14-77 years). (10) The proportion of OPPs was 15.1% among 564 poisonings. Other study male female ratio seen that the female to male ratio was 1.1:1 .Our study differ study done at Emergency Department of Yu¨ zu¨ ncu¨ Yil University Medical Faculty Hospital in Turkey there was Fifty-seven (67.1%) patients were female, 28 (32.9%) were male. (11)

In our study 61 (38.13%) of patients were farmer, followed by 35 (21.88%) of patients were housewives and 26 (16.25%) of patients were students, labour contributed 19 (11.88%), private employee 13 (08.13%), unemployed/others (03.37%). (Table No.04) study done by other author in India distribution of patients did in respect to occupation maximum number seen in agriculture occupation 48% and housewife also contributed same numbers 48%, student contributed only 04%. In our study student contribution was 16.25%. (10) study done at Manipal majority of patients admitted, due to OP poisoning were agriculturists. Out of 100 patients, 51 patients were (45.1%) agriculture workers. (12) A study into OP poisoning were agriculturists. study conducted in Sri Lanka in 2006 by Hoek and Flemming showed that majority of acute poisoning occurs in Agriculture worker. (13)

In our study symptoms presented were vomiting 150 (93.75%) , salivation 150 (93.75%), followed by sweating 147 (91.88%), lacrimation 102 (63.75%) and blurring of vision 80 (50%), breathlessness (40%), faecal incontinence (31.88%), urinary incontinence (18.13%), headache (18.13%) and convulsion (10%). (Table 05)

Study done in Manipal they found symptoms Sweating 69% cases, fasciculations 69% cases, miosis in 78% cases, Respiratory system findings 22%, Tachycardia 34% cases, Loss of consciousness 28% cases, Hypertension 12% cases, Seizure 01% cases, Hypotension 02% cases. (14) comparative pattern of clinical presentation given in (Table No. 01) with other researcher.

In our study commonest signs were smell of poison 150 (93.75%), followed by tachypnoea 134 (83.75%), altered consciousness 115 (71.88%), miosis 86 (53.75%), fasciculation 70 (43.75%), tachycardia (36.25%), bradycardia (28.13) and pulmonary oedema (06.25%). (Table No 06) increased body secretions were the commonest presentation then other symptoms followed were blurring vision, tachypnoea altered consciousness, and respiratory symptoms. Miosis was the most frequent symptom and was seen in 80.66% of the patients. (16)

Table 01: Pattern of presentation compression with other study

<table>
<thead>
<tr>
<th>SN</th>
<th>Symptoms /sign</th>
<th>Present study %</th>
<th>Girish Thunga et al %14</th>
<th>Yusuf Yurumez et al%7</th>
<th>Anurag srivastava et al %15</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Miosis</td>
<td>78.00</td>
<td>78.00</td>
<td>74.50</td>
<td>75.60</td>
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<tr>
<td>2.</td>
<td>Vomiting</td>
<td>93.75</td>
<td>-</td>
<td>32.7</td>
<td>-</td>
</tr>
<tr>
<td>3.</td>
<td>Increased secretions 91.88</td>
<td>69.00</td>
<td>28.6</td>
<td>71.40</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Fasciculations</td>
<td>43.75</td>
<td>69.00</td>
<td>8.20</td>
<td>14.60</td>
</tr>
<tr>
<td>5.</td>
<td>Loss of consciousness</td>
<td>71.88</td>
<td>28.00</td>
<td>30.4</td>
<td>-</td>
</tr>
<tr>
<td>6.</td>
<td>Respiratory symptoms</td>
<td>40.00</td>
<td>22.00</td>
<td>54.6</td>
<td>78.10</td>
</tr>
<tr>
<td>7.</td>
<td>Tachycardia</td>
<td>83.75</td>
<td>34.00</td>
<td>35.4</td>
<td>-</td>
</tr>
<tr>
<td>8.</td>
<td>Convulsion</td>
<td>10.00</td>
<td>01.00</td>
<td>1.80</td>
<td>00.00</td>
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</table>
Table No. 02: Distribution of Study Subjects According to their Age.

<table>
<thead>
<tr>
<th>Age Group (in Years)</th>
<th>No. of Cases</th>
<th>Percentage (%)</th>
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<tbody>
<tr>
<td>&lt;11</td>
<td>02</td>
<td>01.25</td>
</tr>
<tr>
<td>11 – 20</td>
<td>20</td>
<td>12.50</td>
</tr>
<tr>
<td>21 – 30</td>
<td>62</td>
<td>38.75</td>
</tr>
<tr>
<td>31 – 40</td>
<td>39</td>
<td>24.37</td>
</tr>
<tr>
<td>41 – 50</td>
<td>31</td>
<td>19.38</td>
</tr>
<tr>
<td>51 – 60</td>
<td>03</td>
<td>01.86</td>
</tr>
<tr>
<td>&gt; 60</td>
<td>03</td>
<td>01.86</td>
</tr>
<tr>
<td>Total</td>
<td>160</td>
<td>100.0</td>
</tr>
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</table>

Table No. 03: Distribution of Study Subjects According to their Sex.

<table>
<thead>
<tr>
<th>Sex</th>
<th>No. of Cases</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>102</td>
<td>64</td>
</tr>
<tr>
<td>Female</td>
<td>58</td>
<td>36</td>
</tr>
<tr>
<td>Total</td>
<td>160</td>
<td>100</td>
</tr>
</tbody>
</table>

Table No. 04: Distribution of Study Subjects According to their Occupation

<table>
<thead>
<tr>
<th>Occupation</th>
<th>No. of Cases</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture (Farmer)</td>
<td>61</td>
<td>38.13</td>
</tr>
<tr>
<td>Housewife</td>
<td>35</td>
<td>21.88</td>
</tr>
<tr>
<td>Students</td>
<td>26</td>
<td>16.25</td>
</tr>
<tr>
<td>Labour</td>
<td>19</td>
<td>11.88</td>
</tr>
<tr>
<td>Private employee</td>
<td>13</td>
<td>8.13</td>
</tr>
<tr>
<td>Unemployed / Others</td>
<td>06</td>
<td>3.75</td>
</tr>
<tr>
<td>Total</td>
<td>160</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table No. 05: Distribution of Study Subjects According to their Presenting Symptoms.

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>No. of Cases</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vomiting</td>
<td>150</td>
<td>93.75</td>
</tr>
<tr>
<td>Salivation</td>
<td>150</td>
<td>93.75</td>
</tr>
<tr>
<td>Sweating</td>
<td>147</td>
<td>91.88</td>
</tr>
<tr>
<td>Lacrimation</td>
<td>102</td>
<td>63.75</td>
</tr>
<tr>
<td>Clinical Signs</td>
<td>No. of Cases</td>
<td>Percentage (%)</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>--------------</td>
<td>----------------</td>
</tr>
<tr>
<td>Blurring of vision</td>
<td>80</td>
<td>50.00</td>
</tr>
<tr>
<td>Breathlessness</td>
<td>64</td>
<td>40.00</td>
</tr>
<tr>
<td>Faecal incontinence</td>
<td>51</td>
<td>31.88</td>
</tr>
<tr>
<td>Urinary Incontinence</td>
<td>29</td>
<td>18.13</td>
</tr>
<tr>
<td>Headache</td>
<td>29</td>
<td>18.13</td>
</tr>
<tr>
<td>Convulsions</td>
<td>16</td>
<td>10.00</td>
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</tbody>
</table>

Table No. 06: Distribution of Study Subjects According to their Clinical Signs.

### Conclusion

Demographic profile and pattern of sign and symptoms presentation of organophosphorus poisoning can be helpful to make the diagnosis of the poisoning. Demographic profile of the poisoned person can be used to take preventive measure as organophosphorus poisoning is a common poisoning in our country because in India most of the people's livelihood base on agriculture. This information may be useful in future for preventing the incidence of poisoning by educating the target population and restricting the availability of the organophosphorus.

**Acknowledgement:** Thankful to all S N Medical college Agra emergency department employee who help to complete this research project.

**Ethical Clearance:** Taken from the institutional ethical committee (SN Medical College Agra)

**Funding Agency:** Self-funded.

**Conflict of Interest:** Nil

### References


Green Pitch- Be the Part of Solution

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Abstract:
Pursuing “Green” has become the new drive for organisations on the quest towards growth, competitiveness and global excellence. Environmental issues have gained importance in business as well as in public life throughout the world. Green dentistry is a part of strategy to promote our practice by employing environmental credibility. In growing concern of global warming, switching our practice over to green is the need of hour as it involves abundant utilization of natural energy and also produces large amount of biomedical waste at the same time, creating a huge environmental impact. We cannot deny the fact intelligence is the ability to adapt to change. This article speaks about the various concepts of how to go for eco-friendly dental practice.

Key-words: sustainability, Renewable energy, Biomedical waste.

Introduction
Modern health care facilities are highly resource intensive. Unsustainable and inefficient buildings, unsafe disposal of hospital waste and untreated sewage, heavy reliance on processed foods and a fleet of fuel guzzling vehicles are just a few factors that increase the health sector’s carbon footprint, thus making the environment sick. According to the annual report of Central Pollution Control Board (CPCB) in 2016 the quantity of Bio Medical waste generated is approximately 517 tonnes per day and it increased to 550 TPD in 2018 and is proposed to increase to 775 TPD in 2022.1 Dentistry as profession has got a major role toward the health care waste. On exploring the possibilities to counter these issues, we arrived at the idea of “Green hospitals”. Indian Green Building Council approved by US Green Building Council defined Green Hospital as “The hospital which enhances patient wellbeing, aids the curative process, while utilizing natural resources in an efficient, environment-friendly manner”.2 The concept of green hospital comprises of factors such as building design that focuses on providing the proper lighting, improvising the indoor air quality, minimising the unfriendly waste generated either by reducing or recycling, reducing the pollution and conserving the natural energy resources.3 Research team from IGBC propose that by implementing these green strategies in dental clinics/ Hospitals buildings can have positive impact on patients and staff by eliminating the “Sick Building Syndrome” and also provide economic co benefits by reducing the finance required to maintain the practise over a period of time.

Importance of Green Dentistry:
Eco-friendly dentistry is relatively a new concept in dental practice, where as in hospitals it has started its way in 2010. India’s first green hospital was built in Ahmadabad in 2010 and in a more appreciable way, by 2018 with the help of Health and Environment Leadership Programme around 5600 Hospitals and health systems in and around country showed their interest in fulfilling the Global Green Health Hospital agenda.4 Green Dentistry is a part of a bigger picture of the ecologically-sustainable healthcare system. It provides

- Positive impact on the environment & promote environmental awareness & sustainability to the patients.
- It helps prevent the world’s biggest problem – “GLOBAL WARMING”.
- It forms the vital step in maintaining a balanced

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What is Green Dentistry??

Green Dentistry includes the following categories of green practice, providing a comprehensive, eco-friendly model for the dental office. Green dentistry can be simply concised to 4 Rs.

- Rethink
- Reduce and replace.
- Recycle
- Reuse.

Let us discuss how we can approach these 4 Rs in our dental practice

Architectural design of Dental clinic

The architectural planning and designing of the dental clinic takes care of the major deal in switching to ecological side. The prime concern factors in designing are lighting, indoor air quality, construction and maintenance of the building with ecologically accepted material. The construction involves efficient floor plated design, glazing facades to improvise lighting, permanent entry way system with HEC, indoor environmental air quality improvised by zero Volatile organic compound materials and some indoor plants which absorbs the VOC material from air.

Energy management

Good energy management structure not only helps us in bringing the energy efficient culture but also reduces the cost of energy expenses. Major electricity consumers in hospitals are air conditions, waterpumps, aircompressors, lighting and autoclave. The eco model of hospital should maximize the day lighting and optimize the artificial lighting. According to ASHRAE 90.1-2007 ideal lighting power density in a patient waiting room and treatment room should be 0.4- 2.2 respectively. IGBC suggested few design aspects to increase light efficacy such as using Low energy LED lights rather than halogen bulbs, use of task lights in the consultation room and occupancy sensor in passageways and maximizing the day.

Solar-powered medical autoclaves can be an appropriate alternate for off-grid sterilization of medical and dental instruments. Using nanofluid Ni- Gly-water as a base in the solar autoclave setup, ideal autoclaving temperature and pressure can be attained rapidly attributing to its thermophysical properties.

Water management:

Dental clinics utilise water for both core and noncore functions. Speaking on water resource management we need to focus on two factors,

- minimizing the water consumption and
- Dental clinic waste water management.

Dental vacuum systems can use as much as 360 gallons of water per day. Conventional wet suction in dental practice utilizes fresh clean ½ gallons of water per minute per horse power also the oil in suction contaminates the immediate environment. Dry vacuum system eliminates the need of use water for suction purpose and the carbon fibervanes replaces the use of oil thereby making it more environmentally sustainable. It is a known fact that medical grade autoclaves are water consumptive. We can overcome this by installing ejectors in autoclave. It creates vacuum inside the pressure vessel allowing thorough penetration of vapour during the sterilization cycle and speed up steam evacuation system. Scaling and cavity preparations by conventional scalers and aerotors take up 20- 40 ml of water per minute. Embracing the use of ER: YAG LASER for scaling, cavity preparation and crown cutting produces desirable clinical effect with water conservation. The other ways of reducing the water waste is to install a low flow faucets, dual flush system and recycled water which can be used for potable purposes.

Water Waste management

Dental clinic waterlines constitutes hazardous waste such as mercury, lead and silver containing particles and non-hazardous waste such as hand wash, sterilents etc. They enter the sewer system through the chairside and the suction trap. Mercury from dental offices contributes significantly to the overall mercury contamination in wastewater. Amalgam separators are devices designed to remove amalgam particles from dental office wastewater through sedimentation, filtration, centrifugation, chemical removal by ion exchange or a combination of these mechanisms. According to the effluent guidelines of waste management amalgam separator should be installed in all the dental office
by December 2019. The collected amalgam from the separator can be collected and recycled.\textsuperscript{15}

The unused chemical wastes differ in their degree of risk. P-listed chemicals are acutely toxic cause irreversible damage and death at low dose whereas U-listed chemicals are relatively less toxic, but are still considered hazardous. Though we don’t use P-listed chemicals in dental practise, mercury comes under U category. Tree oil or thyme can be can viable alternative to the surface disinfectant.

**Radiographic waste**

Radiation exposure associated with dentistry represents a minor contribution to the total exposure from all sources, including natural and man-made. Threat not only involves the radiation exposure but also the materials and the components used for the conventional radiographs such as lead, silver and silver thiosulfate complex in the developer solution. These materials pose various environmental and human health damages. It can be best managed by electrolyte recovery and metallic replacement treatment and more wisely it could be dealt by switching over to digital radiography.\textsuperscript{16}

**Recycling biomedical waste:**

Biomedical waste is a lethal highly polluting and cannot be disposed through land filling and incineration. Though proper waste management reduces pollution to a larger extent, it still have a major impact on the environment through eutrophication and dioxin gas.\textsuperscript{17} Atmospheric concentration of carbon dioxide, sulphur dioxide and nitrous oxide is increased by incineration which in turn causes global warming. Methane is mostly released from landfills and can absorb 23 times as much infrared radiation as carbon dioxide, warming the earth’s surface.

More that reducing waste, sustainable development requires recycling it or, even better, assessing it as an energy resource Bio waste when anaerobically digested with the poultry yields high quality biogas. Biological fuel cells have increased its importance in recent years due to its implacability in implantable medical devices. The glucose components in the blood and saliva will be oxidised quickly and henceforth been considered as primary energy source of electrical energy among the dental waste.\textsuperscript{18}

**Going Green with the treatment**

Dental diseases are among the major public health problems in the global level affecting man kind. The need for alternative prevention and treatment options and products for oral diseases that are safe, effective and economical comes from the rise in disease incidence, increased resistance of pathogenic bacteria to currently used antibiotics and chemotherapeutics, opportunistic infections in immune compromised individuals and financial considerations in developing countries. The herbal medicine has an edge over conventional antibiotic treatment with high benefit to low-risk ratio.

Aloe Vera, Bloodroot, Caraway, Chamomile, Clove, Cranberry, Evening Primrose, Garlic, Zingiber officinalis, Syzygium aromaticum gel, Eucalyptus globules, ethyl acetate extracts of Piper betle plants, Mimusops elengi L. and Punica granarum L. seed Green Tea, Haritaki, Liquorice, Myrrh, Neem, Peppermint, Propolis, Purple Coneflower, Rosemary, Sage, Thyme, Turmeric, Tulsi, Triphala, represent summary of herbs used in treatment of oral diseases.

**Challenges in implementation of Green Dentistry!**

The most painful barrier in the implementing the concept is unawareness among our professionals about the over exploitation of the resources. The important prerequisite is the green building design which demands financial affair. Lack of incentives from the government demotivates the dentist to adapt to the change. Cost of initial equipment installation will be high. But green dentistry cannot be an option anymore. Challenges have always been faced with every technology revolution. Green marketing is gaining importance in India for various issues concerning sustainable development. Some of the concepts of green dentistry have been made mandatory by ‘Clinical Establishment Act 2018’. This presents us with window of opportunity to make our practise more reliable and efficient with environmental credibility.

**Conclusion**

After years of warnings from scientists, environmental groups and the ecologically conscious people, the ramifications of not caring for the health of the planet finally seem to have crept into our awareness. With increasing eco consciousness we are now driven to the trend of ‘green’. In order to be environmentally-friendly, health sector can deploy some basic measures.
like: improvement of hospital design, introduction of sustainable waste-reduction and management strategies, sustainable use of natural resources such as water and energy, and utilization and purchase of such products and chemicals, which have a minimal impact on the environment.

Ethical Clearance: NIL

Not required as it is a review article.

References


3. Vardeep Singh Dhillon and Dilpreet Kaur Green Hospital and Climate Change: Their Interrelationship and the Way Forward J Clin Diagn Res. 2015 Dec; 9(12): LE01–LE05


A Four Years’ Retrospective Study of Poisoning Cases in Southern India

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Abstract

Objective: To study the pattern of poisoning in Visakhapatnam and its demographic correlates.

Materials & method: The study was retrospectively conducted in all poisoning cases admitted in Casualty department of Anil Neerukonda Hospital, Visakhapatnam and carried out during the period of 1st Jan 2014 to 31st Dec 2017.

Results: Majority (47.37%) of the subjects were between the ages of 20-29 years with slight preponderance towards female (52.63%) as compared to male (47.37%). Most of the cases belonged to lower socioeconomic status (94.74%). Place of occurrence was most commonly within the house (85.97%) & it was predominantly observed during winter season. Aluminum phosphide (21.05%) was the most commonly abused substance followed by Organophosphate compounds (14.04%).

Conclusion: The government should take legislative steps to curb down the menace of poison in the hands of the vulnerable people in the society primarily focusing on developing the poisons with less toxicity or non-toxic to humans.

Keywords: Poisoning, demographic profile, pattern, Aluminum phosphide, Organophosphate compound.

Introduction

According to WHO, poisoning occurs when people drink, eat, breathe, inject, or touch enough of a hazardous substance (poison) to cause illness or death. 1

As per the records of National Poisons Information Center, New Delhi the highest incidence of poisoning was due to household agents (44.1%) followed by drugs (18.8%), agricultural pesticides (12.8%), industrial chemicals (8.9%), animal bites & stings (4.7%), plants (1.7%), unknown (2.9%) & miscellaneous groups (5.6%). The commonest case of poisoning in developing countries is pesticides which include organophosphates, carbamates, chlorinated hydrocarbons, Pyrethroids & aluminum or Zinc phosphide.2

Even National Poison Data System showed that in 2017, 2,607,413 closed encounters were logged by NDPS: 2,115,186 human exposures, 51,164 animal exposures, 435,540 information contacts, 5,424 human confirmed non-exposures, and 99 animal confirmed non-exposures. Analgesics were the most frequently involved substance with more serious outcome. NPDS documented 3,208 human exposures resulting in death.3

Pesticide poisoning is a common cause of suicidal & rarely accidental death in India. The distribution pattern of death due to poisoning in a region depends on its easy accessibility, low cost, effectiveness, socio-economic condition, education, health care facilities, transportation facilities, social stigma etc.

Hence, a detailed study of poisoning in a particular area can help in inoculating primordial & primary preventive measures, early diagnosis, prompt evaluation & treatment of the patient.

Objectives

To study the pattern of poisoning in Visakhapatnam
and its demographic correlates.

**Material & Method**

A retrospective study of all poisoning cases admitted in casualty department of Anil Neerukonda Hospital, Visakhapatnam was carried out during the time period of 1st Jan 2014 to 31st Dec 2017. All the information for the present study was collected from the medical record section of the hospital after obtaining the due permission. A pre-designed pro forma was used to collect the detailed information and categorically tabled followed by statistical analysis using SPSS20.0. Patients discharged against medical advice were not included in our present study.

**Results**

In the present study, 73 poisoning cases between the time periods of 2014-2017 were reported in the hospital. Among those 73 cases only 57 cases were taken into account. The rampantly rising trend of poisoning cases is observed in our study. All the poisons were consumed orally except for 1 snake bite case.

The female proportions were 52.63% followed by 47.37% of male cases. Majority of cases reported were in the age group of 20-29years (47.37%) followed by (17.54%) 10-19years & 30-39years age group. The mean age of entire 57 cases were 26.53±10.75 and the median age is 23years, which indicates the preponderance of suicides in females & young adults as described in Table 1. Statistically, $x^2$ value= 6.876, p= 0.14250. Hence, no significant difference is observed in the age group & sex.

The marital status was not stated in 63.16% while 26.31% were married & 10.53% were single. Similarly, occupation was also not stated in 92.98% while 5.26% were housewife & 1.75% was student. As the data is inconclusive, it cannot be used for study.

94.74% belonged to the low socioeconomic strata while 5.26% were from middle socioeconomic strata (Table 2). On computing, it was observed that $x^2$ value= 45.62, d.f. =1 & p<0.0001. Statistically, the data is significant. Maximum number of patients 31.58% was admitted only for 1 day followed by 21.05% for three days. With the increasing number of days, the patient number decreased as they were discharged after full recovery or loss on follow up or referred to higher center for further evaluation & management or expired. On evaluation it was observed that $x^2$ value= 6.05, d.f. =4, p=0.1954. Therefore, it is not significant.

In this study, only one (1.75%) patient had history of suicidal tendency in the past & only 2 (3.50%) patients were alcoholic. 55(96.49%) of them had committed suicide in their own/rented house, 01(1.75%) of them in college hostel & 01(1.75%) of them in field.

Failure on personal level like marital discord, familial dispute, unemployment, quarrel etc was the most common reason for suicide with 84.21%, followed by 3.5% of accidental, depression & financial reasons (Table 3). The observed proportions are significant as $x^2$ value=227, d.f. =$6$ & p<0.0001 (p<0.001). The mean time of poisoning was 1:25pm & the median time of poisoning was 2pm. The highest number of cases was reported in the last quarter of the year with 35.09% followed by the second quarter of the year i.e. April – June with 29.83% (Table 4). Statistically, $x^2$ value= 5.94, d.f.= 3 & p=0.05.

Almost 86% of cases consumed poison which was available in house followed by 12.28% who bought the poison from shop. The median of time lapse between places of occurrence to hospital was 2hrs & the mean lapse time was 3.37hrs.No. of patients survived after admission into hospital was 52 i.e. 91.24% of the total no. of case while 5 of them expired i.e. 8.77%

Aluminum phosphide (21.05%) accounts for maximum number of poisoning cases followed by organophosphorus poisoning (14.04%) in our study (Table 5). The findings are statistically significant as $x^2$ =58.79; d.f. =15; p<0.001.

Most of the patients came with complaints of vomiting, nausea, drowsiness, respiratory distress, dysphagia, altered sensorium etc. While only 8.77% of patients were asymptomatic on examination (Table 6). Statistically, it is significant as $x^2$ value= 57; d.f. =19; p<0.0.

Gastric lavage was done in 53 cases (92.98%) & not conducted in 4 cases (7.02%). 96.49% of the cases were suicidal while only 3.51% were accidental in manner of poisoning.
Table 1: Distribution of poisoning cases (MLC) according to age & sex (n=57)

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-9</td>
<td>01 (1.75%)</td>
<td>01 (1.75%)</td>
<td>02 (3.5%)</td>
</tr>
<tr>
<td>10-19</td>
<td>03 (5.26%)</td>
<td>07 (12.28%)</td>
<td>10 (17.54%)</td>
</tr>
<tr>
<td>20-29</td>
<td>10 (17.54%)</td>
<td>17 (29.82%)</td>
<td>27 (47.37%)</td>
</tr>
<tr>
<td>30-39</td>
<td>07 (12.28%)</td>
<td>03 (5.26%)</td>
<td>10 (17.54%)</td>
</tr>
<tr>
<td>40-49</td>
<td>04 (7.02%)</td>
<td>02 (3.51%)</td>
<td>06 (10.53%)</td>
</tr>
<tr>
<td>50-59</td>
<td>02 (3.51%)</td>
<td>00</td>
<td>02 (3.51%)</td>
</tr>
<tr>
<td>Total</td>
<td>27 (47.37%)</td>
<td>30 (52.63%)</td>
<td>57 (100%)</td>
</tr>
</tbody>
</table>

Table 2: Distribution of subjects according to economic status (n=57)

<table>
<thead>
<tr>
<th>Economic status</th>
<th>No. of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>54</td>
<td>94.74</td>
</tr>
<tr>
<td>Middle</td>
<td>03</td>
<td>5.26</td>
</tr>
<tr>
<td>High</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>Total</td>
<td>57</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 3: Distribution of subjects according to reasons for poisoning (n=57)

<table>
<thead>
<tr>
<th>Reasons</th>
<th>No. of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal failure (marital discord, familial dispute,</td>
<td>46</td>
<td>84.21</td>
</tr>
<tr>
<td>unemployment, quarrel etc.)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exams</td>
<td>01</td>
<td>1.75</td>
</tr>
<tr>
<td>Accidental/Snake bite</td>
<td>02</td>
<td>3.50</td>
</tr>
<tr>
<td>HIV/TB</td>
<td>01</td>
<td>1.75</td>
</tr>
<tr>
<td>Depression</td>
<td>02</td>
<td>3.50</td>
</tr>
<tr>
<td>Physically handicapped</td>
<td>01</td>
<td>1.75</td>
</tr>
<tr>
<td>Financial</td>
<td>02</td>
<td>3.50</td>
</tr>
<tr>
<td>Total</td>
<td>57</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 4: Season of poisoning

<table>
<thead>
<tr>
<th>Month of poisoning</th>
<th>No. of patients</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>January – March</td>
<td>8</td>
<td>14.03</td>
</tr>
<tr>
<td>April – June</td>
<td>17</td>
<td>29.83</td>
</tr>
<tr>
<td>July – September</td>
<td>12</td>
<td>21.05</td>
</tr>
<tr>
<td>October – December</td>
<td>20</td>
<td>35.09</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>57</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Table 5: Distribution of cases according to type of poison

<table>
<thead>
<tr>
<th>Type of poison</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corrosive</td>
<td>12</td>
<td>10.53</td>
</tr>
<tr>
<td>Atenolol</td>
<td>01</td>
<td>1.75</td>
</tr>
<tr>
<td>Liquid mosquito repellant (All out), transfluthrin</td>
<td>01</td>
<td>1.75</td>
</tr>
<tr>
<td>Alprazolam over dose</td>
<td>01</td>
<td>1.75</td>
</tr>
<tr>
<td>Carbamate</td>
<td>03</td>
<td>5.26</td>
</tr>
<tr>
<td>Pyrethroids</td>
<td>03</td>
<td>5.26</td>
</tr>
<tr>
<td>Organophosphorus compound</td>
<td>08</td>
<td>14.04</td>
</tr>
<tr>
<td>Drug overdose</td>
<td>01</td>
<td>1.75</td>
</tr>
<tr>
<td>Carbamate</td>
<td>03</td>
<td>5.26</td>
</tr>
<tr>
<td>Clonazepam overdose</td>
<td>01</td>
<td>1.75</td>
</tr>
<tr>
<td>Kerosene</td>
<td>02</td>
<td>3.50</td>
</tr>
<tr>
<td>Methanol poison</td>
<td>02</td>
<td>3.50</td>
</tr>
<tr>
<td>Pyrethroids</td>
<td>04</td>
<td>7.02</td>
</tr>
<tr>
<td>Alphos</td>
<td>12</td>
<td>21.05</td>
</tr>
<tr>
<td>Snake bite</td>
<td>01</td>
<td>1.75</td>
</tr>
<tr>
<td>Unknown poison</td>
<td>02</td>
<td>3.50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>57</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>
Table 6: Distribution of cases according to signs & symptoms

<table>
<thead>
<tr>
<th>Signs &amp; symptoms</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drowsy</td>
<td>05</td>
<td>8.77</td>
</tr>
<tr>
<td>Vomiting only</td>
<td>17</td>
<td>29.82</td>
</tr>
<tr>
<td>Nausea &amp; vomiting</td>
<td>08</td>
<td>14.03</td>
</tr>
<tr>
<td>Respiratory distress</td>
<td>03</td>
<td>5.26</td>
</tr>
<tr>
<td>No signs &amp; symptoms</td>
<td>05</td>
<td>8.77</td>
</tr>
<tr>
<td>Unable to open mouth</td>
<td>02</td>
<td>3.50</td>
</tr>
<tr>
<td>Dysphagia</td>
<td>02</td>
<td>3.50</td>
</tr>
<tr>
<td>Swelling pain of right foot</td>
<td>01</td>
<td>1.75</td>
</tr>
<tr>
<td>Epigastric &amp; throat pain</td>
<td>01</td>
<td>1.75</td>
</tr>
<tr>
<td>Drowsiness &amp; constricted pupil</td>
<td>01</td>
<td>1.75</td>
</tr>
<tr>
<td>Drowsy</td>
<td>01</td>
<td>1.75</td>
</tr>
<tr>
<td>Pinpoint pupils &amp; lacrimation</td>
<td>01</td>
<td>1.75</td>
</tr>
<tr>
<td>Irritable without lacrimation</td>
<td>01</td>
<td>1.75</td>
</tr>
<tr>
<td>Pupils dilated</td>
<td>01</td>
<td>1.75</td>
</tr>
<tr>
<td>Loose motion &gt;3 episodes</td>
<td>01</td>
<td>1.75</td>
</tr>
<tr>
<td>Dilated &amp; non-reacting pupil</td>
<td>01</td>
<td>1.75</td>
</tr>
<tr>
<td>Irritable</td>
<td>01</td>
<td>1.75</td>
</tr>
<tr>
<td>Drowsy, headache &amp; burns in throat</td>
<td>01</td>
<td>1.75</td>
</tr>
<tr>
<td>Not stated</td>
<td>03</td>
<td>5.26</td>
</tr>
<tr>
<td>Altered sensorium</td>
<td>01</td>
<td>1.75</td>
</tr>
<tr>
<td>Total</td>
<td>57</td>
<td>100</td>
</tr>
</tbody>
</table>

**Discussion**

In the present study, we aim to assess the pattern of poisoning & outcome. It was observed that there has been an increasing trend in poisoning among low socio-economic community with greater preponderance of female at 20-29 years among others. The approximate findings were also observed by other workers.

In majority of the cases, place of observance was the patient’s residence which is in concurrence with other studies. The most common reason for suicide was failure at personal level in our study which is concurred by other study. Similar seasonal variations was also observed in other study. In contradiction to our observation summer season recorded the maximum incidences in few studies.
Suicide was the most common intention for consumption of poison & it was also observed by many other workers in India, Nepal & Bangladesh. While a study done by Liu Q, et al suggest that accidental poisoning (64.7%) is the most frequent manner of death in China. Aluminum phosphide is the most commonly used poison followed by organophosphorus poisoning in Visakhapatnam (our study). The similar kind of findings was also observed by other workers in the same field in Haryana & Amritsar. In contrast to our study organophosphorus compound & insecticides was observed as the highly abused poison in different studies done in Nepal & India. While organochlorine compounds was found to be increasing abused in Bangladesh.

**Conclusion**

Poisoning with an intention to cause self-harm has been an increasing trend in the recent past. Suicidal tendencies among young adults belonging to low socio-economic background are alarming. The millennial these days are living in a digital world with tremendous exposure & influences from internet isolating them from other social being. Disappointment, failure, bankruptcy, sickness, fear etc. can frustrate an individual very easily & with the cheap & easy availability of poisons like Aluminum phosphide, organophosphorus compound, Zinc sulphide etc. it paves their way to suicide as an easy means to end all the problems.

Hence, with an attempt to reflect the psychology of a person who commits suicide we have come to an understanding that mental wellbeing of an individual should be acknowledged & primordial prevention at grass root levels should be prioritized. Health services department, employment agencies, education institute, etc. can play a pivotal role in shaping the young minds. The government should also strengthen the legislature by introducing awareness programme, educating people about poison & its harmful effects, introduction of poison information center in every state if not in all the districts, control on availability of poison along with development of new & less toxic insecticide, herbicide, rodenticide, pesticide etc. which over a long run can drop down the number of suicidal cases using poison.

**Acknowledgement:** We wish to thank Dr. G. Krishna Murthy, Principal, NRI Institute of Medical Sciences for letting us collect, compile & publish the hospital’s data.

We sincerely thank Sikkim Manipal University for its resources.

**Conflict of Interest:** None

**Source of Support:** None

**Ethical Clearance:** Ethical clearance & funding was not necessary as it was a retrospective study which included only collection of data.

**References**

9. Vishva Deepak Bijawat, Ashutosh Srivastav &


Effect of Audio Assisted Relaxation Therapy on Level of Blood Pressure among Mothers with Pregnancy Induced Hypertension

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Abstract

Introduction: The incidence of PIH is about 8-10% of pregnancies. Hypertensive disorder of pregnancy if unchecked will result in eclampsia with generalized convulsions, HELLP syndrome etc. It is usually managed with medicines. There are various non-pharmacological treatment like muscle relaxation, meditation, breathing etc. which are used to control of hypertension. Present study was aimed to assess the effectiveness of audio assisted relaxation therapy on level of blood pressure among mother with pregnancy induced hypertension.

Method: Experimental approach with one group pretest- posttest design was used for the study. Study was conducted among 30 antenatal mothers diagnosed with PIH admitted in Kamla Nehru Hospital, Shimla H.P, selected by using convenience sampling technique. Semi structured interview schedule is used to collect background information and sphygmomanometer was used to measure the level of blood pressure. The blood pressure (BP) was monitored three times a day for two days to obtain a baseline data and average of it was considered as pre-test. Audio assisted relaxation therapy was then administered for 20 minutes per sessions, two times a day for three days. The blood pressure (BP) was monitored before and after each session of relaxation therapy

Results: The mean posttest systolic is BP, 139.81 mm of Hg was significantly lower than the mean pretest systolic BP, 146.45 mm of Hg. The mean posttest diastolic BP, 87.63 mm of Hg was also lower than the mean pretest diastolic BP, 92.06 mm. Both differences were significant at the level of <0.001.

Discussion: The result of present study shows there is a significant difference in BP before and after intervention. So audio assisted relaxation therapy can be used as an effective add on intervention for the management of with women hypertension during pregnancy.

Key words: Pregnancy induced hypertension, Audio Assisted relaxation Therapy, Pregnant Mothers, blood pressure.

Introduction

Pregnancy-induced hypertension (PIH) is a condition which present with high blood pressure with or without proteinuria and edema, with other clinical manifestation usually occurring late in pregnancy and regressing after delivery of the conceptus1.

According to American College of Obstetricians and Gynecologists (ACOG) 2013 guidelines, the criteria for PIH is systolic blood pressure of 140 mm Hg or higher, or diastolic blood pressure of 90 mm Hg or higher occurring after 20 weeks of gestation in a pregnant mother whose blood pressure (BP) has previously been normal. Preeclampsia is diagnosed by persistent high BP that develops during pregnancy or during the postpartum period that is associated with a lot of protein in the urine or visual disturbances2,3. Indian scenario the incidence of PIH ranges from 5-15% in the
primi gravid mothers, whereas it is 16% in multigravida mothers[^4]. Several epidemiological studies have been performed to determine the prevalence and risk factors of hypertensive disorder of pregnancy (HDP) as well as its subtypes. It was found in a study that prevalence of HDP is 5.2–8.2%, gestational hypertension 1.8–4.4%, and preeclampsia is 0.2–9.2%, respectively[^5]. WHO estimates that out of 5,29,000 maternal deaths reported globally each year, 1,36,000 (25.7%) was contributed by India. Among these 16% are due to pregnancy-related complications. According to WHO census 2010 the risk of a woman dying from a pregnancy-related cause is about 36 times higher during her lifetime in a developing country as compared to a woman living in a developed country[^6]. According to WHO census 2013 every year nearly 76,000 women die globally due to preeclampsia[^7]. Global scenario incidence of PIH is range from 1 to 35%. WHO estimates the incidence of preeclampsia to be seven times higher in developing countries[^8]. Incidence rate of PIH is 8-10% in India[^9].

According to WHO expert committee and Joint National Committee recommends non-pharmacological treatment like muscle relaxation, meditation, breathing therapy as the first measure used to control of hypertension. Relaxation therapy is beneficial as it counteracts the physiological effects of stress and fight or flight response[^10, ^11, ^12]. Present study was aimed to assess the effectiveness of audio assisted relaxation therapy on level of blood pressure among mother with pregnancy induced hypertension.

**Materials and Method**

The aim of the study was to find out the effectiveness of audio assisted relaxation therapy on level of blood pressure. So an experimental approach was appropriate for the study. One group pretest-posttest design with multiple observations is used for this study. As BP is a variable which is subject to variations due to the effect of many external and internal factors, average of three observations per day for two days was obtained to get the baseline blood pressure. The average of baseline measures is considered as pretest. Average of three observations on the last day was considered as the posttest. Intervention included the administration of audio assisted relaxation for 20 minutes two times a day for three days. In order to find the immediate effect of each session of audio assisted relaxation, the blood pressure level before and after intervention was measured.

The setting of the study was Kamala Nehru Hospital, Shimla, Himachal Pradesh (KNH). A sample of 30 antenatal mothers diagnosed with PIH admitted in Kamala Nehru Hospital District Shimla, Himachal Pradesh was recruited for the study by using convenience sampling technique. The study included mothers who are willing to take part in the study, diagnosed with PIH and admitted in KNH and understand Hindi or English. The study excluded the mothers whose medication or dose changed in the past three days, variability in BP more than ten mm hg between mean of first and second day, having complications like eclampsia, HELLP syndrome, and having mental illness.

A detailed explanation was given to participants about the purpose of the study and intervention and it was informed that intervention does not cause any harm to them. Participation was based on their willingness and written informed consent was obtained from each participant prior to data collection and they were allowed to withdraw from the study at any point. On recruitment Semi-structured interview schedule was used to collect Background information. Sphygmomanometer was used to measure the Level of blood pressure at the specified intervals and and blood pressure was recorded in a flow sheet.

Audio assisted relaxation therapy (AART) was given to antenatal mothers along with routine medication and care. AART included sessions of guided relaxation of 20 minutes duration administered to mothers with PIH, with the help of prerecorded instructions by using headset for three continuous. It was developed and validated by experts in relaxation therapy. The intervention was administered in a separate quite room and was guided by prerecorded instructions. The mother was allowed to assume a sitting or side lying position as per her comfort and preference. The technique used for relaxation is focused attention. It is a prerequisite for meditation as a person is required to channelize all his attention to a specific sound and his breath. Focused attention helps in keeping the mind free from any distractions and channelizing thoughts in one direction towards slow breathing.

The data was analyzed using frequency and percentage for distribution of background information. Mean and standard deviation and Paired t test to compare pretest and posttest level of blood pressure.
Results

Background information:

Based on demographic variables majority 73.3% of mothers were in age between 19-30 years, 43.3% of them having diploma or degree and 76.6% of mothers were homemaker. Majority 53.3% of women’s were belongs to joint family. Majority 30% of mothers were having monthly income of 10001-20000 monthly family income. About 66.6% of mothers were primigravidae and 46.6% of them were in gestational week between 36-40 weeks. None of them from any coexisting complications during pregnancy.

Based on PIH related data 40% of mothers were diagnosed with pregnancy induced hypertension at 31-35 weeks of pregnancy. Majority 60% of mothers were taking Labetalol for the treatment of PIH and also among them 51% of mothers used 50 mg dose for once a day. Majority, 87% of mothers were not received any teaching regarding relaxation therapy. About 20% of mothers reported to receive some informal teaching regarding management of PIH by restriction in diet like salt and oil free diet, avoid stress, positioning, fluid intake etc. None of them were not using any Non Pharmacological method.

Baseline Level of Blood Pressure:

Table 1. Frequency and Percentage Distributions based on baseline level of Blood Pressure:

<table>
<thead>
<tr>
<th>Variables</th>
<th>BP in mm of Hg</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of systolic BP at the time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>of diagnosis</td>
<td>Less than 140</td>
<td>1</td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>141-150</td>
<td>20</td>
<td>67%</td>
</tr>
<tr>
<td></td>
<td>151-160</td>
<td>7</td>
<td>23%</td>
</tr>
<tr>
<td></td>
<td>161-170</td>
<td>2</td>
<td>7%</td>
</tr>
<tr>
<td>Level of diastolic BP at the time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>of diagnosis</td>
<td>Less than 90</td>
<td>3</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>91-95</td>
<td>17</td>
<td>57%</td>
</tr>
<tr>
<td></td>
<td>96-100</td>
<td>8</td>
<td>27%</td>
</tr>
<tr>
<td></td>
<td>101-110</td>
<td>2</td>
<td>7%</td>
</tr>
<tr>
<td>Level of systolic BP on the day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>of recruitment</td>
<td>130-140</td>
<td>5</td>
<td>17%</td>
</tr>
<tr>
<td></td>
<td>141-150</td>
<td>14</td>
<td>46.6%</td>
</tr>
<tr>
<td></td>
<td>151-160</td>
<td>11</td>
<td>36.4%</td>
</tr>
<tr>
<td>Level of Diastolic BP on the day</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>of recruitment</td>
<td>86-90</td>
<td>2</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>90-95</td>
<td>12</td>
<td>40%</td>
</tr>
<tr>
<td></td>
<td>96-100</td>
<td>16</td>
<td>53%</td>
</tr>
</tbody>
</table>
Fig 1: Line graph showing the mean blood pressure on first and second Day (N=30)

Figure no 1 shows that systolic and diastolic BP in first and second day was stable. Systolic BP of first and second day ranges from 148.3 mm of Hg to 146.8 mm of Hg and diastolic BP ranges from 95.2 mm of Hg to 90.3 mm of Hg.

**Effect of Audio assisted relaxation therapy on level of blood Pressure**

Fig.2 Line graph showing the mean of pretest and posttest Systolic and Diastolic BP (N=30)

The fig. 2 shows that the mean systolic and diastolic BP is lower in posttest than the pretest. The pre-test systolic and diastolic BP is lower than the pretest with each session of the interventions (Fig.3).
Fig. 3. Bar diagramme showing the immediate pretest and posttest systolic and diastolic blood pressure with each session of audio assisted relaxation (N=30)

Table: 2. Comparison of pretest and posttest Systolic and Diastolic blood pressure.  N=30

<table>
<thead>
<tr>
<th></th>
<th>Pretest BP Mean±S.D.</th>
<th>Posttest BP Mean±S.D.</th>
<th>Mean Difference</th>
<th>t value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic BP</td>
<td>146.45±7.846</td>
<td>139.81±8.103</td>
<td>6.643</td>
<td>5.314</td>
<td>&lt;0.001**</td>
</tr>
<tr>
<td>Diastolic BP</td>
<td>92.06±3.820</td>
<td>87.63±5.581</td>
<td>4.427</td>
<td>5.101</td>
<td>&lt;0.001**</td>
</tr>
</tbody>
</table>

** Highly significant at P<0.001

Table 2 shows that there was significant (P<0.001) difference in the systolic blood pressure and diastolic blood pressure in pre-test and post- test. The mean pre-test scores of Systolic BP was 146.45 & diastolic BP was 92.06 significantly higher than the mean of post -test scores of Systolic BP was 139.81 & diastolic BP was 87.63.

Table: 3. Comparison of pre-test and post-test Systolic blood pressure for mothers receiving medications (group 1) and not taking any medications (group 2)

<table>
<thead>
<tr>
<th></th>
<th>Pretest BP Mean±S.D.</th>
<th>Posttest BP Mean±S.D.</th>
<th>Mean Difference</th>
<th>t value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic BP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 1</td>
<td>149.23±4.47</td>
<td>142.06±7.48</td>
<td>7.17</td>
<td>5.17</td>
<td>&lt;0.001**</td>
</tr>
<tr>
<td>Group 2</td>
<td>143.76±4.88</td>
<td>137.24±8.66</td>
<td>6.51</td>
<td>4.29</td>
<td>&lt;0.001**</td>
</tr>
<tr>
<td>Diastolic BP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 1</td>
<td>92.34±3.45</td>
<td>87.94±6.36</td>
<td>4.39</td>
<td>3.40</td>
<td>&lt;0.001**</td>
</tr>
<tr>
<td>Group 2</td>
<td>91.06±4.257</td>
<td>86.06±4.40</td>
<td>4.00</td>
<td>5.52</td>
<td>&lt;0.001**</td>
</tr>
</tbody>
</table>
Discussion

The present study was aimed to assess an effect of Audio assisted relaxation therapy on level of blood pressure among mothers with pregnancy induced hypertension. Findings of the study showed that AART was a safe method and helps to reduce systolic and diastolic BP and there was a positive strong correlation between AART and level of BP. So there is need to focus on use of non-pharmacological methods to manage PIH and it can be implemented throughout the pregnancy.

Research studies conducted on effectiveness of interventions focusing on level of BP has shown to improve BP among mothers with PIH. A quasi experimental study was conducted at Government hospital and A.J Hospital, Mangalore in India in 2012 to evaluate the effectiveness of relaxation therapy on Mild Pregnancy Induced Hypertension. The results showed that the mean of pre-relaxation score (17.40) was significantly higher than the mean of post relaxation score (7.17). Since the difference in mean post therapy score is evident. A study was conducted to assess the effectiveness of guided imagery on level of blood pressure among PIH mothers in selected hospital in Pankajam Sitharam hospital at Trichy District, Tamilnadu 2015. A quantitative approach using quasi experimental pre-test post-test design with control group. Study sample is 60 PIH mothers were selected using Non-probability purposive sampling technique was used. Guided imagery was given to the mothers in experimental group for 10 minutes duration twice a day for 3 days. Sphygmomanometer was used to assess the level of blood pressure. Analysis using paired ‘t’ test was obtained for level of blood pressure in control group was 0.84 which is not significant at p<0.05 level. The findings of the study revealed that Guided Imagery helps in reducing blood pressure among PIH mothers. In present study there was a significant difference in level of systolic and diastolic BP in pretest and posttest at level of 0.001.

So Audio assisted relaxation therapy can be used as an add on therapy for the management of mothers with pregnancy induced hypertension.

Conflict of Interest: The investigator has no conflict of interest.

Source of Funding: The study is funded by self.

Ethical Clearance: Ethical clearance was obtained from the institutional Ethics committee of Akal College of Nursing. Participation was based on willingness and written informed consent was obtained from all participants.

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A Demographic Study on Cases of Drowning with Special Reference to Histopathological Changes of Lung and Other Tissues in a Tertiary Centre

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Abstract

Introduction: Drowning is the 3rd leading cause of unintentional injury deaths. As drowning is a preventable cause of mortality, our aims for the benefit of society at large is to minimize the events as far as possible. Objective: A clear knowledge about factors which play a major role behind such incidences is important. It has equal forensic importance as determination of cause and manner of death require thorough investigation. Methodology: We conducted one-year study of demographic variables and the histopathological changes in relation to lung and splenic tissues in cases of drowning deaths, in the hot and humid climatic region of Eastern India. Results: The demographic findings were presented in graphs and charts. However, none of the commonly known autopsy findings (histopathological) are found to be individually confirmatory of drowning. Conclusion: Several factors inclusive of autopsy findings, biochemical examination, radiological and molecular technique, are needed to be taken together as complementary methods to conclude drowning as the cause of death when bodies are recovered from water.

Keywords: Drowning, Forensic, Demography, Histopathology

Introduction

Mortality due to drowning is a major global public health concern.¹ A study on Global Burden of Disease (GBD) revealed that drowning constitutes 7% of all injury-related deaths (WHO, 2010). It is the 3rd leading cause of unintentional injury deaths. In 2012, an estimated 372,000 people died from drowning, making drowning a major public health problem worldwide. The WHO Global report on drowning: preventing a leading killer, published in 2014, highlights that 372,000 people drown worldwide each year. Drowning is among the ten leading causes of death for children and young people in every region of the world.² Approximately 90% of drowning take place in freshwater (rivers, lakes and swimming pools) and 10% in seawater.² As with other south East Asian countries, fatalities due to drowning are common in India. Drowning as a method of choice in suicides is also responsible for a substantial proportion of unnatural deaths. According to the National Crime Records Bureau, MHA Govt. of India NCRB (2014), 29,903 deaths (6.6% of total accidental deaths) were reported due to drowning in 2014.³ In developing country like India formulation of health care planning is very much dependent on incidence, prevalence, frequency and distribution of a particular disease or accident.⁴ As drowning is a preventable cause of mortality, our aims for the benefit of society at large is to minimize the events as far as possible. A clear knowledge about factors which play a major role behind such incidences is important. Modell et al.⁵ stated that to ascribe drowning as a cause of death to a body found in water without some evidence of the effect of having aspirated water is risky and concluded that ‘in this situation, it...
may be more accurate to list a differential diagnosis rather than a specific cause of death’. In this study we attempted to analyze the demographic variables and the histopathological changes in relation to lung and splenic tissues in cases of drowning deaths, in the hot and humid climatic region of Eastern India.

**Materials and Method**

A cross sectional study was conducted at the R.G.Kar Medical College & Hospital Police Morgue attached to the Department of Forensic Medicine and Toxicology and Department of Pathology, R.G.Kar Medical College. It was conducted on the dead bodies on which medico legal autopsy performed in the morgue for a one-year period i.e., 1st April, 2012 to 31st March, 2013.

Cases of unnatural deaths (on whom Medico legal Autopsy was performed during the stipulated period) where cause of death was clearly identified as drowning were included in the study.

Cases presenting as drowning but actual cause of death found after autopsy to be something else e.g. head injury, any natural disease etc. were excluded.

**Results & Analysis**

16 cases of drowning were found in age group 11 to 20 years, 13 cases among 31 to 40 years, 10 cases among first 10 years whereas only 2 cases found in 61 to 70 years but no cases in 61 to 70 years age group. Eighty percent of study population was male while twenty percent were female. Maximum cases (46) were found to be accidental in nature, 6 cases were suicidal, only 2 cases were homicidal and 6 were unknown or undetermined. 21 cases of drowning were found in pond, 17 in river, 13 in lake, 6 in canal whereas 2 cases from well and only 1 in sewage pipeline water. Most of the cases (10) found in the month of June whereas least cases (3) in July and December (Fig 1).

Scatter diagram shows age distribution in cases with known manner of death (Fig 2). 70% of all cases were happened during bathing among people with no swimming lesson; different disease conditions including depression comprised 5% of all cases as risk factor; in 3% cases alcohol intake was possible risk factor whereas in 15% cases no significant risk factor was found (Fig 3). 78% of all cases showed dilatation of alveoli and thinning of alveolar septa as microscopic changes in lungs whereas in 14% cases alveolar oedema was found and only 8% cases showed interstitial oedema.

All of the cases showed reactive changes as microscopic feature of spleen. Histopathological examination was performed on all the organs of non-putrefied bodies with the aim to differentiate between death due to drowning and other causes of death. Hematoxylin and eosin (H & E) staining often gives excellent results to determine the cause of death in bodies recovered from water. Pulmonary changes in drowning are distributed heterogeneously in the lung parenchyma (Fig 4, 5). In this study, other organs like spleen showed nonspecific changes like generalized congestion and swelling of the capillary endothelia (Fig 6).

![Fig. 1: Showing distribution of cases in different months](image-url)
Fig. 2: Scatter diagram showing age distribution in cases with known manner of death

Fig. 3: Pie diagram showing possible risk factors among all cases

Fig. 4: Microscopic picture showing bronchopneumonia of lung indicating interstitial oedema (H& E, 100X) in a case of Secondary drowning (Near-drowning).
Discussion

The results of observations have been analyzed in form of graphs & charts and compared with available studies to bring out similarities and dissimilarity in different aspects.

Our study population were distributed from newborn to 80 years of age and it is seen that most of the cases (16) of drowning was in the age group 11 to 20 years. Palimar V, Manjunath S (2010) in their study in Manipal, found that age group commonly involved in drowning was 11-20 years. Davoudi- Kiakalayeh A et al (2008) in their study in Northern Iran also found that more than one-third of all victims of drowning were under the age of 20. Results of both the study corroborated with the findings of our study. On the other hand, Singh A, Gorea R K, Dalal J S, Thind A S, Walia D (2003) showed that most commonly involved age group was 31-40 years. Shetty M conducted a study regarding the profile of drowning deaths in coastal Karnataka (1999-2004) and found that maximum number of drowning victims were of age group 31 – 40 years. Therefore, findings of both the study were nearly similar to findings of our study as second highest no. of cases were found in age group 31-40 years in our study.

Incidence of drowning deaths were much higher in male with a male: female ratio 4:1, as found in our study. Male predominance in drowning deaths was shown in
many other studies done by Kanchan T et al\textsuperscript{10}, Chaudhary B L et al\textsuperscript{11}, Byard R W et al\textsuperscript{12}, Davoudi-Kiakalayeh A et al\textsuperscript{7} and many more. ArdeshirSheikhazadi et al (2009)\textsuperscript{13} found in their study in Iran that male: female ratio was 6.5:1 among drowning deaths whereas Somers GR et al (2005)\textsuperscript{14} found male: female ratio as 2.5 in paediatric drowning cases.

Accidental submersion is the most common manner of deaths by drowning and we found the same result. According to our study, accidental drowning cases comprised of 77% of all cases. Gomiak J M et al (2005) in a 10-years long study\textsuperscript{17} in Ohio, USA found that the majority (78%) of drowning deaths were accidents. This finding was consistent with our findings. Palimar V, Manjunath S (2010) in a 12-year long study\textsuperscript{6} in Manipal, also found that accidental drowning was most common form of drowning. ArdeshirSheikhazadi, Mohammad Hasan Ghadyani (2009) studied about epidemiology of drowning in a province of Iran and found somewhat higher rate of accidental drowning (85.1\%)\textsuperscript{13}.

Data analyses showed that 10% of all cases were suicidal submersion, i.e. 6 out of 60 cases. According to Gomiak J M et al (2005)\textsuperscript{17} 14% cases were suicidal which is close to our findings. On the other hand, Stemberga V et al (2010) studied\textsuperscript{18} about suicidal drowning in Croatia and found that it accounted for 31% of all drowning deaths. A study done by Avis SP (1993)\textsuperscript{19} in Canada also found higher rate (25%) of suicidal drowning.

It is stated that homicidal submersion is really rare because of difficulties it involves when the victim is adult, unless the victim is first weakened by something like alcohol or drugs. Only 2 homicidal cases of drowning were found in our study, both were unknown cases and newborn, one was male and other female, found in lake and sewage pipeline water respectively. It represented 3% of all deaths due to submersion [Table 5, Fig.6&7] which was consistent with findings of Gomiak J.M. et al\textsuperscript{17}. Although ArdeshirSheikhazadi et al\textsuperscript{13} found only 0.3% homicidal cases in Iran. On the other hand, Auer A\textsuperscript{20} found 2.3% homicidal cases in Finland.

When the manner of death could not be recognized, the case is considered undetermined or unknown which comprised 10\%, i.e. 6 cases of total deaths caused due to drowning in our study.

Natural freshwater settings were the sites of all drownings except a newborn which was found in sewage pipeline water. It highlights the risk of going in such water whether deliberately or not. The absence of salt-water drowning case in our area is not surprising, because of geography of the region and jurisdiction of our area.

In our study pond was the location with highest number of drowning victims. Patetta M J, Biddinger P W in a study\textsuperscript{21} in North Carolina, USA showed that most death occurred in freshwater settings, notably lakes and ponds, 39 percent, and rivers and creeks, 29 percent. Chaudhary B L, Singh D et al in their study\textsuperscript{11} in Sevagram, Wardha found that most of drowning deaths were seen as a result of fall in well which was inconsistent to our study and may be due to geographical variation. On the other hand, Stemberga V et al\textsuperscript{18} found 57% incidents occurred in the sea, 34% in water wells, 6% in rivers, and 3% in bathtubs in a study done in Croatia.

We tried to highlight over some risk factors which possibly contributed to the fatal outcome. In our study 70% cases of death occurred during bathing among people with no swimming lesson. Chaudhary B L et al in their study\textsuperscript{11} found that maximum cases of suicidal drowning were seen in person with history of some kind of mental illness or some chronic disease. Byard R W et al in a study\textsuperscript{12} in South Australia showed that alcohol use was not usual and there was often a significant history of mental illness. Copeland AR in a study\textsuperscript{22} in Florida found that the reason for the act was depression concerning poor health, death of a loved one, financial problems, chronic pain, or being “tired of life”.

The increase or decrease of drowning death in a year is closely related to seasons, climatic factors and geographic zone. Our study showed that the majority of deaths took place during the summer followed by the end of the spring, when the weather is warm. This correlates to the results of studies done by ArdeshirSheikhazadi et al in Iran\textsuperscript{13} and also in some western countries. Shetty M.\textsuperscript{9} and Palimar V et al\textsuperscript{6} in their study found different result and concluded that incidence of drowning death increased during rainy season.

We have studied macroscopic and microscopic changes of lung of the drowning victims. In our study 78% cases showed dilatation of alveoli and thinning of alveolar septa as microscopic changes in lungs whereas in 14% cases alveolar oedema was found and only 8% cases showed interstitial oedema. These findings were
consistent with the opinion of Farrugia A and Ludes B. Somers GR et al. highlighted the need for thorough clinicopathologic correlation in cases of drowning to accurately interpret the pathologic findings like frothy exudate, pleural effusion and increased lung weight.

We have studied microscopic changes of spleen of the drowning cases during our study period. In all of the cases no specific finding characteristic of drowning was found; only some reactive changes were found. Kotani H et al. found a significant relationship between red splenic arteriolar hyaline and drowning deaths; moreover, the presence of the red pattern had high specificity for the detection of rapidly fatal cases. These findings were inconsistent with our study findings.

**Conclusion**

Death due to drowning has forensic importance as determination of cause and manner of death require thorough investigation. The forensic pathologists often confront cases wherein the findings are not definite enough to clinch the diagnosis as death due to drowning though the body might have been recovered from water. Moreover, in the majority of the cases, autolytic and putrefactive changes would preclude a scientifically sounded diagnosis of drowning. None of the commonly known autopsy findings are individually confirmatory of drowning. Several factors inclusive of autopsy, biochemical examination, radiological and molecular technique are taken together as complementary methods to conclude drowning as the cause of death when bodies are recovered from water. Unfortunately, the cost–benefit analysis in current practice could be hard to defend. The roles of chloride, magnesium, strontium, silicon is promising. Molecular tools like expression of aquaporins are useful for differentiating salt water from freshwater drowning. This mandates ongoing research to further fine-tune the various modalities of confirming drowning and applying them in real forensic casework.

**Ethical Clearance**- Taken from Ethics Committee of R. G. Kar Medical College

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**Conflict of Interest** - Nil

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Fixing the Deepest Point on Greater Sciatic Notch for Measuring or Calculating Maximum Depth of Greater Sciatic Notch

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Abstract

Background: Aim of the present study is to fix the deepest point in the curvature of greater sciatic notch for measuring or calculating maximum depth.

Material and Method: Hip bones of each sex (30 male and 30 female) were divided in two groups consisting of 15 bones in each group. For first group the farthest point from the maximum width of greater sciatic notch was taken as the deepest point. For the second group the point of first touch from arcuate line onto the greater sciatic notch curvature was taken as the deepest point. Maximum depth of greater sciatic notch was calculated from that point for both groups. The maximum depth of greater sciatic notch for each sex were checked for any statistical difference between the two groups by using two tailed t-test to calculate the p-value.

Result: p-value, for maximum depth of greater sciatic notch between group 1 and 2 was found to be 0.149 for male hip bones and 0.8883 for female hip bones. Statistically there was no significant difference in the maximum depth of greater sciatic notch calculated by fixing the deepest point either from maximum width of greater sciatic notch or from arcuate line.

Conclusion: We can use the point of first touch from arcuate line to greater sciatic notch as the point of maximum depth of greater sciatic notch.

Key words: Hip bone, gender, maximum depth of greater sciatic notch, Arcuate line.

Introduction

Determination of gender of unknown skeleton is a routine work for those who are involved in medico-legal work. Sexing of unknown skeletal material depends on the relative completeness of the skeleton. Percentage of accuracy for adult material is 100 percent from entire skeleton; 95 percent from pelvis alone; 90 percent from skull alone; 98 percent from pelvis plus skull; 80 -90 percent from long bones alone; 90-95 percent from long bones plus skull; 95 percent or more from long bones plus pelvis. The female pelvis, on account of its development for child bearing, has always been the principal and most reliable indicator of sex. The bone which is most important in determining the gender of skeletal remains is hip bone. As a single criterion to determine the sex greater sciatic notch has an accuracy of 75% (Washburn). Different parameters used in determining the gender are maximum width of the greater sciatic notch, maximum depth of greater sciatic notch, greater sciatic notch index, index I of greater sciatic notch, index II of greater sciatic notch and Genovos index. But for the maximum width of greater sciatic notch all the remaining parameters need the maximum depth of greater sciatic notch for calculations. In other words, the value of maximum

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depth of greater sciatic notch is a must when we study the greater sciatic notch. Various scholars used different methods to measure the maximum depth of the greater sciatic notch. In all the studies, the deepest point on the curvature of greater sciatic notch was assessed and then measured the perpendicular distance from that point to the maximum width of the greater sciatic notch.\textsuperscript{10,11,12} But the exact location of deepest point on the greater sciatic notch curvature is not found in texts. It is true that the perpendicular maximum distance from the width of the greater sciatic notch to the notch curvature is to be considered as the maximum depth, hence technically if we keep on drawing parallel lines from the maximum width of greater sciatic notch the point of last touch on greater sciatic notch is to be considered as the point farthest from the width (photograph 1) and hence the deepest point on the curvature of greater sciatic notch. The problem with this method is the deepest point on greater sciatic notch depends on the points taken for measurement of maximum width of greater sciatic notch. Keeping that in mind fixation of the point of maximum depth of greater sciatic notch is attempted independent of the points taken for measuring width of greater sciatic notch. If we draw parallel lines from arcuate line towards greater sciatic notch the point of first touch on greater sciatic notch can be the deepest point (Photograph 2,3). The current study is taken with the aim to check whether the point of first touch from arcuate line is the deepest point on the greater sciatic notch or not.

**Aims and Objectives**

The present study is done on 30 male and 30 female dried adult hip bones to fix the deepest point in greater sciatic notch curvature. Hypothetically it is assumed that point of first touch of the line parallel to the arcuate line of hip bone and the curvature of greater sciatic notch is the point of maximum depth of greater sciatic notch. The hypothetically assumed point is checked statistically whether it corresponds to the point of maximum depth of greater sciatic notch or not.

**Materials and Method**

Materials used for the present study were: Dried adult hip bones of known sex (30 male and 30 female), Vernier calliper, CD marker, OHP sheet with printed parallel lines on it and series of parallel lined paper. Statistical analysis is done using Micro soft office excel 2016.

Inclusion criteria: Morphologically intact dry adult hip bones of known sex.

Exclusion criteria: Broken, incomplete, unossified hip bone and the hip bones of unknown sex.

Sixty morphologically intact dried adult hip bones of known sex (30 male and 30 female) were collected from department of forensic medicine and anatomy of Mamata medical college, Khammam. The hip bones were divided in 2 groups consisting of 15 male hip bones and 15 female hip bones in each group. Two points were marked on each hip bone

1. Point A: Posterior inferior iliac spine,
2. Point B: Tip of ischial spine.

The maximum depth of greater sciatic notch was marked as point “C”. For group 1 the point of last touch from width of greater sciatic notch on the curvature of greater sciatic notch is considered as the deepest point. This was done by using a paper with parallel lines and keeping the hip bone over the paper and then marking the point of last touch as point “C” (photograph 4). In the second group the point of first touch on the curvature of greater sciatic notch from the arcuate line is marked as the point of maximum depth (the nearest point on the curvature of greater sciatic notch from arcuate line), using the OHP sheet with printed parallel lines (photograph 5).

Using Vernier callipers following measurements were taken:

AB (the width of greater sciatic notch), BC and AC (as shown in photographs 6,7 and 8). The perpendicular distance from point C to AB touches the line AB at point “O”. The distance OB is the maximum depth of greater sciatic notch which is calculated as $OC = \frac{2\text{(area of triangle ABC)}}{AB}$.

The maximum depth of greater sciatic notch of group 1 is compared with that of group 2 for the same gender using p-value.
**Observation and result**

Table 1 is showing the depth of greater sciatic notch in males. The mean depth of greater sciatic notch was found to be 33.28 millimetres with standard deviation of 2.35 and a range of 7.36 in group 1. The mean depth of greater sciatic notch was 34.46 with standard deviation of 1.98 and a range of 6.8 in group 2. The $p$-value of 0.149 (as calculated by 2 tailed t test) suggested that the difference between the depth of greater sciatic notch of males of the two groups were statistically insignificant.

Table 2 is showing the depth of greater sciatic notch in females. The mean depth of greater sciatic notch was found to be 31.14 with standard deviation of 2.71 and range of 9.6 in group 1. The mean depth of greater sciatic notch was 31.27 with standard deviation of 2.16 and range of 7.63 in group 2. The $p$-value of 0.8883 (as calculated by 2 tailed t test) suggested that the difference between the depth of greater sciatic notch of females of the two groups were statistically insignificant.

<table>
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<tr>
<th>Table 1. Depth of Greater sciatic notch (Male)</th>
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<td>Male group 1 (n=15)</td>
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<td>Mean in millimetres</td>
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<td>Female group 1 (n=15)</td>
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<td>Mean in millimetres</td>
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<td>2 tailed p-value</td>
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Photograph 1. Showing the deepest point on greater sciatic notch ie Point of last touch from the width of Greater sciatic notch; 2. Showing point of first touch on greater sciatic notch curvature from arcuate line and 3. Showing that both these points may be the same.

Photograph 4. Showing marking of deepest point using point of last touch from width; 5. Showing way to get point of first touch from arcuate line.

Photograph 6. Showing measurement of width of greater sciatic notch; 7. Showing measurement of the distance between B(tip of ischial spine) and C(deepest point in greater sciatic notch); 8. Showing measurement of AC (distance between posterior inferior iliac spine and deepest point in greater sciatic notch).
Discussion

The maximum depth of greater sciatic notch depends on the points taken for the measurement of width of greater sciatic notch. The width of greater sciatic notch is measured as the distance between posterior inferior iliac spine to tip of ischial spine which seems to be correct by seeing the morphology of the bone. The width of greater sciatic notch is measured from pyriformis tubercle to ischial spine, Pyriformis tubercle to tip of ischial spine; Posterior inferior iliac spine to base of ischial spine. This makes the deepest point on greater sciatic notch to be marked differently for the same hip bone, as the deepest point on the greater sciatic notch varies with the variation in selection of points for measurement of width of the greater sciatic notch. We must be in a position to mark the maximum depth on the curvature of greater sciatic notch independent of the points taken for width of the greater sciatic notch. The structure of the hip bone that is less damaged is the mid part of the hip bone. The arcuate line, which is near to the greater sciatic notch curvature and a fixed bony landmark, found in all hip bone was taken into consideration to fix the deepest point of greater sciatic notch. The calculated depth of greater sciatic notch of the two groups of same sex in our study has not shown any statistically significant differences. Hence we can use either point of first touch from arcuate line or point of last touch from the width of greater sciatic notch as the deepest point on the curvature of greater sciatic notch.

Conclusion

Determination of deepest point on the curvature of the greater sciatic notch makes the measurement of maximum depth of the greater sciatic notch easier, more convenient and objective. As forensic experts most of the time we do receive broken hip bones, in such situation point of maximum depth of the greater sciatic notch can be fixed from arcuate line with ease.

Acknowledgement: I express my sincere thanks to Dr Vinay G. Professor and Head of Anatomy Department and Dr Nithesh Kumar K. Professor of community medicine, Mamata medical college, Khammam, for helping in procuring the hip bones for the study and in statistical analysis.

Conflict of Interest: None.

Ethical Clearance - Taken from Communication of Decision of the Institutional Ethics Committee (IEC)/ Institutional Review Board

Source of Funding - Nil

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Enrofloxacin poisoning in Humans – A Rare Case Report

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Abstract

Enrofloxacin flouroquinolone - Veterinary Medicine. It has the general effect of the class of flouroquinolone. This poison is rarely reported in human. We present a case of Enro poisoning. Patient ingested Enrofloxacin. Which was followed by seizures and altered sensorium. Patient was taken on mechanical ventilator. He was managed symptomatically. He developed ST-T changes in ECG. But coronary angio was normal. We also tried doing plasmapheresis. But patient expired even after all efforts. The best of our knowledge, we did not find any such reported case of enro poison in Human. Hence we present this case report.

Key Words: Enrofloxacin, Poisoning, Flouroquinolone

Introduction

Enrofloxacin is a synthetic chemotherapeutic agent from the class of the flouroquinolone carboxylic acid derivatives, acting against a variety of Gram Negative and Gram Positive Bacilli, in veterinary medicine. It is generally administered by subcutaneous injection and intramuscular injection to Pigs, and Chickens for the treatment of infection of the respiratory and alimentary tract(1). We present a case report of its use in human, which is a rare presentation.
Case Report

A 30 year old male, was brought to the Emergency Department in an unconscious, gasping state. The history was given by the attendant who revealed that the patient developed headache, vomiting and frothing from the mouth around 8-10 hours back. It was followed by generalized seizures which lasted for around two minutes. However there was no history of fever. Patient developed seizures and was taken to a local hospital. He was given primary care there and was referred to a private medical college hospital, There the patient was revived a loading dose of Inj. Epsolin. A CT scan of the Head was done, which was normal. Subsequently the attendant shifted the patient to our hospital. There was no significant past history.

The vitals in the ER were as follows:

**Pulse:** 95/min,

**BP:** Systolic 70, Diastolic not recordable.

**GCS:** E, M, V (3/15).

**Deep tender reflexes:** Normal

**Chest:** Bilaterally clear and heart sounds normal, Shallow Breathing

**CVS:** S1, S2

Looking at the gasping state, Patient was immediately intubated and taken on mechanical ventilation. IV fluids were administered and vasopressor support in the form of INJ. Nor Adrenaline was started.

ABG was done which showed metabolic acidosis with a PH: 7.02, HCO3: 7 Lactate: 12.8,

PCO2: 27, Po2: 82.

ECG was normal (fig 1)

Total Leukocyte Count was 13,000. Liver and Renal functions were normal. A provisional diagnosis of Cerebrovascular accident was made.

However the hypotension remained unexplained. Another differential diagnosis was septic shock. But the G.C.S of 3/5 remained unexplained with this looking at the age of the patient, frothing and hypotension a detailed history was again taken from the relatives.

On deep questioning, it was revealed that he had consumed a bottle of Enrofloxacin, an empty bottle of
which was found at home by family members. However
the exact quantity consumed, could not be concluded.

Immediately symptomatic treatment was started
in the form of gastric levage, IV fluid and vasopressor.
Soda bicarbonate was administered for the correction
of metabolic acidosis, demonstrated on ABG. This
gradually improved.

None of our team member had an experience of
managing Enrofloxacin poisoning’s, we searched the
internet for this poisoning, but to our surprise, we did
not find much literature about human exposure. All the
evidence was in animal use.

A single session of plasmapharesis was also done in
hope to eliminate the poison. But matter did not seem to
improve.

MRI BRAIN was done, the very same day which
came out to be normal and hence our provisional
diagnosis was eventually ruled out.

On second day, patient developed significant ST
elevation in ECG in multiple leads including inferior
and lateral leads. (Fig 1). An urgent cardiology reference
was taken.

Echocardiography showed a regional wall motion
abnormality with EF 40%. An urgent Coronary
angiogram was done which ruled out coronary blockage.
But any significant lesion in coronaries was ruled out.

There was only 30% lesion in ostial part of left
circumflex artery. This lesion was insufficient to explain
the clinical findings.

Symptomatic treatment was continued. Patient
developed further hypotension which becomes refractory
to vasopressor. Urine Output started declining gradually.

Partially ultimately developed cardiac arrest and could
not be revived.

**Discussion**

Enrofloxacin (CASRN: 93106-60-6) is a synthetic
fluoroquinolone antibiotic for animal use only. Like
other fluoroquinolone side effects include dizziness,
drowsiness, disorientation, seizures, nausea, vomiting
and tremors. Cardiovascular effect may include QT
prolongation, Polymorphic Ventricular Tachycardia.
Elevated liver enzymes and liver dysfunction have been
reported following therapeutic use of fluoroquinolone.
Other side effects may include joint or cartilage
tenderness, photosensitivity and epidermal necrolysis. (2)

We were unable to find any reported human
ingestion and toxicity.

**Conflict of Interest :** This is to certify that I Dr. Vipul
Khandelwal the author of the Manuscript Enrofloxacin
poisoning in Humans – A rare Case Report. Certify that
there is no conflict of interest regarding this manuscript.
(NIL)

**Source of Funding :** Self Dr. Vipul Khandelwal

**Ethical Clearance:** Taken From Institutional
Ethical Committee.

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Serotonin Syndrome Precipitated by Escitalopram

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Abstract

Depression is characterized by symptoms like sad mood, loss of interest and pleasure, low energy, worthlessness, guilt, psychomotor retardation or agitation, change in appetite and/or sleep and suicidal thoughts, etc. It may be a unipolar or a bipolar cyclic disorder in which cycles of mood swings from mania to depression occur over time. Fluoxetine, Fluvoxamine, Paroxetine, Sertraline, Citalopram and Escitalopram are the various SSRIs(Selective Serotonin Reuptake Inhibitors) preferred as first line of drug in such conditions. Among the SSRIs, Escitalopram exerts a highly selective, potent, and dose-dependent inhibitory effect on the human serotonin transport. By inhibiting the reuptake of serotonin into presynaptic nerve endings, this drug enhances the activity of serotonin in the central nervous system. Herein we report a case of a 82 year old male who presented with altered sensorium, tachycardia, hypertension and restlessness to emergency department of our hospital. Patient was known case of Adjustment disorder with Depressed mood and was on treatment with Tablet Escitalopram 10 mg OD and Tablet Zolpidem 10 mg OD since 1 month. Patient overdosed himself with 4 Escitalopram tablets of 10 mg. He presented with features similar to serotonin syndrome.

Keywords – Depression , Adverse drug reaction(ADR) , Escitalopram , Pharmacovigilance , Serotonin Syndrome

Introduction

Depression is a disorder of mood and it is characterized by persisting feeling of sadness and loss of interest. SSRIs are the first line drugs for the treatment of depression and anxiety disorders(1). TCAs(Tricyclic Antidepressants) are also frequently prescribed for the Depression. The advantage of SSRIs among the Tricyclic antidepressants is that they are relatively safe in overdose. The majority of SSRI overdose cause minor side effects. Central nervous system depression is the most common side effect after SSRI overdose, although in large doses it can cause serotonin syndrome, seizure and cardiac abnormalities.(1) However, QT-interval prolongation and tachycardia have been reported mainly with Citalopram and more recently in case report of Escitalopram toxicity(1). Escitalopram is the S–enantiomer of Citalopram and has been marketed because it is more potent inhibitor of the serotonin transporter and likely accounts for the majority of the inhibitory effects in racemic citalopram. During the last 10 years, there has been an increase in the prescription of Escitalopram and an associated increase in overdose. Serotonin toxicity is more common with escitalopram than with citalopram or other SSRIs because of its increase serotonergic potency. The most common clinical effects with escitalopram overdose are tachycardia, hypertension, drowsiness, nausea, and vomiting. With citalopram, in addition to above, the most common clinical side effects are tremor and seizure. Nausea, vomiting, and hypertension were more common with escitalopram. Escitalopram is comparatively safer than Citalopram(2). Therapeutic dose of Escitalopram is 10 mg /day and maximum dose 20 mg/day(3).Herein we report a case of suspected Serotonin Syndrome as an ADR to high doses of Escitalopram.
Case Details

An 82-year-old Diabetic, Hypertensive male patient brought by relative to the emergency medicine department of our hospital with altered sensorium. On examination, Temperature: normal, Pulse: 116/min regular, BP: 160/90, respiratory rate – 14/min, SpO2-98% on room air, RBS: 273 mg%, CVS: S1S2+, RS: Clear, CNS: In delirium state; planter: right flexor and left extensor. Patient was having Tachycardia, Hypertension, Restlessness and Agitation. He was kept under observation with suspicion of Hyponatremia or CNS problem. His ECG was showing heart rate more than 110/min but rhythm was normal. In emergency room, ABG was done showing normal with Na⁺:141 mEq/L. After 1 hour patient didn’t regain consciousness so CT brain was done which did not reveal any significant finding. IV line started with Normal Saline pint at the rate of 60 ml/hour and patient shifted to ER ICU for further management. On detailed history Patient’s relative told that patient was alright in the evening on previous day and did not wake up in the morning. On arousal he was not following verbal command so he was brought to the hospital.

Patient is a known case of Psychiatric illness diagnosed as Adjustment disorder with Depressed mood since 1 month. He was on treatment with Tablet Escitalopram 10 mg OD and Tablet Zolpidem 10 mg OD, taking regularly. Patient is also known case of Diabetes Mellitus and Hypertension since 15 years so he was on treatment with tablet Voglibose SR 0.3 mg TDS and Tablet Amlodipine 5 mg BD. After 3 hours of admission patient was having persistent tachycardia and hypertension so overdose/toxicity of SSRI was suspected so Tablet Escitalopram and Zolpidem were withheld. Ryle’s tube was inserted and gastric sample collected and stomach wash done with normal saline. Inj Furosemide 20 mg IV was given. Urinary catheter was inserted and Urine drug abuse assay was done to exclude other drug overdose. In ICU patient was treated by Inj Ceftriaxone 1 gm IV BD, Inj Pantoprazole 40 mg IV BD, Inj Ondansetron 4 mg TDS, Inj Optineuron 2ml IV BID, Tab Voglibose SR 0.3 mg BD, Tab. Amlodipine 10 mg OD. 2D Echo was done and normal. His investigations including CBC, Serum electrolytes, LFT, RFT and X ray chest were normal. Patient subsequently improved and regained consciousness on 2nd day with pulse rate of 92/min regular and blood pressure of 120/70 mmHg.

On detailed inquiry Patient had given history of deliberate ingestion of 4 tablets of Escitalopram of 10 mg yesterday night. Psychiatric refer was done and advised to continue Tablet Escitalopram 10 mg OD and Tablet Zolpidem 10 mg OD. Patient was conscious and psychologically stable so discharged on 4th day. This case illustrates an example of toxic overdose with escitalopram that resulted in features suggestive of Serotonin syndrome. This case was reported via Vigiflow at WHO-UMC with Id-2019-38323.

Discussion

Serotonin syndrome is often described as a clinical triad of autonomic hyperactivity, mental status changes and neuromuscular hyperexcitability. Although clinically, serotonin syndrome has a broad range of presentations that often result in under diagnosis. Mild cases may result from therapeutic doses, and the patient may or may not be symptomatic. Moderate cases present with more autonomic and neurological dysfunction. Severe cases generally presents with worsening vital signs, rigidity, hyperthermia and the potential for multiorgan failure(4). There are a number of drugs from different classes that can cause serotonin syndrome either alone at high doses or when combined but the most commonly prescribed class of antidepressant, which work by increasing serotonin, are the serotonin reuptake inhibitors. Escitalopram is a well-tolerated medication, with a side-effect profile comparable to the other SSRIs. A number of side effects have been seen during escitalopram therapy, such as insomnia, nausea, and increased sweating, agitation, restlessness, weakness etc. Cases of serotonin syndrome with escitalopram are reported, but quite a few(5). Previously cases of Serotonin syndrome induced by the readministration of escitalopram after a short-term interruption in an elderly woman with depression by Sato Y et al(6) and Serotonin Syndrome Induced by Combined Use of Tramadol and Escitalopram by Caamano A. et al(7) are reported. Escitalopram works by increasing intra-synaptic levels of the neurotransmitter serotonin by blocking the reuptake of the neurotransmitter into the presynaptic neuron. The use and prevalence of serotonergic drugs for various psychiatric issues is on the rise. As a result, physicians should carefully consider and rule out the clinical diagnosis of serotonin syndrome when presented with an agitated or confused patient with signs and symptoms of serotonin syndrome who is taking serotonergic drugs. One should be hypervigilant when serotonergic drugs are used. Previous studies have reported that 10% to 14% of patients who overdose with
SSRIs experience serotonin toxicity many of whom with only mild presentations(8). Although escitalopram has been reported to show less serotonin toxicity compared with other SSRIs, its effect was best described by one previous study in which 15% of 46 patients exposed to escitalopram alone exhibited significant serotonin toxicity, while isolated serotonergic neuromuscular findings developed in as many as 46% of the patients at a mean ingested dose of 140 mg. Another study reported that the most common clinical effects after an overdose with escitalopram with a mean dose of 130 mg were tachycardia (19.5%), drowsiness (15.0%) and hypertension (9.0%) (8). Serotonin syndrome has long been known, and it is clearly an iatrogenic effect of modern medications.

Here we report a case of elderly male patient who developed this ADR. Age-related physiological changes affect drug pharmacokinetics (absorption, distribution, metabolism and excretion) and pharmacodynamics (the study of effects of a drug on the body) (9). Of the four traditional components of pharmacokinetics—absorption, distribution, metabolism, and excretion—only absorption appears to be substantially independent of age. The distribution of a particular drug can differ importantly in the elderly. An increase in the volume of distribution combined with a reduction in clearance will prolong elimination half-life, which might prolong the duration of action of a single dose of drug. With chronic dosing, reduced clearance without a change in the dosing interval leads to an increased steady-state concentration of medication (10). The higher frequency of ADRs in the elderly, rather than being a consequence of senescence alone, may be attributable in part to the fact that older patients consume more medications and are likely to have more baseline illness than younger patients (11).

**Conclusion**

This case shows a rare incidence of serotonin syndrome with Escitalopram use. It is very important that physicians are familiar with the signs and symptoms of Serotonin syndrome and should suspect it in anyone with altered mental status who is taking serotonin-modifying drugs. In our patient, the diagnosis was made early due to autonomic and neurological signs and suspicion of SSRI overdose which was confirmed when patient regained consciousness. Cessation of serotonergic medication and supportive care remain the mainstay of therapy.

**Acknowledgment:** We are thankful to Dr S. T. Malhan sir, Superintendent of our hospital and our institute for allowing to collect and publish this case report.

**Conflict of Interest:** Nil

**Source of Funding:** Nil

**Ethical Clearance:** Since it is a Case Report which was reported as an Adverse Drug Reaction (ADR) to our centre under Pharmacovigilance Programme of India, Ethical Clearance is not needed. However, the author has taken consent of patient to publish the data for scientific purpose, patient confidentiality is insured.

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Pattern and Profile of Injuries Sustained During Assault by Sharp Weapon: A Prospective Study During Year 2015-16 at Sms Medical College-Jaipur

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Abstract

Introduction: Death and injuries by sharp weapons needs proper attention as regards to their pattern and manner of infliction. This study was thus undertaken to obtain statistical data of the injuries caused by sharp force in fatal and non-fatal medico-legal cases at SMS Hospital, Jaipur to evaluate their pattern and medico-legal profile for of intentional injuries inflicted by others.

Material and method: This study consisted of all the Medico-legal cases of sharp force trauma inflicted by others during assault, including fatal and non-fatal cases comes in department of Forensic Medicine of S.M.S. Medical college Jaipur during the period extending from April, 2015 to March, 2016. A total no. of 93 cases of sharp weapon injuries were studied.

Observations: Males predominated in the present study with 86.02% of cases. Injury inflicted by others was more common in urban population (90.32%). In this study majority of cases of injuries inflicted by others were incised with 62 cases (60.78%) In 24 cases single edged weapon was used to inflict stab wound. Out of all the cases only 5 succumbed to death and was most commonly resulted from by hemorrhagic shock (4 cases).

Key words: Assault, Sharp, Incised, Stab, Shock.

Introduction

Injuries by sharp weapon have been a universal issue since antiquity to human kind. From mass warfare since ancient times to personal feuds of modern times has witnessed the use of sharp weapons leading to serious injuries and sometimes even loss of precious human lives. In modern times the medico-legal diagnosis of the injuries is considered an important aspect in serving the justice to the needful which cannot be overlooked. The medico-legal diagnosis of sharp injuries at post-mortem is handled by autopsy surgeons who are experts in the concerned field. But an individual in casualty suffering the sharp weapon injury requires multi-dimensional treatment ranging from primary treatment and medico-legal diagnosis of the said injury. These doctors might have a significant experience of treatment of the injured but the medico-legal diagnosis of the injuries is also expected from them as this is also of utmost importance in serving the justice.

The most common manner of injuries associated with sharp force trauma is homicide, followed by suicide. Fatalities by accidental sharp injuries do occur but are relatively rare. Fatal sharp injuries are usually indicative of extreme violence; and leads our attention towards the developing sense of frustration and lack of tolerance, indicative of mental disturbances in individuals. Death and injuries by sharp weapons is an underrated issue which needs proper attention as regards to their pattern and manner of infliction, which remains controversial at some times. Study of the profile and pattern of any type of Medico-legal cases is a fundamental aspect for...
the prevention of causalities in forthcoming times. This study was thus undertaken to assess the injuries caused by sharp force in fatal and non-fatal medico-legal cases at SMS Hospital, Jaipur to evaluate their pattern and medico-legal profile for accurate medico-legal diagnosis of intentional injuries inflicted by others and help the Autopsy surgeons and the causality medical officers to anticipate the types of injuries and their probable outcomes and help in aiding justice.

Material and Method

This study consist of all the Medico-legal cases of sharp force trauma inflicted by others, including fatal and non-fatal cases except those cases of alleged history of injury by sharp weapons but found to be resulting from blunt trauma which were brought for medico-legal examination or for autopsy in department of Forensic Medicine of S.M.S. Medical college, Jaipur during the period extending from April, 2015 to March, 2016. A total no. of 93 cases of sharp weapon injury inflicted by others were studied to find medico-legal profile of sharp weapon injuries in both Fatal and non-fatal cases.

Observation

A total of 22,740 medico-legal cases were catered to in the out-patient and in-patient department of SMS Hospital, Jaipur. Amongst them 179 cases were of sharp force trauma (0.78%) out of which 86 cases were excluded from the study. During the study period 4838 medico-legal autopsies were performed among which there were five cases of deaths due to sharp force injuries inflicted by others. Thus, a total of 93 cases comprised the study population in the present study.

Males predominated in the present study with majority of cases. In this study the injuries inflicted by others was most common in age group between 21 to 30 years with 40.86% cases followed by 31 to 40 years group with 27.96% cases. (Table I)

<table>
<thead>
<tr>
<th>Age Group (years)</th>
<th>TOTAL CASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>11 TO 20</td>
<td>14</td>
</tr>
<tr>
<td>21 TO 30</td>
<td>38</td>
</tr>
<tr>
<td>31 TO 40</td>
<td>26</td>
</tr>
<tr>
<td>41 TO 50</td>
<td>10</td>
</tr>
<tr>
<td>51 TO 60</td>
<td>04</td>
</tr>
<tr>
<td>Above 60</td>
<td>01</td>
</tr>
<tr>
<td>Total</td>
<td>93</td>
</tr>
</tbody>
</table>

Injury inflicted by others was more common in urban population (90.32%). Sharp injuries sustained during assault were most common during evening and night hours (82.42%). Most of the injuries sustained were outside home (51.61%) followed by incidence at home (25.80%). Alcohol ingestion was associated in 14 cases (15.05%). Only 5 cases were fatal out of 93 cases. Single injuries were noted in 37 cases (39.78%) followed by multiple injuries were noted in 33 cases (35.48%) (TABLE II)
In this study majority of cases of injuries inflicted by others were incised with 62 cases (60.78%) followed by stab injury with 16 cases (15.69%). (TABLE III)

**TABLE III: DISTRIBUTION OF CASES ACCORDING TO TYPE OF INJURY SUSTAINED.**

<table>
<thead>
<tr>
<th>Type of Injury</th>
<th>TOTAL CASES</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Only Incised Wound</td>
<td>62</td>
<td>66.67%</td>
</tr>
<tr>
<td>Only Stab Wound</td>
<td>16</td>
<td>17.20%</td>
</tr>
<tr>
<td>Stab Incised &amp; Incised Wounds</td>
<td>15</td>
<td>16.13%</td>
</tr>
<tr>
<td>Total</td>
<td>93</td>
<td>100%</td>
</tr>
</tbody>
</table>

In 60 cases, light sharp weapon was used and in rest 33 cases, moderately heavy weapon was used. In 24 cases single edged weapon was used to inflict stab wound and in rest of 7 cases stab wounds were inflicted using double edged weapons. Defense wounds were seen in 36 cases (38.70%). In this study it was observed that limbs were the most common part of the body that was injured followed by thorax and abdomen.(Table IV)

**TABLE IV: DISTRIBUTION OF CASES OF SHARP INJURIES ACCORDING TO BODY PART INVOLVED.**

<table>
<thead>
<tr>
<th>BODY PART</th>
<th>TOTAL CASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face</td>
<td>5</td>
</tr>
<tr>
<td>Head</td>
<td>3</td>
</tr>
<tr>
<td>Neck</td>
<td>4</td>
</tr>
<tr>
<td>Thorax</td>
<td>26</td>
</tr>
<tr>
<td>Abdomen</td>
<td>20</td>
</tr>
<tr>
<td>Limbs</td>
<td>60</td>
</tr>
<tr>
<td>Total number of injuries found in 93 cases</td>
<td>118</td>
</tr>
</tbody>
</table>
Out of all the cases only 5 succumbed to death and was most commonly resulted from by hemorrhagic shock (4 cases) while 1 person succumbed to septicemic shock. In 2 cases of those who succumbed to death the preferred area for assault was thorax injuring heart in both the cases. It was followed by assault to neck injuring common carotid and other major blood vessels of neck.

**Discussion**

This study was undertaken with the aim to study the medico-legal profile of fatal and non-fatal injuries inflicted with sharp force trauma at SMS Hospital, Jaipur during 2015-16 as regards pattern, manner of infliction and sharp weapons used for infliction of sharp injuries.

The load of cases of sharp injuries during this one year period was 0.78% out of which 0.001% cases proved fatal.

In the present study males were predominant (86.02%) and 13.98% females. The results of the present study are slightly variable to those of Bhullar DS and Aggarwal KK (2007) who reported use of 92% light and 7% heavy sharp weapons. However, their study did not classify heavy sharp weapons into moderate and heavier categories. Our findings were contrary to those of Kokatanur CM et al. (2015) who reported 64.6% of sharp injuries were caused by light sharp weapons in this study .Heavy sharp weapons were used in two cases although chop wounds were not caused. The gravity of those wounds could not manifest as accepted from the type weapon used most likely because of the difference in the area of the weapon used. The results of the present study are similar to those of Bhullar DS and Aggarwal KK (2007) who reported use of 92% light and 7% heavy sharp weapons. However, their study did not classify heavy sharp weapons into moderate and heavier categories. Our findings were contrary to those of Kokatanur CM et al. (2015) who reported 64.6% of sharp injuries were caused by light sharp weapons in this study and 28% by moderate sharp weapons.
where maximum victims 31.5% died of shock and hemorrhage followed by 28.5% died due to injury to brain, 17% died due to asphyxia, 15% died due to injury to vital organs. Similarly Dasgupta and Tripathi (1983) had observed that 56.72% died due to hemorrhage and shock. Dikshit PC et al (1986) had observed that cause of death in 51.28% victims was shock, 41.42% was coma due to brain injury and 4.28% was asphyxia. Though there is difference in number of cases, but the sequence of causes of death is similar to study of Dasgupta and Tripathi (1983) i.e. shock and hemorrhage is the main cause of death which outnumbers the other causes.

Present Study is consisted and correlated with simultaneous study Socio-demographic profile of fatal and non-fatal cases of sharp weapon Trauma at SMS medical College & Hospital, Jaipur During the 2015-16, Medico-legal Update:Vol 18:Number 1 January –June 2018; 20-249.

Conclusion

1. A forensic medicine specialist being an expert witness should be able to diagnose the medico legal injuries in their right perspective to help the investigating authorities and the courts of law for their logical conclusions. Apart from playing the role of an expert witness, he must also maintain the comprehensive data pertaining to the injured and the injuries for epidemiological records to assist in the surveys pertaining to the crimes on humanity for behavioral treatment of the criminals and the assault victims. Injuries caused by or sustained from sharp edged weapons may be suicidal, homicidal, self-suffered, self-sustained or accidental but certain medico legal parameters definitely help to diagnose the nature or mode of these injuries. It is worth taking a closer look at patterns of sharp injuries to assess their nature and manner for legal assistance

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Ethical Clearance: not required

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A Study of Awareness on Artificial Insemination among Medical College Students

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Abstract

Introduction: Artificial Insemination (AI) is the deliberate introduction of sperm into a female’s cervix or uterine cavity for the purpose of achieving a pregnancy through in vivo fertilization by means other than sexual intercourse. This is one among the methods of assisted reproductive technique. This study aims to find out the level of awareness about Artificial Insemination among medical students

Materials and Method: This is a questionnaire-based study. A self-administered questionnaire in multiple-choice format distributed among the medical students of Saveetha medical college. Total of 120 students, Forty students from each batch from second to final year were randomly chosen to participate in the the survey.

Results: 120 medical students participated in the survey out of which 76.67% of students had adequate awareness on artificial insemination. 85% of students knew the correct definition of AI while 86.74% were able to correctly identify the techniques used for artificial insemination. Final years medical students had more awareness on artificial insemination than their junior colleagues, and 2nd years medical students had least awareness. Students have inadequate knowledge on the technical aspect of artificial insemination like storage of semen (21%, n=25) and the time duration of sperm viability (54%, n=65) etc. Students also having inadequate knowledge on the legal, social and psychological issues like donor selection, consent of the spouse and the importance of understanding between the partners on artificial insemination.

Discussion: Most of the respondents knew about the basics of Artificial insemination with less awareness on its technical aspect, legal and ethical implications. Medical education have been a good source of information and the inclusion of Artificial Insemination as a form of infertility management in the curriculum of medical students could help in increasing awareness among students.

Keywords: Artificial insemination, Assisted reproductive technique, Awareness, medical students

Introduction

Artificial Insemination is a method of assisted reproductive technique, by which healthy semen is deposited into the vagina, cervix or uterus by instruments to bring about pregnancy.

There are three types of Artificial insemination: Artificial Insemination Homologues (AIH), Artificial Insemination Donor (AID), Artificial Insemination Homologues Donor (AIHD).¹²

A wealth of information about Artificial insemination exists on the internet but current public perceptions and awareness on Artificial insemination among Indian citizens are still unknown because attitude surveys have not conducted. Furthermore, to the best of our knowledge, this is the first survey of its kind in India.

Infertility is nowadays a common medical condition with social, emotional and psychological implications, displaying increasing rates in India and worldwide.

Artificial Insemination is the first line of treatment for infertility. According to PUTOWSKI L et al.³:

‘Popularity of the Artificial Insemination is due to the relatively simple procedure and the lower cost of
treatment compared with In vitro fertilization. In the case of Artificial Insemination, the time of stimulation is shorter and therefore the stimulation itself is cheaper. In countries where the access to IVF/ICSI is significantly limited by e.g. the lack of even partial coverage of costs, insemination treatment remains an important therapeutic step that can be offered to a couple who is unsuccessfully trying to have a child.’

The term Artificial Insemination (AI) includes techniques like intravaginal, intracervical, intrafallopian, intraperitoneal. In clinical practice the Intrauterine Insemination is most often performed. Its effectiveness in the form of live births outnumbers other methods of insemination⁴.

The effectiveness of Artificial Insemination is influenced by many factors, appropriate choice of the treated couple, the duration of infertility, woman’s age, semen quality, semen preparation, the number of inseminations in a cycle, mild ovarian hyper stimulation, the number of inseminations that a couple has already undergone.⁵

**Materials and Method**

This cross-sectional study was carried out from January 2019 to April 2019 at the Saveetha Medical University, Chennai, Tamil nadu. The convenience sampling technique was used to select students for the purpose of enrollment into the study.

This is a questionnaire-based study. A semi structured questionnaire in multiple-choice format was used to collect information in relation to the awareness of the participants about various domains of artificial insemination process.

The questionnaire was handed out to the Students of Saveetha Medical University from second year to final year with various background.

The study was conducted after taking the permission from Institutional ethics committee of the Saveetha Medical University.

On an average forty to fifty students from each batch from second to final year were randomly chosen. 140 Medical students were included. Students who were willing to participate were included in the study. Those who were not willing to participate were excluded from study.

After taking their informed consent the participants were asked to fill out the questionnaire and hand it back. 120 students returned the questionnaire with the response rate of 85.71%.

Questioners returned with incomplete response were excluded from the study.

The questionnaire was pretested before the data collection and necessary modifications were made in terms of content and language.

**Data analysis and presentation**

The responses from returned and properly completed questionnaires were collated, entered into an Excel spread sheet in a laptop and coded accordingly. The analysis was performed in terms of descriptive statistics proportions and means.

**Results**

This study included 120 medical students (Females: 80.833% n=97 and Males: 19.16% n=23) from second to final year with 40 students from each year.

When asked if the students had any prior knowledge of artificial insemination, 115 students said yes while only five said no.

Students had mostly acquired information on artificial insemination from lectures and books while internet, media and CME only played a minor role. (Fig.1)
A total of 15 questions (table I) were analysed using a scoring system where each right answer was coded as 1 and any wrong answer as 0.

**Table I Knowledge about artificial insemination among the medical students Questionnaire**

<table>
<thead>
<tr>
<th>Item number</th>
<th>Item</th>
<th>score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>What does the term artificial insemination mean?</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>What are the techniques used for artificial insemination?</td>
<td>1</td>
</tr>
<tr>
<td>3.</td>
<td>What do you think is the overall success rate of artificial insemination?</td>
<td>1</td>
</tr>
<tr>
<td>4.</td>
<td>When artificial insemination performed?</td>
<td>1</td>
</tr>
<tr>
<td>5.</td>
<td>Whose semen used for artificial insemination?</td>
<td>1</td>
</tr>
<tr>
<td>6.</td>
<td>At what temperature is semen stored in semen bank</td>
<td>1</td>
</tr>
<tr>
<td>7.</td>
<td>How long do sperms retain the power to fertilize the ovum after introduction into female genital tract?</td>
<td>1</td>
</tr>
<tr>
<td>8.</td>
<td>Is artificial insemination husband legal in India?</td>
<td>1</td>
</tr>
<tr>
<td>9.</td>
<td>Is artificial insemination donor legal in India?</td>
<td>1</td>
</tr>
<tr>
<td>10.</td>
<td>Can the donor be a relative of the couple?</td>
<td>1</td>
</tr>
<tr>
<td>11.</td>
<td>Can the donor be held guilty of adultery in India?</td>
<td>1</td>
</tr>
<tr>
<td>12.</td>
<td>Does the artificial insemination donor amount to consummation of marriage.</td>
<td>1</td>
</tr>
<tr>
<td>13.</td>
<td>Can the nonconsenting spouse claim divorce on the grounds of adultery or nonconsummation of marriage.</td>
<td>1</td>
</tr>
<tr>
<td>14.</td>
<td>Can Unmarried or widowed women avail artificial insemination</td>
<td>1</td>
</tr>
<tr>
<td>15.</td>
<td>Can artificial insemination be used for gender selection?</td>
<td>1</td>
</tr>
</tbody>
</table>

Among 40 students from each year, 38 students from final year had more than 50% knowledge on artificial insemination while only 28 from third year had more than 50% knowledge and 26 students from second year had more than 50% knowledge on artificial insemination. In total 76.67% of students had adequate awareness on artificial insemination among all the years.

85% (102) of students knew the correct definition (Fig-2) of AI while 86.74% were able to correctly identify the techniques used for artificial insemination.

**Figure 2 Definition Known correctly**

Comparatively only 17% (n=20) knew that the overall success rate of AI is 30-40
72% (n=86) of the students knows correct timing for Artificial insemination while remaining 28 (n=34) are not known the timing for AI.

When asked whose semen can be used 82%(n=97) answered that either the husbands or donors semen can be used while 7% answered only husbands semen can be used and 9% answered that only donors semen can be used while 2% answered not sure. (Fig-3)

Students seemed to have very little knowledge on the technical aspects of AI only 21% (n=25) knew that the semen is stored at -196 degree C while 48% (n=58) believed the storage temperature to be -4 degree C.

Almost half the participants 54% (n=65) knew that the sperms retain their power to fertilize the ovum after leaving the genital tract for 48 hours. While 31%(n=37) answered that they retain their power only for 24 hours while 8% (n=10) thought it was upto 7 days and 7% (n=8) thought it was less than four hours.

Most of the participants were aware of the legal issues pertaining to AI while some of them were mostly unsure.

73%(N=87) of students were aware that AIH is legal while 3% answering that it is illegal, 25% (n=30) were unsure about it. 68%(n=82) agreed that AID is legal while 7% thought it was illegal.

54% (n=65) agreed that the donor cannot be a relative of the couple while 35% (n=42) weren’t sure .62% (n=75) believed that donor cannot be held guilty of adultery while again 28% (n=33) weren’t sure.

Can the donor be a relative of the couple?

- 54% Yes
- 35% No
- 11% Not sure
- 2% Not sure

49% knew that unmarried or widowed woman could avail artificial insemination while 25% weren’t aware that unmarried woman can avail artificial insemination.

However most of the students (n=104) agreed that artificial insemination cannot be used for gender selection while only 3 thought that it could be used for gender segregation with 13 not sure.

Discussion

Overall awareness on Artificial Insemination among the students was good. This shows the impact of lectures held by professors and specialists in the field impact step-wise education in the process of solving fertility problems through Artificial Insemination. The inclusion of Artificial Insemination in medical books is also an important factor in students knowledge of the subject. This may also be why a large proportion of respondents agreed that Artificial Insemination should be socially acceptable.

According to Howkin and Bourne⁶:

The semen used for Artificial Insemination is first washed, concentrated and its quality improved by
the ‘swim-up’ technique or by use of Percoll gradient. The semen with normal sperms with good motility thus obtained is then inseminated into the female genital tract. Obviously, Artificial Insemination is done around ovulation. About 1/2 mL of concentrated semen is injected 36 h after hCG injection when the ovarian follicle reaches 20 mm. Semen washing removes the abnormal sperms, seminal plasma containing antibodies and other debris, as well as prostaglandins’ (p.247)

They also state that:

‘Intrauterine insemination is normally done once around ovulation, some prefer to do twice in each cycle. Intrauterine insemination (IUI) is repeated up to 3–6 cycles. One moves to IVF or intracytoplasmic insemination if conception fails. The IUI should be done within 90 min of collection of semen, for optimal results. Prophylactic progesterone is recommended to the woman in the luteal phase An Artificial Insemination with husband’s semen for 4 cycles has yielded 30% overall success with 10% success per cycle.’ (p.247)

In this study only 17% of respondents knew the overall success rate of Artificial Insemination

According to ESHRE experts7 IUI combined with the ovulation stimulation before the IVF treatment trial can be offered to the infertile couples because of low cost of procedure and potential success in the form of pregnancies in numerous couples qualified for such a treatment.

According to the study conducted by Ashrafi M et al8:

‘The rate of achieved pregnancies per cycle with IUI is the highest among couples with unexplained infertility and the lowest among couples in whom there is a number of factors limiting fertility determined.’

Artificial Insemination can be done with the husbands or donor semen. Unsuccessful attempts with the use of the husband’s semen in IVF or ICSI and couples in whom the IVF procedure cannot be proposed (e.g. financial barrier) and the presence of severe oligoasthenotatozoospermia or obstructive or non-obstructive azoospermia which do not give chance for pregnancy are factors that qualify to IUI with the donor’s semen.9-10

Majority of students (87%) agree that Artificial Insemination must not be used for gender selection.

Most of the students were unsure about the legal aspects of Artificial Insemination. This problem is also compounded by the absence of a statutory law on Artificial Insemination in India. The status of a child born after Artificial Insemination still remains unclear. A study conducted by Sita Kumari11, looked into the legal issues and current existing laws on Artificial Insemination in India and in other countries around the world. The study concludes that the current legal position of India on Artificial Insemination is inadequate and warrants suitable amendments to all existing laws which are related directly and indirectly related to the status of an AID child

On studying the laws of other countries the study concluded that legitimacy will be conferred on an AID child if the husband consents for the same11

Another ethical issue related to semen donation is the right to disclosure. There is an increasing tendency to disclose the identity of donors to the resulting offspring. A Swedish study12 on disclosure behavior and intention suggested that majority of the infertile couples were willing to disclose the donor identity to their offspring. Seventy-eight percent (78%) of the study population were planning to tell their offspring about the donation. However in a study conducted by Ezugwu et al13 in low resource settings in Nigeria, approximately nine out of ten infertility couples indicated that the identity of the sperm donor should not be disclosed to donor-conceived children. This shows the disparity among infertile couples in different countries. In our study, most (44%) were unsure if the child born after Artificial Insemination should be informed after growing up with only 38% agreeing that the child should be informed. Majority (89%,n=107) agreed that donor identity should remain anonymous while only 11% disagreed

This preference may be as a result of the absence of legislation in both Nigeria and India addressing the legal issues involved in gamete (sperm) donation. In countries where donor nonanonymity is practiced, there are usually regulatory bodies and legislations guiding gamete donation and its use in ART. In the UK, sperm donors do not have any legal claim to the child and are also protected from any legal responsibility to the child14

Hence this study shows an overall good level of knowledge, awareness as well as perception of Artificial Insemination among medical students. Medical lectures have been a good source of information and the inclusion
of Artificial Insemination as a form of infertility
management in the curriculum of medical students has
helped in increasing awareness among students

Study limitations

This study has some limitations. First it was a
convenient sampling of all medical students from a
particular geopolitical area of the country and does not
necessarily represent the views, opinions and awareness
level of medical students from other parts of Tamil Nadu.
Also, a control group of non-medical students could
probably have strengthened the study.

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collect the data.

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Conflict of Interest: None declared

Ethical approval: The study was approved by the
Institutional Ethics Committee

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A Cross-Sectional Study of The Pattern of Cases of Deliberate Self-Harm in a Tertiary Care Hospital

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Abstract

Objective of the Study: To study the different methods used for DSH and precipitating factors

Materials and Method: The present study was conducted in the department of emergency medicine in St John’s Hospital, Bengaluru. 337 individuals who were brought to the emergency department with an alleged history of DSH and were stable after medical management were selected for the study. Subjects were assessed using the structured questionnaire and a thorough history. Group differences for categorical variables were examined with fissure exact test.

Results: Analysis revealed that 60.5% of DSH cases were in the age group of 18-30 years, 54.3% were females, 37.7% of family problems, 42.1% preferred drug over dosage, 10.7% in February and17.8% on Mondays.

Interpretation & Conclusion: Young adults were the most vulnerable group. Singles outnumbered all others. Nuclear family and urbanization proved to be risk factors. Most of them attempted DSH because of family problems and most attempted at home. Drug overdose was the most preferred method.

Keywords: Deliberate self-harm, Suicide attempt, Suicide prevention

Introduction

Deliberate self-harm, both fatal and non-fatal, has become a serious challenge to the public and private health sector of India. Known in many other terms like attempted suicide, deliberate self-injury and Para suicide, an act of self-infliction is well defined by the word ‘Deliberate Self Harm’, which covers all dimensions of self-poisoning and injury – the purposes behind be any1. DSH also forms one of the most common causes for acute medical admissions for both men and women. Most of the developing countries including India don’t maintain an active register of self-harm. England is the first nation to introduce one such, in 2002. Health service planning requires frequently updated information in the dynamic trends of self-harm, to assess the effectiveness of management and preventive measures, as well as to maintain an optimal provision of services to the victims.

This study considers all non-fatal self-harm cases as parts of deliberate self-harm and also carries references to intentional self-inflicted poisoning, injuries and self-harms which may or may not have fatal intents or outcomes. Some of the survivors of self-harm commit it again with a strong intention to die, but they fail. Presently no specific nomenclature exists to denote these two groups. Suicides have been studied and theorised extensively but a very few of those studies consider self-harm, which is a main reason why very less amount of data exists in the national level regarding DSH. Though the National Crime Bureau keeps the statistics of committed suicides, there is no credible source at national level for data regarding the number of deliberate self-harm cases. Most of the suicide cases were under reported in this regard.

Materials and Method

This study was conducted in the Emergency Medicine Department of St John’s Medical College Hospital, a tertiary care hospital with a yearly Emergency OPD cases of around 50000. This hospital is located in Koramangala, situated in the south-eastern part of Bangalore. It is a cross-sectional study and data
collection was done from January 2014 to December 2014. All those individuals who came to/brought to the emergency department of the hospital with a known history of DSH and stable after medical management were selected. An average of 25-30 cases each month accounted to a total of 337 cases of DSH in the year 2014. All cases with history of accidental over dosage of therapeutic agents, alcohol or other poisons and fatal cases of deliberate self-harm were excluded.

A structured questionnaire was given to the subject after taking written informed consent by explaining them the pros and consequences of the study under taken at emergency department of St John’s Hospital, Bangalore. An informed consent to participate in the study was taken from each one of the patients. Strict confidentiality was assured to the patients and their families regarding their identity and details collected during the interview. They were interviewed once they gained physical stability after resuscitation, recovery and a short period of observation in the emergency medicine intensive care unit.

This study has been granted ethical clearance by the Institutional Ethical Review Board (IERB), St. John’s National Academy of Health Sciences. A pilot study was undertaken at St John’s Hospital, Bangalore in December 2013 with individuals who came with history of deliberate self-harm. The purpose of this pilot study was to assess the feasibility of the study, ease with which individuals could answer the self-administered questionnaire and time taken per subject interview. A total of 10 subjects were interviewed in the pilot study. The pilot study helped in scheduling data collection for this study and incorporating changes in questionnaire where required.

Statistical examination and data treatment were carried out by standard statistical methods using SPSS 20 version software. All study variables were described by appropriate descriptive statistics methods like frequency and percentages were done by using Fisher’s exact test since the expected counts in some cells were considerably small. The p value of <0.5 was considered to be statistically significant.

### Results

**Table 1. Age wise distribution of deliberate self-harm cases**

<table>
<thead>
<tr>
<th>Age group in years</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 14</td>
<td>3</td>
<td>0.9</td>
</tr>
<tr>
<td>14 &amp; above- below 18</td>
<td>15</td>
<td>4.5</td>
</tr>
<tr>
<td>18 and above- below 30</td>
<td>204</td>
<td>60.5</td>
</tr>
<tr>
<td>30 and above- below 45</td>
<td>96</td>
<td>28.5</td>
</tr>
<tr>
<td>45 &amp; above – below 60</td>
<td>13</td>
<td>3.9</td>
</tr>
<tr>
<td>60 &amp; above</td>
<td>6</td>
<td>1.8</td>
</tr>
<tr>
<td>Total</td>
<td>337</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Table 2. Sex wise distribution of DSH cases**

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>154</td>
<td>45.7</td>
</tr>
<tr>
<td>Female</td>
<td>183</td>
<td>54.3</td>
</tr>
<tr>
<td>Total</td>
<td>337</td>
<td>100</td>
</tr>
</tbody>
</table>
### Table 3. Precipitating factors

<table>
<thead>
<tr>
<th>Factors</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Debt</td>
<td>16</td>
<td>4.7</td>
</tr>
<tr>
<td>Marital conflict</td>
<td>68</td>
<td>20.2</td>
</tr>
<tr>
<td>Exam tensions</td>
<td>20</td>
<td>5.9</td>
</tr>
<tr>
<td>Other family problem</td>
<td>59</td>
<td>17.5</td>
</tr>
<tr>
<td>Illness</td>
<td>18</td>
<td>5.3</td>
</tr>
<tr>
<td>Mental illness</td>
<td>42</td>
<td>12.5</td>
</tr>
<tr>
<td>Death of dear person</td>
<td>3</td>
<td>.9</td>
</tr>
<tr>
<td>Drug addiction</td>
<td>11</td>
<td>3.3</td>
</tr>
<tr>
<td>Love affair</td>
<td>49</td>
<td>14.5</td>
</tr>
<tr>
<td>Unemployment</td>
<td>11</td>
<td>3.3</td>
</tr>
<tr>
<td>Career problem</td>
<td>7</td>
<td>2.1</td>
</tr>
<tr>
<td>Other causes</td>
<td>33</td>
<td>9.8</td>
</tr>
<tr>
<td>Total</td>
<td>337</td>
<td>100.0</td>
</tr>
</tbody>
</table>

### Table 4. Methods

<table>
<thead>
<tr>
<th>Methods</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug overdose</td>
<td>142</td>
<td>42.1</td>
</tr>
<tr>
<td>Drowning</td>
<td>1</td>
<td>.3</td>
</tr>
<tr>
<td>Self-immolation</td>
<td>3</td>
<td>.9</td>
</tr>
<tr>
<td>Other poisons</td>
<td>70</td>
<td>20.8</td>
</tr>
<tr>
<td>Hanging</td>
<td>14</td>
<td>4.2</td>
</tr>
<tr>
<td>Insecticides</td>
<td>56</td>
<td>16.6</td>
</tr>
<tr>
<td>Self-infliction of injury</td>
<td>23</td>
<td>6.8</td>
</tr>
<tr>
<td>Other means</td>
<td>22</td>
<td>6.5</td>
</tr>
<tr>
<td>Alcoholism</td>
<td>6</td>
<td>1.8</td>
</tr>
<tr>
<td>Total</td>
<td>337</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Table 5. Month wise distribution of DSH cases

<table>
<thead>
<tr>
<th>Months</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>April</td>
<td>31</td>
<td>9.2</td>
</tr>
<tr>
<td>August</td>
<td>33</td>
<td>9.8</td>
</tr>
<tr>
<td>December</td>
<td>20</td>
<td>5.9</td>
</tr>
<tr>
<td>February</td>
<td>36</td>
<td>10.7</td>
</tr>
<tr>
<td>January</td>
<td>33</td>
<td>9.8</td>
</tr>
<tr>
<td>July</td>
<td>29</td>
<td>8.6</td>
</tr>
<tr>
<td>June</td>
<td>23</td>
<td>6.8</td>
</tr>
<tr>
<td>March</td>
<td>30</td>
<td>8.9</td>
</tr>
<tr>
<td>May</td>
<td>26</td>
<td>7.7</td>
</tr>
<tr>
<td>November</td>
<td>30</td>
<td>8.9</td>
</tr>
<tr>
<td>October</td>
<td>22</td>
<td>6.5</td>
</tr>
<tr>
<td>September</td>
<td>24</td>
<td>7.1</td>
</tr>
<tr>
<td>Total</td>
<td>337</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 6. Day wise distribution

<table>
<thead>
<tr>
<th>Days</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friday</td>
<td>39</td>
<td>11.6</td>
</tr>
<tr>
<td>Thursday</td>
<td>50</td>
<td>14.8</td>
</tr>
<tr>
<td>Monday</td>
<td>60</td>
<td>17.8</td>
</tr>
<tr>
<td>Saturday</td>
<td>47</td>
<td>13.9</td>
</tr>
<tr>
<td>Tuesday</td>
<td>45</td>
<td>13.4</td>
</tr>
<tr>
<td>Sunday</td>
<td>51</td>
<td>15.1</td>
</tr>
<tr>
<td>Wednesday</td>
<td>45</td>
<td>13.4</td>
</tr>
<tr>
<td>Total</td>
<td>337</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Discussion

Table No. 1 depicts that the maximum number of DSH patients were in the age group of 18-30 years (60.5%) and least in the age group <14 yrs.(0.9%). The probable reason for young adults being the most important group of DSH patients is- they are the most vulnerable group and as they grow older, there is a chance of their traditionalist households becoming less supportive. They are more prone to job anxiety, higher expectations at home and work place. The modern day youth lives in a fast paced and highly competitive environment with an additional burden of peer pressure and familial pressure. It is a time of emotional turmoil and they are unable to cope with rejection or the other challenges faced in love. Most of the women in this age group are newly married and find it difficult to adjust and coexist in peace and harmony with their spouse and his family. One of the study determined the mean age of attempters as 25.3

Another study shown that people belonging to the age group of 16 – 40 are found with more suicidal ideation in a study of suicidal ideators in a general hospital setting. So almost all studies are consistent with these findings.

Table No. 2 depicts that deliberate self harm is more prevalent in females. Although attempted suicide was 1.2 times higher in women relative to men in some studies, other studies showed a male predominance of Male: Female ratio ranging from 1.13: 1² to 1.63: 1⁶. These differences may be reconciled by an appreciation of social changes in India, with a shift toward nuclear families and the cultural emphasis on the male stereotype which the individual tries to fulfill in vain. In our study the Male: Female ratio was 1: 1.19.

Majority of them were due to marital discord (20.2%) with other family problems (17.5%) coming a close second as depicted in table no 3. Most of the cases in other family problem were due to argument with one of the family member other than the spouse. So in total family problems formed a group of 37.7%. Love affairs formed 14.5% and illness 17.8 % (including insanity/ mental illness (12.5%). Studies on attempted suicide concluded most of the cases with interpersonal conflict, financial stressors, and educational burden as the most common triggers. Chronic pain and illness is featured as a common reason in some studies.

Self-inflicted injuries constituted 6.8% of the cases as depicted in table no 4, of which most of them were due to love failures and was probably motivated by what they had seen on the media when encountered with a similar situation. The common injuries noted were cut injuries near the wrist joint by a sharp object, injuries sustained while punching a mirror or a window and while banging their head on the wall. Other means of attempting DSH constituted around 6.5% and included cases such as consuming bangles, rings and injecting air. Only 4.2% of cases were due to hanging as it was done more with
a definite suicidal intention and most of them succeeded and hence excluded from the study. Those who survived this method were those who did it in front of or in the presence of others and was rescued immediately or due to an improper or failed technique such as a broken fan or ligature material. There was also one case of a person who attempted hanging because her mother had hung herself. 1.8% cases were attributed to alcoholism with most triggering factors being academic failure or the loss of a dear one. Next group was self-immolation (0.9%) and the least attempted method in our study was drowning (0.3%). As these are lethal methods and as DSH are non-fatal in nature only very few are in this group. An Indian study of suicide attempters classified motivation into ‘the wish for change’ and ‘the wish to die’ groups and found that the former had low lethality, lack of planning for their attempt, more likelihood of rescue and were not intoxicated during the attempt. The latter group utilized more drastic measures, such as hanging and was more likely to have a psychiatric disorder with co morbid alcoholism. 

Most of them opted for drug over dosage. Among them, many were impulsive responses to acute psychosocial stressors. So most of the cases were unplanned type and used whatever accessible tool at that particular time. In drug over dosage cases, almost all of the drugs used were already available in their households. Analgesics, vitamins, cough syrups and psychiatric drugs were on the top of the list. The second highest numbers of cases were from poisons other than insecticides like herbal cockroach powder, phenol, goodnight solution, nail removers and rat poisons. The next groups were those who had insecticide.

Table 5 shows more cases were reported in the month of February forming 9.8% and then January and august with 9.8% each and least in the month of December around 5.9%. When analysed with the seasonal pattern of Bangalore, it was noted that the maximum incidence occurred in winter, followed by monsoon and summer. Table 6 shows more cases were attempted on Mondays at about 17.8% and it was followed by Sundays(15.1%). Thus Sunday and Monday constituted about 32.9% and these similarity can be seen in almost all of the yearly reports of NSRF.

In summary our study had identified as 18-30 years as the most stressful time period in one person’s life as more prone to job anxiety, higher expectations at home and work place. Family problems were the first precipitating factor followed by love affairs. Most of them preferred drug overdose because of its easy availability followed by poisons. The month with more number of cases was February and in the winter season and among days it was Monday.

**Ethical Clearance:** This study has been granted ethical clearance by the Institutional Ethical Review Board (IERB), St. John’s National Academy of Health Sciences.

**Source of Funding:** Self

**Declaration of Interest:** The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

**References**

Study of Profile on Juvenile criminals in Chennai

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Abstract

Juvenile delinquency is a serious offence and it is detrimental for the social order in any country. There is a trend of increase in juvenile crimes world-over, with more and more involvement of the youth in violent crimes. Chennai shows similar trends of increasing rate of violent crimes committed by the juveniles. It is a very serious concern for the district and solutions to end the problem need to be sought very carefully. Indian legal system and judiciary has responded to these trends and has brought some amendments in the laws pertaining to juvenile justice in India [1]. This paper aims at looking at the causes of juvenile delinquency and explanations in Chennai for the year 2016. The analysis of statistical data available at the CBCID office crime branch indicates increasing involvement of the juveniles in heinous crimes. Observation homes, Shelter homes have been started by the government for the sake of such offenders then also the rate is continuously increasing day by day. For delinquent juvenile we can say that Prevention is better than cure juveniles should be protected from going to the wrong path.

Keywords: Juvenile criminals, Educational status, Economic status, Nature of crime, Family background, Recidivism, Juvenile delinquency.

Introduction

A child is born with innocence and if nurtured with tender care and attention, then they grow in positive way. Physical, mental, moral and spiritual development of the children makes them capable of realizing their fullest potential. On the opposite side, harmful surroundings, negligence of basic needs, wrong company and other abuses may turn a child to a delinquent i.e. a juvenile delinquent [2].

Juvenile Delinquency means participation of minors or young people in illegal activities. Various legal systems in the world have adopted specific procedures to deal with juvenile offenders such as Juvenile Justice Courts, Observation Homes etc. A juvenile delinquent in India is a person below the age of 18 and has committed act prohibited under the Indian Penal Code, 1860.

This paper aims at looking at the causes of juvenile delinquency and explanations given by scholars from various fields to explain the problem.

Objective

1. To identify the insights about the personal and family background of the juveniles in under the conflict with the law in Tamil Nadu.

2. To explore the nature of offences and charges committed by juveniles such as offence against person, property, etc.,

3. To analyze the role of family and other agencies for the cause of juveniles who are charged committing the offence.

Materials and Method

In case of juvenile criminals the nature and severity of the problem though vary to a great extent in the different part of the world but has posed a serious menace for every society in recent years. Therefore, it needs an in-depth study so as to suggest suitable preventive and curative measures [3]. In this descriptive work, efforts have been made to study and analyze the problem of juvenile in conflict with the law with special focus on the factors responsible for prevalence of the problem which include the educational status, age limits, economical status, family background and recidivism of the juveniles. The design structured for this study is descriptive because the aim of descriptive research design is to interpret and explain the problem on the basis of collected facts. The purpose of this research design is to provide description
of the individuals, nature and causes of the problem under investigation, i.e. juvenile in conflict with the law. This study describes the profile of the juveniles to be in conflict with the law.

The secondary data were collected from different sources such as books, journals, documents and newspapers to substantiate the primary data and to add validity to the analysis. Information was also collected from the records of the District Crime Records Bureau, Chennai.

**Result**

**Educational status**

As we know education plays an important role in the formation of behaviour pattern particularly among the children at the earlier stages. From our data it is clear that out of 485 juvenile offenders the majority of the juvenile offenders i.e. 208(42.8%) belong to above primary but below matric education. But no one had the opportunity to study matric or higher secondary. About 19.7% of the juvenile criminals are illiterate and 181(37.3%) juvenile criminals attended primary school.

![Figure 1: Education of juvenile criminals](image)

**Age**

The age group starts from below 12 years and till 18 years. These age limitation was also amended by Juvenile Justice Act 2000. It is seen from the collected data that major age group was found to be between 16 to 18 years and out of 485 juvenile criminals the number of juvenile criminals who belong to this category are around 339(69.8%), as the age increases anti-social activities also increases. The minimal juvenile delinquents belong to below 12 years of age that is about 8.1%. The juvenile criminals between 12 years to 16 years are 107(22.06%)

It is found out from the above analysis that overwhelming majority of the juvenile delinquents belong to the age group 16 -18 years of age.
Our collected data indicates that out of 485 criminals a large majority i.e. 243 (50.1%) of the juvenile criminals had annual income of Rs. 50,001 - 1,00,000 and the remaining 50% have a varied annual income. Juvenile criminals with annual income of Rs. 25,001 to Rs. 50,000 are 40 (8.2%) and criminals with middle income of Rs. 1,00,001 - 2,00,000 are 191 (39.38%). There were no criminals with annual income more than Rs. 3,00,000 and very little criminals belong to the upper middle class. Findings summary indicated that most of the criminals were belonging to poor families which were resource poor or were earning limited income. It can be said that poverty and wishes for better life were leading these young children towards crime.
Nature of the crime

Table 1: Nature of crime of juvenile criminals

<table>
<thead>
<tr>
<th>Crime</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Murder</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Culpable homicide not amounting to murder</td>
<td>2</td>
<td>0.5</td>
</tr>
<tr>
<td>Rape</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Kidnapping and abduction</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dacoity</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Robbery</td>
<td>6</td>
<td>1.7</td>
</tr>
<tr>
<td>Criminal trespass/Burglary</td>
<td>14</td>
<td>3.9</td>
</tr>
<tr>
<td>Theft</td>
<td>307</td>
<td>87.4</td>
</tr>
<tr>
<td>Forgery</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other IPC crimes</td>
<td>20</td>
<td>5.6</td>
</tr>
<tr>
<td>Total</td>
<td>351</td>
<td>100</td>
</tr>
</tbody>
</table>

The table 1 depicts the crime committed by the juvenile criminals. About more than 3/4 of the criminals have committed theft. 3.9% of the criminals are involved in criminal trespass or burglary. The remaining criminals have committed varied crimes like robbery, murder, dacoity, culpable homicide not amounting to murder and other IPC crimes.

It can be said that theft and criminal trespass or burglary are the majority of the crimes committed by juvenile criminals. So it can be inferred that the juveniles have committed these crimes mostly for their income generation.

Family background

Our data reveals that the majority of the criminals which is 283 (58.3%) live with their parents and 70(14.4%) criminals are living with their guardians. On the other hand, 132(27.3%) criminals are homeless. The criminals who are with their parents should have committed crimes in order to satisfy their daily and family requirements.

![Figure 4: Family background of juvenile criminals]
Recidivism

In Chennai majority of the juvenile criminals (93.1%) have been apprehended for the first time. Minority of the juvenile criminals (6.9%) have been apprehended in the past. Most of the juvenile criminals who have committed crime for the first time have not reoffended the crimes for the second time.

![Recidivism](image)

**Figure 5: Recidivism of juvenile criminals**

Discussion

Education

From our study it is found that majority of the juvenile offenders in Chennai belong to above primary but below matric education category. But no one had the opportunity to study matric or higher secondary. And about 19.7% of the juvenile criminals are illiterate. According to times of India, out of the 7,870 juveniles apprehended in 2015, 3,088 have only been educated up to a primary level, 902 were illiterate and 3,261 had an educational background till higher secondary. For many young offenders, education has long been a struggle. Peter Leone, a professor of behavior disorders at the university of Maryland who specializes in youth incarceration, said that kids who do poorly in school early on are more likely to be truant, or to participate in the sorts of low-level criminal activity that send many kids to detention facilities. The evidence is clear that poor school performance, truancy, and leaving school at a young age are connected to juvenile delinquency.

Age

In our study it is found out that over whelming majority of the juvenile delinquents belong to the age group 16 -18 years of age and minimal juvenile criminals are below the age of 12 years. As per the statistics released by the National Crime Bureau (NCRB), juvenile criminals between 16 and 18 years accounted for more than 60% of the crimes registered against minors in India in 2013. So it is evident that most of the juvenile offenders belong to the age group 16-18 years of age. However, when the latest trends in juvenile delinquency in India are analyzed, in respect of the age pattern and nature of offences committed, it appears that we need to review and amend our juvenile justice policy (Shivani Goswami and Neelu Mehra, 2014). The same kind of trends appeared in US and UK, with peaking of heinous crimes committed by the juveniles in the age group of 16 to 18 years (McDowell, L. Gary, Smith, Jinney, 1999). So there should be strict laws for such juveniles. So that a person cannot be remained unpunished in the cover of a juvenile. Studies of criminal activity by age consistently find that rates of offending begin to rise in preadolescence or early adolescence, reach a peak in the adolescence, and fall through young adult.

Economic status

On analysis of our data it indicates that a large majority i.e. 50.1% of the juvenile criminals had a...
income of Rs.50,001 -1,00,000 and the remaining 50% have a varied annual income and very little criminals belong to the upper middle class. There were no criminals with annual income more than Rs.3,00,000.similarly in a research conducted in Madurai kamaraj university on a study of the causal factors leading juveniles to be in conflict with the law in Tamilnadu indicates that nearly 42 percent of the children come from poor economic condition of their parents (or) family. Around 47 percent of the children belong to normal economic condition of their parents (or) family and only 5.4 percent come from rich back ground [3].One of the important reason for juvenile delinquency is poor economic status. Low income is not, as we have seen, often a single direct cause of juvenile delinquency. It is a complex of factors associated with low income: bad housing, slum neighborhood, prevalence of gangs and lack of community organization. From the above discussion it is understood that people with low economic status tend to commit crimes more than people with moderate economy in order to improve their economy.

Nature of crime

In our study about more than 3/4 of the criminals have committed theft 3.9% of the criminals are involved in criminal trespass or burglary. In similar studies conducted in Maharashtra and Rajasthan in 2015, the highest share of cases registered against juveniles were reported under the crime head “theft” (19.2%), “rape” (5.4%), and kidnapping and abduction (5.2%) [6]. The most involved criminal activity is theft. These crimes are almost always likely to rise with poverty. Thus, both poverty and income inequality are considered to be reasonable proxies of resource deprivation. But, some other types of crimes are different in their relationship with poverty.

Family background

The data in our study reveals that the majority of the criminals (58.3%) live with their parents and 14.4% of the criminals are living with their guardians. On the other hand, 27.3% of the criminals are homeless. Another study done by the child line, India in 2004 reveals that children living with parents/guardians accounted for 76.6% of the total juvenile arrested. The number of homeless children arrested for various crimes was only 7.5% [7]. As a child’s emotional attachment to his parents ensures a well- adjusted adult, so parental rejection of the child has powerful opposite effects. Rejection by the family, which is the child’s first and fundamental “community,” sets the stage for another social tragedy. Rejected children tend gradually to drop out of normal community life. Bonding between children and parents is critical to helping protect against youth violence.

Recidivism

On analysis of the data it is seen that majority of the juvenile criminals (93.1%) have been apprehended for the first time. Minority of the juvenile criminals that is 6.9% have been apprehended in the past. In an identical study too, among the 211 juveniles interviewed, 174 juveniles (82%) indicated that they were the first time offenders whereas only 37 juveniles (18%) mentioned that they were repeat offenders [6]. While researchers have not yet been able to establish a direct causal relation between these two variables, it has been demonstrated that poor academic outcomes can adversely affect a child’s behavior, and early behavioral problems can lead to poor academic outcomes. Studies have also shown that rates of recidivism are highly correlated with low levels of academic performance. Lastly, research has demonstrated that the implementation of sound academic interventions, particularly in reading, can effectively reduce rates of both delinquency and recidivism.

Conclusion

Juveniles involved in crimes are not criminals, in fact, they are victims of society. Juvenile delinquency can be stopped at an early stage, provided special care is taken both at home and in school. Parents and teachers play a significant role in nurturing the mind of a child. Instead of labeling them as criminals or delinquents- steps need to be taken to give them a scope of rectification and it would be better if the errors in their lives (involving social and psychological) are brought to their notices. Juvenile delinquent needs the sympathy and understanding of our society and not the heavy hand of the law. In India, it is indicated from the crime trends that existing laws (prior to 2016) were not proving to be a deterrent. The constant exposure of children to violence and lack of understanding about the consequences of crime committed makes them quite prone to delinquent tendencies. The problem gets worsened in absence of some adults in role of responsible guardians to give them and help them in filtering the information that comes to them through various sources. The primary socialization that functioned through groups such as family, peer groups, traditional neighborhood ties, close kin circles.
is fast becoming ineffective in Indian society. All this has lead to present trends in juvenile delinquency. It is hoped that the study findings will be useful for increasing greater awareness about the profile juvenile criminals, enhancing sensitivity towards the vulnerability of juveniles in conflict with law and planning for systematic rehabilitation.

**Recommendation**

1. Training should be given to the parents who are not able to adjust with their children’s behavior, by the family consellors’

2. Create the awareness about the moral education and behavioral changes among the school children by the school teachers, NGO’s, counsellors

3. Creating and inspiring team work of private and public agencies to prevent the increasing delinquency

4. Giving preparatory training to the members and staff of all organizations concerned with delinquency control.

5. Establishing child guidance clinics to give appropriate treatment to the disturbed and mal adjusted children in schools and all local areas especially rural and slum areas.

6. Counselling centre in every school should be established for early detection and care of the problematic children in the school

7. General awareness programmes should be launched for educating the family to motivate the children in developmental activities.

8. Proper healthy recreational facilities should be provided in rural areas and slums so that the children may channelize their energies in the right directions and neutralize the criminal tendencies.

9. Giving proper assistance to under privileged children to build them with good character.

10. Improving the social environment – slum areas, devoid of gambling centers to prevent children from getting polluted.

**Fund** - Self.

**Conflict of Interest** - Nil

**Ethical Clearance** - Approved by the institution and ethics committee of Saveetha Medical College.

**References**


Characteristic Properties of «Enoant» Bioflavonoids in Alcoholic Liver

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Abstract

At present, the question of the effectiveness of the use of bioflavonoids in the treatment of the alcoholic liver disease is of practical interest and attention from modern medicine. **Aim of our research** is to analyse the antioxidant properties of Enoant in alcoholic liver and to establish the ultra morphostructural changes in liver tissue. **Materials and methods** - assessment of changes in alcohol-impaired rat liver were studied before and after administration of Enoant bioflavonoid concentrate. **Results** - The positive effect of “Enoant” is explained by the antioxidant properties of bioflavonoids, their ability to reduce peroxidation of proteins, stimulate reparative processes, activate protein synthesis and enhance the system of antioxidant protection of hepatocytes. All this allows to attribute the concentrate of bioflavonoids “Enoant” to highly active hepatoprotectors and is of practical interest at all stages of treatment of patients with different stages of liver lesions.

**Keywords:** Alcoholic liver damage, Liver tissue morphology, Concentrate of bioflavonoids “Enoant”, Antioxidant properties of bioflavonoids, Toxicology, Liver pathology.

Introduction

At this time, according to WHO, there is an increase in the number of liver diseases. Alcohol is one of the etiological factors that cause these diseases. Depending on the dose and duration of its use, various forms of damage occurs from alcoholic fatty infiltration to alcoholic cirrhosis [1, 4, 6, 7]. The basis of liver damage by alcohol is the activation of free-radical processes [8, 9, 10]. Medicines used in the complex therapy of these diseases have more than 1000 names. Among them are drugs that increase the resistance of the liver to pathogenic factors and restore its functional activity [5, 11].

Biological activity of grape processing products which are rich in polyphenols as well as their benefits of the human health are well known and worth of studying. It was first shown in Toulouse, France, that cardiovascular mortality stayed the lowest in Europe despite the high level of dietary saturated fats. It was named “a French paradox” [12]. It was proved later that the paradox is caused by the cardioprotective action of polyphenols in red wines that are the traditional beverages of an average Frenchman. Polyphenols are supposed to act as antioxidants that neutralize free radicals, decrease oxidative enzymes’ activity and reduce peroxide lipids’ levels in blood serum [13]. One of the richest sources of polyphenols is *Vitis vinifera*, and products of its processing, including flavonoids and other polyphenols of grape, wine, and grape seeds, are of a great interest due to their antioxidant properties and the ability to scavenge free radicals [14].

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Substances of plant origin, in particular, concentrate of polyphenols of grapes “Enoant”, are quite promising for clinical hepatology. Monomeric grape polyphenols have a pronounced antioxidant activity. In the concentrate of “Enoant”, it mainly consists of components of flavonoids. Their therapeutic effect is due to the ability to bind with free radicals, that stimulate the synthesis of proteins and macro-energies, which facilitates the course of biochemical reactions.

Evaluation of hepatoprotective efficacy and experimental justification for the use of bioflavonoids concentrate “Enoant” for the treatment of liver diseases is a very important issue to be discussed.

**Purpose of the Study**

Aim of our research is to analyse the antioxidant properties of Enoant in alcoholic liver and to establish the ultra-morphostructural changes in liver tissue.

**Material and Method**

The model of alcoholic liver damage in rats was used in the research. The nature and extent of alcoholic damage to the liver was studied morphologically, including electron and light microscopy.

The experiments were performed on 60 non-linear white rats (mean weight 200-230 g), divided into 3 series of 20 animals each. 1st series - intact animals (control). Animals of the 2nd series were injected into the stomach with 40% ethanol for a period of 90 days at a rate of 0.016 ml of 40% ethanol per 1 g of body weight [2]. To the animals of the 3rd series, after a 90-day alcohol intoxication, the probe was injected for 21 days with a concentrate of bioflavonoids “Enoant” at a dose of 0.25 ml per kilogram of weight [3].

**Results and Discussion**

As a result of morphological examination, by the method of light microscopy, the characteristic signs of alcoholic injuries were revealed:

- dyscirculatory (hyperemia of sinusoids and central venules);

- alternative, in the form of fatty and hydropic dystrophy of hepatocytes;

- Mononuclear infiltrates of portal tracts and periportal area.

Electron microscopy of hepatocytes, endothelial cells and stellate reticuloendotheliocytes in animals treated with ethanol for 90 days revealed a number of dystrophic changes.

The nuclear membrane of hepatocytes had foci of loosening and invagination, causing the contours to lose clarity. In places, the nuclear membrane was destroyed. Chromatin is condensed unevenly and dispersed as fragments throughout the nucleus area. The perinuclear space is greatly enlarged. Tanks of the granular endoplasmic reticulum were expanded and had the appearance of electron-transparent vacuoles. Hepatocyte mitochondria had edema and a rounded shape, with an electron-transparent matrix. The destruction centers of the outer membrane of the mitochondria and their cross were determined (Fig. 1). The number of ribosomes on the membranes of the granular endoplasmic reticulum was significantly reduced compared to the control group.

**Fig. 1. Round-shaped mitochondria with swollen and clarified matrix, cells of destruction of the cross and outer membrane of the mitochondria. Electronic micrograph. Magnification x 50,000.**

In most of the hepatocytes there was a pronounced loosening of the cytosol due to the disappearance of glycogen granules and intracellular edema, which was accompanied by a pronounced decrease in the electron-optical density of the cytoplasm (Fig. 2). In the cytoplasm, many transparent vacuoles were noted.

The cytoplasm of endothelial cells was electron-transparent, with frequent lipid inclusions. The nuclei of the endothelial cells became elongated, with deep invaginations of the nuclear membrane. Karyorrhexis was observed.

The cytoplasmic membrane, facing the sinusoid lumen, was partially destroyed and loosened. The lumen of the sinusoids revealed destructively altered
fragments of cell membranes and a structured substance of uneven electron density. There was a sharp swelling of mitochondria, some mitochondria had ruptured membranes and crosses. The cytoplasmic processes of the endothelial cells contained virtually no micropinocytosis vacuoles.

Fig. 2. Cytosol loosening in the cytoplasm of hepatocytes. Perinuclear edema. Electronic micrograph. Magnification x 2000.

Dystrophic changes in organelles were in the cytoplasm of stellar reticuloendothelial cells. The mitochondria swelled, their matrix became electron-transparent, the number of crosses decreased. The endoplasmic reticulum looked like transparent vacuoles. The Golgi lamellar cytoplasmic complex was moderately reduced. In Electron microscope, the experiments of this series, marked sharply expressed plethora of sinusoids, erythrocyte sludge, enlargement of intra acinar bile ducts and ducts.

To study the therapeutic effect of concentrate bioflavonoids “Enoant”, after 90 days of alcohol intoxication, on the background of complete alcohol deprivation, the experimental animals were administered concentrate for 21 days (3 series). In this series of experiments it was found that the trabecular structure of the liver tissue was preserved. Sinusoids were occasionally enlarged only in single preparations, the boundaries of the sinusoids were clear, the phenomena of hyperemia were absent. The dyscirculatory changes consisted only of the plethora of the interosseous veins, but not of the sinusoids. Vacualization of hepatocytes was extremely rare (Fig. 3).

Fig. 3. Minimal dystrophic changes in the liver after the use of concentrate “Enoant” on the background of previous alcohol intoxication. Painting hem-eos. Mag. x 200.

There were no alterative changes in most micropreparations. Dystrophic changes were limited to separate centers of evacuation. Hepatocytes with large nuclei and fine-grained chromatin prevailed. Duplicate hepatocytes were encountered around large portal tracts, indicating an increase in liver regenerative potency. There were many hepatocytes with hyperchromic nuclei and homogeneous light eosinophilic cytoplasm (without evidence of hydropic dystrophy). A lively histioliymphocytic response was observed in the portal tracts and the proliferation of sinusoidal cells was well expressed (Fig. 4).

Fig. 4. Proliferation of sinusoidal cells. Hematoxylin-eosin staining. Magnification x 200. [vol. 20, approx. 10]

At the ultrastructural level, the state of the cell organelles did not differ from the control: the hepatocyte nuclei were rounded, centered or eccentric. The outer and inner membranes of the nuclei were clearly observed. Chromatin was evenly distributed in the nucleoplasm. The mitochondria had a typical structure, the crosses were tightly packed. Tanks of the granular endoplasmic reticulum were slightly expanded (Fig. 5).
In the cytoplasm of hepatocytes contained many membrane-bound and free ribosomes. Submicroscopic organization of endothelial cells was not different from the norm. Activation of intracellular metabolic processes was noted in stellar macrophages. This was manifested in the moderate expansion of the granular endoplasmic reticulum tanks and the Golgi hypertrophy.

**Conclusion**

The enteral use of concentrate of bioflavonoids “Enoant” immediately after the cessation of alcoholization, reduces the damage from alcohol. After the application of “Enoant” was observed complete restoration of trabecular structure of the liver. Around the large portal tracts, in some cases, double-core hepatocytes appeared, as well as hepatocytes with hyperchromic nuclei and homogeneous light eosinophilic cytoplasm, with no evidence of hydropic dystrophy. This indicates an increase in the reparative capacity of the liver tissue.

The positive effect of “Enoant” is explained by the antioxidant properties of bioflavonoids, their ability to reduce peroxidation of proteins, stimulate reparative processes, activate protein synthesis and enhance the system of antioxidant protection of hepatocytes. All this allows to attribute the concentrate of bioflavonoids “Enoant” to highly active hepatoprotectors and is of practical interest at all stages of treatment of patients with different stages of liver lesions.

**Conflict of Interests:** None declared.

**Source of Funding:** Self funding by authors

**Ethical Clearance:** In our study involving all human participants were in accordance with ethical standards of the responsible committee on human experimentation and with the Helsinki Declaration of 1964 and later amendments.

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Effectiveness of Ocular Muscle Exercises on Myopic Individuals with Forward Head Posture

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2Assistant professor of Department of Musculoskeletal Sciences, Faculty of Physiotherapy, KIMS “ Deemed To Be University” Karad, Maharashtra , India

Abstract

Background: The dependence of today’s younger generation on technology is increasing and the work hours spent by professionals in front of computer screens are also increasing. These are the leading causes of myopia. Task related postural adaptation may also cause myopia. However, very few if any people suffering from myopia are being referred to a physiotherapist. There is positive effect of ocular muscle exercises on increasing visual acuity and decreasing stress on the ocular muscles.

Objective: The objective of this study was to find out the effect of ocular muscle exercises on myopic individuals with forward head posture.

Method: There were total 46 subjects who were willing participants of this study. They were divided in two groups one excremental who received exercises while other was control. Pre intervention and post intervention postural assessment were taken and analysed.

Result: There was a significant effect of the ocular exercises on craniovertebral angle of these myopic individuals compared control group (p = 0.0219). Its effect on forward shoulder angle was not quite significant (p = 0.0619).

Conclusion: Ocular exercises are not quite effective in improving forward head posture.

Key Words: Ocular exercises, craniovertebral angle, forward shoulder angle .

Introduction

Myopia is a refractive defect of the eye in which collimated light produces image focus in front of retina when accommodation is relaxed. Myopia is commonly known as nearsightedness. Here, objects that are close appear clear but distant objects appear blurred.1

Myopia can be classified as low Myopia to high myopia with dioptres ranging from - 0D to -8.0D2 Incidence of myopia has increased from 0.4% (1993) to 34.2% (2016). In India, the incidence of myopia in individuals older than 40 years of age is 34.6% In children it is 4.7%, 7% and 10.8% in 5, 10 and 15 year olds. Prevalence of myopia in India is 45% (2012).4

Prevalence of forward head posture in myopic individuals (2019) is 58.95%.

Forward head posture is defined as excessive anterior positioning of the head in relation to a vertical reference line. The thoracic spine thus goes into kyphosis to compensate for this and the pelvis tilts anteriorly. A myopic individual may generally squint, tilt their head or lean forwards in an unnatural position to see clearly. This leads to problems of neck, upper and lower back causing muscle imbalance. It could manifest as tingling or numbness. Burning pain between shoulder blades is also

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Treatments that alleviate the problem temporarily are used. Over time however, these problems worsen and may lead to more severe complications. Photogrammetry can be used to measure the angle by taking a picture of the patient’s head and neck from the lateral view or it can be measured manually. Angles can be measured using Web plot digitizer software. For measuring the angle three dots of an image are transformed onto Cartesian coordinate’s axis and the angles are auto calculated.

Symptoms of myopia are blurring of far objects, eye strain, squinting, excessive bending forwards, headaches, abnormal titling of head and excessive blinking.

Posture is rarely mentioned by researchers, although in a study it was found that head posture is correlated with myopia. Workers in textile industries who had to lean forwards to carry out the task of detecting and correcting flaws in the fabric in which correlation between myopia and duration of work was found. In another study of a group of clinical microbiologists who worked for a minimum 20 hours per week. A high prevalence of myopia of 71% was found in them. A study on analysis of head position used by myopes and emmetropes when performing a near-vision reading task proved that posture might play some role in myopia development. The effect of extraocular muscles on eye ball could cause myopia.

In a study ocular exercises were designed and were implemented on student population which showed improvement in the visual acuity. Therefore, focus needs to be put on studying effect of ocular muscle exercises on myopic individuals with forward head posture.

**Methodology**

An approval for the study was obtained from the Protocol committee and the Institutional Ethical Committee of KIMSDU. 80 individuals were approached and screened out of which 46 were selected according to the inclusion criteria of age 18-32 years, duration of myopia for 1 years and above and Myopia of -0.25 to -6.0D degree of. The procedure was explained and written informed consent was taken. Exercises were explained thoroughly which included palming exercises, swinging exercises, eye muscle exercises, cross crawl, tibetan eye chart. Exercises were given twice a week for six weeks. Pre and post intervention postural assessment was taken and analysed.

**Result**

**1. DISTRIBUTION OF FORWARD SHOULDER ANGLE:**

<table>
<thead>
<tr>
<th>2. Forward shoulder angle</th>
<th>Mean ± ± SD</th>
<th>Paired t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre Intervention</td>
<td>Post Intervention</td>
</tr>
<tr>
<td>Group A</td>
<td>64.22±12.82</td>
<td>53±8.23</td>
</tr>
<tr>
<td>Group B</td>
<td>56.87±14.15</td>
<td>58.26±9.77</td>
</tr>
<tr>
<td>Unpaired t-test</td>
<td>t-value</td>
<td>p-value</td>
</tr>
<tr>
<td></td>
<td>1.846</td>
<td>0.0797</td>
</tr>
</tbody>
</table>

**Interpretation:** Table no 1 shows that the mean Forward shoulder angle in group A pre intervention was 64.22 ±12.82 and post intervention was 53±8.23. In group B it was 56.87±14.15 pre intervention and 58.26±9.77 post intervention. The paired t test for Group A angle had t-value 1.796 and p-value 0.0862 which is not quite significant. For Group B, angle had t-value 0.4427 and p-value 0.6623 which is not significant. Intergroup post-test values according to unpaired t-test t-value was 1.916 and p-value was 0.0619 which is not quite significant.
2. DISTRIBUTION OF CRANIOVERTEBRAL ANGLE:

**Table no 2: Distribution of craniovertebral angle:**

<table>
<thead>
<tr>
<th>Craniovertebral angle</th>
<th>Mean ± SD</th>
<th>Paired t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre Intervention</td>
<td>Post Intervention</td>
</tr>
<tr>
<td>Group A</td>
<td>44.39 ± 4.85</td>
<td>54.39 ± 6.34</td>
</tr>
<tr>
<td>Group B</td>
<td>56.65 ± 5.16</td>
<td>56.65 ± 7.35</td>
</tr>
<tr>
<td>Unpaired t-test</td>
<td>t-value</td>
<td>p-value</td>
</tr>
<tr>
<td></td>
<td>1.542</td>
<td>0.1302</td>
</tr>
</tbody>
</table>

**Interpretation:** Table no 2 shows that the mean Craniovertebral angle in group A pre intervention was 44.39 ± 4.85 and post intervention was 54.39 ± 6.34. In group B it was 56.65 ± 5.16 pre intervention and 56.65 ± 7.35 post intervention. The paired t test for Group A angle had t-value 2.019 and p-value 0.0559 which is not quite significant. For Group B, angle had t-value 0.000 and p-value >0.9999. Intergroup post-test values according to unpaired t-test, t-value was 2.377 and p-value was 0.0219 which is significant.

**Discussion**

The aim of this study was to find out the effect of ocular muscle exercises on myopic individuals with forward head posture. The objectives of this study were to assess young adults with myopia for forward head posture. To assess the severity of the postural misalignment in relation to the degree of myopia. To assess the severity of the misalignment in relation to the duration of myopia and to observe the effect of ocular muscle exercises on forward head posture. An effort to find the association between the effects of the ocular muscle exercises with the effects of not administering any exercise program was made.

Total 80 myopic individuals were screened for forward head posture and 46 individuals fulfilling inclusion and exclusion criteria were selected. 46 subjects of both the genders of age group 18-32 and degree of myopia ranging -0.25 to -6.0 D were selected. They were divided into two groups, A and B respectively where group A was administered an exercise protocol and group B underwent no form of exercise protocol. Palming, cross crawl, swinging exercises, eye muscle exercises and Tibetan eye chart were included in the exercise protocol for group A. Exercises were given twice a week for six continuous weeks. Forward shoulder angle and craniovertebral angle were measured using Web Plot Digitizer and Pre and post measurement for posture was taken.

The mean Forward shoulder angle in group A pre intervention was 64.22 ± 12.82 and post intervention was 53 ± 8.23. In group B it was 56.87 ± 14.15 pre intervention and 58.26 ± 9.77 post intervention. Forward shoulder angles were measured pre-intervention and post-intervention, the effect of exercise was not quite significant as seen by p value of 0.0862 of group A and not significant p value of 0.6623 of group B. Intergroup post-test values according to unpaired t-test t-value was 1.916 and p-value was 0.0619 which is not quite significant.

The mean Craniovertebral angle in group A pre intervention was 44.39 ± 4.85 and post intervention was 54.39 ± 6.34. In group B it was 56.65 ± 5.16 pre intervention and 56.65 ± 7.35 post intervention. Effect of exercise on craniovertebral angle was also found to be not quite significant as seen by p value 0.0559 of group A and not significant p value >0.9999 of group
B. Intergroup post-test values according to unpaired t-test, t-value was 2.377 and p-value was 0.0219 which is significant.

Higher amount of near work load, head positions during performing tasks could also make these exercises insufficient even if the eye exercises are effective in bringing about a change, which could have been a possibility in present study. Stress on eyes, exposure to electronic devices, improper postural adaptations, head position while a near task was performed etc, may be the factors due to which the exercises may not be effective in improving visual acuity. Increasing the interventional period could help improve the effectiveness of ocular muscle exercises on posture.

Rahul Pandey et al. studied effect of eye exercise on myopia in children aged between 10-15 years and concluded that visual acuity and ocular health was improved with eye exercises in children with myopia.

The reason for this discrepancy in this study results may be due to various factors. The study included myopic children with a degree of myopia under -3D only whereas this study had a mean degree of -3.25D which is significantly more than their study. Also, the study was conducted in children in contrast to this present study which was on young adults. These young adults will comparatively have myopia for more duration compared to the children. Poor postural habits and stress over the neck and eyes have had a greater time to build in young adults compared to children and thus may be more difficult to treat.

Thus, the present study concluded that the ocular muscle exercises were not quite effective in improving the forward head posture or degree of myopia. There are multiple studies supporting the result but there are also considerable number of studies that contradict the present result. On the basis of this it is safe to say that more detailed and precise research must be conducted to find conclusive results. This can be done by increasing the frequency and duration of exercises, including individuals with uniform demographic data and using more efficient outcome measures. As a result, there is immense scope for further research in this topic.

CONCLUSION:

On the basis of the results of the study, there was some improvement in forward head posture however it was statistically not quite significant. There was a difference in alteration of both forward shoulder angle and craniovertebral angle measurements in Group A and Group B pre and post treatment but were not quite significant.

**Conflict of Interest:** There were no conflicts of interest in this study

**Ethical Clearance:** Ethical clearance was taken from institutional committee of Krishna Institute of Medical Sciences, Deemed to be University, Karad.

**Source of Funding:** Krishna Institute of Medical Sciences Deemed to be University, Karad

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10. Sun-Myung Lee et al. “Clinical effectiveness of


An Autopsy Based Study of Sexual Dimorphism of Adult Human Sterna

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Abstract

Creation of an individual’s biological profile is of extreme importance and depends on age, sex and stature. The cranial and pelvic bones are important in identifying the sex of an individual. However, loss of complete bones or bones getting destroyed renders it impossible to use them for such estimations. However, since such sex-specific bones are hard to find at each and every scene, forensic experts are left with no choice but to depend on less sexually dimorphic elements of the human skeleton such as the sternum.

This study was conducted in subjects that were subjected to medicolegal autopsy. The deceased aged 18 years and above, of either sex, were included in study. The deceased with evidence of trauma and surgery to the anterior chest wall, generalized bone diseases, observable deformities over the sternum were excluded. The analysis of 300 sterna was carried out to study sexual dimorphism in sternum using different parameters such as width of suprasternal notch, width of sternum at level of fourth rib, posterior curved length of sternum, manubrio-corpus index and length of sternum.

Key words – Sexual dimorphism, sternal measurements, sternum.

Introduction

In forensic medicine, characterization of the biological profile of a deceased includes investigating the individual’s age, sex, stature etc. Although pelvic and skull bones are known to be best identifiers of an individual’s sex, relying on only these two bones for sexual dimorphism is limiting, considering their fragile nature or instances of their unavailability. Therefore, intensive research work has been performed and confirmed the potential use of sternum to detect sexual dimorphism. Moreover, manubrium and sternum are reported to have a high recovery rate as it resists the effects of putrefaction and decomposition for a long period of time.

Sex estimation from sternal remains relies on factors of sexual dimorphisms, such as length and proportion differences of the manubrium, corpus sterni and combined length of manubrium and mesosternum between males and females.¹ Sexual dimorphism has been considered in sex estimation from sternum, specifically with the application of Hyrtl’s law which stipulates the length of a female’s manubrium to exceed half the length of the corpus sterni, while those of the male sterna are, at least double the manubrium length.² This study of sexual dimorphism in adult human sterna is also carried out to compare and analyse the sternal measurements among both genders.

Materials and Method

This autopsy study was conducted in the mortuary at the department of forensic medicine, Topiwala National Medical College, Mumbai after obtaining permission from the institutional ethics committee.

This study was conducted in subjects that were subjected to medicolegal autopsy. The deceased aged 18 years and above, of either sex, were included in study.
The deceased with evidence of trauma and surgery to the anterior chest wall, generalized bone diseases, observable deformities over the sternum were excluded. During the period of November 2014 to August 2016, 150 (50%) sterna of males and 150 (50%) of females were studied. The preliminary data, in each case, was collected from the inquest report and hospital indoor paper records in admitted cases.

During the autopsy ‘I’ shaped incision was taken from chin to pubis symphyses. The skin over the chest, subcutaneous tissue under the skin and pectoralis muscles on both the sides was separated carefully. The clavicle was disarticulated from sternum and sternum was removed by cutting ribs by their costal cartilage. After removing the sternum from the thoracic cage, the sternal margins that articulate with the cartilages of the first seven pairs of ribs were carefully dissected. The sternum was washed and soft tissue was scraped and direct measurements were taken using a calibrated vernier calliper and measuring tape. After noting the measurements the sternum was placed back in the body. The xiphoid process was not taken into consideration in the present metric study to measure the length of sternum because of the high variability of its length.

The following measurements were taken keeping the bone on a flat surface in anatomical positions:

1. Width of suprasternal notch (WS).
2. Width of sternum at level of 4th rib (WM4).
3. Posterior curved length of sternum (PCL).
4. Distance from suprasternal notch to manubrio-mesosternal junction in midline (M)
5. Distance from manubrio-mesosternal junction to mesosternal-xiphoid junction in midline (B)
6. Manubrio – corpus index (MCI) = M / B x 100
7. Length of sternum (in cm) = M + B

Baseline study participant characteristics were described using descriptive statistics like mean and standard deviations. The unpaired ‘t’ test was used to compare the mean values between males & females. Discriminant functional analysis was done to examine the sexual dimorphism in the sternum and how the variables correctly assigned the bones to the proper sex.

Findings

<table>
<thead>
<tr>
<th>Table 1: Age and Sex-wise distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>Males</td>
</tr>
<tr>
<td>Females</td>
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</tbody>
</table>

P = 0.0518, using unpaired t-test.

In our study, the mean age of males was 43.83 ± 14.93 years and that of females was 39.98 ± 18.92 years.
Table 2: Comparison of various measurements of sternum

<table>
<thead>
<tr>
<th></th>
<th>Gender</th>
<th>Minimum (mm)</th>
<th>Maximum (mm)</th>
<th>Mean (mm)</th>
<th>Standard Deviation</th>
<th>P value using unpaired t test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width of suprasternal notch (WS)</td>
<td>Males</td>
<td>20</td>
<td>45</td>
<td>30.67</td>
<td>4.96</td>
<td>P = 0.0002</td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>21</td>
<td>43</td>
<td>28.61</td>
<td>4.32</td>
<td></td>
</tr>
<tr>
<td>Width of sternum at the level of 4th rib (WM4)</td>
<td>Males</td>
<td>22</td>
<td>48</td>
<td>33.25</td>
<td>5.60</td>
<td>P &lt; 0.0001</td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>22</td>
<td>40</td>
<td>30.19</td>
<td>4.56</td>
<td></td>
</tr>
<tr>
<td>Posterior curved length of sternum (PCL)</td>
<td>Males</td>
<td>124</td>
<td>185</td>
<td>140.37</td>
<td>12.90</td>
<td>P = 0.0002</td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>115</td>
<td>185</td>
<td>135.1</td>
<td>11.09</td>
<td></td>
</tr>
<tr>
<td>Distance from suprasternal notch to manubrio-mesosternal junction in midline of sternum (M)</td>
<td>Males</td>
<td>34</td>
<td>65</td>
<td>42.58</td>
<td>5.74</td>
<td>P = &lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>35</td>
<td>60</td>
<td>46.06</td>
<td>4.66</td>
<td></td>
</tr>
<tr>
<td>Distance from manubrio-mesosternal junction to mesosternal-xiphoid junction in midline (B)</td>
<td>Males</td>
<td>83</td>
<td>140</td>
<td>97.40</td>
<td>10.79</td>
<td>P = &lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>75</td>
<td>120</td>
<td>87.72</td>
<td>8.40</td>
<td></td>
</tr>
<tr>
<td>Manubrio-corpus index (MCI)</td>
<td>Males</td>
<td>25</td>
<td>61.9047</td>
<td>43.91</td>
<td>5.32</td>
<td>P = &lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>40</td>
<td>70.5128</td>
<td>52.70</td>
<td>4.98</td>
<td></td>
</tr>
<tr>
<td>Distance from suprasternal notch to mesosternal-xiphoid junction in the midline (M+B)</td>
<td>Males</td>
<td>119</td>
<td>188</td>
<td>139.98</td>
<td>14.40</td>
<td>P value &lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>Females</td>
<td>110</td>
<td>175</td>
<td>133.94</td>
<td>11.78</td>
<td></td>
</tr>
</tbody>
</table>

The unpaired t-test indicates a significant difference in all the measurements of the sternum amongst males and females.
Sensitivity and specificity results of parameters used for gender identification

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cut-off (&gt; for males)</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>ROC (AUC) &amp; (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>WS</td>
<td>29.5 mm</td>
<td>60%</td>
<td>64%</td>
<td>0.629 (0.566-0.693)</td>
</tr>
<tr>
<td>WM4</td>
<td>31.5 mm</td>
<td>62%</td>
<td>68%</td>
<td>0.659 (0.596-0.722)</td>
</tr>
<tr>
<td>PCL</td>
<td>137.5 mm</td>
<td>52%</td>
<td>67%</td>
<td>0.628 (0.564-0.691)</td>
</tr>
<tr>
<td>M</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>0.297 (0.238-0.356)</td>
</tr>
<tr>
<td>B</td>
<td>90.5 mm</td>
<td>63%</td>
<td>69%</td>
<td>0.773 (0.721-0.825)</td>
</tr>
<tr>
<td>MCI</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>0.097 (0.012-0.10)</td>
</tr>
<tr>
<td>M+B</td>
<td>119.5 mm</td>
<td>99%</td>
<td>90%</td>
<td>0.935 (0.90-0.97)</td>
</tr>
</tbody>
</table>

The Receiver Operating Curve (ROC) plot values are area under curve (AUC)

- > 0.90 = Excellent detective test
- 0.81 - 0.90 = Very good detective test
- 0.71 - 0.80 = Good detective test
- 0.61 - 0.70 = Average detective test
- ≤0.50 = Not to be used as detective test

A mean WS in males (30.67 ± 4.96 mm) was more in comparison with that of females (28.61 ± 4.32 mm). In males, the largest WS noted was 45 mm while the smallest was 20 mm in length. In females, the largest observed WS was 43 mm and the smallest WS was 21 mm in length. Similar findings were reported by Mukhopadhyay, who studied 35 adult sterna in West Bengal, India, that WS was more in males than females. However he observed that the mean WS in males was 5.71 ± 0.39 cm and that of females was 4.79 ± 0.31 cm which was far greater than the mean WS observed in the present study. The ROC for WS was equal to 0.629 (95% confidence interval (CI) of 0.566-0.693) with 60% sensitivity and 64% specificity. Results of present study showed that, if WS is greater than 29.5 mm, the cadaver is that of a male whereas if WS is <29.5 mm it belongs to a female.

The mean WM4 in the present study was greater in males (33.25 ± 5.60 mm) than females (30.19 ± 4.56 mm). The largest WM4 in males, was found to be 48 mm as compared to that in females which was 40 mm; while the length of the smallest WM4 was observed to be 22 mm in both the genders. The mean WM4 of males and females studied by Mukhopadhyay were 5.3 ± 0.31 cm and 4.4 ± 0.33 cm respectively. Their findings were more than those found in present study. The ROC for WM4 was equal to 0.659 (95% CI of 0.596-0.722) with 62% sensitivity and 68% specificity. Results of present study showed that, if WM4 is greater than 31.5 mm, the cadaver belongs to a male and if WM4 is <31.5 mm it belongs to a female.

The mean PCL was greater in males (140.37 ± 12.90 mm) as compared to females (135.10 ± 11.09 mm). The maximum length of PCL observed in both the genders was same, i.e. 185 mm. However, the minimum length of PCL in males was noted to be 124 mm and that in females was 115 mm. However Mukhopadhyay noted the mean PCL in males as 22.4 ± 1.01 cm; females as 17.92 ± 0.98 cm which are more than that observed in present study this might be due to regional and ethnic variations in population. The ROC for PCL was equal to 0.628 (95% CI of 0.564-0.691) with 52% sensitivity and 67% specificity. Results of present study showed that, if PCL is greater than 137.5 mm, the cadaver belongs to a male whereas if PCL is <137.5 mm it belongs to a female.

The mean length of manubrium (M) was greater in females (46.06 ± 4.66 mm) as compared to males (42.58 ± 5.74 mm). The distance from suprasternal notch to manubrio-mesosternal junction in midline of sternum ranged from 65 mm (maximum) to 34 mm (minimum) in males and from 60 mm (maximum) to 35 mm in females.
However, the findings observed were in contrast to previous studies where the lengths of the manubrium were reported greater in males rather than females.1,5,6,7 This might be due to regional and ethnic variations in population. The ROC for length of manubrium was equal to 0.297 (95% CI of 0.238-0.356), hence it cannot be considered as a parameter for sexual dimorphism.

The mean mesosternum length (B) was greater in males (97.4 ± 10.79 mm) as compared to females (87.72 ± 8.4 mm). The distance from manubrio-mesosternal junction to mesosternal-xiphoid junction in midline of sternum ranged from 140 mm (maximum) to 83 mm (minimum) in males and from 120 mm (maximum) to 75 mm (in females). These results are in accordance with the studies of Gautam et al7 (95 mm males; 76 mm in females), Dahiphale et al5 (94.427 mm in males; 70.191 mm in females) Ankit et al6 (92.11 mm in males; 78.28 mm in females), Hunnargi et al1 (89.17 mm in males; 72.38 mm in females), Ramadan et al8 (100.7 mm in males; 85.1 mm in males) and Puttabanthi et al9 (92.36 mm in males; 88.95 in females). The ROC was equal to 0.773, with 95% confidence interval 0.721-0.825, showing mean mesosternum length can be considered as a good detective test with 63% sensitivity and 69% specificity. In agreement with previous studies and the results of present study, we agree that the length of mesosternum is a reliable parameter in determining the sex of a deceased.

A highest manubrio-corpus index of 61.91 in male cadavers and 70.51 in female cadavers; and the lowest observed manubrio-corpus index was 25 in male cadavers and 40 in female cadavers. The mean (SD) manubrio-corpus index in males was 43.91 (5.32) and that in females was 52.70 (4.98). Though the samples follow Hyrtl’s law and statistically significant gender differences are obvious, sternal indices among males and females shows considerable overlapping. Therefore, the manubrio-corpus index (MCI) is not helpful when applied to detect sexual dimorphism of an individual specimen. Similar conclusions were reported by various researchers, viz. Hunnargi et al1, Dahiphale et al5, Ankit et al6, Puttabanthi et al9. On similar grounds, Ashley10 and Jit et al11 also reported the index to be ‘unreliable’. Since the ROC for manubrio-corpus index was equal to 0.097 (95% CI of 0.012-0.10), hence it cannot be used as a detective test.

The mean combined length (M+B) observed in the present study was greater in males (139.98 ± 14.40 mm) than females (133.94 ± 11.78 mm). The maximum distance from suprasternal notch to mesosternal-xiphoid junction in midline of male cadavers was 188 mm and in female cadavers was 177 mm. The minimum distance from suprasternal notch to mesosternal-xiphoid junction in midline of male cadavers was 119 mm and in female cadavers was 110 mm. The results obtained in present study are in accordance with those reported by several previous studies.1,5,6,7,8,9 According to results of present study, the distance from suprasternal notch to mesosternal-xiphoid junction in midline can be considered as an excellent detective test since the ROC curve was equal to 0.935 with 95% confidence interval of 0.90-0.97, 99% sensitivity and 90% specificity.

**Conclusion**

Distance from suprasternal notch to mesosternal-xiphoid junction in midline i.e. sternum length can be considered as excellent detective test for sexual dimorphism from sternum. Parameters like width of suprasternal notch (WS), width of sternum at the level of 4th rib (WM4) and the posterior curved length of sternum (PCL) can be considered as average parameters for sexual dimorphism from sternum. Length of manubrium (M) and the manubrio-corpus index (MCI) are not helpful for sexual dimorphism.

It has been observed that detection of sexual dimorphism using sternum is subjected to population diversity. To obtain an excellent detective test to access sexual dimorphism of adult human sterna from different measurements of sternum, a detailed analysis in a larger sample size and closed Indian population is warranted.

**Abbreviations**

- WS - Width of suprasternal notch.
- WM4 - Width of sternum at level of 4th rib.
- PCL - Posterior curved length of sternum.
- M - Distance from suprasternal notch to manubrio-mesosternal junction in midline.
- B - Distance from manubrio-mesosternal junction to mesosternal-xiphoid junction in midline.
- MCI - Manubrio – corpus index = M / B x 100
- M+B - Length of sternum (in cm).

**Conflict of Interest** – None
Source of Funding – None

Ethical Clearance – Yes

References


2. Dwight T. The sternum is an index of sex, height and age. Journal of Anatomy. 1890;24:527-35.


Effect of Jack Knife Stretching Versus Proprioceptive Neuromuscular Facilitation (Hold Relax) Stretching Technique in Asymptomatic Individuals with Hamstring Tightness: A Randomized Clinical Trial

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Abstract

Background: Study is to compare the effectiveness of Jack knife stretching and Proprioceptive Neuromuscular Facilitation (PNF) stretching Technique in asymptomatic individuals with hamstring tightness.

Aims and Objectives: 1. To study the effect of jack-knife stretching on the individuals with asymptomatic hamstring tightness in terms of Active knee extension test, finger to floor, passive SLR and LEFS Questionnaire. 2. To Study the effect of PNF stretching on individuals with asymptomatic hamstring tightness. 3. To compare the effect of Jack knife and PNF stretching in individuals with hamstring tightness.

Material and Method: Ethical approval was obtained. 56 healthy subjects were assigned into two groups. PNF (hold relax) stretching technique was given to the Group A and Group B received Jack Knife stretching. Active knee extension test, Finger to floor test, Passive single leg raise test and Lower extremity functional scale these parameters were measured.

Results: Intra-group comparison for all the outcome measures in both the groups showed statistical significance. Inter-group comparison for all the outcome measures for both the groups had differences but showed statistical significance. Group B Jack knife stretching was more effective than group A PNF (hold relax) stretching.

Conclusion: The present study results indicate that to increase hamstring flexibility both the treatment techniques i.e PNF stretching and jack knife stretching are effective in asymptomatic individuals with hamstring tightness. Thus, our study shows jack knife stretching gives immediate effect due to closed pack position of stretching compared to open pack position of PNF group.

Keywords: Hamstring Tightness; PNF Stretching, Jack Knife Stretching

Introduction

Almost everyone, regardless of age knows and values the ability to function as independently as possible during activities of daily life.¹ Humans have the capability to produce infinite variety of postures and movements that will need the structures of human body to both generate and respond to forces that produces and control movement at the body’s joints.² The movement occurring in the human body is caused by the musculature system.³ There are about 700 muscles, which are attached to the bones of the skeletal system that make up up-to half of the person’s body weight. Hamstring muscles is situated at the posterior part of the thigh. It includes 3 muscles – biceps femoris muscle, semitendinosus

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muscle, semimembranosus muscle. These muscles share some common characters of which is its origin which is from ischial tuberosity and its insertion into one of the bones of the leg. Nerve supply to these group of muscles is from the tibial part of sciatic nerve. These muscles function together for the flexion of the knee (front bending of the knee) and helps in the extension of hip (moving the hip backwards). These muscles also help in rotating the knee. According to Darlene Hertling, the term muscle tightness refers to adaptive shortening of the contractile and non-contractile elements of muscle. Inability to achieve more than 160 degree of knee extension with hip at 90 degree of flexion is considered as hamstring tightness. Hamstring tightness can be treated successfully in many ways like with cryotherapy, thermotherapy, stretching and spray, ultrasound, soft tissue massage, shortwave diathermy, myofascial release, and muscle energy technique, bowen technique.

Jack knife stretch for improving the hamstring flexibility was tested by Michelle Hamilton. Benefits of these stretch include improvement of the blood flow to the lower extremities, relaxation of tight hamstring and many more. The stretch is to be held for 5 second’s and is to be repeated 5 times, 2 sets every day.

Hold relax PNF stretching facilitate muscle relaxation and increases the range of motion. This PNF stretching is facilitated by the Golgi tendon organ. The stretch is to be held for about 6 seconds and is to be repeated thrice and is then repeated on the other side. Outcome measures which are being used in study are lower extremity functional scale (LEFS), active knee extension test, popliteal angle, finger to floor test and passive SLR test.

Aims and Objectives

1. To study the effect of jack-knife stretching on the individuals with asymptomatic hamstring tightness in terms of Active knee extension test, finger to floor, passive SLR and LEFS Questionnaire.

2. To Study the effect of Proprioceptive neuromuscular facilitation stretching on individuals with asymptomatic hamstring tightness in terms of Active knee extension test, finger to floor, passive SLR and LEFS Questionnaire. 4

3. To compare the effect of Jack knife stretching and Proprioceptive neuromuscular facilitation stretching in individuals with asymptomatic hamstring tightness in terms of Active knee extension test, finger to floor, passive SLR and LEFS Questionnaire

Methods & Methodology

Ethical approval was obtained from the Institutional Ethical Committee and written consent was obtained from the participants of our study. The present randomized clinical trial was carried out among 56 normal healthy subjects which comprised of both male and female between the age of 18-24 years and were assigned into two groups. PNF (hold relax) stretching technique was given to the Group A and Group B received Jack Knife stretching technique. Six alternate sessions were given to both the Groups for two weeks. Active knee extension test, Finger to floor test, Passive single leg raise test and Lower extremity functional scale these parameters were measured pre intervention and post intervention.

Procedure

The purpose of this study was explained to all the subjects volunteered in the study. A written informed consent was also obtained from all the subjects. The subjects were then screened upon the basin of the inclusion and the exclusion criteria and were selected based on the inclusion criteria. Subjects were explained about: Pattern of study, Need of study, Information generated out of the study. Once the consent was taken detailed information was gathered and statistical analysis was done in order to derive conclusion. Subjects in both the group’s, PNF (hold-relax) group and the jack-knife group were assessed before starting the treatment. Demographic data was collected with the initial assessment of the pre-treatment measurements of finger to floor test for flexibility of the hamstring muscle, active knee extension test to measure the popliteal angle, passive SLR test to check the range of motion and the lower extremity functional scale to check the limitations of work due to tight hamstrings.

PNF(hold-relax) Group

1. The subject is told to lie down in a supine lying position.

2. The subject is then told to take a belt which he/she has to place it under the sole of the foot, the two ends of which will be held by the patient.

3. The other leg of the Subject is stabilized by the belt to the table.
4. The subject is now asked to raise his leg straight with knees in extension to the level where he cannot take his leg further and hold the position with the help of the cloth for 30 seconds and then relax repeating it 3 times.

5. Alternate day intervention will be given for 2 weeks.

Jack-knife Group

1. In this technique, subject is asked to squat completely and hold the ankles from behind and then instructed to extend the knees holding the ankle wherein the chest the subject is in complete contact with the thigh.

2. This position is held for 5 seconds and is repeated 5 times.

Jack knife Stretching

Result

Components of demographic data such as age, height, weight, BMI were analysed and compared between the two groups. Pre intervention measurements and post intervention measurements were compared between the groups (intergroup comparison) by using independent t-test. Probability values less than 0.05 were considered statistically significant. To find the significance of the study parameters between two groups paired t-test was used, and Kolmogorov smirnov test was used to find the pair wise significance of the outcome measures i.e active knee extension test, passive SLR, finger to floor test and LEFS.

The mean± SD before intervention is 34.86±9.28 and after intervention is 46.8±9.60 in PNF group and mean± SD pre intervention is 31.43±8.47 and post intervention after 2 weeks is 49.8±10.7 for active knee extension by independent t test in Jack knife group. For finger to floor test pre intervention mean± SD is 17.16±6.47 and post intervention 9.19±3.65 for Group PNF. Mean± SD for group Jack knife pre intervention is 17.96±6.49 and post intervention is 7.43±6.22. In passive SLR Baseline mean
receive passive mobilization. The subjects stretching increased their range of passive single leg raise to a higher degree and at a faster rate than the subjects receiving PNF hold relax mobilization on increasing hamstring muscle length. The conclusion of our study was that the subjects receiving the PNF hold relax stretching for 6 alternate sessions for two weeks, our study also showed improvement in the flexibility of hamstrings to a greater extent when measured for FTF test, PSLR test, AKET and LEFS. Hence our study came to a conclusion that, Jack-knife stretching technique and PNF(hold-relax) stretching technique when compared are equally effective in increasing the hamstring flexibility and ROM when administered for six sessions alternatively for 2 weeks. It also concluded that Jack-knife group showed significantly more improvement then PNF (hold-relax) group in terms of FTF, PSLR, LEFS and AKET. As per our knowledge, this is the first study comparing the effect of Jack-knife and PNF(hold-relax) on hamstring flexibility in healthy individuals with alternate 6 day sessions intervention. Hence jack knife stretching showed immediate effect on hamstring tightness as it is closed pack position, PNF stretching technique is in open pack position which again one of the impact factor for the result. Hence both the techniques can be used clinically to increase the flexibility and range of motion of the hamstring muscle.

Discussion

The present study was conducted to compare the effects of jack knife stretching and PNF (Hold relax) stretching on asymptomatic subjects with hamstring tightness. An alternate day intervention was done for two weeks (six sessions) to see which stretching technique is more effective in increasing hamstring muscle flexibility in terms of Active knee extension test, passive single leg raise test, finger to floor test and lower extremity functional scale.

Koichi Sairyo has done study on tight hamstring muscle for four week by using jack knife stretching. Pelvis forward inclination angle (PFIA) and finger to floor distance (FFD) were the parameters included in the study. FFD was 14.1 ± 6.1 cm before the intervention and decreased to -8.1 to 3.7 cm by the end of 4 week. Which indicated the gain of hamstring flexibility by 22cm. PFIA was 50.6± 8.2 before the experiment and 83.8± 5.8 degree after the intervention was given. Before and after the experiment difference of outcome measure were significant (p<0.05) which concluded that jack knife stretching is useful technique to improve flexibility of tight hamstring. After the application of jack knife stretching for 6 alternate sessions for two weeks, our study showed significant improvements in hamstring flexibility in terms of finger to floor test, lower extremity functional scale and increase in range of motion in terms of active knee extension test and passive single leg raise test. Scott G. Spernoga, Timothy et al conducted a study to see the duration of maintained hamstring flexibility after a one time modified hold relax PNF stretching protocol concluded that 5 min. of hold relax stretches produced significantly increased hamstring flexibility that lasted for 6 min after the stretching protocol was given. One study was done by Marvin C. Tanglawa in comparing the hold relax PNF stretching and passive mobilization on increasing hamstring muscle length concluded that the subjects receiving the PNF hold relax stretching increased their range of passive single leg raise to a higher degree and at a faster rate than the subjects receiving passive mobilization. A study carried out by Jill M Binkley et al to assess the reliability, validity and sensitivity of Lower Extremity Functional Scale (LEFS) concluded that the test retest reliability of LEFS scores were excellent (R= 0.94 with … interval = 0.89 ) and that LEFS is efficient to administer and is applicable for research purpose as well as for clinical practice. A study undertaken by Michelle Hamilton to compare if standing jack-knife stretch is better than seated for hamstrings included 17 youths aged between 8-18 years with back pain who performed 2 sets of stretch twice a day for 04 weeks. One set consisted of 5 repetitions of jack-knife stretch holding it for 5 seconds and FTF forward bend test was taken to establish a baseline of flexibility. This study concluded standing jack-knife stretch increases flexibility in hamstrings After the application of jack-knife stretching technique for six sessions alternatively for 2 weeks our study also showed improvement in the flexibility of hamstrings to a greater extent when measured for FTF test, PSLR test, AKET and LEFS. As per our knowledge, this is the first study comparing the effect of Jack-knife and PNF(hold-relax) on hamstring flexibility in healthy individuals with alternate 6 day sessions intervention. Hence jack knife stretching showed immediate effect on hamstring tightness as it is closed pack position, PNF stretching technique is in open pack position which again one of the impact factor for the result. Hence both the techniques can be used clinically to increase the flexibility and range of motion of the hamstring muscle.

Conclusion

The present study proves that both the stretching techniques that is Jack knife and Proprioceptive neuromuscular stretching are equally effective for increasing the flexibility of hamstring muscles in individuals with asymptomatic hamstring tightness. However, jack-knife stretching technique showed immediate effect on hamstring tightness compared to Proprioceptive neuromuscular facilitation stretching. Thus, both the stretching can be used in clinical practice for improving the flexibility of hamstring muscle.
Conflict of Interest: Nil

Source of Funding: KIMSDU, karad.

Ethical Clearance: Ethical clearance was obtained from KAHER institute of physiotherapy Institutional Ethics Committee on Human Subjects Research

References

Comparative Effectiveness of Kinesio Taping and Ift in Upper Cross Syndrome- A Randomized Clinical Trial

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Abstract

Background: Upper cross syndrome refers to a particular configuration of overlapping overactive and underactive muscle groups in the neck, chest and shoulders. Typically, poor posture causes the syndrome, including the forward head posture, which occurs when people use electronic devices, read, and drive. The present study is intended to investigate the effect of kinesio taping on upper cross syndrome

Objectives: 1. To study the effectiveness of kinesio taping, Hot Moist Pack and exercises in upper cross syndrome, 2. To study the effectiveness of IFT, HMP and exercises in upper cross syndrome and 3. To compare the effectiveness of kinesio taping and IFT in upper cross syndrome.

Methodology: The study consisted of 2 groups. Group A was experimental group and Group B was conventional group. Both the groups received treatment protocol for 2 weeks. Sample size was 60 with 30 in each group.

Results: Visual analogue scale, cranio-vertebral angle and forward shoulder angle were used as outcome measures. Statistically significant results were found with VAS p=<0.0001, cranio-vertebral angle p=0.0632 and forward shoulder angle p=0.285

Conclusion: The study concluded that the use of kinesio taping is recommended in reducing pain and improving the neck angles in participants with upper cross syndrome as compared to conventional therapy.

Key Words: Conventional Physiotherapy, IFT, kinesiotaping, upper cross syndrome

Introduction

Crossed syndromes are characterized by alternating sides of inhibition and facilitation in the quadrants. The muscle imbalances are seen between the fronts and back of the body or sometimes in left and right side of body.

Upper cross syndrome (UCS) is also referred as proximal or shoulder crossed syndrome. According to Dr. Vladimir Janda, upper cross syndrome is characterized by tightness of the upper trapezius, levator scapulae on dorsal side crosses with tightness of pectoralis major and minor. Weakness of the deep cervical flexors ventrally crosses with weakness of middle and lower trapezius¹.

This pattern of imbalance creates joint dysfunction, particularly at the atlanto-occipital joint, C4-C5 segment, cervicothoracic joint, glenohumeral joint, and T4-T5 segment. Janda noted that these focal areas of stress within the spine correspond to transitional zones in which neighboring vertebrae change in morphology²,³,⁴.

Specific postural changes are seen in UCS, including forward head posture, increased cervical lordosis and thoracic kyphosis, elevated and protracted shoulders, and rotation or abduction and winging of the scapulae¹.

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As these muscles help maintain spinal curvature in turn normal body posture. When these muscles undergo imbalance gives rise to altered posture and signs and symptoms related to it. These kind of postural alterations are seen in all aged population.

Because of increased work stress and sedentary lifestyle, the society is becoming more flexion-addicted attitude. In which people tend to frequently stoop forward. This is seen in office workers and students who tend to sit at a desk for prolonged periods, slouching forward to see the computer screen. Students carrying heavy backpacks also tend to lean forward. All these reasons in turn increase prevalence of UCS.

Poor posture leads to consequences such as, pain in the neck, mid-back muscle spasm/tightness, decreased range of motion, fatigue, arthritis due to uneven joint wear over time, increased risk for disc herniation, headaches, reduced performance which collectively reduces quality of life.

There are different treatment approaches available for UCS Out of which one of the successful treatment approach is physiotherapy.

Kinesio tex tape has been modified since its creation to mimic the qualities of skin. This tape has been designed to allow longitudinal stretch of 55-60 % of its resting length. This degree of stretch approximates the elastic qualities of human skin. The thickness of the kinesio tex tape is approximately the same as that of epidermis of the skin. This was intended to limit the body’s perception of weight and avoid sensory stimulus. The composition of kinesio tex tape is polymer elastic strand wrapped by 100 % cotton fibers which absorbs moisture from skin. These tapes are latex free. The adhesive is 100 % acrylic and heat activated. Kase et al have proposed several benefits, depending on the amount of stretch applied to the tape during application:

1) To provide a positional stimulus through the skin,
2) To align fascial tissues,
3) To create more space by lifting fascia and soft tissue above area of pain/inflammation,
4) To provide sensory stimulation to assist or limit motion, and
5) To assist in the removal of edema by directing exudates toward a lymph duct.

Various therapeutic currents have been used for modulating clinical pain. Interferential current (IFC) is a medium frequency (3000–5100 Hz) alternating current with a beat frequency ranging from 0 to 250 Hz.

Interferential current (about 100 Hz for TENS), IFC produces lower impedance on skin and subcutaneous tissue, therefore the theoretical penetration power should be deeper than that of TENS (6). Studies have demonstrated that IFC is effective in managing pain conditions such as migraine and muscle soreness.

The analgesic effect of interferential therapy can be explained in part by Wednesky inhibition of Type C nociceptive fibres, although other mechanisms are certainly involved. ‘Pain gate’ theory, proposed by Malzack and Wall and much modified subsequently remains central to this explanation.

Methodology

It was an comparative study in the physiotherapy department of Krishna institute of medical sciences. Ethical permission was obtained from institutional ethical committee, KIMSDU, Karad.60 subjects were equally divided into 2 groups using lottery method. Subjects were selected according to inclusion and exclusion criteria. The inclusion criteria was as follows 1) Both male and female participants with clinical diagnosis of upper cross syndrome. 2) Age group between 21 to 40 years. 3) Participants willing to participate in the study.

The exclusion criteria was as follows. 1) Degenerative condition of spine. 2) Cervical rib. 3) Thoracic outlet syndrome. 4) Tumors or malignancies. 5) Subjects with mental disorders. 6) History of spinal surgery. 7) Clinical conditions such as over sensitive skin, pregnancy, pacemakers etc. where IFT application is contraindicated. 8) Any shoulder pathology causing limitation of movement.

The exclusion criteria was as follows. 1) Degenerative condition of spine. 2) Cervical rib. 3) Thoracic outlet syndrome. 4) Tumors or malignancies. 5) Subjects with mental disorders. 6) History of spinal surgery. 7) Clinical conditions such as over sensitive skin, pregnancy, pacemakers etc. where IFT application is contraindicated. 8) Any shoulder pathology causing limitation of movement.

Written informed consent form was taken, and the whole study was explained to them. A detailed musculoskeletal evaluation was done to screen the subjects.

Study Design : Experimental study

Setting : Krishna Hospital, Physiotherapy Department
**Study population:** All participants were selected by Simple Random Sampling method. Participants were selected on the basis of inclusion and exclusion criteria. Selected participants were then randomly divided into 2 groups.

**Procedure:**

Both groups received respective training for 4 weeks.

**Group A:**
- Pectoralis major inhibitory technique: tonus-decreasing muscle application
- Middle and lower trapezius facilitation technique: tonus-increasing muscle application
- Deep neck flexors and serratus anterior strengthening
  - 10 rep* 3 sets
- Middle and lower trapezius strengthening
  - 10 rep* 3 sets
- Stretching of pectoralis major and minor muscles
  - 30 sec hold* 5 rep
- Hot Moist Pack for 15 mins

**Group B:**
- Hot moist pack 15 mins for upper back
- IFT 20 Mins for upper back
- Deep neck flexors and serratus anterior strengthening
- Middle and lower trapezius strengthening
  - 10 rep* 3 sets
- Stretching of pectoralis major and minor muscles
  - 30 sec hold* 5 rep

**Variables:**
1) Visual analogue scale
2) Cranio-vertebral angle
3) Forward shoulder angle

**Study size:**
The study size was 60
- Group A – 30
- Group B – 30

**Statistical analysis**

Statistical analysis of the study was done manually as well as using the instat software so as to verify the results. The data was entered into an excel spread sheet, tabulated and participated to statistical analysis. Various statistical measures such as mean, standard deviation and tests of significance such as paired ‘t’ test and unpaired ‘t’ test were utilized for all the available scores in all the participants. Nominal data from patient’s demographic data i.e. age, sex distribution were also analyzed. Intra group comparison of pre interventional and post interventional outcome measures was done using student paired ‘t’ test whereas Unpaired ‘t’ test was utilized to measure the difference between two groups (Intergroup comparison)

**Results**

**1. VISUAL ANALOG SCALE**

Table no. 1: Visual analog scale (VAS) score (in centimeters):Intra – group comparison (Paired ‘t’ test)

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pre-interventional</th>
<th>Post-interventional</th>
<th>p Value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group (A)</td>
<td>7.41 ± 1.48</td>
<td>2.97 ± 1.36</td>
<td>&lt;0.0001</td>
<td>Statistically significant</td>
</tr>
<tr>
<td>Group (B)</td>
<td>7.48 ± 1.66</td>
<td>3.10 ± 1.31</td>
<td>&lt;0.0001</td>
<td>Statistically significant</td>
</tr>
</tbody>
</table>
Table no. 2: Visual analog scale (VAS) score (in centimeters): Inter – groups comparison (Unpaired ‘t’ test)

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pre-interventional</th>
<th>Post-interventional</th>
<th>p Value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group (A)</td>
<td>7.48 ± 1.66</td>
<td>3.10 ± 1.31</td>
<td>0.88</td>
<td>Statistically significant pain reduction on inter-group comparison</td>
</tr>
<tr>
<td>Group (B)</td>
<td>7.41 ± 1.48</td>
<td>2.97 ± 1.36</td>
<td>0.75</td>
<td></td>
</tr>
</tbody>
</table>

2. CRANIO-VERTEBRAL ANGLE

Table no. 3: Cranio-Vertebral Angle : Intra – group comparison (Paired ‘t’ test)

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pre-interventional</th>
<th>Post-interventional</th>
<th>p Value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group (A)</td>
<td>63.3 ± 10</td>
<td>36.95 ± 9.74</td>
<td>&lt;0.0001</td>
<td>Statistically significant</td>
</tr>
<tr>
<td>Group (B)</td>
<td>57.15 ± 10.32</td>
<td>24 ± 6.07</td>
<td>&lt;0.0001</td>
<td>Statistically significant</td>
</tr>
</tbody>
</table>

Table no. 4: Cranio-Vertebral Angle Inter – groups comparison (Unpaired t test)

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pre-interventional</th>
<th>Post-interventional</th>
<th>p Value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group (A)</td>
<td>63.3° ± 10°</td>
<td>36.95° ± 9.74°</td>
<td>0.0632</td>
<td>Statistically significant</td>
</tr>
<tr>
<td>Group (B)</td>
<td>57.15° ± 10.32°</td>
<td>24° ± 6.07°</td>
<td>1.15</td>
<td></td>
</tr>
</tbody>
</table>

3. FORWARD SHOULDER ANGLE

Table no. 5: Forward Shoulder Angle Intra – group comparison (Paired ‘t’ test)

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pre-interventional</th>
<th>Post-interventional</th>
<th>p Value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>41.55° ± 9.84°</td>
<td>71.7° ± 11.16°</td>
<td>&lt;0.0001</td>
<td>Statistically significant</td>
</tr>
<tr>
<td>Group B</td>
<td>45.3° ± 11.97°</td>
<td>77.1° ± 12.37°</td>
<td>&lt;0.0001</td>
<td>Statistically significant</td>
</tr>
</tbody>
</table>
Table no.6 - Forward Shoulder Angle: Inter – group comparison (Unpaired ‘t’ test)

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pre-interventional</th>
<th>Post-interventional</th>
<th>p Value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group (A)</td>
<td>41.55º ± 9.84º</td>
<td>71.7º ± 11.16º</td>
<td>0.285</td>
<td>Statistically significant improvement in ROM on inter-group comparison</td>
</tr>
<tr>
<td>Group (B)</td>
<td>45.3º ± 11.97º</td>
<td>77.1º ± 12.37º</td>
<td>0.155</td>
<td></td>
</tr>
</tbody>
</table>

Discussion

The present clinical trial was conducted to compare the effectiveness of kinesio taping in Upper cross syndrome. Results of this study were focused on pain relief, improvement of cranio-vertebral angle and forward shoulder angle. It was noticed that there was improvement in all the above parameters in both groups.

A combination of pain assessment by visual analogue scale (VAS); cranio-vertebral angle and forward shoulder angle range of motion assessment outcome measures were used to assess the effectiveness of kinesio taping in Upper cross syndrome.

In this study, the age group of the participants was in between 21 to 40 years. Participants between this age group were prone for upper cross syndrome because of increased work stress and sedentary life style, the society is becoming more flexion-addicted attitude. In which people tend to frequently stoop forward. This is seen in office workers and students who tend to sit at a desk for prolonged periods, slouching forward to see the computer screen. Students carrying heavy backpacks also tend to lean forward. All these reasons in turn increase prevalence of UCS.

Sample size of present study consisted of 28 females and 32 males that are 46.66% females and 53.33% males. When the intragroup mean values of visual analogue scale (VAS) were analyzed it was found statistically significant in both groups pre to post intervention p=<0.0001. The adhesion of the K-Tape to the skin, and the resulting mechanical displacement caused by body movement, leads to stimulation of the mechanoreceptors in the skin. Like the nociceptive afferents, these proprioceptive afferents also run to the dorsal horn and inhibit the relaying of nociception. Additionally strengthening and stretching exercises for affected muscles along with electrotherapy modalities might have helped in reducing pain by improving balance of short and weak muscles.

The results of this study found that there was significant improvement in cranio-vertebral angle p=0.0632 and forward shoulder angle p=0.285 within groups pre and post intervention. There was significant difference was seen on comparing the pre session and post session values between the groups. Possible reasoning for improvement in these angles could be in a tonus-increasing muscle application; the elastic stretch tape exerts tension via the restoring force in the direction of origin to the fixed base, and thus displaces the skin in the same direction. This brings about support of the muscle contraction. In a tonus-decreasing muscle application, the elastic stretch tape exerts tension in the direction of insertion to the fixed base and likewise displaces the skin in the same direction. This causes a reduction in muscle contraction.

Limitations:

1. Small sample size
2. Participants could not be followed up after the study.
3. Duration of the study was short.

Recommendations:

1. Studies with longer duration are recommended with longer follow-up period to assess long term benefits.
2. Study can be conducted with larger sample size.
3. This was a heterogeneous group with both male and female population, future studies could be done taking up a homogenous sample with either male or female participants separately.
Conclusion

In conclusion, the present experimental study provided evidence to support the use kineio tape in relieving pain, improving range of motion and improving the cranio-vertebral angle and forward shoulder angle in participants with Upper cross syndrome.

Source of Funding – Self

Conflict of Interest – Nil

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Proportion of Diagonal Ear Lobe Crease and its Association With Sudden Death Due to Coronary Artery Disease- An Autopsy Study

Anwar Abdul Rahman1, Renju Raveendran2

1Senior Resident, 2Professor, Department of Forensic Medicine, Government Medical College, Kottayam.

Abstract

Coronary artery disease has been a number one killer worldwide and in India it has increased phenomenally as the most important cause of sudden natural death of cardiac aetiology in the last few decades. Changing lifestyles, stress, habits, presence of other predisposing pathologies etc have played direct as well as indirect roles in its causation. Conventionally the predictors for coronary artery disease have been predominantly risk factors. Notwithstanding this, of recently a number of extra cardiovascular physical parameters like ear lobe crease have shown a reasonably promising trend in predicting the presence of coronary artery disease thereby enabling prompt intervention which in turn can reduce cardiac mortality in the long run. The present study focuses on this aspect of detecting an association between diagonal ear lobe crease and sudden death due to coronary artery disease. A total of 188 cases brought for medicolegal autopsy was studied. It has been revealed that diagonal ear lobe crease detected at autopsy has a statistically significant association with both the presence of coronary artery disease as well as the severity of atheromatous occlusion in sudden deaths. Hence diagonal ear lobe crease can have a reasonable predictive value in detecting coronary artery disease that could be used for the early detection of individuals with coronary artery disease and thus pave the way for early interventional strategies.

Key words: diagonal ear lobe crease, coronary artery disease, sudden death, extra cardiovascular physical predictors.

Introduction

Atherosclerosis is a major source of disability and leading cause of mortality in India. Coronary artery atherosclerosis has resulted in millions of citizens suffering either a fatal myocardial infarction or stroke associated death 1. Premature mortality because of cardiovascular disease in India has showed a phenomenal rise especially during the last few decades2. Many of these catastrophic events were in individuals free of prodromal symptoms and often without classical risk factors such as hypertension, hyperlipidemia, diabetes, tobacco use, obesity, or sedentary lifestyle. This “detection gap” has spurred clinicians to attempt to find extravascular physical signs which might identify individuals at high risk of atherosclerosis and consequent cardiac fatalities. “Frank’s sign or diagonal ear-lobe crease” is found to be associated with the development of premature atherosclerosis of the coronary arteries.

It has been postulated that diagonal ear-lobe crease and coronary artery atherosclerosis originate simultaneously because the ear lobe and heart are supplied by “end arteries” without the possibility for collateral circulation.3 Still controversies exist regarding the association between them4. If there is such an association, an intervention at the right time could bring down the mortality rate due to cardiovascular disease. Several studies conducted abroad have demonstrated an association between ear lobe crease and sudden death5,6,7,8, 9. So, this study is scientifically challenging and socially relevant to these changing times as far as cardiovascular disease and sudden death is concerned.
Materials and Method

This was a cross sectional study conducted in the Department of Forensic Medicine, Government Medical College, Kottayam during the period from 1st March 2017 to 28th February 2018. All sudden death cases in the age group 15-60 years brought to the department for medico-legal autopsy were selected. A total of 188 such cases were studied. Relevant details of the deceased regarding the previous history of illness, details of the present illness, treatment history etc were obtained from the police and the available close relatives. All cases were studied for diagonal ear lobe crease and categorized as:

1. absent
2. unilateral
3. bilateral

Coronary arteries were examined for atheromatous thickening of the intima, calcification, any haemorrhage into the atheromatous plaque and thrombosis. Circumference of coronary artery, 5 cm distal to its origin was taken using twine and measured using Vernier callipers. Thickness of coronary artery wall was also measured using Vernier callipers. From these measurements, area of original lumen and residual lumen of coronary artery and the percentage of occlusion were calculated mathematically.

Results

Among the 188 cases studied, the greatest number of victims were in the age group of 40 to 60 years (48.94%). The youngest age to participate in the study was 18 years, whereas the eldest was 82 years. The mean age of the study sample was 50 years with a standard deviation of 14.

Of the 188 cases, 163 (86.7 %) were males and 25 (13.3 %) were females. The lowest age among the females was 32 years and the highest was 82 years. On the other hand, the lowest age among males was 18 and the highest was 82 years.

In the present study, the most common cause of death was cardiovascular disease (64.9%) and among this, coronary artery disease due to atherosclerosis accounted for 62.2%. Second commonest cause was respiratory system disorders (21.3%). Third commonest cause was central nervous system diseases (7.4%) followed by gastrointestinal system disorders (2.7%) and those related to the genito-urinary system (3.7%), which were by far the least common. Among coronary artery disease, males are mostly affected (92.3% and 96.4%) compared to female (7.7% and 3.6%) in younger and middle age groups respectively. But during old age, it was seen that the proportion of females with coronary artery disease rose to 25%. In male population incidence was more during middle age (51%) but in female population incidence was more during old age (69.2%).

The subjects were classified into three categories based on presence of ear lobe crease as: a. Absent. b. Unilateral ear lobe crease and c. Bilateral ear lobe crease.

Among the study group consisting of 188 cases, 53.2 % had bilateral earlobe crease, 5.3% had unilateral earlobe crease and absent ear lobe crease in 41.5 %.

Table 1: Table showing association of cause of death and diagonal earlobe crease

<table>
<thead>
<tr>
<th>Earlobe crease</th>
<th>Coronary artery disease</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
</tr>
<tr>
<td>Absent</td>
<td>36</td>
<td>46.2</td>
</tr>
<tr>
<td>Present</td>
<td>81</td>
<td>69.2</td>
</tr>
<tr>
<td>Total</td>
<td>117</td>
<td>62.2</td>
</tr>
</tbody>
</table>

Diagonal Earlobe crease was present in 69.2 % cases of sudden death due to coronary artery disease and 26.4% cases of sudden death due to other causes. Statistically significant association (Chi-square – 14.666, p value = 0.000) was observed between the coronary artery disease and diagonal earlobe crease.
The subjects were further classified into four categories based on percentage of stenosis as follows:

1. <25% - minimal stenosis
2. 25-50% - mild stenosis
3. 50-75% - moderate stenosis
4. >75% - severe stenosis.

![Atheromatous thickening of the coronary arteries](image)

**Figure 1:** Showing atheromatous thickening of the coronary arteries

**Table 2:** Showing association of ear lobe crease and severity of occlusion

<table>
<thead>
<tr>
<th>Severity of occlusion</th>
<th>Diagonal ear lobe crease</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Absent</td>
<td>present</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td>Frequency</td>
<td>Percentage</td>
<td></td>
</tr>
<tr>
<td>&lt;75 (Noncritical)</td>
<td>49</td>
<td>62.8</td>
<td>28</td>
<td>25.5</td>
<td></td>
</tr>
<tr>
<td>&gt;75 (Critical)</td>
<td>29</td>
<td>37.2</td>
<td>82</td>
<td>74.5</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>78</td>
<td>100</td>
<td>110</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

74.5% cases with ear lobe crease showed critical narrowing. Whereas only 25.5% of cases with ear lobe crease showed noncritical narrowing. Statistically significant association (Chi-square for trend – 26.350, *p value = 0.000*) was observed between the severity of occlusion and diagonal earlobe crease.

**Discussion**

Among the 188 cases studied, the greatest number of victims were in the age group 40 to 60 years (48.94%). Regarding coronary artery diseases, nearly half (47%) of cases, were present in the middle age category (40 to 60 years).
In an autopsy study conducted by Salini.R et al\textsuperscript{10} at Government Medical College Thiruvananthapuram, maximum incidence of sudden cardiac death was found to be in the age group of 40-50 years (28.3\%) followed by 27.7 \% in the age group 50-60 years. Therefore, an estimated 55.3\% were in the age group 40-60 years which is very close to our study. In another autopsy study by Deepu.T et al\textsuperscript{11} at Government Medical College, Kottayam, maximum number of Sudden natural deaths due to coronary artery disease were in the 36-50-year age group (42.2\%) and 33.3\% in the 51-65-year age group which is again in agreement with our findings. Among coronary artery diseases, nearly half (47\%) of cases were occurring in the middle-aged group. On increasing age, risk of coronary artery disease was also seen rising exponentially.

In a study by Mittal.G et al\textsuperscript{12} conducted at Kasturba Medical College Mangalore; a male to female predisposition ratio of 7:1 was observed, which is proximate to our findings. In the autopsy study by Salini.R et al\textsuperscript{10}, among coronary artery diseases, incidence was more in males (90\%), which is again consistent with findings of the present study. Incidence of coronary atherosclerosis is very high in males which may be due to high workload, stress, change in dietary habits and addictions like alcohol, drugs and smoking.

In the study group, irrespective of the cause of death 53.2 \% had bilateral earlobe crease, 5.3\% had unilateral earlobe crease and it was found absent in 41.5 \%. As regards coronary artery disease in particular, 69.2\% of them had diagonal earlobe crease. Statistically significant association (Chi-square – 14.666, \textit{p value} = 0.000) was observed between the coronary artery disease and diagonal earlobe crease.

In an autopsy study by Kaukola et al\textsuperscript{13}, ear lobe crease was present in 66.3\% of cases of occlusive coronary artery disease which is in compliance with our findings. As revealed in a British forensic necropsy study\textsuperscript{8}, proportion of diagonal earlobe crease in males and females was (72\%) and (67\%) which is also in agreement with our findings. In the study by Salini.R et al\textsuperscript{10}, ear lobe crease was present in 66.3\% of cases of occlusive coronary artery disease and hence is not inconsistent with the present study.

Statistically significant association was also observed between the severity of occlusion and diagonal earlobe crease with 74.5\% cases showing critical narrowing of the coronary arteries especially the anterior descending branch of the left coronary artery. In an autopsy study by Patel. V et al\textsuperscript{14}, sensitivity of well-defined bilateral diagonal earlobe crease for detecting severe coronary artery disease was 62.1\% for men and 69.2\% for women, which is in accordance with our findings. In an angiogram study by Evrengül H et al\textsuperscript{7}, there was a highly significant statistically greater prevalence of diagonal earlobe crease (51.4\%) in those patients with more than 70\% stenosis than in those whose angiogram was normal (15.1\%), which is evidently lesser than the findings of this study.

As per the present study, horizontal ear lobe crease can be considered as a predictor for the presence of coronary artery disease.

Conclusions

The present study “Proportion of Diagonal Ear Lobe Crease and its Association with Death due to Coronary Artery Disease – An Autopsy Study” was to assess the proportion of new risk factors in coronary artery disease and whether it can predict chances of coronary artery disease so that fatalities due to cardiovascular diseases may be reduced in the future. 1. Majority of victims were in the age group of 40 to 60 years (48.94\%). Among sudden deaths due to coronary artery disease, greater number of victims were present in the middle age group.

2. Males are predominantly affected in sudden death due to coronary artery disease (88.88\%).

3. The most common cause of death was cardiovascular diseases (64.9\%) and among this, coronary artery disease due to atherosclerosis accounted for 62.2\%. Second commonest cause was respiratory system disorders (21.3\%). Third commonest cause is central nervous system disorders (7.4\%) followed by gastrointestinal system diseases (2.7\%) and least commonly those of the genito-urinary system (3.7\%).

4 Among coronary artery disease, 69.2\% of them had diagonal earlobe crease. Statistically significant association (\textit{p value} = 0.000) was observed between coronary artery disease and diagonal earlobe crease. Diagonal ear lobe crease can be reasonably considered as a predictor for the presence of coronary artery disease.

5 74.5\% cases with ear lobe crease showed critical narrowing (more than 75\%). Statistically significant association (\textit{p value} = 0.000) was observed between
the severity of occlusion and the presence of diagonal earlobe crease.

6. Among the three coronary arteries, critical narrowing (more than 75%) was mostly seen in left anterior descending artery (46.3%), followed by right coronary artery (23.4%) and least commonly in the left circumflex artery (9%).

Conflict of Interest statement: This study is an original research work and does not include issues of conflict of interests

Source of Funding: Self

Ethical Clearance: Ethical Clearance was obtained from the Institutional Review Board, Government Medical College, Kottayam.

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Peek (Polyether Ether Ketone) – A Review Article

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¹Professor, ²Post graduate, ³Professor & Head, Department of Prosthodontics, Sree Balaji Dental College & Hospital, BIHER

Abstract

This article is aimed to review the applications of Polyether Ether Ketone (PEEK) in dentistry. The evolving desire for functions and aesthetics, few drawbacks with existing materials and clinicians shifting their paradigms towards metal free restorations led space for the metal-free restorations in today’s restorative practice. PEEK is a polymer based innovative material, that can be used in either fixed or removable prosthetics. This literature review discusses various applications and uses of PEEK.

Keywords: PEEK, Polyether ether ketone, aesthetics, biocompatibility, restoration

Introduction

Advance in dentistry and development of technologies can be reached by improving materials. Biocompatibility, good oral hygiene, good aesthetics and characteristics close to dental structure are essential to modern materials used in advanced dentistry. It helps to rebuild the defects of the teeth and dentition and please demanding patients. Dental defects can be restored by using fixed or removable restorations. For better aesthetics and metal-free restorative treatment, we can prefer PEEK material which can be used in both fixed and removable prosthesis.

PEEK (-C₆H₄-OC₆H₄-O-C₆H₄-CO-)ₙ is a semi-crystalline linear polycyclic aromatic polymer. Later PEEK became an important high-potential thermoplastic material for alternating metal implant components, in vertebral surgery as a material of the interbody fusion cage. Ma R, Tang T et. Al in 2014 found that, With the introduction of carbon fibre reinforced PEEK (CF/PEEK), this new composite material was exploited for fracture fixation and femoral prosthesis in artificial hip joints¹.

Physical Properties of PEEK

PEEK is rigid, radiolucent material with great thermal stability up to 335.8° C. It is non allergic and has low plaque affinity². Density – 1300 kg/m³, Flexural modulus of PEEK is 140-170 MPa, thermal conductivity 0.29 W/Mk³-⁶. PEEK’s mechanical properties do not change during sterilization process, using steam, gamma and ethylene oxide³,⁵,⁶. Young’s (elastic) modulus of PEEK is 3-4 GPa⁷,⁸. Young’s modulus and tensile properties are close to human bone, enamel and dentin⁹. Polyether ether ketone is resistant to hydrolysis, non-toxic and has one of the best biocompatibility¹⁰,¹¹. PEEK shows stable physical and chemical properties: stability at high temperatures (like sterilization processes), resistance to most substances apart from concentrated sulfuric acid and wear-resistance¹. Lieberman et al.¹² in vitro research comparing PEEK, poly methyl methacrylate (PMMA) and composite resin showed that PEEK has the lowest solubility and water absorption values. As PEEK is quite new material in dentistry comparing to composite, ceramics or zirconia, it is important to find out and summarize its properties. The aim of this literature review is to understand PEEK polymer and its use in dentistry.

Discussion

PEEK is quite new material in prosthodontics. Comparing to the metals used in dentistry, PEEK is more aesthetic, stable, biocompatible, lighter and has reduced degree of discoloration¹³,¹⁴. This fulfills patient’s aesthetic requirements. However, due to its grayish-brown...
colour PEEK is not suitable for monolithic aesthetic restorations of anterior teeth\textsuperscript{15}. High aesthetic material like composite can be used as a layering to obtain desired aesthetics. Air abrasion with and without silica coating creates wettable surface, but etching with sulfuric acid makes rough and chemically processed surface\textsuperscript{3,16}. Low energy of PEEK surface creates resistance to chemical processing. Uhrenbacher et al.\textsuperscript{17} investigated the modification of the surface strength of PEEK crowns adhesively bonded to dentin abutments. The greatest values were found for the airborne-particle abrasion and sulfuric etched groups. The results of Hallmann et al. research show that abraded PEEK surface with 50 μm alumina particles followed by etching with piranha solution lead to the highest tensile bond strength when Heliobond was used as adhesive\textsuperscript{14}. Various research confirms that resin composites can be used as a layering material for the PEEK frames. However, it is hazardous to use concentrated sulfuric acid in dental practice.

Mechanical properties of the PEEK resembles dentin and enamel. Thus its advantageous over metal and ceramic restorations. The fracture resistance of CAD- CAM milled PEEK fixed prostheses 2354N. It has higher resistance than lithium disilicate ceramic (950N), aluminium (851N) or zirconia (981-1331N)\textsuperscript{18}. Mastication cyclically loads the teeth with a 400 N force. As PEEK has high fracture load resistance it is suitable for producing frames. High fracture resistance is also stated in Stawarczyk et al. publications. A mean fracture relative load was 1383 N of 3-unit PEEK frameworks without veneering\textsuperscript{15}.

Relatively weak mechanically in homogenic form. Tannous et al.\textsuperscript{13} in vitro research showed that clasps that are made of PEEK material have low resistance forces than those made of cobalt – chrome metal. Scientists have searched for combinations with other materials, to improve PEEK’s properties. Polyether Etherketonethat are modified containing 20% ceramic fillers known as BioHPP, is non allergic material and has high biocompatible. Possibility of corrections, excellent stability, great optimal polishable properties and aesthetic white shade of BioHPP help to produce high-quality prosthetic restorations\textsuperscript{3}. BioHPP has a great potential as framework material. This is a good alternative to Cr-Co frames for the patients with high aesthetic requirements. But in clinical situations the results might be different. Individual abutments on implants can be milled of PEEK. They are usually used for temporary restorations. Randomized controlled clinical trial showed, that there is no statistically significant difference between PEEK and titanium abutments, causing bone resorption or inflammation. Moreover, the attachment of oral microorganisms to PEEK abutments is comparable to those made of titanium, zirconia and poly methyl methacrylate. Therefore, PEEK is a promising alternative to titanium abutments\textsuperscript{3}. Comparing to titanium, the polymer could exhibit less stress shielding, but very limited inherent osteoconductive properties\textsuperscript{3}. Thus PEEK has better Osseo integrative property. Nowadays, there are many combinations of PEEK with other materials such as fibres, carbon or ceramics. Due to its chemical structure and poor wetting capability of PEEK it is difficulty to fabricate its surface to increase its bond strength and bonding with composites. For better functioning, the surface of PEEK restorations has to be layered by resin composites or lithium disilicate. The best surface processing option is still not found. Moreover, composite as a coating material of the PEEK may degrade with time. So if the polymer frame remains stable, it is necessary to renew the coating material. These are extra expenses to the patient. Unfortunately, there was not enough clinical research made to prove PEEK’s superiority over other materials. There is still not enough information stated about complications, biofilm formation on PEEK surface and its resistance to compression. Even so, PEEK is being used in manufacturing fixed restorations\textsuperscript{17}, dental implants, individual abutments, removable prostheses and their parts\textsuperscript{3} and even maxillary obturator prostheses\textsuperscript{19}.

**Conclusions**

PEEK is an innovative material to use in prosthodontics. Due to its excellent physical, mechanical and chemical properties it is used in fabricating fixed and removable prostheses. As most of the studies have been carried out in vitro, more clinical research is essential for its better applications.

**Conflict of Interest** – nil

**Source of Funding** – nil

**Ethical Clearance** – not required as it is a review article

**References**


Effectiveness of Strengthening Vs Strengthening with Stretching in Individuals with Nonspecific Low Back Pain

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Abstract

Objectives:- To assess and compare the effectiveness of strengthening and strengthening with stretching in patients with nonspecific low back pain

Methodology:- There were total 40 patients with low back pain in the study. This study was done to find and compare the effect of strengthening and strengthening with stretching in patients with nonspecific low back pain. The patients were assessed with Visual Analogue Scale for pain and Manual Muscle Testing for the strength before and after 12 weeks of treatment.

Result: Strengthening and stretching of the muscles has effect on the pain reduction as well as strength of the muscles in patients with nonspecific low back pain.

Conclusion: On the basis of the result of this study, it was concluded that the strengthening and stretching of the muscles has effect on the pain reduction as well as strength of the muscles in patients with nonspecific low back pain

Keywords: Nonspecific Low Back Pain, Visual Analogue Scale, Manual Muscle Testing, Strengthening, Stretching

Introduction

Low Back Pain is one of the most commonest musculoskeletal condition affecting the adult population with a prevalence of about 84%[1]. It affects both the genders, but most commonly seen in women than the men[2]. Low Back Pain is the pain which is localized between the 12th rib and the inferior gluteal folds, with or without any radiating pain to the legs[2]. Low Back Pain can be due to degeneration of the spine and discs, trunk stabilizers, jobs that requires repetitive heavy lifting, excessive mechanical stress on the intervertebral disc, along with psychological factors of the patients[2]. Patients complaining of low back pain for almost 3 months may present with decreased muscle strength. Impaired motor control, decreased Co-ordination and Postural Control that interferes with the functional activities of the patients[2].

Age: Children usually do not complain of low back pain, and if they complain that may be because of some Organic disease[12]. Traumatic back pain and postural back pain is the common cause in the adolescent age group[12]. In adults the pain may be due to various conditions such as Ankylosing Spondylitis, Disc Prolapse etc. Degenerative Arthritis or osteoporosis is the main cause of low back pain in elderly[12].

Sex: Women who had multiple pregnancies are mostly affected. Poor Muscle Tone due to Lack of Exercises are the contributory factors in these women. Obesity during the pregnancy can also lead to Mechanical Back Pain[12].

Occupation: Occupation gives us the clues of the risk factors which are responsible for the low back pain people with the sedentary jobs are most likely prone for the low back pain[12].

Physical activity to Increase the Muscle strength as well as the aerobic capacity of the lumbar extensors is an important factor of the patients with chronic low back pain in assisting the patients to complete the activities of daily living[3]. Abnormal habitual posture can lead
to tightness in the lumbo-pelvic Hip complex muscles that can cause abnormal stresses which can increase the shear or the compressive forces on the joints that can lead to excessive stress on the articular surface and further develops mechanical low back pain\[4\].

If the Tensor Fascia Lata which helps the hip joint in flexion, adduction and the internal rotation and helps the knee joint for extension shortens then the Hip joint will be internally rotated more which leads to rotation of the pelvis and that excessive rotation of the hip joint will cause an abnormal alignment of the lumbar spine and the hip joint further leading to pain in the lumbar region\[4\]. Shortening of the Tensor Fascia Lata can increase the iliotibial band tightness which leads to anterior inclination of the pelvis\[5\]. In addition due to shortening and muscle spasm of the hamstring muscle results in a posterior inclination of the pelvis\[5\]. Therefore simultaneous contraction of these two muscles can decrease the flexibility of the pelvis and increase the lumbar stress during the functional activities\[5\].

The related muscle involved are the trunk extensors which become tightened due to prolonged overstretching of the innervated soft tissue, but whereas the abdominal and the gluteal muscle undergo weakness and atrophy\[5\].

Some studies have found that passive and active stretching of the muscles help to improve the flexibility and also increases the Range of Motion in low back pain individuals. Weaker muscles often act as tight muscles, owing to the Neurological changes within the particular muscles which are weak\[6\]. If the muscles are not strong enough to perform the particular action, then it can seize up to protect itself which may further lead to a feeling of tightness\[6\].

The core muscles are the primary muscle group responsible for maintaining the spinal stability\[7,8\]. These muscle includes the transversus Abdominis, lumbar Multifidus, Internal Oblique muscle and the Quadratus Lumborum\[6,7,8\]. The lumbar Multifidus is the muscle which is directly connected to each lumbar vertebral segment and transversus Abdominis and the lumbar Multifidus activate a co-contraction mechanism\[4,5\]. These muscles provides a precise motor control and are thus primarily responsible for the spinal stability\[7,8\].

Most of the low back pain patients experiences fear of pain therefore they tends to avoid the physical activity which can result in tissue and structural changes. Ultimately continuous back pain persists during the lifetime and consequently this can cause secondary damage and followed by recurrence of back pain\[5,7,9\].

**Methodology**

Prior to the commencement of the study the ethical clearance was taken from the Institutional ethical committee. Individuals with Low Back Pain were selected as subjects. The subjects were selected as per the inclusion and exclusion criteria. They were given a detailed instruction about the study. The consent was taken from the subjects. The study was taken place in Satara District.

The duration of the study was 3 months. The sample size for this study was 40 irrespective of caste, religion and gender. After selecting the sample the subjects were divided into two groups randomly. The age group was between 20-40 and both the gender was selected.

The study was conducted in Karad. Demographic Data including name, age, gender, address was collected. Prior to the treatment the pre-treatment assessment was taken. Pain was assessed with the help of visual analogue scale and muscle strength with the help of manual muscle testing.

A detailed instructions were given to the participants about the treatment protocol. Group A was given only the Strengthening program, and Group B was given Strengthening and Stretching program. Group A was given strengthening program for the back muscles. Group B was given strengthening of the back muscles as well as stretching of three muscles.

All the subjects from both the group performed the exercises twice in a week for around 50min per session with the instructor for 12 weeks. Pain assessment and Muscle strength was taken before and after 12 weeks of the exercise program. The score were calculated and data was recorded. Later statistical analysis was done.

**Result**

**Table no:-1- VAS at Rest (Pre Treatment)**

<table>
<thead>
<tr>
<th></th>
<th>Mean±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>6.470 ± 1.055</td>
</tr>
<tr>
<td>Group B</td>
<td>6.400 ± 0.9531</td>
</tr>
</tbody>
</table>
The baseline mean VAS score pre treatment at rest was found to be 6.470 ± 1.055 for Group A patients and 6.400 ± 0.953 for Group B patients.

**Table no:- 2 - VAS at Rest (Post Treatment)**

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Paired t Value</th>
<th>p-Value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>5.375</td>
<td>0.9678</td>
<td>6.897</td>
<td>&lt;0.0001</td>
<td>-2.684 to -1.466</td>
</tr>
<tr>
<td>Group B</td>
<td>3.300</td>
<td>0.9347</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The mean VAS score post intervention at rest was found to be 5.375 ± 0.968 for Group A patients and 3.300 ± 0.935 for Group B patients. A statistically significant reduction in Mean VAS score at rest was found for Group B patients when compared to Group A patients where the P value is <0.0001.

**Table:- 3- VAS on Activity (Pre Treatment)**

<table>
<thead>
<tr>
<th></th>
<th>Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>8.385 ± 1.177</td>
</tr>
<tr>
<td>Group B</td>
<td>8.515 ± 1.075</td>
</tr>
</tbody>
</table>

The baseline mean VAS score pre treatment on activity was found to be 8.385 ± 1.177 for Group A patients and 8.515 ± 1.075 for Group B patients.

**Table:- 4- VAS on Activity (Post Treatment)**

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Paired t Value</th>
<th>p-Value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>6.925</td>
<td>0.8949</td>
<td>8.979</td>
<td>&lt;0.0001</td>
<td>-3.045 to -1.925</td>
</tr>
<tr>
<td>Group B</td>
<td>4.440</td>
<td>0.8550</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The mean VAS score post Intervention on activity was found to be 6.925 ± 0.8949 for Group A patients and 4.440 ± 0.8550 for Group B patients. A statistically significant reduction in Mean VAS score on activity was found for Group B patients when compared to Group A patients where P value is <0.0001.

**Table:- 5- MMT (Pre Treatment)**

<table>
<thead>
<tr>
<th></th>
<th>Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>3.450 ± 0.5104</td>
</tr>
<tr>
<td>Group B</td>
<td>3.400 ± 0.5026</td>
</tr>
</tbody>
</table>

The baseline mean MMT score pre treatment was found to be 3.450 ± 0.5104 for Group A patients and 3.400 ± 0.5026 for Group B patients.
Table: MMT (Post Treatment)

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>Paired t Value</th>
<th>p-Value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>4.500</td>
<td>0.5130</td>
<td>1.285</td>
<td>0.2064</td>
<td>-0.5150 to 0.1150</td>
</tr>
<tr>
<td>Group B</td>
<td>4.700</td>
<td>0.4702</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The MMT post intervention was found to be 4.500 ± 0.5130 for Group A patients and 4.700 ± 0.4702 for Group B patients. A statistically significant increase in MMT score was found in Group B patients when compared to Group A patients where P value is (<0.0001).

Discussion

Low Back Pain is one of the most common musculoskeletal condition affecting the adult population with a prevalence of about 84%. It affects both the genders, but most commonly observed in women than the men. Low Back Pain is the pain which is localized between the 12th rib and the inferior gluteal folds, with or without any radiating pain to the legs. Low Back Pain can be due to degeneration of the spine and discs, trunk stabilizers, jobs that require repetitive heavy lifting, excessive mechanical stress on the intervertebral disc, along with psychological factors of the patients. Patients complaining of low back pain for almost 3 months may present with decreased muscle strength, Impaired motor control, decreased Co-ordination and Postural Control that interferes with the functional activities of the patients.

This research was undertaken with the aim to study and compare the Effect of Strengthening and Strengthening with Stretching in Nonspecific Low Back Pain patients.

A total of 40 Patients with nonspecific low back pain coming in the age group 20-40 years were included in the study out of which 25 were females and 15 were males. The patients were randomly divided into two Groups. The patients were assessed on the basis of Visual Analogue Scale for the pain and Manual Muscle Testing for Strength. Group A was given Strength training and Group B was given Strengthening as well as Stretching.

The pain intensity score of the patients belonging to Group A and Group B was assessed using Visual Analogue Scale (VAS). The scoring range of this scale is in the range of 0-10, where 0 indicates low intense pain and 10 indicates extremely intense pain. The pain score was assessed at rest and on activity pre and post treatment. The baseline mean VAS score pre treatment at rest was found to be 6.470 ± 1.055 for Group A patients and 6.400 ± 0.953 for Group B patients. The treatment Strengthening was given to Group A patients twice in a week and Group B patients Strengthening and Stretching was given for the same duration. The VAS score was reassessed after 3 months in both Group of patients. The mean VAS score post intervention at rest was found to be 5.375 ± 0.968 for Group A patients and 3.300 ± 0.935 for Group B patients. A statistically significant reduction in Mean VAS score at rest was found for Group B patients when compared to Group A patients where the P value is <0.0001. The study conducted by Khwairakpam proved stretching as an effective treatment intervention for patients with chronic mechanical lower back pain whereas this study proves that the combination treatment intervention is superior than single treatment intervention in patients with nonspecific chronic low back pain.

The baseline mean VAS score pre treatment on activity was found to be 8.385 ± 1.177 for Group A patients and 8.515 ± 1.075 for Group B patients. The treatment Strengthening was given to Group A patients twice in a week and Group B patients Strengthening and Stretching was given for the same duration. The VAS score was reassessed after 3 months in both Group of Patients. The mean VAS score post Intervention on activity was found to be 6.925 ± 0.8949 for Group A patients and 4.440 ± 0.8550 for Group B patients. A statistically significant reduction in Mean VAS score on activity was found for Group B patients when compared to Group A patients where P value is <0.0001. The study conduction by Khwairakpam proved stretching as an Effective treatment intervention for patients with chronic mechanical lower back pain whereas this study...
proves that the combination treatment intervention is superior than single treatment intervention in patients with nonspecific chronic low back pain.

The Muscle strength of the patients belonging to Group A and Group B was assessed using Manual Muscle Testing (MMT). The scoring range of this scale is in the range of 0-5, where 0 means no contraction and 5 means full range of motion against gravity with maximal resistance. The strength of the back extensors was assessed pre and post treatment. The baseline mean MMT score pre treatment was found to be 3.450 ± 0.5104 for Group A patients and 3.400 ± 0.5026 for Group B patients. The treatment Strengthening was given to Group A patients Twice in a week and Group B patients Strengthening and Stretching was given for the same duration. The MMT post Intervention was found to be 4.500 ± 0.5130 for Group A patients and 4.700 ± 0.4702 for Group B patients. A statistically significant increase in MMT score was found in Group B patients when compared to Group A patients where P value is (<0.0001) as the strength of the back extensors was found to be increased as Group B patients where given a combination treatment Strengthening and Stretching. This study proves that the combination treatment intervention is effective for the increase in the strength of the muscles.

Conclusion

On the basis of the result of this study, it was concluded that the strengthening and stretching of the muscles has effect on the pain reduction as well as strength of the muscles in patients with nonspecific low back pain.

Conflicts of Interest: There were no conflicts of interest in this study

Ethical Clearance: Ethical clearance was taken from institutional committee of Krishna institute of medical sciences.

Funding: This study was self funded.

References

Effectiveness of Guided Imagery on Stress and Coping among Wives of Alcoholics: A Systematic Review

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Abstract

Background: Alcoholism is one of the major health as well as social problem all over the world today. Alcoholism is a family problem, it causes stress in the relationship and misuse affects couples’ relationship in a variety of negative ways. Purpose: To systematically review articles to evaluate the effectiveness of Guided Imagery on Stress and Coping among Wives of Alcoholics in selected De-addiction centre. Method: The search of significant articles including effectiveness of Guided Imagery on Stress and Coping among Wives of Alcoholics was carried out in PubMed/Medline, and Google Scholar. The included studies both qualitative and quantitative were evaluated according to predefined quality criteria. Medline and PubMed were searched to identify peer-reviewed English-language studies published between 1985 and March 2018 reporting on stress and coping among wives of alcoholics. Total 300 studies were selected for review, out of which only 32 were found appropriate to be included in the study. Results: Analysis was done 90 papers were retrieved by the search. Among them, 30 were evaluated to be of higher quality. Studies recruiting sample of wives of alcoholics and excluded wives of non-alcoholics. Conclusion: Based on the review it was concluded that Wives of alcoholics had more stress and social disabilities which were directly related to the severity of husband’s drinking pattern. Wives of alcoholics have highest rate of personality and emotional disturbance. Working women faced lesser stress as compared to non-working women. Wives of alcoholics had poor coping skills. They used maladaptive coping behavior to cope up with their husband’s drinking problem such as but not limited to discord, fearful withdrawal and avoidance were commonly used maladaptive coping behaviors. Relaxation therapies were found to be effective to reduce stress and in improving coping. Guided imagery was very effective in reducing stress and improving adaptive coping among wives of alcoholics.

Keywords: Alcoholism, Wives of alcoholics, Guided Imagery, De-addiction.

Introduction

Alcohol poisoning kills six people every day. Three of every four people killed by alcohol poisoning are men.1

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Alcohol addiction causes stress and family disruption. Usually the children and wives of alcoholics have low self-esteem, decreased trust and are less communicative. Alcoholism is the third leading psychiatric problem in the world today.2

Stress now a days is very common and one must learn how to deal with it and also about the stress reduction techniques. Relaxation therapies help to reduce stress and in improving one’s ability to cope with stress and stressful situations.2
Method

A systematic review was conducted by electronic search to identify articles in PubMed/ Medline, and Google Scholar. Inclusion criteria were the studies including stress and coping among wives of alcoholics. Descriptive, cross sectional, systematic review, quasi experimental studies and qualitative studies were included and studies on children and other family members of alcoholics, case reports/series, randomized clinical trials regarding other relaxation therapies except guided imagery were excluded. The search generated a total 92 articles. Out of 90 articles, the full texts of the 32 articles were retrieved and reviewed.

Results

Analysis was done. 92 papers were retrieved by the search. Among them, 30 were evaluated to be of higher quality. A systematic review was done to evaluate the effectiveness of guided imagery on stress and coping among wives of alcoholics.

The reviews were divided into three areas:

• related to the stress among the wives of alcoholics.
• related to the coping among wives of alcoholics.
• related to effect of psychological interventions on stress and coping among wives of alcoholics.

• Review related to the stress among the wives of alcoholics.

Out of 10 studies three studies (30%) were descriptive studies on stress among wives of alcoholics and revealed that wives of alcoholics had moderate to severe level of stress. (3, 4, 5) Another three studies (30%) were a comparative study which focused on comparison of stress level among alcoholic wives and non-alcoholic wives and they revealed that wives of alcoholics had more psychosocial stresses as compared to non-alcoholics spouses. (6,7,8) Two studies (20%) were non-experimental studies which revealed that the stressful life events are significantly higher among spouses of alcoholic in comparison to non-alcoholic’s spouse (9, 10) One cross sectional study to evaluate the quality of life and stress in wives of alcoholics revealed that 55.9% were mothers with a mean age of 47.66 years and 23.8% had depressive symptoms. Mean stress among caregivers was 2.24. There was significant correlation in quality of life, depression and stress of caregivers. (11) One more exploratory study to assess the role of work in lives of wives of alcoholics revealed that majority of working wives reported minimal negative impact of their husbands’ drinking on all areas of their work functioning. The working wives described work as a positive experience they faced the issues such as changing jobs, absenteeism and discussing husband’s drinking at work. None of the study revealed that the wives of alcoholics had no stress. (12)

Sample reviews:

A descriptive study was conducted to assess the level of stress among spouses of alcoholic men admitted at ranipokhri community, Dehradun. Fifty spouses of alcoholic were selected for study by using purposive sampling technique. Tool used for the study were: modified four point likert scale to assess the stress level among the wives of alcoholics.

A comparative study was conducted to assess the stress levels among wives of alcoholics and non-alcoholics at hanumanahalli village, Kolar district. A sample of sixty, 30 wives of alcoholics and 30 wives of non-alcoholics were selected by using purposive sampling technique. A tool used to measure stress level was Perceived Stress Scale (PSS) with the help of Interview Technique. The results of the study revealed that there was a significant difference (χ² = 21.418, df= 1, p<.05) between the stress level scores of the wives of alcoholics and the wives of non-alcoholics (χ² = 9.180, df = 1, p<.05). The study concluded that the research should need to focus on the impact of stress on health. (8)

• Reviews related to the coping among wives of alcoholics.

Out of 11, six studies (46.15%) were descriptive studies on coping strategies among wives of alcoholics and it was found that major coping style used by wives were Avoidance (53%), Discord (57.5%), Fearful Withdrawal (40.4%) and Sexual Withdrawal (25.8%) which were maladaptive strategies of coping. (13, 14,15,16,17,18) Two studies (15.38%) were exploratory studies on assessing the coping strategies among wives of alcoholics and there was difference in the coping strategies between the treatment and non treatment groups. (19,20) Another two studies (15.38%) were
non-experimental studies to assess the psychosocial problems and coping among wives of alcoholics and it was found that about 71.1% women had adaptive and 28.3% showed mal-adaptive coping. Majority of women had physiological problems [13.13%] followed by psychological problems [12.79%] and psycho-social problems [7.40%]. While 6.6% women had financial problems and only 3.92% had sexual problems. (21,22)

**Sample reviews:**

A descriptive study was conducted to assess the coping strategies among wives of alcoholics. Hundred wives of alcoholics were selected in the study by purposive sampling technique. The tool used was ‘Coping with Drinking Questionnaire’. Result of the study revealed that the avoidance was the most commonly endorsed coping behavior. Further the study revealed that there was a significant correlation between all the coping components and alcohol related problems. There was no correlation between neurotism scores and coping behavior. The study concluded that both personality and situational variables play a role in determining the coping behavior of the wives of alcoholics. (15)

A descriptive study was conducted to assess the ways of coping among the wives of alcoholics staying with their husbands. The objectives of the study were to delineate how wives in India cope with their alcoholic husbands and what motivates them to carry on in spite of the husband’s addiction. A total 200 wives of alcoholics were selected and data was collected by tool “Coping Questionnaires”. Results showed that the majority of wives of alcoholics used escape-avoidance as a coping strategy. Further the coping strategies were evaluated by substantial scores translated to relative scores to find out the highest proportion for each coping strategies mean score from 0.14 to 0.16. (17)

- Reviews related to effect of psychological interventions on stress and coping among wives of alcoholics.

Two out of nine studies (22.2%) assessed the effect of guided imagery along with other interventions on stress and coping among wives of alcoholics and it was found that guided imagery when combined with other interventions was effective enough to reduce stress among wives of alcoholics. (23,24) Further two more studies (22.2%) assessed the effectiveness of guided imagery alone on stress reduction among wives of alcoholics and it was found that guided imagery therapy was effective in reducing the level of stress among wives of alcoholics. (25,26) One randomized control study to assess effects of coping skills training, group support, and information for spouses of alcoholics and the study results revealed that changing of coping strategies in spouses of alcoholics can be successful with only one single information session, whereas the reduction of mental symptoms may need longer treatment. (27) One quasi experimental study to assess the effectiveness of coping strategies on stress and coping among the care givers of alcohol dependents revealed that the coping Strategies was significantly effective in improving the coping and reduction of stress among the caregivers of alcohol dependents. (28) One more experimental study to evaluate the effectiveness of three different interventional programmes i.e. Coping Skills Training, Group Support, and Information for spouses of alcoholics and it was found that all the three groups score similarly on 24 months on the four scales which showed long term retention of programme effectiveness is still questioned. (29) Further one more pre experimental study to assess the effectiveness of psycho-educational package on stress and coping among wives of alcoholics revealed that the wives of alcoholics experience more stress and the Psycho-educational package was highly effective in improving the coping level among wives of alcoholics. (30)

**Sample reviews:**

A quasi experimental study was conducted to assess the ways of coping among 200 wives of alcoholics who were staying with their husbands at residential substance abuse treatment facility in Charleston Centre Clinic. Samples were selected by using the convenient sampling technique and the tool used was DASS Stress Scale to assess the level of stress. Guided Imagery technique and intellectual life skill training was given to the spouses of alcoholics. The study revealed that there was significant relationship between Guided imagery and intellectual life skill training and the stress reduction (r(148) = .17, p = .07) among the spouse of alcoholics. (27)

A Pre-experimental one group pre-test post test study was conducted to evaluate the effectiveness of Guided imagery on stress among spouses of alcoholics at de-addiction ward in Government Rajaji hospital, Madurai. Purposive sampling technique was used to select the samples and the sample size was 40. The
data was collected by DASS Stress scale with interview technique before and after Guided imagery. Study subjects were given with Guided imagery technique once a day for 20 minutes for the period of 7 days. The results of the study revealed that there was a significant difference in the mean score of stress before and after Guided imagery as the calculated ‘t’ value was 19.613 at 0.05 level of significance. Further there was no any significant association between the stress score and selected demographic variables. The study concluded that the Guided imagery was cost effective, non invasive, non pharmacological complementary and alternative therapy to reduce the level of stress among spouse of alcoholics. (28)

**Conclusion**

Based on the above stated reviews it was found that: Wives of alcoholics had more stress and social disabilities which were directly related to the severity of husband’s drinking pattern. Wives of alcoholics have highest rate of personality and emotional disturbance. Working women faced lesser stress as compared to non-working women. Wives of alcoholics had poor coping skills. They used maladaptive coping behavior to cope up with their husband’s drinking problem such as but not limited to discord, fearful withdrawal and avoidance were commonly used maladaptive coping behaviors. Engaged and tolerant were commonly used adaptive coping styles by wives of alcoholics. The Psychological interventions such as Guided Imagery, Paced Auditory Serial Addition Test, Coping Skills Training, Group Support and Information, psycho-educational package and intellectual life skill training were effective enough in reducing stress and improving coping among wives of alcoholics.

**Conflict of Interest:** NIL

**Funding Sources:** Self

**Ethical approval:** The ethical clearance was obtained from university research ethics committee of Maharishi Markandeshwar (Deemed To be University) Mullana, Ambala (MMDU/IEC/197) and the study was carried out in accordance with the guidelines laid by Indian Council of Medical Research ICMR(2006). The permission was taken to conduct the study in the De-addiction centre (from Chief Medical Officer of Civil Hospital Ambala city). The written consent from the wives of alcoholics was collected prior to the study. The purpose for carrying out research project was explained and assurance of confidentiality was given to the participants.

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Assessment of Epidemiological Causes, Occurrence and Allocation Resulting to Fatality in Two Wheeler Fortuitous Accidents in Uttar Pradesh

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1Assistant Professor, Dept. of Forensic Medicine, TMMC & RC, Moradabad, 2Assistant Professor, Dept. of Forensic Medicine, Saraswathi Institute of Medical Sciences, Hapur, 3Associate Professor, 4Professor, Dept. of Forensic Medicine, TMMC & RC, Moradabad

Abstract

Introduction- This study is intended to construe epidemiological causes, occurrence and allocation resulting to fatality in two wheeler fortuitous deaths.

Materials and Method- This observational and cross section study, among the medico-legal autopsies conducted in the study Centre, includes motorized and non-motorized two wheeler associated accidental deaths. It was too assessed to identify the individual, automobile and road issues originating accidents. All findings pertaining to the bodies including wounds were thoroughly observed at autopsy and well interrelated with pat instances.

Results- Two wheeler fatalities in males were found to be considerably much elevated (91.66%) than females. The fatalities percentage in male were recorded as 91.66% whereas in females, it was only 8.33%. The entire victims were in the age group of 20 to 29 years (35%). The preponderance of the victims belonged to the city population which comprised of 48% of the total size. Working and business group individuals were 28%. National highways share maximum numbers of fatalities (37%) whereas roads in villages have comparatively less accidents (13%).

Conclusion- Road traffic accidents are very frequent in the riders of young age group which is also a huge loss to the nation.

Keywords- Epidemiological, occurrence, Road traffic accidents, medico-legal autopsies, two wheeler

Introduction

Road traffic accidents (RTA) are worldwide a great concern as about 3400 people die every day due to them. The predicted figures of such cases are even more devastating as they are expected to be around 1.9 million every year by the year 2020.1 The numbers of losses due to RTA are very high in low and middle income nations which almost covers 90% of worldwide fatalities. On the contrary, countries having 60% of world’s automobile assets have very less number of such cases.2 Developing countries comparatively have major numbers of causalities due to Road traffic accidents (RTA). Two wheelers motor vehicles are major responsible factors for road traffic. Consequently, two wheeler riders are more likely to fall prey to the road accidents. Other than motorcycle users, usual amblers and cyclists too are at risk of road traffic accidents as they are at the directly exposure of the impacting vehicle at the time of collision.

Worldwide increasing RTAs are very much disquieting for all. Despite massive progress and insinuation of advanced technology in medical sciences, the increasing causality and deformity rates occurring due to the road traffic accidents are yet to be controlled.

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Rather incidences of R T A have been increasing at an alarming rate throughout the world. Road traffic accidents could be controlled with a strategic planning resulting from the outcomes of this study. Asia-Pacific region alone have almost half of the total road accident fatalities occurring in developing countries which ranges up to 85% of the total accidents recorded globally. India covers about 10% of it. RTAs happen due to certain responsible factors which involve increasing load of traffic and automobiles on roads, rash driving, public in general, over speeding, unskilled driving, poor traffic knowledge, exhaustion due to long driving, mechanical breakdown, pitiable road conditions, infringement on roads, road rule defiance etc. Poor weather conditions too could be responsible for road traffic accidents. In India, Bangalore is recorded to have an adverse rise in road traffic accidents ensuing from escalating populace and traffic on roads. Even RTA cases of two wheelers are very high in numbers in Uttar Pradesh Region. Apparently these accidents seem to be ignored by responsible bodies.

Therefore, this study is intended to construe epidemiological causes, occurrence and allocation resulting to fatality in two wheeled vehicle fortuitous demises.

**Materials and Method**

The practice was carried out at Teerthanker Mahaveer Medical College and hospital from 1st April to 31st March 2018, this observational and cross section study, amongst the medico-legal autopsies conducted in the study centre, includes motorized and non-motorized two wheeler associated accidental demises.

Despite the progression of technology and medical sciences, demises and deformities following road traffic accidents are yet to be controlled. Prevalence of RTAs is mounting at a frightening pace throughout the globe. At the very start of the study, the diverse features of RTA death victims autopsied in the department of Forensic Medicine, TMMC and RC Moradabad were taken into consideration for further findings and analysis. A premeditated arrangement could definitely be ensured to prevent road-traffic accidents with the findings of this study. Furthermore, it was too assessed to identify the individual, automobile and road issues originating accidents. All findings pertaining to the bodies including wounds were thoroughly observed at autopsy and well interrelated with pat instances. The study eliminates RTA deceases causing apart from two wheeled automobiles; accidents and gashes caused without vehicles, and unproven cases.

**Statistical Methodology**

Statistical Software Package SPSS version 20 was used for analysis in the study. Statistical study was exercised for occurrences, amounts, proportions and quotient. Outcomes were construed.

**Results**

On the whole, 610 medico-legal autopsies were performed in the study centre during the calendar year 2018. Out of the total numbers, 287 are RTA incidents and 120 are solely two wheeler associated RTA deaths.

However, this study involves 120 cases of road traffic accidents. The numbers of selected males for the study were 110 that are approx 91.66% of the total sample size and the rest 10 were of females comprising 8.33% of the cases selected. Subsequently, male/female ratio was about 6.91:1 [Table 1].

<table>
<thead>
<tr>
<th>Sex</th>
<th>No. of cases</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>110</td>
<td>91.66</td>
</tr>
<tr>
<td>Female</td>
<td>10</td>
<td>8.33</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

Two wheeler fatalities in males were found to be considerably much elevated (91.66%) than females The fatalities percentage in male were recorded as 91.66% whereas in females, it was only 8.33%. The entire victims were in the age group of 20 to 29 years (35%). The preponderance of the victims belonged to the city population which comprised of 48% of the total size. Working and business group individuals were 28%. National highways share maximum numbers of fatalities (37%) whereas roads in villages have comparatively less accidents (13%). Age and sex allocation of cases are being displayed in table2. It is quite evident in table that the rate of recurrence of two wheeler accidents was higher in Males (59%) and common in 20-29 (35%) year’s age group.
Table 2: Age and gender wise distribution of cases

<table>
<thead>
<tr>
<th>Age group (yrs)</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-9yrs</td>
<td>3(3%)</td>
<td>2(2%)</td>
</tr>
<tr>
<td>10-19yrs</td>
<td>9(8%)</td>
<td>6(5%)</td>
</tr>
<tr>
<td>20-29yrs</td>
<td>20(17%)</td>
<td>15(13%)</td>
</tr>
<tr>
<td>30-39yrs</td>
<td>15(13%)</td>
<td>12(10%)</td>
</tr>
<tr>
<td>40-49yrs</td>
<td>12(10%)</td>
<td>5(4%)</td>
</tr>
<tr>
<td>50-59yrs</td>
<td>8(7%)</td>
<td>6(5%)</td>
</tr>
<tr>
<td>&gt;60yrs</td>
<td>4(3%)</td>
<td>3(3%)</td>
</tr>
<tr>
<td>Total</td>
<td>71(59%)</td>
<td>49(41%)</td>
</tr>
</tbody>
</table>

Table 3 indicates the place of incidence. It displays that occurrence of two wheeler accidents was higher in urban vicinity (48%) in comparison to the rural (23%) and semi urban (24%) areas.

Table 3: Domicile distribution of cases

<table>
<thead>
<tr>
<th>Domicile</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>28(23%)</td>
</tr>
<tr>
<td>Semi urban</td>
<td>29(24%)</td>
</tr>
<tr>
<td>Urban</td>
<td>58(48%)</td>
</tr>
<tr>
<td>Unknown</td>
<td>5(4%)</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
</tr>
</tbody>
</table>

Table 4 exhibits the working status of fatalities. It displays that rate of recurrence of two wheeler accidents was higher in employed sufferers (28%) than unemployed victims (17%).

Table 4: Occupational status of cases

<table>
<thead>
<tr>
<th>Occupational status</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unemployed</td>
<td>20(17%)</td>
</tr>
<tr>
<td>Employed</td>
<td>33(28%)</td>
</tr>
<tr>
<td>Students</td>
<td>28(23%)</td>
</tr>
<tr>
<td>Business</td>
<td>20(17%)</td>
</tr>
<tr>
<td>Agriculture &amp; Labour</td>
<td>19(16%)</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
</tr>
</tbody>
</table>
Table 5, indicates the types of roads where accidents took place. As stated above, national highways (37%) share bigger numbers of fatalities.

Table 5: Type of roads

<table>
<thead>
<tr>
<th>Type of road</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>National highway</td>
<td>44(37%)</td>
</tr>
<tr>
<td>State highway</td>
<td>34(28%)</td>
</tr>
<tr>
<td>City road</td>
<td>18(15%)</td>
</tr>
<tr>
<td>Village road</td>
<td>16(13%)</td>
</tr>
<tr>
<td>Unknown</td>
<td>8(7%)</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
</tr>
</tbody>
</table>

Discussion

Almost half of entire RTA deaths encompass two wheeler accidents. As a result, two wheeled vehicle users and pedestrian have the uppermost rates of terminal injuries.5,6 Two wheeler accidents are more likely to happen due to various responsible factors which include rapidly increasing numbers of vehicles on Indian roads, vehicle susceptibility, meager road conditions, and moreover unawareness and ignoring tendency of riders to road safety, rules and traffic regulations. In comparison to females, males share major numbers of causalities. The reasons behind such statistics may incorporate the spending of major portions of time in travelling and diverse outdoor engagements by men. Subsequently they are more prone to accidents and have adverse gender proportions.7 The most susceptible age group was identified as between 21–30 years mounting to the total numbers of 56 of total sample size (30.77%) and the slightest affected cluster was of those who were above 70 years of age as they were counted only 2 in numbers amounting to 1.10% of total size selected for the study.8,9 However, it is mentioned as 2% according to Gupta Setal10 & 1% by Menon A and NageshKR.9

One interesting point too was identified in the study. Literacy in general has been found to be playing no significant role in taking caution of accidents or casualties since a fine number of natives, who were recorded to have met with accidents which ultimately resulted in demise, were from educated backgrounds. As mentioned earlier, preponderance of accidents took place on National Highway 113 which mounts to the total percentage of 62.09%.11-13 Though, one possible reason for such big numbers could be the recently constructed main four lane National highway fleeting through Barpeta district which is in good quality condition and hence woos riders for overspeeding resulting in accidents. Highest number of cases were recorded to be in the winter months which reaches up to the numbers of 61 amounting to the total percentage of 33.52. These figures are in consensus with Dhillon Setal12 and Singh H and Dhatarwal SK.13

Timings of the accidents too were taken into consideration in the study. Maximum numbers of accidents were recorded between the peak period of 12 Noon to 6 PM. Total number of 88 cases which mounts to the percentage of 48.35% were followed by a number of 42 cases between the period of 6 AM to 12 noon figuring 23.08% of total fatalities. These findings indicate to the truth that Barpeta is under developing area and major operational hours of the natives are the day time. These finding are unafiling with the conclusion supplied by Kachre R V, Kachre VH and Asawa SS12. However, some dissimilarities too are observed by Biswas G, Verma S K, Sharma JJ and Aggarwal NK & Ghangale AL13 where culmination of prevalence of RTA were suggested between 6 PM to 12 Midnight.

The possible reasons for accidents on city roads, national and state highways account to the busy roads are, narrow passages in roads, heavy traffic during climax hours, inadequate or sometimes even no traffic signals at crossroads and negligence of firm implementation of road security rules. Sternness of mishap, transportation issues, scarcity of therapeutic
emergency services, inadequate and unqualified workforce and amenities in the hospitals too are some multifarious causes of incidents. Intoxicated driving too is a contributor to the accidents. Driving a vehicle under the influence of intoxication is against law as alcohol of any other intoxication weakens driving capacity of a person and echelon of mutilation is straight away related to blood alcohol assimilation. Tendency of using cell phones while driving too escalates possibility of accidents. Therefore traffic laws forbid the application of such devices by drivers while riding a vehicle. Many countries have made it binding constraint on permissible age for driving, over speeding, amplification in fine and abandonment of driver’s permit, graduate rider licensing, and speed control interference which have led to momentous decline in traffic accidents.

Conclusion

Accidents could be toned down with improved attentiveness, utilization of road safety and shielding procedures and tutoring to the general public and susceptible highway users to abide by traffic regulations. Road traffic accidents are very frequent in the riders of young age group which is also a huge loss to the nation. Therefore, incidents of these accidental deaths has to be discouraged by providing guidance to general populace about emergency and first aid services, founding suitably prepared treating centers, adopting apposite road safety measures and by creating appropriate roads to put up the weight of escalating traffic.

Ethical Clearance- Taken from the institutional ethical committee (Teerthanker Mahaveer Medical College and Research center)

Source of Funding- Self

Conflict of Interest - nil

References

Effect of Core Strengthening and Conditioning Programme on Badminton Beginners

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Abstract

Background: Badminton requires a specific physical conditioning in terms of motor and action controls; coordinative variables such as reaction time, foot stepping and static or dynamic balances, which are essential motor demands in this sport. Therefore, badminton players need enough core strength and a high level of dynamic balance during the rapid postural movements around the court.

Objectives: To study the effect of core strengthening and to study the effect of conditioning program on badminton beginners

Methodology: 25 players, aged between 12-19 years were given core strengthening and conditioning protocol for 4 weeks. Players were assessed at 0, 2nd and 4th week through 60 degree curl up test and modified Sorensen test.

Results: statistically significant difference was seen in pre and post treatment values of the 2 tests. In 60 degree curl up test at 0 week p=, 2nd week p= and 4th week p= and in modified Sorensen test at 0 week p=, 2nd week p= and 4th week p=

Conclusion: players showed improvement in their core strength after 4 weeks of core training.

Key words: badminton, core, conditioning, players, strength

Introduction

Badminton is a racquet sport played using racquets to hit a shuttlecock across a net. There is high level skill required to play badminton at the elite level, though to be a successful player they also need good reflexes and be quick and agile around the court. The important factors for badminton players are muscle strength, muscular endurance, power, speed, agility, flexibility, balance and coordination. Functional movements are highly dependent on this part of the body, and lack of core muscular development can result in predisposition of injury¹.

Core muscles includes transverse abdominal muscle, abdominal external oblique muscle, multifidus muscles, abdominal internal oblique, psoas major muscle. A core muscle is used to stabilize the thorax and the pelvis during dynamic movement and it also provides internal pressure to expel substances. Static core functionally is the ability of one’s core to align the skeleton to resist a force that does not change. The core strength training plays an important role in reducing and preventing lower and knee joint injuries².

It appears that repeated activation of core musculature along with extremity movements helps to improve postural control. During performance of sports skills, a stable core provides a foundation upon which the muscles of the upper and lower extremities can...
accelerate body segments and transfer force between distal and proximal body segments\(^3\).

Core stability is defined in athletic settings as the optimum production, which can transfer and control the force from the centre of the body to the limbs, through stabilization of the position and motion of torso\(^4\). Also described it as a central motor control of the lumbar-pelvic-thigh to maintain the stability of the core region against different postural and external forces.\(^5\)

Generally referred to as the core area, these overall and local muscles which constantly working to maintain posture and assist in changing postures and dynamic movements\(^10\). Described the role of core muscles as to, transfer force and doing a link between upper and lower extremities, help passive existence protect and support the spine. Previously, core stability exercises were widely used for reducing the injuries of the low back and lower extremities\(^5,6,7\). Recently, core stability training has been purported to improve player performance\(^7-11\), but the previous studies have not supported these claims in badminton sport.

The core muscle strengthening may help to improve dynamic balance and muscle coordination between lower and upper extremities, as well as reducing injury risk and muscle imbalance. Thus, the purpose of this study to find out the effect of core strengthening and conditioning programme on badminton beginners.

### Methodology

An approval for the study was obtained from the Protocol committee and the Institutional Ethical Committee of KIMSDU. An Experimental study was conducted for a duration of 6 months at Physiotherapy department of Krishna college of Physiotherapy. Individuals were approached and those fulfilling the inclusive criteria were selected.

**Study Design**: Experimental study

**Setting**: Krishna Hospital, Physiotherapy Department

**Study population**: All participants were selected by Simple Random Sampling method. Participants were selected on the basis of inclusion and exclusion criteria.

**Study size** – 25 subjects

**Procedure**: In general, the subjects performed 3 sessions badminton training per week for ~90 - 120 minutes every session; the (CSG) group performed the core stability training only 2 sessions per week over a period of 4 weeks. The core stability training programme of (CSG) group consisted of three progressive levels of exercises which focusing on the strengthening training of muscle abdominal, low back, and pelvic muscles through a variety of functional positions and different exercises.

### Exercise protocol

The group will receive respective training for 4 weeks:

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Shoulder bridge</th>
<th>Full plank</th>
<th>Prone bridge</th>
<th>Abdominal crook</th>
<th>Side bridge</th>
<th>Supine bridge</th>
<th>Diagonal crunch</th>
<th>Pitcher squat</th>
<th>Back bridge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>25×2</td>
<td>20×2</td>
<td>20×2</td>
<td>15×2</td>
<td>20×2</td>
<td>25×2</td>
<td>15×2</td>
<td>20×2</td>
<td>20×2</td>
</tr>
<tr>
<td>Week 2</td>
<td>30×2</td>
<td>25×2</td>
<td>20×2</td>
<td>20×2</td>
<td>25×2</td>
<td>20×2</td>
<td>20×2</td>
<td>20×2</td>
<td>25×2</td>
</tr>
<tr>
<td>Week 3</td>
<td>30×2</td>
<td>25×2</td>
<td>30×2</td>
<td>25×2</td>
<td>30×2</td>
<td>30×2</td>
<td>25×2</td>
<td>30×2</td>
<td>25×2</td>
</tr>
<tr>
<td>Week 4</td>
<td>45×2</td>
<td>35×2</td>
<td>25×2</td>
<td>30×2</td>
<td>25×2</td>
<td>40×2</td>
<td>30×2</td>
<td>25×2</td>
<td>35×2</td>
</tr>
</tbody>
</table>
Outcome Measures:

60 degree curl up test was done with subjects positioned on the plinth against a wedge supporting the back so that the hip was flexed to 60 degrees. Knees flexed to 90 degrees as measured with goniometer. In that stable arm is parallel to the ground and movable arm is at the supporting wedge. The test began when the wedge was removed and was terminated when the subject could no longer maintain the 60 degree angle independently. Subjects were asked to hold the position as much as possible. The duration on the stopwatch was noted for the individual subjects.

Modified Sorensen test subjects lay prone on an examination table with the trunk of the body extended off the edge of the table at the level of the anterior superior iliac spine of the pelvis. The buttocks and legs are fixed to the table with two straps. Subject were instructed to cross their arms in front of their chest and to lift their upper body until their trunk was parallel to the ground. Subjects were asked to hold the position as much as possible. The duration on stopwatch was noted for individual subjects.

Results

1. AGE DISTRIBUTION

Table no – 1: Interpretation: 56% players were in the age group of 12-15 years, 44% players were in the age group of 16-19 years.

<table>
<thead>
<tr>
<th>AGE GROUP</th>
<th>NUMBER OF SUBJECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-15 YEARS</td>
<td>14</td>
</tr>
<tr>
<td>16-19 YEARS</td>
<td>11</td>
</tr>
</tbody>
</table>

2. GENDER DISTRIBUTION

Table no – 2: Interpretation: 52% of male participated in the study, 48% of female participated in the study.

<table>
<thead>
<tr>
<th>GENDER</th>
<th>NUMBER OF SUBJECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MALES</td>
<td>13</td>
</tr>
<tr>
<td>FEMALES</td>
<td>12</td>
</tr>
</tbody>
</table>
3. **COMPARISON OF PRE AND POST TREATMENT P AND T VALUE WITHIN GROUP**

**Table no – 3**

<table>
<thead>
<tr>
<th>VARIABLES EXPERIMENTAL GROUP</th>
<th>INTERPRETATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERPRETATION</td>
<td>EXPERIMENTAL GROUP</td>
</tr>
<tr>
<td>WEEKS</td>
<td>0 WEEKS</td>
</tr>
<tr>
<td>T value</td>
<td>P value</td>
</tr>
<tr>
<td>60 DEGREE CURL UP TEST</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>MODIFIED SORENSAN TEST</td>
<td>0.268</td>
</tr>
</tbody>
</table>

**Interpretation**: The above table shows comparison of pre and post treatment of 60 degree curl up test and modified Sorenson test, with the p value of 1.393, 2.241 and 3.418 at 0 weeks, 2 weeks and 4 weeks respectively which is statistically extremely significant.

4. **COMPARISON OF PRE AND POST TREATMENT MEAN AND STANDARD DEVIATION VALUE WITHIN GROUP**

**Table no - 4**

<table>
<thead>
<tr>
<th>VARIABLES EXPERIMENTAL GROUP</th>
<th>INTERPRETATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>INTERPRETATION</td>
<td>EXPERIMENTAL GROUP</td>
</tr>
<tr>
<td>WEEKS</td>
<td>0 WEEK</td>
</tr>
<tr>
<td>MEAN±SD</td>
<td>MEAN±SD</td>
</tr>
<tr>
<td>60 DEGREE CURL UP TEST</td>
<td>123.94±93.52</td>
</tr>
<tr>
<td>MODIFIED SORENSEN TEST</td>
<td>71.73±23.51</td>
</tr>
</tbody>
</table>

**Interpretation**: The above table shows comparison of variable of pre and post treatment of 60 degree curl up test and modified Sorenson test, which is statistically extremely significant.

Chart no – 1: Comparison of pre and post treatment mean values within the group
Discussion

The present clinical trial was conducted to compare the effectiveness of core strengthening and conditioning program in badminton beginners. Results of this study were focused on improvement of core strength and endurance. It was noticed that there was improvement in all the above parameters in the experimental group.

A combination of 60 degree curl up test and modified Sorensen test were used as outcome measures were used to assess the effectiveness of core strengthening and conditioning program in badminton beginners.

In this study, the age group of the participants was in between 12 to 19 years. Subjects between this age group were considered as beginners of badminton and training them before hand could raise their level of performance in the game much early. The players of this age group could take up more advance training and more hours of play.

Sample size of present study consisted of 12 females and 13 males that are 48% females and 52% males.

From table number 3 we can see that in 60 degree curl up test the group showed statistically significant differences in pre and post treatment with p value, in 0-2 weeks p=1.393, 2 – 4 weeks p=2.241 and 0-4 weeks p=3.418. Similarly, a study showed statistically significant difference in 60 degree curl up test after incorporating core strengthening exercises with the help of swiss ball exercise for 4 weeks was found to be significant.

From table number 3 we can see that in modified Sorensen test the group showed statistically significant difference in pre and post treatment with p value within, 0-2 weeks p=2.154, 2-4 weeks p=1.669 and 0-4 weeks p=0.670.

The core muscles after four weeks of strengthening will respond like any other skeletal muscle, to training, thereby improving the ability of the neuromuscular system to perform dynamic, eccentric, isometric stabilization contractions in response to gravity and momentum. Higher core stability performance might lead to improved synchronization of motor units and lowering of neural inhibitory reflexes.

It is well known that position of the spine significantly determines the position of the body’s COG and compensatory muscle synergy/strategy to counteract the perturbations, to maintain the body’s equilibrium state and to regulate body’s postural control. Higher core stability performances allow optimal and long sustained contraction of the deeper spinal stabilizer muscles. These stabilizer muscles due to their close proximity with the spine are responsible for better control of the intersegment motion of the spine and thus a better control of the body’s COG. Study also indicated that core training not only improve the core muscle strength, but also improve the stability of the body movement during the LOS test which requires the well coordination of the upper and lower extremity limb, because a recent study also indicated that pilates training can enhances the control of trunk movement, and improves the neuromuscular coordination of movements.

An Article concludes that there is effect of core strengthening on dynamic balance and agility in badminton players.

The finding of this study showed significant improvement in the overall performance of 60 degree curl up test and modified Sorensen test.

Limitations:

1. Small sample size
2. Subjects could not be followed up after the study.
3. Duration of the study was short.

Recommendations:

1. Studies with longer duration are recommended with longer follow-up period to assess long term benefits.
2. Conduct the study with larger sample size.
3. This was a heterogenous group with both male and female population, future studies could be done taking up a homogenous sample with either male or female subjects separately.

Conclusion

This study concluded that there was an improvement in the core strength of the beginner badminton players after undergoing 4 weeks of core strengthening protocol. This indirectly improved their game by reducing injuries to lower limb and improving their dynamic balance.
**Conflict of Interest:** There were no conflicts of interest in this study.

**Funding:** This study was funded by Krishna Institute of Medical sciences Deemed To Be University, Karad.

**Ethical Clearance:** The study was approved by the institutional ethics committee of KIMSDU.

**References**


Effect of Postural Ergonomics and Static Gluteus Exercise Along with Bridging on Quality of Life in Individual with Mechanical Low Back Pain

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Abstract

Background: This study is to improve the posture of the patient to reduce the excessive stress on the joint and muscular structure It can reduce the mechanical low back pain in the patient .To enhance the performance and productivity of the job and prevent muscle fatigue .It can improve the posture and controls the health of the patient. So we need to study effect of static gluteus exercise along with bridging in patient with mechanical low back pain.

Objectives: To find out the effect of static gluteus exercise along with bridging in patient with mechanical low back pain. To find out the effect postural ergonomic who have low back pain.

Methodology: The study was carried out in karad area. The subjects were selected according to inclusion and exclusion criteria. Total 26 subjects were participated in this study. Prior consent and assent form was taken. Aim and procedure were explained to the subjects in their preferred language before data collection. The subjects were given static gluteal exercise along with pelvic bridging and postural ergonomic advise also given. Pre and post assessment was done before treatment and after 6 weeks of treatment respectively with the help of Visual analogue scale and the data was analysed with help of appropriate statistical analysis.

Result: In conducted study, Visual analogue scale showed statistically significant difference between pre and post treatment values. Pain decreases in individuals.

Conclusion: On the basis of the result of the study, it can be concluded that postural ergonomics and static glutes exercise along with pelvic bridging helps in reducing mechanical low back pain and improving quality of life.

Key words: static gluteus exercise along with pelvic bridging individual with low back pain.

Introduction

Low back pain is mostly nonspecific or mechanical. Mechanical low back pain arises from the spine, intervertebral disks and surrounding soft tissues. This comprises lumbosacral muscle strain, disk herniation, lumbar spondylosis, spondylolisthesis, spondylolysis, vertebral compression fractures, and acute or chronic traumatic injury.\textsuperscript{(1)} Common causes of chronic mechanical low back pain are repetitive trauma and overuse which is often secondary to workplace injury. Most patients who experience activity-limiting low back pain suffer from recurrent episodes. Chronic low back pain affects up to 23\% of the worldwide population, with 24\% to 80\% of patients having a recurrence at one year.\textsuperscript{(2)}
The low back pain in active workers is associated with occupational exposure. Individual in jobs which includes manual materials handling, repeated heavy lifting and lifting while twisting, are at risk of back pain leading to work absence. Exposure to job requirements for static postures are associated with back pain. The pelvic bridge pose helps to reduce excessive shortening of the hip flexors from prolonged sitting. It helps to stretch tight hips and also helps to strengthen the gluteus. In supine position keep hips and knees bent to 90 degrees with feet flat on the floor and arms palm down by sides. Take a deep breath in, and breathe out while lifting hips off the floor until shoulders, hips, and knees are in a straight line. Hold this position for 10 seconds and repeat 3-5 times.

Bend elbows to 90 degrees so that upper arm will be on the ground. Press lower back down into the ground which will create a posterior pelvic tilt. This will help to protect lower back and engage abdominals as well as your gluteus muscles. Then drive up through heels and upper back to lift your pelvis up off the ground. Lift hips up as high as possible. Focus on squeezing gluteus muscles.

Pelvic bridging can be recommended as an effective method to selectively facilitate gluteus muscle activity. Lumbar segmental stabilization exercise and exercise to strengthen the muscles of the gluteus resulted in a greater decrease in low back pain and increase in lumbar muscle strength.

Ergonomic interventions are used to prevent or reduce low back pain. There is high rates of low back pain in office workers, the association between low back pain and sitting posture in the occupational setting has been infrequently studied. There is association between prolonged sitting and an increased risk in low back pain.

Material and Methodology

This was a study to find the effect of postural ergonomics and static gluteus exercise along with pelvic bridging exercises on quality of life in individuals with mechanical low back pain. The exclusion criteria were subjects who had gone through Spinal operation, Patients with bone Fracture, Patient who had bone malignancies and spinal deformity. Demographic data of the subjects was taken. Prior consent and assent form was taken. Aim and procedure were explained to the subjects in their preferred language before data collection. The subjects undergone pelvic bridging along with static gluteus exercises and back isometric exercises for 6 weeks and postural ergonomics also taught. Pre and post assessment was done visual analogue scale (VAS). The experimental results were statistically analyzed.

Graph no: 1 (pre test)

Interpretation: In the present study pre interventional mean and standard deviation of VAS scale on rest of group A is 3.5 ±1.047 and group B is 2.707±1.098 and p value is 0.0104, whereas t value is 2.663 with 50 degree of freedom. It concluded that interference was considered extremely significant.

Graph no: 2 (post test)

Interpretation: In the present study pre interventional mean and standard deviation of VAS scale on rest of group A is 3.5 ±1.047 and group B is 2.707±1.098 and p value is 0.0104, whereas t value is 2.663 with 50 degree of freedom. It concluded that interference was considered extremely significant.
**Interpretation:** In the present study post interventional mean and standard deviation of VAS scale on activity of group A is 6.488±1.257 and group B 4.411±0.7612 is and p value is < 0.0001, whereas t value is 7.205 with 50 degree of freedom. It concluded that interference was considered extremely significant.

**Discussion**

This research was undertaken with the aim to study the effect of postural ergonomics and static gluteus exercise along with bridging individual with mechanical low back pain. The study was carried out and the result was drawn by postural ergonomic advice and static gluteus exercise along with bridging by using visual analogue scale. The study was carried out in karad area. Subjects with a sample of 50 were screened for inclusion and exclusion criteria. Subjects fulfilling inclusion criteria were recruited in the study with a sample of 26. Total 26 Prior consent and assent form was taken. Aim and procedure were explained to the subjects in their preferred language before data collection. Treatment started with warm up exercises. Pre and post assessment was done by using visual analogue scale to find whether the pain is reduced or not. Mean. Included participants started Exercise protocol will start with stretches and warm up exercise. Static gluteus exercise with bridging – 10 times repetition and 3 set Back isometric exercise – 5 times repetition . Participants will also receive postural ergonomic advice. For pre treatment mean is 3.5 on rest and on activity is 2.707. Standard deviation(SD) of pre treatment on rest is 1.047 and on activity is 1.098. P value of pre treatment is 0.0104. This is considered significant. Mean difference of pre treatment is -0.7923. t value of pre treatment is 2.663 with 50 degree of freedom. For post treatment mean is 6.488 on rest and on activity is 4.411. Standard deviation of post treatment on rest is 1.257 and on activity is 7612. The result shows p value of is <0.0001. It considered extremely significant. Mean difference post treatment is – 2.077. t value of post treatment is 7.205 with 50 degree of freedom. Included participants started Exercise protocol will start with stretches and warm up exercise. Static gluteus exercise with bridging – 10 times repetition and 3 set Back isometric exercise – 5 times repetition . Participants will also receive postural ergonomic advice.

**Conclusion**

On the basis of the result of the study, it can be concluded that postural ergonomics static gluteus exercises with pelvic bridging helps in reducing mechanical low back pain.

**Conflicts of Interest:** There is no conflict of interest in this study.

**Source of Funding:** The study was funded by Krishna institute of medical sciences deemed to be university, karad.

**Ethical Clearance:** This study is undergone ethical clearance through the university level ethical committee. Protocol number is 0104/2019-21.

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Leukopenia, Hypomagnesemia in 2,4-D Poisoning-A Rare Presentation

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Abstract

2,4-D (2,4-Dichlorophenoxyacetic acid) is a common herbicide in agriculture field. It has moderately toxic effect on mammals. 2,4-D is available either in salt or ester formulations for field level use. Although no specific antidote available for this herbicide, forced alkaline diuresis is one of the modalities of treatment to promote early excretion of toxin through kidney and minimize its complications. Other management are essentially supportive measure and prevention of possible complications like aspiration pneumonia. There are a numbers of complications that are reported in varying degree. It affects skeletal muscle, cardiovascular, gastrointestinal, renal, central and peripheral nervous system. Here we report a case who developed unusual complications like leukopenia, hypomagnesemia, proximal muscle weakness after consumption of 2,4-D after suicidal intent.

Keywords: 2,4-D formulations, leukopenia, hypomagnesemia.

Introduction

2,4-D is a selective broad-leaved weed killer. It is marketed as ester or salt compound in India. The ester formulation is commonly available in North India, whereas in Western part of Odisha state, which is an important agricultural belt of state, both forms are available. Here we report a case who consumed 58% salt formulation of 2,4-D (Weedmar-super58%SL™) for suicidal intent.

Case Report

A 24-year-old lactating mother after quarrel in the family consumed around 30 ml of 2,4-D, methylamine 58% salt and brought to emergency Department of VSS Institute of Medical Sciences and Research, Burla, Odisha. During admission she was anxious, confused and restless. General examination showed pulse rate-88/min; regular, blood pressure (BP) -100/70mm of Hg, respiration rate-22/min, without pallor, icterus, clubbing, cyanosis, and pedal edema. There was no engorgement of neck veins or thyromegaly. Examination of respiratory, cardiovascular, gastro-intestinal, and central nervous system did not show any abnormality. Investigations showed Hb-11.4gm/dl, differential leukocyte count (DLC)-N 79 L16 M5, total leukocyte count (TLC)-9100/cu.mm., total platelet count (TPC)-2.24L/ml, blood ura-50mg/dl, serum (s.) creatinine-1.1mg/dl, s. Na+-142meq/l, s. K+-3.7meq/l, s.Ca++-1.0meq/l, s.bilirubin (total)-0.39mg/dl, AST-32IU/L, ALT-23IU/L, ALP-87IU/L. Urine routine and microscopic examination, electrocardiogram were within normal limits. She was treated with gastric lavage, forced alkaline diuresis, iv fluids and inj. ceftriaxone 1 gm IV twice daily, Inj pantoprazole. She was put on nil per oral for next 48 hours. On 4th day she developed proximal muscle weakness. On examination she had lower motor neuron type of quadriplegia. On repeat investigations all investigations mentioned above were within normal limits except s.Mg++ which was low (1.3mg/dl; normal1.8-2.3mg/dl) and leukopenia (TLC: 2500/cmm). She was given magnesium 2 gm three times a day orally. After 24 hours, the power was improved to normal. On 8th day there was improvement of muscle power to normal, improvement of leukopenia and s.Mg++ to normal range.

Discussion

2,4-D compounds are available either as ester or salt
formulation for commercial use as weedicide for broad leaved weed in agriculture sector. Most case reports done have shown ester compound as culprit. Here in this case a lactating mother consumed salt compound (2,4-D-dimethylamine salt 58%). The lethal dose of 2,4-D lie between 447-826mg/l in plasma\(^4\). Nausea, vomiting, diarrhea, gastrointestinal hemorrhage are early effects of these compounds\(^3\). It affects skeletal muscle, kidney, heart, liver, central and peripheral nervous system. Hypokalemia, hypomagnesemia, hyperthermia, leukopenia, thrombocytopenia are rare complications reported\(^5\). There is no specific antidote available. Supportive measure included alkaline diuresis, assisting respiration, and prevention of aspiration and arrythmia\(^1\)\(^3\). The mechanism of injury by 2,4-D are cell membrane damage, uncoupling of oxidative phosphorylation and disruption of Acetyl coenzyme-A metabolism\(^6\). Hypomagnesemia usually mimics hypocalcemia, hypokalemia. The present patient developed hypomagnesemia leading to proximal muscle weakness and leukopenia. Although 2,4-D itself can cause myopathy leading to muscle weakness we attribute it to hypomagnesemia as the muscle weakness improved to normal with magnesium supplementation\(^5\). The transient leukopenia developed in first week (4\(^{th}\)day) returned to normal in second week (8\(^{th}\) day) prompting to search for such complications in patients of 2,4-D poisoning for proper management. This case highlights that muscular weakness may be due to hypomagnesemia which can be treated with magnesium replacement. Further this observation encourages to search whether the salt and ester formulations have a different clinical profile and whether they have different degree of affection to different systems in humans.

**Conflict of Interest** - Nil.

**Source of Funding** - Self.

**Ethical Clearance** - Taken from virec committee.

**References**

Factors that Correlation to Occupational Contact Dermatitis Among Tobacco Farmers in Jember District, East Java Province, Indonesia

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Abstract

Introduction. Contact dermatitis is positived by most agricultural sector workers. Tobacco farming is one of the places where chemicals are sourced from pesticides, fertilizers, and also nicotine derived from tobacco leaves. This study aims to analyze the factors associated with contact dermatitis in tobacco farmers in Jember, East Java Province, Indonesia. Method. The research design is case control with 155 tobacco farmers. The dependent variable of this study is Occupational Contact Dermatitis (OCD) as measured through the results of a doctor's examination. Independent variables are individual factors and occupational factors. Individual factors include age, sex, education, individual hygiene, use of personal protective equipment, and complaints of GTS. Occupational factors consist of the main job, additional work, types of tobacco leaves, work at risk, work period, length of work, length of rest. Data analysis used Chi-Square test with a significance value of p <0,05. Result and Discussion. The results revealed that factors related to OCD in tobacco farmers in Jember Regency were age (p = 0.037), education (0,013), GTS complaints (p = 0,030), type of tobacco leaf (p=0,005), working periode (p=0,042) and working hours (p=0,008). Conclusion Individual factors related to OCD in tobacco farmers are age, education, and GTS complaints. Occupational factors related to OCD are the type of tobacco leaves, working period and length of work. This study revealed that OCD through promotion and integrated occupational health education.

Keyword: occupational contact dermatitis, tobacco farmers, tobacco workers

Introduction

Contact dermatitis (CD) is the most widely known occupational disease in many countries, and occupational contact dermatitis (OCD) is not reported (1). Dermatitis is inflammation of the skin. The term dermatitis is synonymous with eczema. The skin becomes red, itchy, and can blister. Skin with dermatitis becomes hard, thickened and cracked (2). OCD is a skin disorder caused by contact with certain substances in the workplace. Research has shown that within 10 years after the condition first occurs the worker will still have some skin problems, like allergens and irritants (3). Tobacco farming shows that workers are exposed to or contact pesticides, fertilizers, and nicotine derived from tobacco leaves which can cause contact dermatitis (4). Exposure to chemicals in the workplace can increase risk (5). OCD is one of the occupational diseases that often occurs in agricultural workers such as tobacco farming. OCD accounts for a significant proportion of occupational diseases. Exposure to allergens and long-term or repeated irritation can cause dermatitis which can reduce quality of life (3), (6).

The agricultural sector is one of the workplaces that lacks health and safety protection. Farmers, vulnerable to occupational diseases. Meanwhile, in Indonesia data regarding work-related diseases are not recorded properly. This study aims to analyze OCD and the factors associated with dermatitis due.

The research findings are factors related to OCD cases beneficial for occupational health policy makers to be used as the basis for occupational health and safety policies so that the quality of life of farmers increases.
Materials and Method

Research Design

This type of research is observational analytic research. The study observes the variables, then analyzes the risk factors or causal factors for the event to be examined. The research design used is case-control.

Location and Time Schedule

The results of previous surveys indicate that there is exposure to substances that have the potential to cause OCD. The time of the research is starting in May 2018-November 2018. The population was chosen by considering the inclusion and exclusion criteria, ie respondents aged between 15-65 years old, not sick or pregnant, no history of skin disease.

Population and Sample

Samples are obtained through formula (7)

\[ P_2 = 0.31, \text{ Proportion of Exposure to the group that is not sick} \]
\[ P_1 = \text{Exposure proportion in the sick group} \]
\[ \text{Odds Ratio} = 2.31, \text{ Odds ratio in previous studies} \]
\[ Z_1-\alpha / 2 = \text{value in the standard normal distribution which is equal to the significance level} \]
\[ Z_1-\beta = \text{value in the standard normal distribution equal to power by 90%}, \text{ value 1.28.} \]

From the above calculation results obtained a sample of 129 (=130) people. In order to anticipate missing data, samples were added to become 155 tobacco farmers.

Research Variable.

The variables of this study are workers and occupational factors. Worker or individual factors are personal characteristics that exist in tobacco farmers which can be a risk of dermatitis. Individual factors consist of age, gender, education, individual hygiene, use of personal protective equipment, and complaints of GTS. Occupational factors consist of the main types of work, types of tobacco leave, risky activities, working periode and working hours per day.

Instrument

The dependent variable of observed dermatitis cases was measured through doctor’s examination Positive cases of dermatitis if the results of examination by a doctor found signs of dermatitis in one part of the body, legs, hands or arms. Negative cases of dermatitis if the results of a doctor’s examination found no signs of dermatitis. Data on independent variables were obtained through interviews and questionnaires.

Data Analysis

The collected data were analyzed using the Bivariate Chi-Square test with a significance p <0.05.

Finding

Result and Discussion

Table 1 shows the results of bivariate tests of individual factors and cases of dermatitis in tobacco farmers in Jember Regency. Among 155 tobacco farmers, 36 (23.22%) had dermatitis. The results showed that based on the age of the majority of tobacco farmers aged ≤ 45 years. In the group of farmers who positived dermatitis, it was more common in farmers aged> 45 years, as many as 24 people (66.7%), while in the group of farmers who negative dermatitis, they were dominated by age ≤45 years, as many as 64 people (58.8%). Table 1 indicates that age was associated with dermatitis cases with a significance value of p <0.05 (0.037). This means that young and old age have different risks for OCD.

Based on gender, Table 1 reveals that in the group of farmers who positived dermatitis cases, it was more positived by farmers with female sex. Table 1 provides an illustration that gender is not related to dermatitis cases, meaning that the sexes of men and women have the same probability for the occurrence of OCD p> 0.05 (0.280).

The next variable is the level of education. The majority of tobacco farmers in the both of group had primary school education. Based on education level, Table 1 displays data that educational status is associated with dermatitis cases with p-value <0.05 (0.013). Different levels of education will also be different probability for OCD.

Table 1 proves that the majority of farmers with dermatitis as many as 20 people (5.6%) had good individual hygiene. Individual hygiene is not associated with dermatitis cases with p value> 0.05 (0.482). Tobacco farmers who have good and bad hygiene have the same probability of OCD.
Table 1 shows the results that in the group of tobacco farmers who positive dermatitis as many as 19 people (52.8%) used good personal protection. The use of personal protective equipment is not related to the status of dermatitis with a significance value of $p > 0.05$ (0.273). Tobacco farmers who use or do not use personal protective equipment have the same chance of occurring OCD.

The next variable is Green Tobacco Sickness (GTS) complaints. GTS complaints are classified into two, there are GTS complaints and no GTS complaints. GTS was associated with dermatitis cases with a significance value of $p < 0.05$ (0.030). Farmers who positive GTS and negative GTS have different opportunities for OCD.

Table 1. Bivariate Analysis Results with Chi-Square Factors Individual Risk Factors and OCD in Tobacco Farmers in Jember Regency

<table>
<thead>
<tr>
<th>No</th>
<th>Job Factor</th>
<th>Category</th>
<th>Positive Dermatitis</th>
<th>%</th>
<th>Negative Dermatitis</th>
<th>%</th>
<th>P-Value</th>
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<td>Age</td>
<td>≤45 years old</td>
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<td>&gt;45 years old</td>
<td>24</td>
<td>66.7</td>
<td>55</td>
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<td></td>
<td>Total</td>
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<td>100</td>
<td>119</td>
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<tr>
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<td></td>
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<td>72.2</td>
<td>72</td>
<td>60.5</td>
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</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
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<td>100</td>
<td>119</td>
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<td></td>
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<td>3.</td>
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<td>Total</td>
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<td>100</td>
<td>119</td>
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<td>Good</td>
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<td>Poor</td>
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<td>Green Tobacco Sickness</td>
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<td>19</td>
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<td>36</td>
<td>100</td>
<td>119</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
Table 2 shows the results of the bivariate test of occupational factors and cases of dermatitis in tobacco farmers in Jember Regency. The main occupation was not related to dermatitis cases $p > 0.05$ (0.773). Landowners and farm laborers have the same possibility of occurrence of dermatitis cases.

Table 2 reveals cases of dermatitis based on the type of tobacco leaf planted. There are four types of tobacco leaves that are planted by tobacco farmers in Jember Regency, namely Traditional Oogst Na, Kasturi, Lower Shade Tobacco and Choper Tobacco. The type of leaf will determine the need for pesticides. Tobacco leaf type is associated with dermatitis with $p$ value $< 0.05$ (0.005).

Table 2 shows cases of dermatitis based on risky activities. The majority of tobacco farmers in the all group have more than 5 risk activities. Farmers who have risk activities of more than five or less than five have the same chance for the occurrence of dermatitis $p > 0.05$ (0.083).

Table 2 shows the dermatitis cases based on working periode. Working periode was related to OCD cases with a significance value of $p < 0.05$ (0.042). Farmers who have a working period of $< 18$ years or $\geq 18$ years have different opportunities for the occurrence of dermatitis.

Table 2 informs dermatitis cases based on working hours. The working hours of tobacco farmers in the group with majority dermatitis is more than 8 hours / day as many as 27 people (75%). Tobacco farmers with less than 8 hours / day and more than 8 hours / day have a different chance of developing dermatitis with a significance value of $p < 0.005$ (0.008).

### Table 2. Bivariate Analysis Results with Chi-Square Factor Occupations and OCD in Tobacco Farmers in Jember Regency

<table>
<thead>
<tr>
<th>No</th>
<th>Job Factor</th>
<th>Category</th>
<th>Positive</th>
<th>Negative</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Main Job</td>
<td>Owner and Farmer</td>
<td>14</td>
<td>34,5</td>
<td>41</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Workers</td>
<td>22</td>
<td>65,5</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>36</td>
<td>100</td>
<td>119</td>
</tr>
<tr>
<td>2</td>
<td>Tobacco leaf</td>
<td>Na Oogst Traditional</td>
<td>11</td>
<td>30,6</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kasturi</td>
<td>12</td>
<td>33,3</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TBN</td>
<td>12</td>
<td>33,3</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Choper</td>
<td>1</td>
<td>2,8</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>36</td>
<td>100</td>
<td>119</td>
</tr>
<tr>
<td>3</td>
<td>Risk Activity</td>
<td>&lt;5 activities</td>
<td>9</td>
<td>25</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\geq5$ activities</td>
<td>27</td>
<td>75</td>
<td>68</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>36</td>
<td>100</td>
<td>119</td>
</tr>
<tr>
<td>4</td>
<td>Working periode</td>
<td>&lt;18 years</td>
<td>10</td>
<td>27,8</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\geq18$ years</td>
<td>26</td>
<td>72,2</td>
<td>61</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>36</td>
<td>100</td>
<td>119</td>
</tr>
<tr>
<td>5</td>
<td>Working hours</td>
<td>$\leq8$ hours/day</td>
<td>9</td>
<td>25</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$&gt;8$ hours /day</td>
<td>27</td>
<td>75</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>36</td>
<td>100</td>
<td>119</td>
</tr>
</tbody>
</table>
The results revealed that there were 36 people (23.22%) tobacco farmers positived OCD. Nicotine enters the body through the skin together with pesticides attached to the leaves (10). The leaf nicotine which exposed the peasant’s skin can be in the form of granules or liquid form. In the form of granules, nicotine is black and is sticky. Nicotine attached to the hand will cause a persistent eczeome reaction. This reaction extends along with worsening- spreading improvement off work (11). Figure 1 shows the farmer with a sign of contact dermatitis caused by contact with nicotine.

The main toxic compound found in tobacco farming is nicotine. Nicotine (C10H14N2) is released by fermentation and curing together with ammonium, carbon dioxide and furan aldehydes (11). Direct contact with tobacco has the potential to cause contact dermatitis (4). This will also increase with the working hours. The longer working hours, the greater the amount of exposure.

Another toxic ingredient found in tobacco farming is pesticides. Several studies state that tobacco farmers face the danger of pesticides and nicotine all at once (12), (13). Type of tobacco pesticides are generally organophosphates (14). Types of leaves planted will determine the need for pesticides. Among the four types of tobacco leaves planted, the leaves that need the most pesticides are Na Oogst. Agricultural chemicals present in pesticides can affect health (15), (16), (17).

Other results from this study mention that dermatitis is associated with cases of Green Tobacco Sickness (GTS). GTS is caused by the absorption of nicotine derived from wet sugarcane leaves. Nicotine is absorbed through the skin in direct contact with tobacco (18). GTS is a disease that is very common in tobacco farmers and occurs in the harvest season (19), (20). Farmers with dermatitis will be at greater risk for developing GTS.

Research conducted on tobacco farmers in Latino is different. Skin problems diagnosed with contact dermatitis and traumatic skin lesions did not have a significant relationship with GTS in bivariate or multivariate analyzes. Skin conditions do increase the possibility of GTS. However, this skin problem must have enough intensity to attract the attention of agricultural workers. Rash, which harms the surface of the skin and increases the potential for nicotine absorption, is the skin problem most strongly associated with GTS (9).

**Conclusion**

The findings in this study revealed that the factors associated with occupational contact dermititis among tobacco farmers in Jember Regency, East Java Province, Indonesia were age, GTS complaint, education, type of tobacco leaves, working periode and working hours. OCD can be prevented through promotive and preventive efforts that can be done by maintaining individual hygiene and the use of personal protection. More broadly, it is necessary to have integrated management of occupational health and prevention of occupational diseases by the parties involved, namely from farmers, doctors and agricultural landowners. Suggestions for further research is to conduct research by examining OCD with various examination methods and types of occupational contact dermatitis.

**Conflict of Interest:** There is no conflict of interest.

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**Ethical Clearance:** Research ethics approval was proposed through the Health Research Ethics Commission of the Faculty of Public Health, Airlangga University, Surabaya. Research has passed the Ethics Review by the Health Research Ethics Commission of the Faculty of Public Health Universitas Airlangga Surabaya, No 472-KEPK August 3, 2018.

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Improve Awareness of the Forensic Odontology among Medical Graduates: Need of the Hour?

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Abstract

Introduction: Forensic odontology is a fastly growing field in both dental and forensic sciences. It involves the application of principles and expertise of dental sciences for criminal investigations. With increasing demand and use of dental evidence in forensic examinations, proper knowledge and awareness of the subject is more necessary than ever before.

Materials and Method: A survey was conducted in Medical and Dental colleges in and around Mangalore, Dakshina Kannada after approval from institutional ethics committee. It included MBBS and BDS students (III year to internship)

Result: The analysis of the data showed two fold results. Knowledge of tooth as a source of DNA, evidence for natural disasters in personal identification was equal among the graduates. Medical graduates had higher awareness of certain aspects like barr bodies and anthropometry whereas; Dental graduates were aware of the odontology aspects in identification of cases of rapes, child abuse, techniques like forensic radiology, bite mark analysis and sexual dimorphism in teeth.

Conclusion: The study highlighted the difference in knowledge of forensic odontology between medical and dental students. It emphasized on the need of increasing awareness of the subject among medical graduates and to help them understand the role of their peers from the dental fraternity in forensic sciences. The study also stressed on the need of a forensic odontologist in the State Forensic Team.

Keywords: Forensic odontology, teeth, dental records, questionnaire, graduates

Introduction

Forensic odontology has evolved as one of the most important tools of forensic sciences. It uses dental records, ante-mortem and post-mortem records, analysis of bite marks, oral photographs and radiographs in solving criminal cases and in identification of persons. It involves proper handling, examination and evaluation of dental-evidence, which could be presented in the court of justice.

Teeth tend to survive extreme conditions and is often resistant to decomposition, thus are sometimes the only source of information, the pulp contains DNA and enamel, dentin and cementum change with age. Every dentition is different, the rationale of forensic odontology depends on this uniqueness and recognizable marks of the teeth.1

Dentistry faction of forensic science plays important role in many scenarios like, solving cases of assaults, murders, rapes and domestic violences, identification of victims in natural disasters like fires, earthquakes, etc., and to examine and interpret archaeological findings.2 As time is passing, the number of criminal activities are also

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increasing, the murder and rapes cases we hear about in the NEWS are getting horrific by the day. In most of these cases the body of the victims are left badly mutilated. Forensic Odontology plays a major role in getting to the root of these cases and finding the criminal.

It is important for Indian doctors and dentists to be educated and trained in the subject. More importantly, doctors must understand the role of a dentist in forensic related cases. Students should be exposed to forensic sciences during their undergraduate course to an extent where they truly understand the subject.

The objective of this study was to draw a comparison between the knowledge and awareness of forensic odontology between Medical and Dental graduates. It also aimed to recognize the need of a forensic odontologist in the state forensic team.

**Aims and Objectives**

The aim of this study is to compare the knowledge and awareness of forensic odontology among medical and dental graduates.

**Materials and Method**

A questionnaire study was conducted in medical and dental colleges of Mangalore, Dakshina Kannada after approval from Institutional ethical committee. It included students from IIIrd year to internship in both the groups.

A questionnaire validated by experts in forensics was prepared. It consisted of 23 questions with 6 divisions (TABLE B & C). First question has 18 subdivisions with Yes/No answers assessing the knowledge and need of forensic evidence. The next 5 questions have multiple choice answers, to evaluate subject specific knowledge of the participant have. Each consenting individual was given 10-15 minutes to answer the questionnaire. The collected data of both the groups was then entered in an excel sheet (Microsoft Inc.). Chi square test was done on the collected data and P Value was found calculated.

**Result**

Both medical and dental graduates (third year to internship) were given a survey on Forensic Odontology consisting of 23 questions, the questionnaire aimed to assess their knowledge and awareness on the subject. On analysis of the statistics many significant differences in the knowledge of the two groups were seen. (Table 1, 2 and 3)

It was observed that almost equal number of participants from both the groups knew that teeth can be used to recognize the dead and that the teeth contain DNA, they are aware that dental records can help during a forensic examination, most of them think that forensic examination requires a complete dental examination to be done when a case is brought to an expert. All the participants of both the groups are aware of bite marks being of importance in certain criminal offenses.

Chi square tests identified significant differences between the medical and dental graduates. Higher awareness and knowledge were observed among dental graduates in most of the questions about the subject. About 88.20% dental graduates knew that a tooth can be used to identify the gender of the dead compared to 64.90% medical graduates. Only 73.70% medical graduates know that enamel and dentin act as an aid for age identification, while this fact is known by 94.10% of dental graduates. 45.10% dental graduates know of institutions offering training in forensic odontology in contrast to only 6.10% medical graduates. The awareness among dental graduates was also high regarding the information of the cases being solved with the help of forensic odontology, accounting for 80.40% as compared to the medical graduates (42.10%). Approximately fifty seven percent (57.80%) dental graduates knew a forensic odontologist in the country compared to 4.40% of medical graduates. Although both medical and dental graduates agreed regarding the need for a forensic odontologist in the team of forensic expert, the need was emphasized more by the dental graduates (95.10%) compared to 79.80% by medical graduates.

While majority of participants agreed to the fact that dental forensic evidence can be presented as an expert witness in the court of law, the numbers were very high among dental graduates (89.20%) compared to the medical graduates group (69.30%). Around eighty eight percent (88.20%) dental graduates want their college to set up a forensic odontology department in contrast to 55.30% medical graduates agreeing for the same. Approximately, sixty two percent (61.80%) dental graduates feel forensic medicine is a good career option in comparison to only 43% medical students, also, 66.70% dental students have interest in forensic sciences, compared to 34.20% medical students.
Some of the attributes showed more positive response from the medical graduates. It was seen that more medical graduates (86.80%) knew that barr-bodies can be used to identify gender in comparison to 62.70% dental graduates. Though the number of participants who are confident in handling a forensic case is low in both the groups, the number is still higher in medical graduates (24.60%) than dental graduates (12.70%).

The participants were asked if forensic odontology was a recognized specialization in India, to our surprise, 47.10% dental graduates and 24.21% medical graduates agreed.

The participants were then asked, in what cases they believed dental evidence was of importance. Though not a significant difference was seen, but some options were considered more important by dental graduates than medical graduates. Dental graduates were more aware of the significance of dental evidence in solving cases of child assaults, rapes and domestic violence and murders. Around seventy three percent (73.5%) dental graduates and 61.4% medical graduates agreed on the importance of dental evidence in solving cases of child assaults, while 73.5% dental graduates knew about the role of dental records in solving rapes and domestic violence crimes compared to 61.4% medical graduates. 76.5% dental graduates said murder cases could also be solved with dental evidence whereas only 58.8% medical graduates agreed on the same.

The importance of archeological evidence was better understood by the medical graduates, with the percentages of medical graduates being 65.8% in comparison to 57.8% dental graduates.

When asked, what would they do if they recognized signs and symptoms of child abuse in a patient, more dental graduates (65.7%) thought that parents should be informed while more medical graduates thought (55.3%) NGO’s should be notified. Almost 80% people of both the groups agreed on involving the police.

Most dental graduates (72.5%) know that visual identification is the first step of identification in unclaimed bodies in comparison to 64% medical graduates. Around 35.1% and 14% medical graduates thought that analysis of physical features and dental examination are the first steps respectively. The number of dental graduates who believed the same were much lesser.

Various techniques are used in forensic odontology examination to identify the deceased. Almost equal number of participants from both the groups thought comparative dental identification, forensic anthropology, DNA methods like PCR, rugoscopy, cheiloscopy, occupational dental considerations and abnormalities of tooth formation and eruption. More medical graduates (52.6%) believed forensic anthropometry is used in many cases compared to only 39.2% dental graduates agreeing to the same.

Bite mark analysis was considered important by 71.6% dental graduates compared to 56.1% medical graduates answering the same. (p value=0.019) Forensic radiology was another method more popular among dental graduates compared to medical graduates. Also, dental students felt that the study of habits and dental variations can also be more helpful compared to medical students.

The participants were then asked about how did they gain the knowledge about forensic sciences. Teachers played the most important role in education participants of both the groups. Almost equal number of participants gained knowledge from the internet and television sitcoms, crime scene investigation shows. While seminars held in colleges and institutions was a source of information for many dental graduates (51%), only 21.9% medical students gained knowledge from seminars. More medical graduates (33.3%) gained awareness from NEWS than dental graduates (24.5%). Family was the last source of knowledge on the subject.
TABLE 1: General awareness of forensic odontology and age and gender changes of teeth which can be used in forensic examination

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>N=216</th>
<th>DENTAL GRADUATES</th>
<th>MEDICAL GRADUATES</th>
<th>CHI SQUARE VALUE</th>
<th>P VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Answer the following with yes, no or maybe</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you think that teeth can be used to recognise the dead?</td>
<td>213</td>
<td>101(99.00%)</td>
<td>112 (98.20%)</td>
<td>0.904</td>
<td>0.636</td>
</tr>
<tr>
<td>Can a tooth help identify the gender of an unclaimed dead body?</td>
<td>164</td>
<td>90 (88.20%)*</td>
<td>74 (64.90%)</td>
<td>23.737</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Can bar bodies be used to identify gender of a deceased?</td>
<td>163</td>
<td>64 (62.70%)</td>
<td>99 (86.80%)*</td>
<td>21.303</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Can enamel or dentin act as aid for age identification?</td>
<td>180</td>
<td>96 (94.10%)*</td>
<td>84 (73.70%)</td>
<td>17.727</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Do you think that teeth contain DNA?</td>
<td>151</td>
<td>79(77.50%)</td>
<td>72(63.20%)</td>
<td>5.292</td>
<td>0.071</td>
</tr>
<tr>
<td>Do you think that dental records can help during a forensic examination?</td>
<td>214</td>
<td>102(100%)</td>
<td>112(98.20%)</td>
<td>1.806</td>
<td>0.405</td>
</tr>
<tr>
<td>Can bite marks be of importance in certain criminal offenses?</td>
<td>216</td>
<td>102(100%)</td>
<td>114(100%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Does forensic examination require a complete dental examination to be done when a case is brought to an expert?</td>
<td>176</td>
<td>88(86.30%)</td>
<td>88(77.20%)</td>
<td>5.254</td>
<td>0.072</td>
</tr>
<tr>
<td>Is forensic odontology a recognised specialisation in India?</td>
<td>72</td>
<td>48(47.10%)</td>
<td>24(21.10%)*</td>
<td>24.754</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Are you aware of any forensic odontology training centers in India?</td>
<td>53</td>
<td>46(45.10%)*</td>
<td>7(6.10%)</td>
<td>46.278</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Do you know about any forensic cases solved with the help of forensic odontology?</td>
<td>130</td>
<td>82(80.40%)*</td>
<td>48(42.10%)</td>
<td>33.279</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Do you know of any forensic odontologist in India?</td>
<td>64</td>
<td>59(57.80%)*</td>
<td>5(4.40%)</td>
<td>83.49</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Are you confident in handling any forensic related case?</td>
<td>41</td>
<td>13(12.70%)</td>
<td>28(24.60%)*</td>
<td>8.095</td>
<td>0.017</td>
</tr>
<tr>
<td>Can dental forensic evidence be presented as an expert witness in the court of law?</td>
<td>170</td>
<td>91(89.20%)*</td>
<td>79(69.30%)</td>
<td>12.744</td>
<td>0.002</td>
</tr>
<tr>
<td>Do you think your college should set up a forensic odontology department?</td>
<td>153</td>
<td>90(88.20%)*</td>
<td>63(55.30%)</td>
<td>28.347</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Do you think it is important to include a forensic odontology expert in a team of forensic medicine experts?</td>
<td>188</td>
<td>97(95.10%)*</td>
<td>91(79.80%)</td>
<td>11.454</td>
<td>0.003</td>
</tr>
<tr>
<td>Does forensic medicine as a specialty interest you?</td>
<td>107</td>
<td>68(66.70%)*</td>
<td>39(34.20%)</td>
<td>46.383</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Is forensic medicine a good career option?</td>
<td>112</td>
<td>63(61.80%)*</td>
<td>49(43.00%)</td>
<td>8.281</td>
<td>0.016</td>
</tr>
</tbody>
</table>
TABLE 2: awareness of tooth as an evidence in various cases among medical and dental graduates

<table>
<thead>
<tr>
<th>QUESTION</th>
<th>N=216</th>
<th>DENTAL GRADUATES</th>
<th>MEDICAL GRADUATES</th>
<th>CHI SQUARE VALUE</th>
<th>P VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>2) In your opinion, is dental evidence of utmost importance is cases of?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) Fires</td>
<td>112</td>
<td>56(54.9%)</td>
<td>56(49.1%)</td>
<td>0.72</td>
<td>0.396</td>
</tr>
<tr>
<td>ii) Earthquakes</td>
<td>84</td>
<td>36(35.3%)</td>
<td>48(42.1%)</td>
<td>1.051</td>
<td>0.305</td>
</tr>
<tr>
<td>iii) Rapes and Domestic Violence</td>
<td>173</td>
<td>89(87.3%)*</td>
<td>84(73.7%)</td>
<td>6.218</td>
<td>0.013</td>
</tr>
<tr>
<td>iv) Child Assaults</td>
<td>145</td>
<td>75(73.5%)</td>
<td>70(61.4%)</td>
<td>3.587</td>
<td>0.058</td>
</tr>
<tr>
<td>v) Archaeological Importance</td>
<td>134</td>
<td>59 (57.8%)</td>
<td>75(65.8%)*</td>
<td>1.443</td>
<td>0.23</td>
</tr>
<tr>
<td>vi) Murders</td>
<td>145</td>
<td>78(76.5%)*</td>
<td>67(58.8%)</td>
<td>7.642</td>
<td>0.006</td>
</tr>
<tr>
<td>vii) Identification</td>
<td>184</td>
<td>94(92.2%)*</td>
<td>90(78.9%)</td>
<td>7.443</td>
<td>0.006</td>
</tr>
<tr>
<td>3) What would you do if you identify signs and symptoms of child abuse in a patient?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) Inform Parents</td>
<td>115</td>
<td>67(65.7%)*</td>
<td>48(42.1%)</td>
<td>12.024</td>
<td>0.001</td>
</tr>
<tr>
<td>ii) Inform Police</td>
<td>176</td>
<td>82(80.4%)</td>
<td>94(82.5%)</td>
<td>0.152</td>
<td>0.697</td>
</tr>
<tr>
<td>iii) Inform NGO</td>
<td>108</td>
<td>45 (44.1%)</td>
<td>63(55.3%)</td>
<td>2.675</td>
<td>0.102</td>
</tr>
<tr>
<td>4) What is the first step for the means of identification for unclaimed bodies?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) Visual Identification</td>
<td>147</td>
<td>74 (72.5%)</td>
<td>73(64%)</td>
<td>1.795</td>
<td>0.18</td>
</tr>
<tr>
<td>ii) Analyzing Physical Features of the Body</td>
<td>63</td>
<td>23(22.5%)</td>
<td>40 (35.1%)*</td>
<td>4.097</td>
<td>0.043</td>
</tr>
<tr>
<td>iii) Dental Examination</td>
<td>21</td>
<td>5(4.9%)</td>
<td>16 (14%)*</td>
<td>5.116</td>
<td>0.024</td>
</tr>
<tr>
<td>5) Can the following techniques be useful in identifying a deceased?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) Comparative Dental Identification</td>
<td>158</td>
<td>73(71.6%)</td>
<td>85(74.6%)</td>
<td>0.245</td>
<td>0.62</td>
</tr>
<tr>
<td>ii) Forensic Anthropology</td>
<td>108</td>
<td>50(49%)</td>
<td>58(50.9%)</td>
<td>0.074</td>
<td>0.785</td>
</tr>
<tr>
<td>iii) Rugoscopy</td>
<td>110</td>
<td>46(45.1%)</td>
<td>64(56.1%)</td>
<td>2.627</td>
<td>0.105</td>
</tr>
<tr>
<td>iv) Cheiloscopy</td>
<td>126</td>
<td>56(54.9%)</td>
<td>70(61.4%)</td>
<td>0.936</td>
<td>0.333</td>
</tr>
<tr>
<td>v) Bitemark Analysis</td>
<td>137</td>
<td>73(71.6%)*</td>
<td>64(56.1%)</td>
<td>5.524</td>
<td>0.019</td>
</tr>
<tr>
<td>vi) Forensic Radiology</td>
<td>111</td>
<td>62(60.8%)*</td>
<td>49(43%)</td>
<td>6.829</td>
<td>0.009</td>
</tr>
<tr>
<td>vii) DNA Methods</td>
<td>182</td>
<td>84(82.4%)</td>
<td>98(86%)</td>
<td>0.53</td>
<td>0.467</td>
</tr>
<tr>
<td>viii) Forensic Anthropometry</td>
<td>100</td>
<td>40(39.2%)</td>
<td>60(52.6%)*</td>
<td>3.897</td>
<td>0.048</td>
</tr>
<tr>
<td>ix) Occupational and Dental Considerations</td>
<td>70</td>
<td>36(35.3%)</td>
<td>34(29.8%)</td>
<td>0.735</td>
<td>0.391</td>
</tr>
<tr>
<td>x) Habits and Dental Variation</td>
<td>76</td>
<td>44(43.1%)*</td>
<td>32(28.1%)</td>
<td>5.359</td>
<td>0.021</td>
</tr>
<tr>
<td>xi) Abnormalities of Tooth Formation and Eruption</td>
<td>97</td>
<td>49(48%)</td>
<td>48(42.1%)</td>
<td>0.766</td>
<td>0.381</td>
</tr>
<tr>
<td>6) What is your source of initial knowledge about forensic sciences?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TABLE 2: awareness of tooth as an evidence in various cases among medical and dental graduates

<table>
<thead>
<tr>
<th>i) NEWS</th>
<th>63</th>
<th>25(24.5%)</th>
<th>38(33.3%)</th>
<th>2.029</th>
<th>0.154</th>
</tr>
</thead>
<tbody>
<tr>
<td>ii) Teachers</td>
<td>137</td>
<td>68(66.7%)</td>
<td>69(60.5%)</td>
<td>0.875</td>
<td>0.35</td>
</tr>
<tr>
<td>iii) TV Shows</td>
<td>99</td>
<td>44(43.1%)</td>
<td>55(48.2%)</td>
<td>0.566</td>
<td>0.452</td>
</tr>
<tr>
<td>iv) Internet</td>
<td>87</td>
<td>41(40.2%)</td>
<td>46(40.4%)</td>
<td>0.001</td>
<td>0.982</td>
</tr>
<tr>
<td>v) Seminars</td>
<td>77</td>
<td>52(51.9)*</td>
<td>25(21.9%)</td>
<td>19.804</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>vi) Family</td>
<td>8</td>
<td>5(4.9%)</td>
<td>3(2.6%)</td>
<td>0.778</td>
<td>0.378</td>
</tr>
</tbody>
</table>

TABLE 3: Fields where increase in knowledge and understanding should be increased in the two groups

<table>
<thead>
<tr>
<th>What medical graduate should understand</th>
<th>What dental graduate should understand</th>
</tr>
</thead>
<tbody>
<tr>
<td>Importance in Fires, Rapes, Domestic Violence, Child Assaults, Murders, Identification</td>
<td>Barr Body</td>
</tr>
<tr>
<td>Importance of Bite Mark Analysis, Forensic Radiology</td>
<td></td>
</tr>
<tr>
<td>Role of habits and dental variation in identification</td>
<td>Importance of Forensic Anthropometry</td>
</tr>
<tr>
<td>Sexual dimorphism characters in teeth</td>
<td></td>
</tr>
</tbody>
</table>

Discussion

Forensic odontology is one of the most progressing fields of forensics. Newer morphometric, histological metrics are employed to not only identify the deceased but also to solve civil and criminal cases.

Size, shape and color of teeth vary with age, gender and ethnicity, hence they can be very helpful in classifying the dead. In addition the pulp is potential a source of DNA even in adverse conditions. In the present study both the groups were equally aware of teeth as a source of DNA and they were aware of teeth being able to be used to identify the deceased. Previous dental records of a person ease the process of identification of a victim and even an offender (in cases of rapes, domestic violence, abuse, murder etc.), dentition, number of teeth, restorations, crowns etc., all count as valuable information in cases of identification. Dental post-mortem and ante-mortem records can also help in certain cases, this was known by participants of both the groups, hence, doing a complete dental examination during a forensic evaluation is also considered of importance. Importance of bite marks was known by all the participants from the two groups. Bite marks are of grave importance in cases of rapes, domestic violence and abuse, they are very helpful in identifying the culprit.

In our cohort the awareness of use of teeth as an identification of sex was more in dental graduates than in medical graduates. Sexual dimorphism is an inherent trait of the tooth. The sex chromosomes (X and Y chromosome) both code for the enamel formation and are responsible for the larger size of the teeth in males. Studies have shown minimal influence of hormones in regulating the tooth size. Dental graduates have better knowledge about using enamel and dentin in age estimation. Age changes in tooth can be in all structures of teeth. The enamel shows attrition, dentin formation is present throughout life leading to pulp recession, dentinal sclerosis is a part of the tooth aging process, cementum deposition occurs in increments. All these features can be grossly as well as radiological or histopathologically be estimated to assess age. Enamel, dentin and cementum change with age, while the amount of enamel decreases, dentin increases with age correlating with formation of reparative and
sclerotic dentin and cementum increases with age. Thus, as seen with various methods of age estimation (like Gustafson’s methods, Dermijian’s method etc.), enamel and dentin play an important role in identifying the age.

Use of teeth or the jaw to solve criminal cases since time immemorial. Awareness about cases solved with the help forensic sciences more in dental graduates. From the identification of Lollia Paulina to the identification of Abraham Lincoln’s assassin to the very recent Nirbhaya case, all were solved with the help of forensic odontology. A forensic odontologist’s presence, as agreed by most participants, is of importance in a state forensic team, as he/she is the most capable of doing a complete forensic dental examination as and when required. Dental forensic evidence, bite marks, oral radiographs, patient records, ante-mortem and post-mortem reports etc., can be used as evidence in a court of law.

Medical graduates are more aware of use of barr bodies in identification of gender in the dead. Barr bodies are gender markers, presence of Barr bodies marks genetic femaleness. It is an inactivated X Chromosome.

However, forensic odontology is not a recognized specialization yet in India. This showed more awareness among medical graduates. Some institutions provide a diploma fellowship and certificate courses and training for the same in the country.

The number of people agreeing to importance of forensic odontology in Fires and earthquakes is still low, as it is of utmost importance in mass disasters. Teeth tend to survive high temperatures and extreme conditions, hence, can be the only source of information in these cases. Differences in jaw and teeth morphology, number of crowns and restorations can help in unmasking the criminals.

There is no correct response for who should be informed first in cases of child abuse, while some might consider that informing parents, agreed response by dental graduates is must, a certain group of people, some dental graduates and most medical graduates, might think that informing the police can be more helpful as parents can also be the reason of abuse in certain cases.

Most of the participants agreed on visual identification being the first step of forensic examination. When an oral forensic examination is required to be done, firstly visual examination is done after a complete clean up of the deceased. Oral autopsy is done before any other body part is incisioned. Oral photographs must be taken before and after the autopsy procedure. Radiographs are taken by keeping the mouth open with clamps, impressions are made, and the dentition and oral conditions studied. These records are used to formulate a forensic report and find the criminal.

The awareness about the use of bitemarks in identification was more among the dental graduates. Bite mark analysis sure is on one of the most important tools of forensic dental sciences, however, rugoscopy and cheiloscopy can also be very helpful. Occupation considerations, habits and dental variation studies can also give fruitful results, like, notched incisors in tailors, attrited teeth in bruxers, etc. Even though DNA methods came out to be the most popular response, it is not usually done in most cases, as it is very expensive in comparison to the other methods and time consuming as well. Similarly, comparative dental identification, though answered by many participants, is not always done.

The evaluation of the results of the present study reflected on the gap of knowledge between the two groups of participants. It is evident that dental graduates are more aware and educated on the subject of forensic odontology, yet the subject is not given much importance. However, dental graduates also lack awareness in certain aspects, like the importance of barr bodies and the technique of forensic anthropomtry in identification, needed to be updated by more intensive lectures on the subject. Medical graduates need to be taught various parts of the subject like sexual dimorphism of teeth, use of teeth in cases of identification, natural disasters and rapes and murders, importance of bite mark analysis and forensic radiology and role of dental variation and habits in identification. (Table 1, 2 and 3).

Forensic investigations are a team effort, where the forensic experts, law makes and the police work together to solve mysteries around the death of a person.

**Conclusion**

Forensic odontology should be included on the curriculum of both dental and medical degrees. More seminar should be held for medical students to understand the importance of the role of their peers in forensic sciences. A forensic odontologist should be made an integral part of the state forensic teams. The law makers, the police officers and the forensic medicine experts should come together to accept the role of
this new key member who can help solve many more unsolved cases.

Conflict of Interest: There is no conflict of interest among the authors of this study.

Ethical Clearance: A copy of ethical clearance from Institutional Ethics Committee is attached.

References


Spectrum of Hepatic Pathologies in Medicolegal Autopsies

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Abstract

Background: Silent liver disease is a major cause of morbidity and mortality in the population due to its silent progression to end stage liver disease without significant symptoms. We aim to study pattern of pathological findings and latent forms of diseases in the 100 liver autopsy specimen and to find clinicopathological correlation between clinical diagnosis and pathological diagnosis wherever possible.

Method: The present study was conducted on 100 liver autopsy specimens received in the department of Pathology, Govt. Medical College, Patiala. Sections from representative areas were submitted for processing, sectioned and stained with Hematoxylin & Eosin stain.

Results: Out of 100 specimens, 38 cases (38%) showed hepatic steatosis, followed by cirrhosis 14 cases (14%), chronic venous congestion 13 (13%) cases, portal triaditis 12 (12%) cases, normal 12 (12%) cases, hepatitis 8 (8%) cases, granulomatous/tuberculosis pathology 2 (2%) cases and 1(1%) metastatic deposits of carcinoid tumour. Maximum cases seen in age group of 41-50 years with mean age 39.92±12.68 years. Liver disease predominated in males with male:female ratio of 6:1.

Conclusion: Silent liver diseases are not uncommon. Autopsy examination of liver is very helpful to identify silent liver diseases like hepatic steatosis, cirrhosis, venous congestion and malignant tumours.

Keywords: Autopsy, Histopathology, Liver disease, Cirrhosis

Introduction

Liver is vulnerable to wide variety of metabolic, toxic, microbial and circulatory insults. In some instances, the disease is primary while in others the hepatic involvement is secondary to cardiac decompensation, alcoholism or 'extra hepatic infections. Quite rightly liver is, called as “The custodian of milieu interior”. Autopsy study is useful to monitor the cause of death and to plan medical strategy. [2]

Liver diseases have been known to have diverse etiologies. Broadly they are classified into various categories namely Infectious disorders of liver, Autoimmune disorders, Drug and toxic induced liver injury, Alcoholic liver diseases, metabolic liver diseases, cholestatic diseases, Autoimmune cholangiopathies, structural abnormalities of the biliary tree, circulatory disorders, Hepatic complications of organ or stem cell transplantation, Hepatic diseases associated with pregnancy and lastly tumors of different origins. [1]

Alcohol abuse generally leads to three pathologically distinct liver diseases; these are fatty liver, hepatitis and alcoholic cirrhosis. Any one or all the three can occur at the same time, in the same patient. [3] Fatty changes (steatosis) are very common finding both in biopsies and at postmortem examinations. Liver cell involvement may be focal, diffuse or zonal. [4]

Chronic hepatitis is usually due to hepatotropic viruses, or conditions like auto immune chronic hepatitis or chronic idiosyncratic drug-induced hepatitis. [4]
Material and Method

The present descriptive pattern of study was conducted on 100 liver autopsy specimens received in the department of Pathology, Govt. Medical College, Patiala over a period of 1 year 9 months. Liver specimens were received as a part of multiple viscera from mortuary for histopathological examination of medicolegal cases. In each case, important information regarding age, sex, clinical diagnosis (wherever possible) and postmortem findings were obtained from postmortem papers. Gross examination of the liver specimen was done as regards to the weight, surface, capsule, colour, consistency, etc. Formalin fixed liver tissues stained with Hematoxylin and Eosin were examined under microscope. The findings were recorded and analysed. Autolytic specimens were excluded from the study.

Observations

During the study, 100 cases were evaluated, out of which liver diseases predominated in males 86 cases (86%) as compared to females 14 cases (14%).

<table>
<thead>
<tr>
<th>TABLE-1 : DISTRIBUTION OF HISTOPATHOLOGY FINDINGS OF CASES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Histopathology Findings</td>
</tr>
<tr>
<td>--------------------------</td>
</tr>
<tr>
<td>Hepatic Steatosis</td>
</tr>
<tr>
<td>Cirrhosis</td>
</tr>
<tr>
<td>Hepatitis</td>
</tr>
<tr>
<td>Chronic Venous Congestion</td>
</tr>
<tr>
<td>Portal Triaditis</td>
</tr>
<tr>
<td>Granulomatous Pathology/Tuberculosis</td>
</tr>
<tr>
<td>Metastatic Deposits of Carcinoid Tumour</td>
</tr>
<tr>
<td>Normal</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

On histopathological examination of 100 liver autopsy specimens, the most common finding was hepatic steatosis i.e. 38 cases (38%) followed by cirrhosis i.e. 14 cases (14%), chronic venous congestion i.e. 13 cases (13%), normal histology and portal triaditis i.e. 12 cases each (12%), hepatitis i.e. 8 cases (8%), granulomatous pathology/tuberculosis i.e. 2 cases (2%) and metastatic deposits of carcinoid tumour i.e. 1 case (1%).

<table>
<thead>
<tr>
<th>TABLE-2 : GENDER WISE DISTRIBUTION OF HISTOPATHOLOGY FINDINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Histopathology Findings</td>
</tr>
<tr>
<td>--------------------------</td>
</tr>
<tr>
<td>Hepatic Steatosis</td>
</tr>
<tr>
<td>Cirrhosis</td>
</tr>
</tbody>
</table>
Cont. TABLE-2: GENDER WISE DISTRIBUTION OF HISTOPATHOLOGY FINDINGS

<table>
<thead>
<tr>
<th>Pathological Diagnosis (n=48)</th>
<th>Clinical Diagnosis (n=48)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Alcohol Liver Disease</td>
</tr>
<tr>
<td>Hepatic Steatosis</td>
<td>26 (68.42%)</td>
</tr>
<tr>
<td>Cirrhosis</td>
<td>12 (31.58%)</td>
</tr>
<tr>
<td>Hepatitis</td>
<td>-</td>
</tr>
<tr>
<td>Chronic Venous Congestion</td>
<td>-</td>
</tr>
<tr>
<td>Portal Triaditis</td>
<td>-</td>
</tr>
<tr>
<td>Granulomatous Pathology/Tuberculosis</td>
<td>-</td>
</tr>
<tr>
<td>Metastatic Deposits of Carcinoid Tumour</td>
<td>-</td>
</tr>
<tr>
<td>Normal</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>38 (100%)</td>
</tr>
</tbody>
</table>

Mcnemar Value 3.000

p value 0.223

In 100 liver autopsy cases included in the present study, 48 cases had ante-mortem clinical diagnosis and 52 cases had no clinical diagnosis.
From the above table, we can conclude that there is no significance difference between the clinical diagnosis and pathology diagnosis as there $p>0.05$ therefore both are showing correlation.

![Fig 1. Histopathological Section showing interface between normal liver tissue and metastatic deposits of carcinoid tumor (H & E 40x)](image1)

![Fig. 2: Histopathological Section of hepatic cirrhosis exhibiting nodular pattern (H & E 40x)](image2)

**Discussion**

A wide spectrum of liver pathologies has been observed in liver autopsies and has a significant role in mortality across the globe.

In the present study, clinical diagnosis was available in 48 cases. The age of the cases in the present study ranged from 12 years to 90 years; however, the predominant population was in the 4th decade with a mean age of 39.92±12.68 years. The results of the present study agree with the studies by Selvi et al[6] (2012), in which the mean age was 46.9 ±-5.28 years. The decline in the number of cases beyond the age of 80 years reflects the average life span of people in our country.
Liver diseases predominated in males in the present study (86%) compared to females (14%). These findings were in close concordance with the study done by Singal et al[5] (2017) where maximum cases predominated in males (82.8%). This may be attributed to the fact that men are more prone to alcohol consumption.

In the present study, hepatic steatosis (38%) was the most common silent liver disease. This finding is similar to studies conducted by Bal et al[2] (2004) showing 39% cases.

Alcoholic liver disease was the most common clinical diagnosis observed in 38 cases. Out of total 38 cases of hepatic steatosis, 26 (68.42%) cases had alcohol liver disease as a clinical diagnosis and 12 (23.08%) cases were incidental findings. This finding is similar to study conducted by Tuusov et al[10] (2014) where association of alcohol liver disease with hepatic steatosis was found to be 60.5%.

Maximum cases of hepatic steatosis in the present study belonged to the age group of 40-49 years comprising to be 52.63%. Similarly, study conducted by Bal et al[2] (2004) found maximum cases (53.85%) in the same age group.

In the present study, maximum cases of cirrhosis was seen in the age group of 40-49 years i.e. 6 (42.86%) cases which is comparable to the study conducted by Devi et al[7] (2013) with maximum cases in 40-49 years age group i.e. 10 (40 %) cases.

The frequency of cirrhosis in the present study was seen in 14 (14 %) cases which is comparable to the study conducted by Bal et al[2] (2004) showing 14% cases of cirrhosis. Whereas, Singal et al[5] (2017) and Konjengbam et al[8] (2017) found cirrhosis in 11.4% and 11.8% cases respectively. In the present study, cirrhosis was predominately seen in males i.e. 13 cases (13.51%) which is in concordance with study done by Singal et al[5] (2017) where males predominated i.e. 8 cases (13.7%). In the present study, 12 out of 14 cases (31.58%) had history of alcohol liver disease whereas other 2 cases (25%) had history of jaundice with viral etiology. In study conducted by Goncalves et al[11] (2014), association of alcohol liver disease and cirrhosis was found to be 40.5%. In a study conducted by Nandakumar et al[12] (2003), frequency of virus induced cirrhosis was found to 25% which is concordant with the present study (25%).

The present study shows the frequency of hepatitis in 8 (8%) cases which is in concordance to the study conducted by Singal et al[5] (2017) i.e. 6 (9%) cases. Similarly Konjengbam et al[8] (2017) had 6.2% cases. In the present study, hepatitis viral serology was not performed however, 5 out of 8 cases (62.5%) presented with clinical diagnosis of jaundice with viral etiology and 3 cases (5.77%) were incidental findings on histopathology.

The maximum cases of hepatitis is found in age group of 20-29 years i.e. 3 (37.5%) cases which is comparable to the study conducted by Devi et al[7] (2013) where maximum cases were in 20 -29 years age group i.e. 7 (32%) cases. This could be attributed to the intravenous drug usage in younger age group in these regions. No case of fulminant hepatitis was noted.

The frequency of chronic venous congestion in the present study is 13 (13%) cases. This finding is in accordance to studies conducted by Konjengbam et al[8] (2017) showing 11.5% cases.

In the present study, the incidence of portal triaditis is 12% which is similar to the studies conducted by Devi et al[7] (2013) and Konjengbam et al[8] (2017) with 15% and 10.9% cases respectively.

In the present study, the frequency of granulomatous/tuberculosis pathology is 2% which is similar to studies conducted by Konjengbam et al[8] (2017) and Singal et al[5] (2017) showing 2.1% and 1.5% cases respectively.

In one case of Granulomatous/Tuberculosis pathology, there was ante-mortem clinical diagnosis of tuberculosis (100%). Ziehl Neelseen stain was positive in one case of Granulomatous/tuberculosis pathology exhibiting acid fast bacilli.

In the present study, the frequency of metastatic deposits is 1% similar to the study conducted by Selvi et al[6] (2012) and Patel et al[9] (2017) showing 1.9% and 0.24% cases respectively. The age of the case in the present study was 47 years. The histopathological finding in this case correlated with the positive ante-mortem clinical diagnosis of cancer (100%).

The primary origin of the metastasis is unknown in the present study however, Patel et al[9] (2017) reported a case of metastatic carcinoma from lung adenocarcinoma in their study. In the present study, liver findings were normal in 12% cases which are comparable to studies.
conducted by Singal et al\textsuperscript{[5]} (2017) and Konjengbam et al\textsuperscript{[8]} (2017) showing 13\% and 14\% cases respectively.

**Conclusion**

From the present study, we conclude that autopsy specimens of liver helps to identify silent liver diseases. The incidence of hepatic pathology being more common in males as compared to females. Histopathological examination and clinical correlation are two most important tools for diagnosis of liver diseases.

**Conflict of Interest :** Nil

**Source of Funding:** Nil

**Ethical Clearance :** Taken

**References**

Epidemiological Profile of Fatal Abdominal Injuries Secondary to Blunt Force Impact: Autopsy based Study Conducted At A. J. Institute of Medical Sciences & Research Centre, Mangalore

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Abstract

Background: Evaluating patients who have sustained blunt abdominal trauma remains one of the most challenging and resource-intensive aspects of acute trauma care. The objective of this dissertation is to analyse the pattern of fatal abdominal injuries secondary to blunt force impact.

Aim: The aim of this research is to analyze the pattern of fatal abdominal injuries secondary to blunt force impact

Materials and Method: Detailed observations for 38 autopsies with evidence of fatal abdominal trauma during the period October 2014 to July 2016 were carried out. Routine information like age, sex, occupation brief facts of the cases collected from the inquest report. Clinical history like time of admission, and deaths and other relevant data was collected from the hospital case sheets and death summaries.

Results: Analysis involves 38 autopsies with evidence of fatal abdominal trauma during the period October 2014 to July 2016. The most common age group involved was between 21-30 years of age comprising 26% of total 38 cases followed by the age group of 11-20 years comprising 21% of total cases. The most common cause of blunt fatal abdominal trauma was vehicular accident seen in 84% of cases. In 38 cases, it was found that 24 cases (63%) were dead on arrival. Amongst 32 vehicular accidents, a total of 21 pedestrians (66%) were killed in 38 fatal blunt abdominal trauma cases. Liver was the organ mainly affected in fatal blunt abdominal trauma followed by pelvic trauma and kidney. Haemorrhage accounted for the largest number of cases (94.74%).

Conclusion: The present study emphasizes the need for adopting measures to prevent morbidity and mortality resulting from blunt abdominal trauma.

Keywords: Abdominal Trauma; blunt force; Hemorrhage; Pelvic trauma.

Introduction

Trauma is one of the leading preventable causes of death in developing countries, and is a major health and social problem. Trauma affects generally the young people, and accounts for loss of more years of life,
than lost due to cancer and heart diseases put together. Accidents are considered as a modern day epidemic and counter product of modernization and hasty life. The statistical profile reflects a global estimate of 5.1 million deaths in 2000. Road Traffic Accident (RTA) accounted one of the top five causes of morbidity and 10% -25% of mortality in South-East Asian countries.1,2

RTA cause mechanical trauma, resulting in morbidity, disability and even mortality. India is one of the highest victimized by road traffic accidents in the world and reported to be 20 times more than that reported in developed countries.3

Abdominal trauma accounts for nearly 20% of all severe traffic injuries and can often result from intentional physical violence. Blunt liver injury is regarded as the most common type of injury following abdominal trauma, and is associated with a high mortality rate.4,5 Blunt abdominal trauma is a leading cause of morbidity and mortality among all age groups. Identification of serious intra-abdominal pathology is often challenging. Many injuries may not manifest during the initial assessment and treatment period. Missed intra-abdominal injuries and concealed hemorrhage are frequent causes of increased morbidity and mortality, especially in patients who survive the initial phase after an injury.

Blunt abdominal trauma usually results from motor vehicle collisions (MVCs), assaults, recreational accidents, or falls. The most commonly injured organs are the spleen, liver, retroperitoneum, small bowel, kidneys, bladder, colorectum, diaphragm, and pancreas. Men tend to be affected slightly more often than women.

Physical examination findings are notoriously unreliable. One reason is that mechanisms of injury often result in other associated injuries that may divert the physician’s attention from potentially life-threatening intra-abdominal pathology. Other common reasons are an altered mental state and drug and alcohol intoxication.

The care of the trauma patient is demanding and requires speed and efficiency. Evaluating patients who have sustained blunt abdominal trauma remains one of the most challenging and resource-intensive aspects of acute trauma care.6,7 The objective of this dissertation is to analyse the pattern of fatal abdominal injuries secondary to blunt force impact.

**Materials and Method**

Detailed observations for 38 autopsies with evidence of fatal abdominal trauma during the period October 2014 to July 2016 were carried out. Due permission was taken from Institutional Ethics Committee of A.J. institute of Medical Sciences & Research Centre, Mangalore for the conduct of the study.

Routine information like age, sex, occupation brief facts of the cases collected from the inquest report. Clinical history like time of admission, and deaths and other relevant data was collected from the hospital case sheets and death summaries. Pattern, nature of injuries, complications, cause of death and mechanism of death were obtained from a detailed follow up and study of the autopsy cases and reports.

**Results**

Detailed observations for 38 autopsies with evidence of fatal abdominal trauma during the period October 2014 to July 2016 were carried out and various statistical results were drawn from them. The most common age group involved was between 21-30 years of age comprising 26% of total 38 cases followed by the age group of 11-20 years comprising 21% of total cases. Children below 10 years constituted only 8% of total cases. Persons above 60 years constituted only three cases, i.e., 7.9% of total cases.

The most vulnerable age group involved among males was between 21-30 years of age followed by the age group of 11-20 years. The most vulnerable age group involved among females was between 21-30 and 31-40 years of age as depicted Figure 1. Among those 38 cases studied, males comprised 29 cases, i.e., 76.32% of cases, while females were only 9 in number, i.e., 23.68% of cases.
The most common cause of blunt fatal abdominal trauma was vehicular accident seen in 84% of cases followed by fall from height constituting 13% of cases.

In 38 cases, it was found that 24 cases (63%) (Were dead on arrival i.e., died at the scene/spot or were brought dead to the casualty as depicted in Figure 2. Those surviving for more than a day constituted only 8% of the cases.

Amongst 32 vehicular accidents, A total of 21 pedestrians (66%) were killed in 38 fatal blunt abdominal trauma cases. The next common category was two wheeler occupants which accounted for 10 cases (31%). Car occupants were not involved in any case as illustrated in Table 1.
Table 1: Mode of causation of blunt injury

<table>
<thead>
<tr>
<th>Type of Victim</th>
<th>Number of victims</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedestrian</td>
<td>21</td>
<td>65.68</td>
</tr>
<tr>
<td>Two wheelers occupants</td>
<td>10</td>
<td>31.22</td>
</tr>
<tr>
<td>Cyclist</td>
<td>1</td>
<td>3.10</td>
</tr>
<tr>
<td>Car occupants</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Bus/Truck passenger</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>100</td>
</tr>
</tbody>
</table>

Liver was the organ mainly affected in fatal blunt abdominal trauma followed by pelvic trauma and kidney as described in Table 2.

Table 2: Number of victims in relation to different organs injured

<table>
<thead>
<tr>
<th>Age group</th>
<th>No of Victims</th>
<th>Liver</th>
<th>Spleen</th>
<th>Bowel</th>
<th>Pancreas</th>
<th>Kidney</th>
<th>Ureter</th>
<th>Bladder</th>
<th>Pelvis</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>11-20</td>
<td>8</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>21-30</td>
<td>10</td>
<td>7</td>
<td>4</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>0</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>31-40</td>
<td>6</td>
<td>5</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>41-50</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>51-60</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>&gt;60</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>total</td>
<td>38</td>
<td>27</td>
<td>15</td>
<td>6</td>
<td>2</td>
<td>17</td>
<td>1</td>
<td>11</td>
<td>21</td>
</tr>
</tbody>
</table>

In all the cases studied manner of death was accidental. Haemorrhage accounted for the largest number of cases (94.74%) followed by Speticemia (5.26%) as illustrated in Figure 3.
Discussion

In the present study it was observed that majority of cases were males in the age group of 21-30 years. The large number of cases in this age group can be attributed to the fact that this period of life is the most vulnerable to trauma because of a very high level of outdoor activities. Male dominance in this type of injury could likely be due to the fact the males are more exposed to trauma as they constitute working and earning member in majority of families and so move out of the house more often than females. Similar findings were also observed by Jha et al, Meera and Nabachandra, Rautji et al, Sharma et al, and Mansar et al.

In the present study, majority of fatal blunt abdominal injuries were due to vehicular accidents. There was no case of assault by blunt weapon. This finding is also in agreement with the work of Meera and Nabachandra who also observed that the commonest cause of blunt thoracoabdominal trauma was vehicular accidents (86.40%).

Liver was injured in maximum number of cases. This may be due to the fact that in maximum number of vehicular accidents causes primary impact injuries over the upper abdominal region. Another reason for the greater involvement of the liver could be due to fall on the ground after impact with offending vehicle leading to liver injury.

These findings are also in agreement with the findings of Bergqvist et al who studied patients with abdominal trauma and fatal outcome in an analysis of a 30-year series in a rural Swedish area. They found that Patients with blunt abdominal trauma with fatal outcome comprised of 127 patients and found that one fourth of these patients died from an abdominal injury alone.

A total of 21 (66%) pedestrians were killed in 38 fatal blunt abdominal trauma cases. Similar increased numbers of abdominal trauma among pedestrians have also been reported by Jha et al, Meera and Nabachandra, and Sharma et al (Table 18). The next common category was two wheeler occupants which accounted for 10 (31%) cases. Car occupants were not involved in any case. The pedestrians in most of the instances were knocked down by vehicles leading to fatal abdominal injuries. Encroachment of pavements making people walk on roads, little segregation between vehicular and pedestrian traffic, lack of awareness among pedestrian of road rules and lack of pedestrian crossings are some of the reasons for increased involvement of pedestrians. Poor maintenance of roads and lack of observance of traffic rules by vehicular traffic are some other reasons.

In the present study majority of cases were dead on arrival. Similar findings have also been reported by Meera.
and Nabachandra and Sharma et al. This emphasizes the fact that most of our vital organs are present in the chest and abdominal cavity and further the abdominal cavity lacks any protective bony cover. So trauma quickly leads to injuries to the vital organs and major blood vessels present in the thoracic and abdominal cavities. Inadequate infrastructure for early transport of victims and lack of proper management of trauma patients on the way to hospital because of traffic congestion on the highway leads to early deaths. These victims need on-spot emergency, medical care and rapid transportation from the incident site to the hospital which is lacking in this part of the world.9,10

**Conclusion**

Analysis involves 38 autopsies with evidence of fatal abdominal trauma during the period October 2014 to July 2016. The most common age group involved was between 21-30 years of age comprising 26% of total 38 cases followed by the age group of 11-20 years comprising 21% of total cases. The most vulnerable age group involved among males was between 21-30 years of age followed by the age group of 11-20 years. The most vulnerable age group involved among females was between 21-30 and 31-40 years of age. The most common cause of blunt fatal abdominal trauma was vehicular accident seen in 84% of cases. In 38 cases, it was found that 24 cases (63%) were dead on arrival i.e., died at the scene/spot or were brought dead to the casualty.

Amongst 32 vehicular accidents, a total of 21 pedestrians (66%) were killed in 38 fatal blunt abdominal trauma cases. Liver was the organ mainly affected in fatal blunt abdominal trauma followed by pelvic trauma and kidney. In all the cases studied manner of death was accidental. Haemorrhage accounted for the largest number of cases (94.74%).

**Ethical Clearance**: Ethical Clearance was taken from Institutional Ethics Committee of A.J. institute of Medical Sciences & Research Centre, Mangalore for the conduct of the study.

**Source of Funding**: Self.

**Conflict of Interest**: Nil.

**References**

Antimicrobial and Biofilm Inhibitory Activity of Nanoparticles Against Clinical Isolates from Urinary Tract Infection

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Abstract

At these days nanoparticles (NPs) are used as antibacterial due to its have chemical-physical addition to biological effect. A big group of microbial cells adhering to a surface are called biofilm. Exposure to nanoparticles such as (Ag, Al$_2$O$_3$, Ni) may prevent colonization of new bacteria onto the biofilm. In the present research we have analyze whether the biofilm formation of some isolates of pathogenic bacteria could be influenced by NPs. Also we examined the susceptibility of the isolates to some antibiotics in combination with Ag, Al$_2$O$_3$ and Ni nanoparticles. (50) Strains of isolated K. pneumonia have been examine from patients with urinary tract infection were collected from Education of Baghdad hospitals in Iraq. Serial dilution of Tube method to determination of MIC and MBEC for Nanoparticles against isolates was done. Biofilm formation was evaluated by micro titer plates. Additionally, disc diffusion method was used to assay the various antibiotics and combinations for bactericidal activity against the isolates. The results showed that about 97% of the strains were capable to form of structure biofilms. More than 82% about of strains showed resistance to commonly used antibiotics. Antibiotics and antimicrobials from mixed nanoparticles were higher than compared to nanoparticles alone. Therefore, a synergistic effect was observed between silver - Nickel nanoparticles and silver - aluminum oxide nanoparticles in to inhibiting the growth of K. pneumonia strains. Furthermore, cytotoxicity activity of Ag NPs against Neuro-2a cells was higher than Al$_2$O$_3$ NPs. The results suggest that nanoparticles can be used as antimicrobial agents for therapeutic to treat urinary tract infections caused by K. pneumoniae.

Keywords: Antimicrobial activity, anti-biofilm, K. pneumoniae, Urinary Tract Infection, Nanoparticles.

Introduction

Urinary tract infections are one of the most common infectious diseases, mainly caused by gram negative bacteria it is estimated that klebsella species account for about 8% from all infectious diseases in the USA and Europe (1). Klebsella infection is mainly caused by K. pneumonia bacteria the most common infection of the urinary tract infection. K. Pneumonia is an opportunistic pathogen, rod form, negative gram and a member of the intestinal family (2), which is widely found in the intestines, mouth, and skin it can lead to pneumoniae, blood, surgical infections and urinary tract infections (3). The most important agents of pneumonia strains can be polysaccharide adhesives sideophore, lipid polysaccharides and the formation of biofilms (4). Biofilm is one of the key factors for the development of chronic diseases. Studies have shown that most K. pneumonia isolates from blood, wound and urine are able to produce biofilms. Bio membranes formed in vivo protect pathogens against antibiotic and host immune responses (5, 6).

Recent developments in nanotechnology, especially the ability to manufacture nanoparticles in different shapes and sizes, have caused a wide range of antimicrobial agents. The small size (<100 nm) and the ratio of the surface to the large size of the nanoparticles led to the unique chemical, thermal, mechanical and electrical properties of their massive materials and increased biological and chemical activity(7). To date,
many nanoparticles have been actively synthesized against antimicrobial agents, such as Ag, Ni, ZnO, Au, and Cu nanoparticles. Nanoparticles kill bacterial cells through various mechanisms, including cell wall binding and cell penetration, the release of metal ions, interaction with their groups in enzymes and proteins, the accumulation of nanoparticles in the cytoplasm, and the production of ROS(8).

Most bacteria are present in the form of biofilm, which often contains diverse types that interact with each other and their environment. Bio-membranes specifically microbial aggregates and extracellular products such as extracellular polymeric materials. (9). The bacteria growth inversely on the out surface but the expression of extracellular polymers the attachment irreversible. Once bacteria are stable bacterial whip is discouraged and the bacteria multiply rapidly, leading to the development of mature biofilm. From this step the bacteria are restrict together and form a barrier that can tolerate antibiotics and supply a source of chronic systemic infection. (10). The aim of this study was to investigate the potential antibacterial and antibiofilm activities of nanoparticles against K. pneumonia associated with urinary tract infection.

**Materials and Method**

Collection bacterial strains

50 strains of (K. pneumonia) were collected from urine sample of patients in Baghdad / Iraq hospitals. They were grown in nutrient broth, and nutrient agar. To isolate urinary tract strains loop full of urine samples was placed in nutrient agar blood agar and agar chocolate plates and incubated at 37 ° C for one day. Individual colonies were selected the following day and were determined based on morphological characteristics, gram staining and biochemical characters (11).

Biofilm formation assay

Measurement of biofilm formation among the (K. pneumoniae) strains was carried out by using the tube method and tissue culture plate assay. In this tissue culture method, 100 µl (0.5 McFarland) of an overnight culture of strains was inoculated into each well of a 96-well polystyrene plate, and incubated at 37 ° C for 48 days. After incubation period, the bacteria were stained with 150 µl of crystal violet (0.1 %) for 10 min. Finally, 100 µl of acetic acid (33 % v/v) was added to each of the wells and the optical density was measured at 545 nm.

Antibiofilm activity assay of nanoparticles

Antibiofilm activity of nanoparticles (Ag, Al₂O₃ and Ni) alone and in mix with each other, against biofilm producing strains was performed by micro titer plate method. Briefly, 100 µl of bacterial suspension (0.5 McFarland) was inoculated into 96 plate wells, with different concentrations of Ag (0.031 – 2 mg ml⁻¹), Al₂O₃ (0.031 – 1 mg ml⁻¹) and Ni (0.031 – 4 mg ml⁻¹) nanoparticles and incubated at 37 °C for 48h. And read on absorbance at 545 nm (12).

**Cytotoxicity test:**

Both Neuro 2a cells were cultured using DMEM containing 10% fetal bovine serum (fbs) and 1% antibiotics (100 mg/ml streptomycin and 100 U/ml penicillin) and were maintained at 37 °C in a humidified atmosphere with 5% CO₂ They were subculture every 2 days when they reached 90% confluence by digestion with trypsin/EDTA.

**MTT assay**

The MTT assay was performed on Neuro 2a cells. The eight concentrations of Ag NPs (0.78 – 100 µg ml⁻¹) and Al₂O₃ NPs (1.95 – 500 µg ml⁻¹) were prepared in water by two-fold serial dilution method. 50 µl of various concentrations of Ag and Al₂O₃ NPs were added to wells containing cells, separately. Untreated cells were taken as the control. Over time, 20 µl of MTT solution at a concentration of 5 mg ml⁻¹ were added to each well, and the plate was incubated for 4 hours. Afterward, the medium containing MTT was removed and 200 µl of DMSO solution was added to each well to dissolve the formazan crystals formed in living cells. Finally, after 15 min of incubation, the optical absorption of each well was read by ELISA reader at a wavelength of 570 nm. All tests were performed in triplicate and the results were reported as cell viability referred to control (Eq. 1).

**Statistical analysis**

All the experimental, data were expressed as means (means ± SD). The antimicrobial activity data were analyzed using the one-way ANOVA with IBM SPSS version 20.1.
Results

Out of 50 (K. pneumonia) isolate collected from the Urinary tract infection patients, were obtained. Initial identification of bacterial strains using biochemical tests, showed that 100% of the strains were negative for catalase, oxidase, and endol and positive for VP. 95% of cases were positive for urea’s and citrate and 90% were positive for H2S. As showed in Fig 1

Antibiotic susceptibility testing

The Antibiotic susceptibility testing cards used to determine antibiotic susceptibility and ESBLs producing strains. Based on the antibiotic resistance profile, 9 (17.6 %) from strains were sensitive (S) and 42 (82.3 %) from strains were resistant (R). The highest and lowest resistance among K. pneumoniae strains was observed for ampicillin (AMP) (100 %) and tigecycline (TGC) (0 %), respectively. The piperacillin/tazobactam (TMP-SMX), cefazolin (CFZ), cefoxin (FOX), ceftazidime (CAZ), ceftriaxone (CTR), cefepime (FEP), imipenem (IPM) and amikacin (AMK) antibiotics with 82 % resistance among the strains were ranked second. It was also found that none of the bacterial strains produces ESBLs. Yang and colleagues reported that among 137 K. pneumoniae strains isolated urine, more than 85 % of ESBLs-producing bacteria have the ability to produce biofilm, whereas our results showed that none of the strains were ESBLs producers.

The result in the Table 1. Observe the minimum biofilm eliminating concentration (MBEC) of the mixed nanoparticles also found that Ag - Al2O3 NPs has the highest inhibitory effect on biofilm formation of K. pneumoniae strains. Treatment of K. pneumoniae strains with 0.5 mg ml⁻¹ of Ag - Al2O3 NPs completely prevented the formation of biofilm in K-13 and K-36 strains. The checkerboard assay was used to evaluate the synergistic effects of mixed nanoparticles. Statistical analysis revealed that there was no significant difference in MBEC of nanoparticles against K. pneumoniae strains in the concentration range of 0.031 – 1 mg ml⁻¹ (p > 0.05).

<table>
<thead>
<tr>
<th>Organisim</th>
<th>Nanoparticles/(mg ml⁻¹) alone</th>
<th>Nanoparticles/(mg ml⁻¹) mixed</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Al2O3</td>
<td>Ni</td>
</tr>
<tr>
<td>K. pneumoniae K-13</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>K. pneumoniae K-33</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>K. pneumoniae K-36</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

The minimum inhibitory concentration (MIC) against bacterial strains were performed using broth microdilution assay. As you can see in the Table 2, the results of the statistical analysis shows that there is a significant difference between the GI % of Ag and Ni NPs, as well as Al2O3 and Ni NPs in the concentration range of 0.125 – 1 mg ml⁻¹ in K. pneumoniae strains. Significant (p > 0.05). The interaction between Ag – Ni and Ag – Al2O3 NPs was synergistic against all the K. pneumoniae strains. While an indifference effect was observed for Al2O3 - Ni NPs in K. pneumoniae strains.

The MTT assay was used to assess the cytotoxicity of NPs. The percentage of cell viability in the presence of Ag and Al2O3 NPs are shown in Fig. 2a, b, respectively. As it can be seen the cell survival is reduced, by increasing the concentration of (NP) nanoparticles in a concentration-dependent manner after 24 h. Ag NPs showed higher cytotoxicity toward Neuro-2a cells as compared to Al2O3 NPs, so that at a concentrations of 100 µg ml⁻¹ of Ag NPs and 500 µg ml⁻¹ of Al2O3 NPs decreased the Neuro-2a cells survival by 61 % and 36.7 %, respectively.

Table 1. The MBC values of the nanoparticles (alone and mixed) against biofilm forming strains
Table 2. The MIC values of the nanoparticles (alone and mixed) against *K. pneumoniae* strains

<table>
<thead>
<tr>
<th>Organism</th>
<th>Ag</th>
<th>Al2O3</th>
<th>Ni</th>
<th>Ni–Ag</th>
<th>Al2O3–Ag</th>
<th>Al2O3–Ni</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>K. pneumoniae</em> K-13</td>
<td>4</td>
<td>2</td>
<td>8</td>
<td>0.060</td>
<td>0.25</td>
<td>2</td>
</tr>
<tr>
<td><em>K. pneumoniae</em> K-33</td>
<td>4</td>
<td>2</td>
<td>8</td>
<td>0.060</td>
<td>0.25</td>
<td>2</td>
</tr>
<tr>
<td><em>K. pneumoniae</em> K-36</td>
<td>4</td>
<td>2</td>
<td>8</td>
<td>0.060</td>
<td>0.125</td>
<td>2</td>
</tr>
</tbody>
</table>

Fig. 2. Percentage of cell viability of Neuro-2a cells in presence of different concentrations of Ag NPs (a) and Al2O3 NPs (b)
This study was carried out on 50 *K. pneumonia* isolates was identification of bacterial strains by biochemical tests revealed that all strains it’s belong to *K. pneumonia* consistent. This is in accordance with results developed by (13). The results of biochemical tests showed that *K. pneumonia* strain is gram negative, rod-shaped, non-motile, negative gelatinase and indole, and positive catalase and urease. The strains are positive for the fermentation test of all carbohydrates Voges-Proskauer (14).

From Figure 1, it can be observed. antibiotic susceptibility cards was found a similar study by (15) reported that among 137 *K.pneumoniae* strains isolated from sputum and urine, more than 85 % of ESBLs-producing bacteria have the ability to produce biofilm, whereas our results showed that none of the strains were ESBLs producers.

Similar findings were observed the MIC and MBEC in the study conducted by (16). They evaluated the antibiofilm activity of silver nanoparticles against microorganisms using of Congo-red and tube methods, it was determined that biofilm formation in *C.neoformans* and *K.pneumoniae* bacteria was completely inhibited by tube method. Other study investigated the effects of AgNPs in different concentrations on *K.pneumoniae* biofilm; the findings demonstrated that biofilm growth was completely inhibited in 40 and 80 µg ml-1 of nanoparticles (17). The MIC results showed that the addition of thallium ions into ZnO significantly increased the bacteriostatic activity of ZnO nanoparticles against *E. coli*, *S. aureus* and *B. subtilis* strains by (18).

Many studies have also been conducted to evaluate the cytotoxic activity of Al₂O₃ NPs, but unlike other NPs, Al₂O₃ NPs have less effect for human cell lines. In one of these studies, the cytotoxicity effects of Al₂O₃ NPs on L926 and BJ cells were investigated and it was found that NPs had no significant cytotoxicity in the concentration range of 10 to 200 µg ml⁻¹, and at a concentration of 400 µg ml⁻¹, about 10% of the cell survival was reduced (19). Zhang et al. evaluated the impact of various NPs (ZnO, TiO₂, SiO₂ and Al₂O₃) on HFL1 cells. The findings showed that Al₂O₃ NPs had the least effect on cellular survival, and a reduction of about 10% of cell viability at a concentration of 250 µg ml⁻¹ was observed (20).

**Conclusions**

In this study we have investigated the antimicrobial activity of different nanoparticles against urinary tract infections caused by *K. pneumonia*. The nanoparticles could be used as an effective anti-microorganism agent for the treatment of urinary tract infections caused by *K. pneumonia*. However, Ag-Ni NPs revealed more efficacy than other mixed NPs. On the other hand, Ag NPs indicated higher cytotoxicity against Neuro-2a cells as compared to Al₂O₃ NPs. It seems that the mentioned NPs can be a good candidate for the treatment of bacterial infections and the removal of antibiotic-resistant strains.

**Acknowledgement:** We are thankful to the following clinical analysis laboratories of health and medical technique in Department of medical laboratory technique at University of Medill Technical their support to conduct this research project.

**Ethical Clearance:** No need

**Source of Funding:** None

**Conflict of Interest:** The authors have declared no conflict of interest

**References**


Ulnar length – A Tool for Stature Estimation

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Abstract

Stature is a important factor in identification of an unidentified dead body or any mutilated part of such body. In present study we made an attempt to estimate the stature from percutaneous length of ulna. Study consists of 94 adult males and 96 adult females between the age group of 18- 24 years, born and brought up in Maharashtra. The length of the of the right and left ulna was measured with a venier calliper from the apex of the olecranon to the styloid process and the height of the individual was measured with a calibrated standing meter rule. The measurements were noted in the proforma. The data was statistically analyzed and linear regression formulae were derived.

Key Words: Ulnar length, Stature, Linear regression.

Introduction

Stature is a important factor in identification of an unidentified dead body or any mutilated part of such body.¹ Anthropometry has an extensive application in forensic sciences, and it is receiving augmented use especially in the discipline of Forensic Medicine and Anatomy. Anthropometric data are believed to be objective.²

When intact bodies are to be examined, stature estimation does not pose any problem. However, in cases of dismembered human body parts, mutilated and decomposed bodies there is a greater challenge for the forensic experts. Several factors are taken into consideration for establishing the identity in these cases. Stature is considered as one of the important parameters for personal identification and stature reconstruction plays a vital role in identification of individuals.³ Assessment of height from different parts of body by anthropometry of skeleton is always an area of interest to anatomist, anthropologists and forensic experts.⁴

In calculating stature from bones, regression formulae based on long-bone measurements is the easiest and trustworthy method that yields the most accurate results. The ulna is a long bone that is often used for body height estimation. Once the ossification of all bones is complete, there is no further growth of a person. Ossification of upper limb bones is usually complete within 19-22 years of age. Hence, the present study was conducted on persons belonging to age group of 19 -24 years with an effort to establish a correlation between length of ulna and body stature.²

The equations that were derived by Trotter and Gleser in the early 1950s for Americans were being continuously revised using data from different sources. In 1961, Allbrook attempted to develop standards for the estimation of stature from a British sample using ulnar length.⁵ The most detailed description of stature estimation from skeletal remains was compiled by Krogman and Iscan. Pearson estimated the stature from long bones by formulating the regression equations. He also found that these formulae are population specific and should not be applied to individuals of different population groups.⁶

Material and Method

The present study comprised of a total 190 Medical college students belonging to different regions of Maharashtra residing in and around Jalgaon. Their age ranged between 19 to 24 years. After obtaining informed consent from the study participants we recorded the data in our proforma. Students with
significant systemic diseases, history of old fractures, orthopaedic malformation, developmental disorders, metabolic disorders which could have affected the bony growth were excluded from study. The measurements were taken at a fixed time of a day to eliminate diurnal discrepancy. Ulna is mostly subcutaneous throughout its length and easily approachable for measurement.

The length of the of the right and left ulna was measured with a standard venier calliper from the apex of the olecranon to the styloid process with the elbow in full flexion and the height of the individual was measured from crown to heel with head oriented in Frankfurt’s plane with a calibrated standing meter rule.

The measurements were tabulated in the proforma and the data was analyzed using SPSS version 24 statistical package. The linear regression formulae were also derived to determine the stature separately for males and females.

### Observation & Results

**Table 1: Mean, SD and Range for all the parameters (Males)**

<table>
<thead>
<tr>
<th>Parameter(cm)</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>175.58</td>
<td>5.17</td>
<td>169-185</td>
</tr>
<tr>
<td>Length of Ulna(right)</td>
<td>28.54</td>
<td>0.93</td>
<td>27.20-30.50</td>
</tr>
<tr>
<td>Length of Ulna(left)</td>
<td>28.82</td>
<td>0.91</td>
<td>27.60-30.80</td>
</tr>
</tbody>
</table>

Mean height was 175.58±5.17 cm, mean length of right ulna was 28.54±0.93 and mean length of left ulna was 28.82±0.91 in males.

**Table 2: Mean, SD and Range for all the parameters (Females)**

<table>
<thead>
<tr>
<th>Parameter(cm)</th>
<th>Mean</th>
<th>SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>158.94</td>
<td>4.35</td>
<td>148-167</td>
</tr>
<tr>
<td>Length of Ulna(right)</td>
<td>25.81</td>
<td>1.07</td>
<td>23.80-27.30</td>
</tr>
<tr>
<td>Length of Ulna(left)</td>
<td>25.58</td>
<td>1.09</td>
<td>23.50-27.10</td>
</tr>
</tbody>
</table>

Mean height was 158.94±4.35cm, mean length of right ulna was 25.81±1.07 and mean length of left ulna was 25.58±1.09.

**Table 3: Comparison of length of right and left ulna**

<table>
<thead>
<tr>
<th>Gender</th>
<th>Length of ulna (Right)</th>
<th>Length of ulna (Left)</th>
<th>z-value</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>28.54±0.93</td>
<td>28.82±0.91</td>
<td>2.10</td>
<td>0.36, NS</td>
</tr>
<tr>
<td>Female</td>
<td>25.84±1.07</td>
<td>25.58±1.09</td>
<td>1.64</td>
<td>0.10,NS</td>
</tr>
</tbody>
</table>
Mean length of right ulna for males was 28.54±0.93 and for left ulna it was 28.82±0.91 cm and mean length of right ulna for females was 25.84±1.07 cm and for left ulna it was 25.47±1.09 cm. By using z-test for difference between two means, statistically insignificant difference was found in mean length of right and left ulna in males and females also.

Table 4: Pearson’s Correlation Coefficient

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Correlation Coefficient (r)</th>
<th>Coefficient of Determination (%)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.866</td>
<td>74</td>
<td>0.0001,S</td>
</tr>
<tr>
<td>Female</td>
<td>0.918</td>
<td>84</td>
<td>0.0001,S</td>
</tr>
</tbody>
</table>

Above table shows that the correlation of height with length of ulna is 0.866 in males and 0.918 in females, which are positive and statistically highly significant (p<0.01) i.e. if length of ulna increases, the height of the subject also increases and vice versa.

Table 5: Pearson’s Correlation Coefficient

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Correlation Coefficient (r)</th>
<th>Regression Equation</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.866</td>
<td>Y = 36.12 + 4.86 X</td>
<td>0.0001,S</td>
</tr>
<tr>
<td>Female</td>
<td>0.918</td>
<td>Y = 16.98 + 5.52 X</td>
<td>0.0001,S</td>
</tr>
</tbody>
</table>

Above table shows the linear regression equation for height with length of ulna in male and female where,

Y = Height/ Stature (cm) and X = Length of ulna (cm)

36.12 and 16.98 are intercept (constant) for male and female respectively.

4.86 and 5.52 are regression coefficient for male and female respectively.

Here it is observed that the regression formula within a region also varies between male and female population of that region.

Table 6: Pearson’s Correlation Coefficient

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Correlation Coefficient (r)</th>
<th>Regression Equation</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right Ulna</td>
<td>0.875</td>
<td>Y = 36.54 + 4.87 X</td>
<td>0.0001,S</td>
</tr>
<tr>
<td>Left Ulna</td>
<td>0.854</td>
<td>Y = 36.73 + 4.81 X</td>
<td>0.0001,S</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right Ulna</td>
<td>0.919</td>
<td>Y = 14.84 + 5.57 X</td>
<td>0.0001,S</td>
</tr>
<tr>
<td>Left Ulna</td>
<td>0.917</td>
<td>Y = 20.45 + 5.41 X</td>
<td>0.0001,S</td>
</tr>
</tbody>
</table>
Above table shows the linear regression equation for height with length of ulna in male and female where,

\[
Y = \frac{\text{Height}}{\text{Stature (cm)}}
\]

\[
X = \text{Length of ulna (cm)}
\]

36.54, 36.73 are intercept (constant) of right and left ulna of male.

14.84, 20.45 are intercept (constant) of right and left ulna of female.

4.87, 4.81 are regression coefficient for male,

5.57, 5.41 are regression coefficient for females.

**Discussion**

Anthropometry is considered as the simple, inexpensive, non-invasive method to assess body proportions. Stature estimation methods cannot be universally applied due to the influence of environment among population, modernisation and social economic development between nations and even among people of the same nation. \(^7\)

In our study, correlation coefficient (r) of height and length of right ulna is 0.875 and of left ulna is 0.854 in males; 0.919 (right ulna) and 0.917 (left ulna) in females. In the study by Amit Mehta et al, the correlation coefficient (r) was 0.754 (right ulna) and 0.745 (left ulna) in males; 0.691 (right ulna) and 0.701 (left ulna) in females. \(^8\) The value of r shows a positive correlation which is also very highly significant (P < 0.001). The Correlation coefficient between the total height and length of ulna was found to be positive indicating a strong relationship between the two parameters. The positive correlation suggests if length of ulna increases or decreases, the height of the subject also increases or decreases and vice versa. \(^6\) It must be noted that estimates are mean values with appropriate standard deviations, so estimated stature of unidentified remains may be inaccurate by several centimeters. \(^9\) The data of the study can be used for estimation of stature amongst specific ethnic group.

Various authors have shown a significant correlation between height and length of ulna. Allbrook derived regression formulae for estimation of stature from the length of ulna in British population as: Stature: 88.94 + 3.06 (ulnar length) ± 4.4 (Standard error). Athawala derived a regression formula for estimation of stature in Maharastrians of India; Stature = 56.9709 cm + 3.9613 X average length of right or left ulna (cm) ± 3.64 cm. In our study the linear regression equation for males is stature= 36.12+ 4.86 x length of ulna and for females, stature= 16.98 + 5.52 x length of ulna. \(^2\)

In study by Babu RS et al, mean value of right ulnar length is 27.84 cm and that of left ulnar length is 27.75 in males. \(^3\) According to Borhani-Haghighi M. et al, the mean length of the ulna was 29.17 cm in males and 26.47 cm in females. In our study, mean length of right ulna was 28.54±0.93 and mean length of left ulna was 28.82±0.91 for males. For females mean length of right ulna was 25.81±1.07 and mean length of left ulna was 25.58±1.09. Similar were the observations by Bamne et al and Ashish Pande. \(^5, 6, 10, 11\) In the study by Anjali Prasad et al, gender differences in mean height and length of ulna were found to be highly significant and mean ulna lengths of the male were significantly larger than that of the females of all ages. The mean value of length of right and left ulna is statistically insignificant in males and also in females correlating with our study. \(^12\)

**Ethical Clearance**- From Institutional ethical committee.

**Source of Funding**- None

**Conflict of Interest**- Nil.

**References**


Occlusal Morphology of Primary Molars in Anganwadi Children, Faridabad

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1Student, 2Senior Lecturer, 3Associate Professor, 4Lecturer, Department of Public Health Dentistry, Manav Rachna Dental College, 5Institute of Dental Sciences and Technology, Modi Nagar

Abstract

Introduction - Forensic odontology helps in identifying any suspect involved in crime, in accidental cases, in disaster victim identifications. Teeth show variation in its anatomy as it has a very strong hereditary component. Variations in occlusal morphology of teeth include differences in the number of cusps and the fissure pattern. So, it is important to know the occlusal morphology of teeth in Forensic odontology.

Materials and Method - A descriptive study was conducted to evaluate the cusp and groove pattern in primary second molar of 3-6 year old children from Anganwadis of Faridabad. Hellman and Gregory's criteria for groove pattern were used to know the buccal groove pattern and cusps of primary molar. Data were analyzed with SPSS statistics software 23.0 version.

Result - The predominant groove pattern was “Y” (73.34%). Majority of the participants has 5 cusps in primary second molar. 67.45% of the study participants had 5Y occlusal morphology of primary mandibular second molar and it is mostly seen in male children.

Conclusion - This occlusal configuration will further help in various genetic, anthropological and forensic investigations. Furthermore, knowing common variations in dental anatomy and morphology about each individual tooth can help in providing dental treatments such as restorative, endodontic and orthodontic treatments.

Keywords – Cusps, grooves, primary molar, forensics

Introduction

Forensic odontology mainly includes use of teeth and oral structures. It helps in identifying any suspect involved in crime or in accidental cases. Sometimes forensic dentistry is involved in disaster victim identifications such as flood, tsunamis and earthquake. As oral structures are hard structures of body and can remain safe even in adverse conditions so they can be easily used for forensics. These structures can withstand high temperature as well as they are not easily decomposed by bacteria. So they can be recovered in case of mass fatality when where the other means of identification such as fingerprints and facial features are destroyed.

Anatomical characteristics of teeth and jaws helps in providing important information related to different species. Teeth show variation in its anatomy as it has a very strong hereditary component which helps in recording and assessing various evolutionary changes in a population. Within a population, some people have specific structure, while others do not. Further, there is variation observed in anatomy of different oral structures like teeth according to gender and age.

So, data regarding variation and diversities within population can also be obtained using Forensic dentistry. Dental characteristics such as tooth morphology, number, position, size, colour, rotation, malalignment,
filings, oral pathologies, tooth wear, and other dental anomalies provide a special identity to an individual which helps in identification of an individual. Further, various genetic and environmental factors as well as some oral habits influence the tooth structure formation. Tooth structure formation is a slow progressive process and involves a lot of molecular and cellular interactions.

The cusps, ridges, and grooves that are present on crown surface vary in number and form of tooth roots within different species of primates. Variations in occlusal morphology of teeth also include differences in the number of cusps and the fissure pattern. These morphological differences play a major role in clinical practice also. Dental practitioners and specialists should know these differences, as it can affect various dental treatments. Gregory allocated a cusp number according to its position to make it easy for description of mandibular molars (cusp 1, mesiobuccal; cusp 2, mesiolingual; cusp 3, distobuccal; cusp 4, distolingual; cusp 5, distal; and cusp 6, distomedial). Mandibular first molars are usually five-cusped.

Groove pattern are the fundamental arrangement of grooves and cusps on occlusal surface of primary and permanent molars. It is observed that this trait (fissure pattern) is polygenic, and its expression of this trait is determined by combinations of alleles at two or more loci. A total of six occlusal groove patterns are observed in permanent mandibular molars: 4+, 4Y, 5+, 5Y, 6+, and 6Y, where 4, 5, and 6 represent the number of cusps present and “+” and “Y” represents the groove patterns. The basic pattern is the “5Y” type.

The primary second mandibular molar is smaller in size as compared to permanent first mandibular molar. They both resembles in shape. The objective of the present study was to assess the occlusal morphology of the primary mandibular second molar in North Indian population.

Information regarding variations in the dental anatomy and morphology of each tooth can help in some dental treatments, like restorative, endodontic, and orthodontic treatments. Till today, there are very few studies on the frequency and expression of different types of occlusal grooves and patterns of the primary mandibular molars in North Indian population. Hence, the present study was undertaken to assess the number of cusps and occlusal groove patterns in the primary mandibular second molar of Faridabad district, North India.

Material and Method

A descriptive study was conducted to evaluate the cusp and groove pattern in primary second molar of 3-6 year old children from eight Anganwadis of Faridabad, North India. Four Anganwadis were selected from East and four from West Faridabad through cluster random sampling. A total of 484 children were examined for checking grooves and cusps pattern. Ethical approval to conduct the study was taken from institutional ethical committee. Permission from concerned authorities of Anganwadis and consents from parents was obtained to conduct the study after explaining the purpose of the study. Demographic details like age, gender were recorded. Intra Oral examination was done for number of cusps and grooves using moth mirror under natural light. Hellman and Gregory’s criteria for groove pattern were used. Inter examiner reliability was found to be 0.82. Y pattern was considered if the contact of metaconid with the hypoconid occurs. If there was no contact of the metaconid with the hypoconid then + pattern was considered.

Data were analyzed with IBM. SPSS statistics software 23.0 version (SPSS 23.0, IBM, Armonk, NY, United States of America). Children with fully erupted primary second molar, cooperative patients and molars showing clear occlusal outline with all cups and groove pattern were included in the present study. Broken teeth, filled teeth, decayed teeth, teeth with developmental defects of the structure and shape were excluded.

Result

The present study was conducted among 484 Anganwadi children. Among these study participants, 320 were males and 164 are females. In this population, five cusp pattern was most frequently observed. The predominant groove pattern was “Y” (73.34%). Table 1 shows distribution of cusp and groove pattern. Table 2 shows distribution of cusp and groove pattern according to gender are depicted in Table 2 and 3 respectively.
Table 1. Distribution of cusps and groove pattern of primary mandibular second molar

<table>
<thead>
<tr>
<th>Tooth</th>
<th>Left Molar</th>
<th>Right molar</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 cusps</td>
<td>30 (6.19%)</td>
<td>30 (6.19%)</td>
<td>60 (6.19%)</td>
</tr>
<tr>
<td>5 cusps</td>
<td>424 (87.6%)</td>
<td>424 (87.6%)</td>
<td>848 (87.6%)</td>
</tr>
<tr>
<td>6 cusps</td>
<td>30 (6.19%)</td>
<td>30 (6.19%)</td>
<td>60 (6.19%)</td>
</tr>
<tr>
<td>+ pattern groove</td>
<td>132 (27.2%)</td>
<td>126 (26.03%)</td>
<td>258 (26.65%)</td>
</tr>
<tr>
<td>Y pattern groove</td>
<td>352 (72.72%)</td>
<td>358 (73.9%)</td>
<td>710 (73.34%)</td>
</tr>
</tbody>
</table>

Table 2. Occlusal morphology of primary mandibular second molar

<table>
<thead>
<tr>
<th>Tooth</th>
<th>Left Molar</th>
<th>Right molar</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>4+</td>
<td>8 (1.65%)</td>
<td>12 (2.47%)</td>
<td>20 (2.06%)</td>
</tr>
<tr>
<td>4Y</td>
<td>10 (2.06%)</td>
<td>14 (2.89%)</td>
<td>24 (2.47%)</td>
</tr>
<tr>
<td>5+</td>
<td>130 (26.85%)</td>
<td>117 (24.17%)</td>
<td>247 (25.51%)</td>
</tr>
<tr>
<td>5Y</td>
<td>327 (67.56%)</td>
<td>326 (67.35%)</td>
<td>653 (67.45%)</td>
</tr>
<tr>
<td>6+</td>
<td>5 (1.03%)</td>
<td>9 (1.85)</td>
<td>14 (1.44%)</td>
</tr>
<tr>
<td>6Y</td>
<td>4 (0.82%)</td>
<td>6 (1.23%)</td>
<td>10 (1.03%)</td>
</tr>
</tbody>
</table>

Table 3. Cusp numbers and groove pattern in primary mandibular second molar with gender

<table>
<thead>
<tr>
<th></th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>+</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
<td>M</td>
<td>F</td>
<td>M</td>
</tr>
<tr>
<td>L</td>
<td>18 (60%)</td>
<td>12 (40%)</td>
<td>301 (70.9%)</td>
<td>123 (29.10%)</td>
<td>13 (44.3%)</td>
</tr>
<tr>
<td>R</td>
<td>18 (60%)</td>
<td>12 (40%)</td>
<td>301 (70.9%)</td>
<td>123 (29.10%)</td>
<td>13 (44.3%)</td>
</tr>
</tbody>
</table>

*M – Male, F- Female, L- Left side molar, R – Right side molar

Discussion

It is very important to study oral anatomical characteristics like teeth as they are very valuable in forensic odontology and other anthropological studies. Forensic odontology provides information related to hereditary relationship and differences in characteristics within a population. There is inherent variability observed in human dentition, so it is very easy for a forensic odontologist to make dental identification. Further, if good evidence is there then identification can be done with high level of accuracy. Generally antemortem dental records include radiographs; dental charts, both intra- and/or extra-oral photographs, dental casts, and notes.

Occlusal anatomy of primary molars has been recognized as important feature in dental anatomy and clinical dentistry. There is basic arrangement of cusps and grooves on occlusal surface of primary second molar.
Expression of groove trait is determined by combinations of alleles at two or more loci. So, a dental trait in humans can be a valuable diagnostic tool in anthropological studies for differentiating and characterizing various ethnic groups. In past, various studies have been done to relate the prevalence of dental anatomy with different factors. Variations in the size, number of cusps, and groove pattern, have been observed in the mandibular molars of different populations.

The morphological features of the occlusal surfaces of the mandibular molars have been described by Gregory and Hellman. The present study aimed to determine the prevalence of different occlusal morphologies (number of cusps and occlusal groove patterns) of the permanent mandibular second molar in Faridabad district, North India.

In the present study, 5 cusps (87.6%) was the most commonly observed cusp type in primary second molar. 4 and 6 cusps types (6.19%) were seen equally among the study population. In contrast to the present study, study done by Phullari et al had seen that the 4 cusp form (88.4%) was the most frequent in second permanent molars. Similarly, in study done by Shetty el al and Dholia et al also, it has been observed that the 4 cusp form was the most frequent occlusal configuration in 86% and 93.5% of the study population respectively. The reason for this could be that majority of the study participants in the present study were males (66.1%) and it has been seen that variation in anatomical structure occur according to gender.

The most commonly observed groove pattern in the present study population was Y (73.34%). In contrast to the present study, in the study done by Shetty et al, the predominant occlusal groove pattern seen in mandibular second molar was a “+” shape (85%) followed by “y” pattern (11%) similarly, in the study done by Phullari et al and Dholia et al it was observed that the predominant groove pattern was “+” in 90.1% and 93.5% of study participants respectively. Again, the reason for this could be gender variation in these studies.

The most prevalent occlusal configuration of primary second molars in the present study participants was 5Y pattern. This configuration is important in forensic odontology and only 15% dental practitioners have formal training in collecting, evaluating, and presenting dental evidence. So, there is an increased need for dental surgeons to have a good knowledge about forensic odontology as it is useful in identification of an individual and also discover abuse among all ages.

**Conclusion**

The present study has been done in children of Anganwadi, Faridabad; it was observed that the most common occlusal configuration was 5Y. This occlusal configuration will further help in various genetic, anthropological and forensic investigations. Furthermore, knowing common variations in dental anatomy and morphology about each individual tooth can help in providing dental treatments such as restorative, endodontic and orthodontic treatments. Hence, studying the occlusal morphology of second molar will be helpful in forensic as well as clinical practice.

**References**

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Health Status of Children in Assam

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Abstract

Children are the most valuable asset of a nation; their good health is the cornerstone for survival and development for current and succeeding generations which guarantee the sound and sustained economic development. Child health is a state of social, emotional, intellectual, mental and physical well-being which does not merely represent the absence of disease or infirmity. The term nutrition refers to a process of attaining necessary food for proper health and growth of human being. The nutritional status of children impacts their health, cognition and educational achievements. But underweight and malnutrition are most prominent health indicators in India and also in Assam (According to NFHS-3 & NFHS-4). Assam is situated in the North-East of India, bearing a considerable percentage of its population under the poverty line. Assam does not have shown much improvement in its health and nutrition indicators. Almost 36.4 percent children under age 5 are stunted and Infant Mortality Rate as high as 48 (NFHS-4). The health status of children in rural areas of Assam is very pathetic. 55 percent children are stunting in rural areas. Various reports states that though Assam has made progress in its health indicators, still there is a great need to strengthen its existing health care services especially in the rural areas. The present study has made an attempt to study the health status of children in Assam. This study may be able to provide a base line information and need for effective implementation of various schemes and programmes for the improvement of health status of children in future.

Keywords: Assam, Child, Economic Development, Health Care, Health Indicators, Nutrition.

Introduction

Childhood is a significant phase of life and deprivation during this period can have long term adverse impact on the well being of children. Child health is a state of social, emotional, intellectual, mental and physical well-being which does not merely represent the absence of disease or infirmity. The term nutrition refers to a process of attaining necessary food for proper health and growth of human being. According to World Health Organization (WHO), “Malnutrition means the cellular imbalance between, supply of nutrients and energy and the body’s demand for them to ensure growth, maintenance and specific functions.”

Healthy children have the fullest potentialities to attain proper weight in relation to height and resistance to diseases. Thus, it may increase life expectancy and help human beings to enjoy life fully, may also increase work capacity that results in increased productivity of nation and it enhances economic growth and development. Assam is situated in the North-East of India, bearing a considerable percentage of its population under the poverty line. Assam does not have shown much improvement in its health and nutrition indicators. Almost 36.4 percent children under age 5 are stunted and Infant Mortality Rate as high as 48 (NFHS). Various research article and study has reported that children in the developing country are most vulnerable as 50 percent of all deaths were occurring during the first 5 years of life. Despite inclusive efforts for improving malnutrition like ICDS programme, malnutrition among children remains a significant problem in India as well as in Assam.

The most common method used to assess the health status of children is given by World Health Organization (WHO). WHO growth standard can be used to assess
whether children are growing and developing. It can also be used to observe whether efforts to reduce child mortality and disease are effective. According to WHO, growth standard are:-

- If < -1 to > -2 Z-score implies Mild Malnutrition
- If < -2 to > -3 Z-score implies Moderate Malnutrition and
- If < -3 Z-score implies Severe Malnutrition

On the basis of the above growth standard, three common anthropometric indicators are used to measure the nutritional status are -

1. **Height-for-age (HAZ)**. HAZ is used to denote “stunting” - or low height for age, which is an indicator of chronic form of under-nutrition. It is caused by long-term insufficient nutrition intake and frequent infections.

2. **Weight-for-height (WHZ)**. WAZ or low weight corresponding to height stands for “wasting” or more acute or current form of under nutrition. It is a strong predictor of mortality among children under five. It is usually the result of acute significant food shortage or disease.

3. **Weight-for-age (WAZ)**. The WHZ, low weight for age, is an indicator of chronic form of under-nutrition, denoting “under-weight.”

**Objective:**

1. To study the health status of children in Assam.

**Methodology**

The present study is based on the secondary data that are collected from different government reports and organizations. The sources of secondary data are:-

i. The Department of Social Welfare, Government of Assam;

ii. National Family Health Survey -3 (NFHS-3)

iii. National Family Health Survey - 4 (NFHS-4)

iv. Census reports, Govt. of India.

v. Health and family welfare reports.

vi. Statistical Handbook of Govt. of Assam.

vii. Nutrition Policy reports of Govt. of India, etc.

**Results and Discussions**

Assam happens to be one of the worst performers in reducing child’s nutritional status. A scrutiny of the nutritional status of the children, the adults of tomorrow, is important to assess the wellbeing and health. Detailed studies were prepared by NFHS-3 and NFHS-4 and the main findings shows that stunted rate is 46.5 percent, wasted rate is 13.7 percent, severely wasted rate is 4.0 percent and underweight rate is 36.4 percent. However, according to NFHS-4, stunted rate has reduced to 36.4 percent and underweight rate also reduced to 29.8 percent. On the other hand, wasted rate and severely wasted rate has increased to 17.0 percent and 6.2 percent respectively. Again in Assam, the infant mortality rate and under 5 mortality rates is 48 and 56 respectively which is 66 and 84.

The following table shows the percentage of malnourished children in Assam –

<table>
<thead>
<tr>
<th>Table-1: Child Malnutrition Status in Assam</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ASSAM</strong></td>
</tr>
<tr>
<td><strong>INDICATORS</strong></td>
</tr>
<tr>
<td>Stunted</td>
</tr>
<tr>
<td>Wasted</td>
</tr>
<tr>
<td>Severely Wasted</td>
</tr>
<tr>
<td>Under-weight</td>
</tr>
<tr>
<td>Infant Mortality Rate</td>
</tr>
<tr>
<td>Under Five Mortality Rate</td>
</tr>
</tbody>
</table>

Source: NFHS - 3 & NFHS - 4
In Assam, the percentage of stunted children has decreased from 46.5 percent to 36.4 percent whereas wasted and severely wasted children are increased from 13.5 percent to 17 percent and 4 percent to 6.2 percent respectively. But the percentage of underweight children has reduced from 36.4 percent to 29.8 percent.

The district wise nutritional status of children in Assam is shown in table 1.2. It can be seen from table 1.2 that Dhubri district has the highest number of “stunting” children with 47.4 per cent. Goalpara district has the highest number of “under-weight” children with 39.5 per cent. Cachar district on the other hand, has the highest number of “wasting” children with 30.6 per cent.

Table 2: Child Nutritional Status in Various Districts of Assam (In percentage)

<table>
<thead>
<tr>
<th>DISTRICT</th>
<th>STUNTED</th>
<th>WASTED</th>
<th>SEVERELY WASTED</th>
<th>UNDER WEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>KOKRAJHAR</td>
<td>30.6</td>
<td>15.7</td>
<td>6.1</td>
<td>27.1</td>
</tr>
<tr>
<td>DHUBRI</td>
<td>47.4</td>
<td>22.2</td>
<td>9.5</td>
<td>39.0</td>
</tr>
<tr>
<td>GOALPARA</td>
<td>42.7</td>
<td>22.1</td>
<td>8.9</td>
<td>39.5</td>
</tr>
<tr>
<td>BARPETA</td>
<td>41.7</td>
<td>16.6</td>
<td>5.8</td>
<td>33.1</td>
</tr>
<tr>
<td>MARIGAON</td>
<td>38.4</td>
<td>10.3</td>
<td>0.9</td>
<td>25.8</td>
</tr>
<tr>
<td>NAGAON</td>
<td>38.4</td>
<td>13.3</td>
<td>4.4</td>
<td>31.3</td>
</tr>
<tr>
<td>SONITPUR</td>
<td>28.7</td>
<td>21.5</td>
<td>10.9</td>
<td>26.9</td>
</tr>
<tr>
<td>LAKHIMPUR</td>
<td>29.3</td>
<td>11.2</td>
<td>4.4</td>
<td>24.2</td>
</tr>
<tr>
<td>DHEMAJI</td>
<td>35.5</td>
<td>6.2</td>
<td>0.8</td>
<td>15.8</td>
</tr>
<tr>
<td>TINSUKIA</td>
<td>36.0</td>
<td>14.8</td>
<td>2.2</td>
<td>32.7</td>
</tr>
<tr>
<td>DIBRUGARH</td>
<td>33.3</td>
<td>22.4</td>
<td>8.2</td>
<td>33.0</td>
</tr>
<tr>
<td>SIVSAGAR</td>
<td>35.5</td>
<td>8.3</td>
<td>1.5</td>
<td>22.2</td>
</tr>
<tr>
<td>JORHAT</td>
<td>25.5</td>
<td>14.8</td>
<td>5.4</td>
<td>18.1</td>
</tr>
<tr>
<td>GOLAGHAT</td>
<td>32.6</td>
<td>13.9</td>
<td>6.5</td>
<td>20.2</td>
</tr>
<tr>
<td>KARBI ANGLONG</td>
<td>28.1</td>
<td>18.7</td>
<td>11.0</td>
<td>23.7</td>
</tr>
<tr>
<td>DIMA HASAO</td>
<td>34.7</td>
<td>6.3</td>
<td>1.3</td>
<td>18.2</td>
</tr>
<tr>
<td>CACHAR</td>
<td>36.3</td>
<td>30.6</td>
<td>11.3</td>
<td>36.3</td>
</tr>
<tr>
<td>KARIMGANJ</td>
<td>42.3</td>
<td>17.6</td>
<td>6.1</td>
<td>35.6</td>
</tr>
<tr>
<td>HAILAKANDI</td>
<td>38.1</td>
<td>19.1</td>
<td>6.3</td>
<td>32.5</td>
</tr>
<tr>
<td>BONGAIGAON</td>
<td>39.1</td>
<td>23.6</td>
<td>12.7</td>
<td>32.9</td>
</tr>
<tr>
<td>CHIRANG</td>
<td>40.1</td>
<td>13.0</td>
<td>4.4</td>
<td>24.7</td>
</tr>
<tr>
<td>KAMRUP (R)</td>
<td>33.3</td>
<td>18.8</td>
<td>5.3</td>
<td>29.6</td>
</tr>
<tr>
<td>KAMRUP (M)</td>
<td>24.6</td>
<td>11.0</td>
<td>2.4</td>
<td>23.2</td>
</tr>
<tr>
<td>NALBARI</td>
<td>26.8</td>
<td>15.3</td>
<td>6.2</td>
<td>20.0</td>
</tr>
<tr>
<td>BAKSA</td>
<td>32.4</td>
<td>10.5</td>
<td>2.7</td>
<td>22.4</td>
</tr>
<tr>
<td>DARRANG</td>
<td>43.5</td>
<td>19.2</td>
<td>5.3</td>
<td>37.9</td>
</tr>
<tr>
<td>UDALGURI</td>
<td>39.1</td>
<td>18.3</td>
<td>8.1</td>
<td>31.8</td>
</tr>
</tbody>
</table>

Source: NFHS-4
If we look at the table of health status of children of Assam in the geographical diversity category, it was found that the number of “stunting” children is highest in general area (66.1 per cent) followed by Char areas (61.8 per cent). According to the Human Development Reports (HDR) Assam-2014, the multiple diversity areas and border areas are more vulnerable to “under-weight” and “wasting” children. Number of wasting and under-weight children is highest in multiple diversity areas (24.6 percent and 45.8 per cent) followed by border areas (22.3 percent and 39.8 per cent). The following table shows the health status of children according to geographical diversity-

**Table-3: Health Status of Children in Geographically Diverse Area of Assam**

<table>
<thead>
<tr>
<th>GEOGRAPHICAL DIVERSITY</th>
<th>STUNTING</th>
<th>WASTING</th>
<th>UNDERWEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Char areas</td>
<td>61.8</td>
<td>14.7</td>
<td>37.9</td>
</tr>
<tr>
<td>Flood affected areas</td>
<td>49.7</td>
<td>17.3</td>
<td>33.7</td>
</tr>
<tr>
<td>Hills</td>
<td>36.6</td>
<td>4.9</td>
<td>28.3</td>
</tr>
<tr>
<td>Tea-garden area</td>
<td>46.8</td>
<td>18.2</td>
<td>33.6</td>
</tr>
<tr>
<td>Border areas</td>
<td>47.8</td>
<td>22.3</td>
<td>39.8</td>
</tr>
<tr>
<td>Multiple diversity</td>
<td>55.1</td>
<td>24.6</td>
<td>45.8</td>
</tr>
<tr>
<td>General</td>
<td>66.1</td>
<td>12.6</td>
<td>37.7</td>
</tr>
</tbody>
</table>

Source: Assam HDR, 2014

The HDR Assam-2014 studied the male-female break up regarding the nutritional status of children under age five and it was found that 55 per cent male children against 52.9 per cent female children are “stunting”, 17.7 per cent male against 16.1 per cent is “wasting”, 39 per cent male children against 35.7 per cent female children are “under-weight.” Again, the rural-urban break up has shown that 55 per cent rural children against 44.3 percent urban children are “stunting”; 17.1 per cent rural children against 15.6 urban children are “wasting” and 38.2 rural children against 30.4 urban children are “under-weight.” The following table shows male-female and rural-urban break up in the three category of nutritional status of children in Assam:-

**Table - 4: Malnutrition in Assam**

<table>
<thead>
<tr>
<th>ATTRIBUTORS</th>
<th>STUNTING</th>
<th>WASTING</th>
<th>UNDERWEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>55</td>
<td>17.7</td>
<td>39</td>
</tr>
<tr>
<td>Female</td>
<td>52.9</td>
<td>16.1</td>
<td>35.7</td>
</tr>
<tr>
<td>Rural</td>
<td>55</td>
<td>17.1</td>
<td>38.2</td>
</tr>
<tr>
<td>Urban</td>
<td>44.3</td>
<td>15.6</td>
<td>3.4</td>
</tr>
</tbody>
</table>

Source: Assam HDR, 2014
Conclusion

From the above, we can conclude that Assam has made progress in its health indicators, but it is most urgent to strengthen its existing health care services especially in the rural areas. The percentage of proper nourished children in rural Assam is not very satisfactory. 55 percent children are stunting in rural areas. According to National Family Health Survey-4, the health profile of Assam shows that about 29.8% children below the age of 5 years are underweight. Besides, 35.7% children between the age group of 6-59 months are anemic and about 25.7% women have body mass index (BMI) below normal. It indicates the state of acute malnutrition which may be attributed to lack of proper nutritious foods, illiteracy among parents, lack of proper sanitization facilities, irregular health checkup, food scarcity and various socio economics factors that affect the nutritional status of children. Under National Rural Health Mission (NRHM) various quality development programme has been launched and under the Ministry of Social Welfare, ICDS programme has been introduced to facilitate regular health check-up, immunization, health education and other child health education programme.

Ethical Clearance: It is a review article.

Source of Fund: Self

Conflict of Interest: Nil

References

Knowledge, Attitude and Behavior of Undergraduate Dental Students towards Cardiopulmonary Resuscitation: A Descriptive Study

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Abstract

Context: Medical Emergencies can be encountered by any individual, and its occurrence is usually high in a Dental setting due to the procedures involved. Hence it is important that Dentists be equipped with the knowledge of Cardiopulmonary resuscitation (CPR).

Aims: The Study aims to assess the Knowledge, Attitude and Behavior of Dental Undergraduate students towards CPR training.

Methods and Materials: The present study was a Cross Sectional study conducted among 163 Final Year Undergraduate students and Interns of a Dental Institution in Mangalore. A validated Self Structured Questionnaire was distributed to the students.

Statistical Analysis: Descriptive and Inferential statistics like Student’s Unpaired T Test determined the difference in Knowledge, Attitude and Behavior among the participants.

Results: The overall Knowledge of Students regarding CPR was Poor, with Interns possessing a Significantly higher Knowledge than Final Year BDS Students. Amidst the poor Knowledge, 75.5% students were trained in CPR and 65.6% students were ready to perform CPR in an emergency situation thus displaying a Positive Attitude.

Conclusion: The present study showed that despite a dearth in CPR Knowledge among the Students, they exhibited a Positive Attitude and Behavior towards Training and Practice of CPR. Thus the study highlights the need to strengthen CPR training among Dental Students, by Inculcating and Standardizing it in the Undergraduate and Postgraduate curriculum.

Keywords: Undergraduates, Cardiopulmonary Resuscitation, Knowledge, Attitude, Behavior

Introduction

India, a developing nation has witnessed a paradigm shift in the burden of Non-Communicable diseases which can be attributed to the changing Lifestyle among the Population. Cardiovascular diseases are one among the major Non Communicable diseases which has been responsible for the rising Mortality rate. In 2016 Cardiovascular diseases accounted for 28.1% of the total deaths in India. Cardiac arrests are the most
common emergencies with grave consequences and thus has paralleled the need for all Population sectors to be competent in handling medical emergencies to increase the Golden Period for an ailing patient till medical care is available\(^2\).

Medical Emergencies are multi-factorial in nature. They can occur at any time, at any place and to any person. Dental Treatments being invasive in nature can predispose any individual to the risk of medical emergencies. A study by Haas D has quoted that approximately 19-44% dentists had encountered a medical emergency in a year especially during and after the application of Local Anaesthesia for Extraction and during Endodontic Procedures. Syncope and Hyperventilation were the most commonly reported medical emergencies\(^3\).

The enormity of these situations substantiates the need for Dental Professionals to be equipped with the skill sets of performing Cardio-Pulmonary Resuscitation (CPR). To bestow Dental Professionals with the knowledge to handle such emergencies, the underpinning established at the undergraduate juncture is crucial. CPR training although has been inculcated in the Undergraduate Curriculum, it is often overlooked by majority of the Dental Colleges as they impart only theoretical knowledge to the students rather than the Practical Aspects of the same \(^4\). Thus the competency of the students in handling Medical Emergencies are compromised to a large extent.

Studies in India and Globally have assessed the Knowledge, Attitude and Behaviour of Medical Students\(^5,6\), Nurses\(^7,8\) and Private Dental Practitioners\(^4,9-11\) towards CPR training. In India studies assessing Dental Students’ awareness on CPR are meagre\(^12,13\). Hence this present study aims to close the current gap by assessing the Knowledge, Attitude and Behaviour of Final Year Dental Undergraduates and Interns towards CPR training.

**Materials and Method**

The present study followed a Cross Sectional study design. It was conducted among the Final Year Undergraduate students and Interns of a Dental Institution in Mangalore during January to August 2019 after obtaining Ethical Clearance from the Institutional Review Board. All the Final Year Undergraduates and Interns in the Institution were approached to participate in the study following a Total Enumeration Method. Students who provided Consent and present on the day of the study were included.

A Self structured and validated questionnaire in English language was developed which consisted of 19 closed ended questions. 10 questions addressed the Knowledge Domain, 6 questions addressed the Attitude domain and 3 Questions addressed the Behaviour domain of the participants. After obtaining Written Informed Consent from the participants, the Questionnaire was distributed to them in their classrooms. Care was taken to ensure that no verbal or non-verbal communication could occur among the participants and no names were recorded to ensure anonymity in order to obtain immaculate data. The obtained data was entered into Microsoft Excel and analysed using SPSS version 23 for Descriptive Statistics and Inferential Statistics. The Year wise and Gender Wise differences in the Knowledge, Attitude and Behaviour of the students was analysed using Student’s Unpaired T Test with a significance level of p<0.05.

**Results**

The study obtained a response rate of 95.3%. Among the participants 78 (47.9%) were Final Year BDS students and 85 (52.1%) were Interns. 67.5% of the participants were Females.

Knowledge of students regarding CPR

The Knowledge Domain consisted of 10 Questions among which 7 questions received greater percentage of incorrect responses by the Participants indicating a Poor Knowledge among them. About 69.3% and 51.5% students were unaware of the abbreviations of CPR and Automated External Defibrillator respectively. 63.8% students were unaware of the recommended sequence of CPR (Table 1). Interns exhibited a higher Knowledge score (6.09±2.43) as compared to the Final Year BDS students (3.26±1.39) and this difference was statistically significant (p=0.000) (Table 2). While no significant Gender wise difference was found, Females had a significantly higher Knowledge score than Males \([p<0.05]\) (Table 3).

Attitude of students towards CPR training

75.5% of the students had undergone training in CPR and 65.6% of them were ready to perform CPR in an emergency situation, displaying a Positive Attitude. 73.6% of the students were of the opinion that dentists
need to be competent in performing CPR and hence wanted CPR training to be a part of the BDS Curriculum (Table 4). No Year wise or Gender wise difference was observed in the responses of the participants \[p>0.05\] (Table 2 and 3).

**Behaviour of students towards CPR training**

The behaviour of the students towards performing a Life Support mechanism during an emergency event was observed to be positive. 60.1% students said that on witnessing an unresponsive patient they would initiate CPR by checking for breathing (Table 5).

A Statistically Significant difference was observed in the Behaviour of Final BDS Students and Interns \(p=0.009\) (Table 2). However, no significant Gender wise difference was found \[p=0.065\] (Table 3).

**Table 1: Knowledge of students regarding CPR**

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Question</th>
<th>Responses – n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Abbreviation of CPR</td>
<td>Correct 50 (30.7) Incorrect 113 (69.3)</td>
</tr>
<tr>
<td>2.</td>
<td>Abbreviation of AED</td>
<td>Correct 79 (48.5) Incorrect 84 (51.5)</td>
</tr>
<tr>
<td>3.</td>
<td>Target Depth for Adult Compressions</td>
<td>Correct 101 (62) Incorrect 62 (38)</td>
</tr>
<tr>
<td>4.</td>
<td>Recommended sequence of CPR</td>
<td>Correct 59 (36.2) Incorrect 104 (63.8)</td>
</tr>
<tr>
<td>5.</td>
<td>Recommended Compressions per minute</td>
<td>Correct 53 (32.5) Incorrect 110 (67.5)</td>
</tr>
<tr>
<td>6.</td>
<td>Manoeuvre performed to create a patent airway</td>
<td>Correct 117 (71.8) Incorrect 46 (28.2)</td>
</tr>
<tr>
<td>7.</td>
<td>Pulse is checked before initiating CPR</td>
<td>Correct 43 (26.4) Incorrect 120 (73.6)</td>
</tr>
<tr>
<td>8.</td>
<td>Conditions that are an absolute indications for CPR</td>
<td>Correct 59 (36.2) Incorrect 104 (63.8)</td>
</tr>
<tr>
<td>9.</td>
<td>What should be the pulse in an unconscious patient</td>
<td>Correct 75 (46.0) Incorrect 88 (54.0)</td>
</tr>
<tr>
<td>10.</td>
<td>Universal recognised distress signal for choking</td>
<td>Correct 116 (71.2) Incorrect 47 (28.8)</td>
</tr>
</tbody>
</table>

**Table 2: Year Wise difference in Knowledge, Attitude and behaviour of students regarding CPR**

<table>
<thead>
<tr>
<th>Year of study</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
<th>Mean Difference</th>
<th>95% Confidence Interval</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final BDS</td>
<td>85</td>
<td>3.26</td>
<td>1.399</td>
<td>0.152</td>
<td>-2.831</td>
<td>-3.439 -2.223</td>
<td>0.000*</td>
</tr>
<tr>
<td>Interns</td>
<td>78</td>
<td>6.09</td>
<td>2.435</td>
<td>0.276</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final BDS</td>
<td>85</td>
<td>9.75</td>
<td>2.390</td>
<td>0.259</td>
<td>-0.298</td>
<td>-0.979 0.382</td>
<td>0.388</td>
</tr>
<tr>
<td>Interns</td>
<td>78</td>
<td>10.05</td>
<td>1.967</td>
<td>0.223</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Behaviour</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final BDS</td>
<td>85</td>
<td>6.33</td>
<td>1.499</td>
<td>0.163</td>
<td>-0.594</td>
<td>-1.037 -0.150</td>
<td>0.009*</td>
</tr>
<tr>
<td>Interns</td>
<td>78</td>
<td>6.92</td>
<td>1.356</td>
<td>0.154</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3: Gender Wise difference in Knowledge, Attitude and behaviour of students regarding CPR

<table>
<thead>
<tr>
<th>Year of study</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
<th>Mean Difference</th>
<th>95% Confidence Interval</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>53</td>
<td>4.38</td>
<td>2.420</td>
<td>0.332</td>
<td>-0.350</td>
<td>-1.149 - 0.449</td>
<td>0.388</td>
</tr>
<tr>
<td>Female</td>
<td>110</td>
<td>4.73</td>
<td>2.419</td>
<td>0.231</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>53</td>
<td>10.34</td>
<td>2.731</td>
<td>0.375</td>
<td>0.658</td>
<td>-0.062 - 1.378</td>
<td>0.073</td>
</tr>
<tr>
<td>Female</td>
<td>110</td>
<td>9.68</td>
<td>1.862</td>
<td>0.178</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>53</td>
<td>6.94</td>
<td>1.499</td>
<td>0.206</td>
<td>0.489</td>
<td>0.012 - 0.966</td>
<td>0.065</td>
</tr>
<tr>
<td>Female</td>
<td>110</td>
<td>6.45</td>
<td>1.418</td>
<td>0.135</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Attitude of students towards CPR training

<table>
<thead>
<tr>
<th>Sl</th>
<th>Questions</th>
<th>Responses</th>
<th>n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Are you trained in performing CPR</td>
<td>Yes</td>
<td>123 (75.5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>40 (24.5)</td>
</tr>
<tr>
<td>2</td>
<td>If an emergency situation arises, will u perform CPR ?</td>
<td>Yes</td>
<td>107 (65.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>56 (34.4)</td>
</tr>
<tr>
<td>3</td>
<td>Do you think CPR training is necessary for dentists</td>
<td>Yes</td>
<td>120 (73.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>21 (12.9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May be</td>
<td>18 (11.0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Don't know</td>
<td>4 (2.5)</td>
</tr>
<tr>
<td>4</td>
<td>Should CPR training be part of the BDS curriculum</td>
<td>Yes</td>
<td>105 (64.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>23 (14.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>May be</td>
<td>30 (18.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Don't know</td>
<td>5 (3.1)</td>
</tr>
<tr>
<td>5</td>
<td>If resuscitation is made mandatory in the BDS curriculum,how often should it be reinforced</td>
<td>Every 6 months</td>
<td>138 (84.7)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Every Year</td>
<td>25 (15.3)</td>
</tr>
<tr>
<td>6</td>
<td>Do u want to undergo further training in CPR and enhance your competency</td>
<td>No</td>
<td>26 (16.0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes, 6 months</td>
<td>95 (58.3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes, every year</td>
<td>39 (23.9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Don't know</td>
<td>3 (1.8)</td>
</tr>
</tbody>
</table>
Table 5: Behaviour of students towards CPR training

<table>
<thead>
<tr>
<th>Sl</th>
<th>Questions</th>
<th>Responses</th>
<th>n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Your first response on seeing your friend expressing the symptoms of choking</td>
<td>Call for help</td>
<td>45 (27.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mouth to mouth breathing</td>
<td>96 (58.9)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Talk to patient</td>
<td>22 (13.5)</td>
</tr>
<tr>
<td>2</td>
<td>You find someone unresponsive in the middle of the road, what will be your first response (note: you are alone)</td>
<td>Walk away</td>
<td>18 (11.0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ask for help</td>
<td>29 (17.8)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check breathing</td>
<td>98 (60.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Call ambulance</td>
<td>18 (11.0)</td>
</tr>
<tr>
<td>3</td>
<td>How would you respond if you witness an adult unresponsive victim who was drowning and has spontaneous breathing?</td>
<td>Resuscitation</td>
<td>38 (23.3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check breathing</td>
<td>53 (32.5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ambulance</td>
<td>48 (29.4)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Keep patient in recovery position</td>
<td>24 (14.7)</td>
</tr>
</tbody>
</table>

**Discussion and Conclusion**

A stitch in time saves nine. Similarly, Cardio pulmonary Resuscitation is a procedure which can save an individual’s life if carried out at the right time and appropriately. Dentists are bestowed with the reverence of doctors and thus are often looked upon by people as a life saver in any emergency situation. Hence, they need to be equipped with this life saving skill set owing to the non-invasive procedures they perform. This study thus seeks to explore the Knowledge, Attitude and Behaviour of Dental Students towards CPR training.

In the present study, it was found that the Knowledge of students was found to be Poor. Majority of the Students in our study were unaware of the Recommended sequence of CPR, the recommended Compressions per minute or the Absolute Indications of CPR. The Interns displayed a significantly higher Knowledge as compared to the Final BDS Students. The findings of our study is in par with various studies conducted worldwide. Studies by Shamiri et al and Alotaibi et al showed that the Dental students and Faculty had Poor Knowledge regarding CPR procedure\(^{14,15}\). This lack of Knowledge about emergency procedures among the dental students can be attributed to the lack of emphasis on CPR training in the present curriculum. CPR Training is often overlooked by many of the dental colleges, some providing merely theoretical Knowledge.

Although in the present study, a poor Knowledge was displayed by the students, it was noted that 75.5% students had undergone training in CPR. However, 65.6% students were ready to perform CPR in an emergency situation. 73.6% students felt that CPR training was necessary for Dentists and should be part of the BDS Curriculum, thus displaying a positive attitude. The results are in par with the results of a study by Goel et al where 78.5% of the participants were ready to perform CPR\(^{16}\). However, the study results are in contrast to a study by Alotaibi et al wherein 63.2% students were reluctant to perform CPR\(^{15}\). On portraying situations of Medical Emergencies, majority of the students were of the opinion that they would check for breathing and perform resuscitation procedures, thus displaying their Positive Behaviour. The findings are in par with the results of a study by Laurent et al wherein despite poor Knowledge exhibited by the students, the Attitude and Behaviour towards performing CPR was Positive\(^{17}\).

The positive Attitude and Behaviour in students can be attributed to the fact that as doctors they realize the importance of emergency medicine not only in medical field but in general, which could save a person’s life. However, the level of training provided to the students in dental colleges could hinder their confidence in independently handling CPR.

The present study was a Questionnaire study and hence the possibility of Social Desirability Bias cannot
be ruled out. The study was conducted in a single dental institution with non-assessment of practical skills of students. Thus, further research is necessary involving all Dental colleges and all BDS students and Faculty.

The results of the current study highlight the existing gap in the curriculum and the incompetency of students in the practical management of Medical Emergencies. Emphasis should lay on implementation of Standardized and Regular training of Students and Faculty in handling Medical Emergencies. Continuing dental education with hands on workshops using Mannequin followed by practical skill assessment can prove to be an effective method in this regard. Nevertheless, once graduated the students may become ignorant in enhancing their skill sets in this field. Thus post assessment, after graduating from the dental school should be made mandatory. Similar regulations have been executed worldwide. The Dental regulatory boards across USA require mandatory completion of board-approved course in Infection Control and certification in Basic Life Support courses for license renewal 18. The present study uplifts the existing Knowledge among the future dentists which is an alarming situation. Thus stringent measures in enforcing regular training of Medical emergencies should be sought after and implemented at the earliest in Dental Schools, thus producing more competent doctors.

Conflict of Interest: None.

Source of Funding: Nil

Ethical Clearance: Obtained

References


Effect of Therapeutic Shoulder Sling And Proximal Control Exercises on Shoulder Subluxation in Stroke Survivors

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¹MPTh Student, ²Associate Professor Department of Neurosciences, Faculty of Physiotherapy, Krishna Institute of Medical Sciences Deemed to be University, Karad, Maharashtra

Abstract

Background: Shoulder subluxation is the common problem as it causes shoulder pain and hinders activity. In flaccid stage, proprioceptive impairment, lack of tone and muscle paralysis reduce the support and normal stirring action of rotator cuff muscles particularly supraspinatus. Methods: Ethical clearance was obtained from Institutional Ethical Comittee, KIMSDU, Karad. An Experimental study was conducted with 50 subjects. Which were divided into two groups using consecutive sampling with random allocation with computer generated table. Group A was given conventional treatment for reducing shoulder subluxation in stroke survivors Group B was treated with the Therapeutic shoulder sling and proximal control exercises. The outcome measures were AP lat X-ray, VAS, Functional outcome measurement By Motor assessment scale :Upper arm function. Results: Within the group comparison for the X-ray was done with the pair t test which was very significant for group A with P value of 0.0301 and Extremely significant for group B with P value ≤0.0001. within the group comparison for visual analogue scale for both the groups is extremely significant with the p value of ≤0.0001. within the group comparison for motor assessment scale for both the groups is extremely significant with the p value of ≤0.0001 Conclusions: Therapeutic shoulder sling with proximal control exercises shows significant reduction of subluxation in shoulder x-ray as well as it reduces the pain and improves ADL activity. Keywords: Shoulder subluxation, therapeutic shoulder sling, Proximal control exercises, VAS, MAS

Introduction

Stroke is an acute onset of neurological dysfunction due to abnormality in the cerebral circulation with resultant sign and symptom that correspond to involvement of focal areas of brain Motor deficits are characterized by paralysis (hemiplegia) or weakness (hemiparesis), typically on the side of the body opposite the side of the lesion. The term hemiplegia is often used generically to refer to the wide variety of motor problems that result from stroke. The location and extent of brain injury, the amount of collateral blood flow, and early acute care management determine the severity of neurological deficits in an individual patient. Impairments may resolve spontaneously as brain swelling subsides (reversible ischemic neurological deficit Stroke is a global health care problem that is common, serious and disabling. In most countries stroke is the second or third most common cause of death and one of the main causes of acquired disability. The estimated prevalence rate of stroke range, 84-262/100,000 in rural and 334-424/100,000 in urban areas. The incidence rate is 119-145/100,000 based on the recent population based studies. There is also a wide variation in case fatality rates with the highest being 42% in Kolkata. In the absence of any cure for the initial pathology, rehabilitation is the most universally adopted treatment strategy to improve quality of life in patients with stroke. Rehabilitation, as described by Stucki et al can be defined as ‘the health strategy that aims to enable people with health conditions experiencing or likely to experience disability to achieve and maintain optimal functioning in interaction with the environment’. The
main aim of organised stroke rehabilitation is to achieve a level of functional independence that enables patients to return home and reintegrate into community life that lives up to their own expectations and desires as much as possible. Physiotherapy is perceived as one of the key disciplines in providing Organised stroke care. Early intervention after stroke improves the prognosis.

**Normal shoulder biomechanics** Shoulder joint is ball and socket type of synovial joint with 3 degree of freedom. it is most mobile joint of human body as it is mobility is more stability is compromised. Particularly if the abduction of complex is considers the main force couple acting is the supraspinatus and posterior fibbers of deltoid muscle.

**Pathomechanics in stroke responsible for subluxation** The normal stirring action of the force couple of supraspinatus and posterior fibres of deltoid is affected due to flaccid stage of the muscles. so while abduction and flexion movement due to gravitational pull to the head of humerus subluxates caudally.

**Shoulder subluxation in stroke**

Shoulder subluxation is the common problem as it causes shoulder pain and hinders activity. the reported incidence is 17% to 18% in flaccid stage, proprioceptive impairment, lack of tone and muscle paralysis reduce the support and normal stirring action of rotator cuff muscles particularly supraspinatus. the normal orientation of glenoid fossa is upward, outward and forward. so that it keeps the superior capsule taut and stabilizes the humerus mechanically. in the absence of support from the muscles any abduction or forward flexion of humerus or scapular depression and downward rotation reduces the stabilization and causes the humerus to subluxation.

**Management of shoulder subluxation in stroke**

**Education:** Caregivers/Health Professionals/Relatives need to be informed on the importance of proper handling of the arm. Stroke patients who have their arm unsupported and/or handled inappropriately by caregivers (pulling on the arm) are at a higher risk for traction neuropathy and injury. Hence, it is essential that caregivers of stroke survivors are adequately trained in handling the hemiplegic arm especially when shoulder subluxation is present. Positioning: Lap trays, Pillows and foam support help to keep the arm and shoulder supported in the correct position. Good positioning will help reduce strain on your ligaments and prevent frozen shoulder from occurring.

**Orthotic devices:** The use of shoulder supports is common early after stroke to decrease glenohumeral subluxation and support the shoulder joint. Examples of shoulder supports are the Henderson shoulder ring, Bobath roll, Harris hemi-sling, Rolyan humeral cuff sling, Cavalier shoulder support, arm trough or lapboard and shoulder strapping. A study conducted by Nadler et al found reducing vertical subluxation with a shoulder orthoses may reduce hemiplegic shoulder pain. Orthosis with proximal and distal attachments are more effective. In addition, care must be take in its usage to avoid contractures.

**Exercises:** In the early phase of rehabilitation passive range of motion exercises has been shown to be effective in preventing shoulder subluxation among stroke patients. Range-of-motion exercises for the shoulder joint include flexion-extension, abduction-adduction and external-internal rotation. It is important to know that if the exercises are improperly carried out, it can cause injury to the shoulder and increase the stroke patient’s risk for shoulder subluxation. Also, weight bearing exercises on the affected upper extremity proved to be beneficial. these exercises are included as proximal control exercises.

**Electrical stimulation** conventional trans cutaneous electrical nerve stimulation(TENS) is given to relieve pain.

Traditionally, slings have been applied to prevent or reduce shoulder subluxation after stroke but most of them have drawback of holding the limb in poor position that is likely to cause soft tissue contractures and also affect in terms of pain. conventionally the shoulder subluxation in stroke survivors is treated considering radiological changes in joint anatomy but the pain caused due to pull to joint capsule and surrounded soft tissue is untouched area. to consider this both the shoulder sling is modified with the inclusion of electrical modality of pain relieving that is TENS this newly invented therapeutic shoulder sling gives the treatment in corrected position of shoulder joint. by means of orthosis working on three point pressure system of forces.

**Materials and Method**

The study protocol was started after obtaining ethical clearance from ethical committee of Krishna Institute of...
medical sciences deemed to be University, Karad The subjects were selected according to the inclusion and exclusion criteria. Informed consent was taken from the patient or patients caretaker. the purpose of the study was explained to the participants and their care takers Randomization is done and the subjects was divided in two groups

- **Group A** conventional management for shoulder subluxation in stroke
- **Group B** Therapeutic shoulder sling with proximal control exercises

Patient was assessed for the neurological symptoms and the pre treatment shoulder x-ray for assessing the position of humeral head in glenoid fossa was taken. pre treatment VAS also was taken Patients were also assessed for functional scale by Motor assessment scale Intervention was given for 3 weeks .5days per week for both the groups.

**Statistical Analysis**

Post treatment assessment were taken Data was statistically analyzed by using software (INSTAT 3).Within the group comparison was done with pair t test and between the group was done by unpaired t test .

**Results**

In the study out of 50 participants from group A 10 were left hemiplegics and 15 were right hemiplegics.In group B 8 were left hemiplegics and remaining 17 were right hemiplegics

In the study group A was having 15 male and 10 female .group B was having 16 male and 9 female participants. In total sample of 50 31 were male and 19 female patients.

Mean age of group B was 45 years and for group A 46 years

| TABLE NO.1 INTERGROUP ANALYSIS FOR VAS |

<table>
<thead>
<tr>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean ±SD</td>
<td>5.84±1.375</td>
</tr>
<tr>
<td>Two tailed P Value</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>t value</td>
<td>5.527</td>
</tr>
<tr>
<td>Significance</td>
<td>Extremely significant</td>
</tr>
</tbody>
</table>

| TABLE NO.2 INTERGROUP ANALYSIS FOR X-RAY |

<table>
<thead>
<tr>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean ±SD</td>
<td>1.0952±0.4364</td>
</tr>
<tr>
<td>Two tailed P value</td>
<td>0.0301</td>
</tr>
<tr>
<td>t value</td>
<td>10.314</td>
</tr>
<tr>
<td>Significance</td>
<td>very Significant</td>
</tr>
</tbody>
</table>
Table No.3 Inter Group Analysis For Mas

<table>
<thead>
<tr>
<th></th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean ±SD</td>
<td>3.04±0.9345</td>
<td>3.72±0.9798</td>
</tr>
<tr>
<td>Two tailed P Value</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>t value</td>
<td>5.421</td>
<td>6.220</td>
</tr>
<tr>
<td>significance</td>
<td>Extremely significant</td>
<td>Extremely significant</td>
</tr>
</tbody>
</table>

Discussion

Shoulder subluxation is most likely to occur in the first 3 weeks after stroke, while the limb is still flaccid and, in particular, the supraspinatus muscle is inactive. For individuals with hemiplegia inferior shoulder subluxation develops as a result of a prolonged downward pull of gravity on the arm against hypotonic muscles, resulting in overstretch of both the glenohumeral capsule and the hypotonic supraspinatus and deltoid muscle. 19

Along with the subluxation the over stretch of soft tissue causes pain and relative decreased hand activities in daily living . Present study was done in patients with brunnstrom recovery stage 2 which were having shoulder subluxation secondary to stroke. Total 50 patients were included in the study fulfilling inclusion and exclusion criteria. Group A with 25 patients received conventional treatment for the subluxation and group B received therapeutic shoulder sling and proximal control exercises.

In the available research done by K Walsh Management of shoulder pain14 in patients with stroke stated that Foam supports or shoulder strapping may be used to prevent shoulder pain.6 treatment should include high intensity transcutaneous electrical nerve stimulation.

M .leandri, C.I Parodi in their study comparison of TENS treatments in hemiplegic shoulder pain concluded that high intensity TENS valuable for treating hemiplegic shoulder pain, whereas traditional low intensity TENS seems to be of no use in such case15. Evidences shows that shoulder subluxation can be reduced by the application of external devices such as orthosis. There is insufficient evidence to conclude whether slings and prevent subluxation, decrease pain, increase function or adversely increase contracture in the shoulder after stroke . The first systematic studies of the painful shoulder after a stroke or traumatic brain injury were conducted back in the 1970s. Krempen et al. Emphasise that there are many causes of a painful shoulder in neurological diseases. In the cases where the painful shoulder occurred in conjunction with a subluxation, effective pain relief was achieved using a conventional neck.]. Radiologic evidence of the reduction of subluxation was found when this shoulder sling was used. The authors also report a reduction of pain. However, no information was provided on the effect on the development or reduction of SHS. Zorowitz et al. also studied the effect of different orthoses (“single-strap hemisling”, “Bobath roll”, “Rolyan humeral cuff sling”, “Cavalier support”) for a shoulder subluxation [23]. For the study, 20 stroke patients were provided with 4 different orthoses and the change in horizontal, vertical, and absolute asymmetry compared with the unaffected side was determined by radiologic analysis. Ultimately, an improvement of subluxation was found for all orthoses, although different orthoses had the best result for different patients. The authors concluded that fitting with an orthosis for shoulder subluxation must be customised for the individual patient. This study did not investigate other effects of the orthosis such as relieving pain or reducing SHS .7

In flaccid paralysis, subluxation due to the absence of muscular stability was identified as the cause of pain. In addition to cautious use of the affected arm and systematic interdisciplinary care, continuous support of the arm was considered to be essential. Functional electrical stimulation (FES) to activate muscles could also be important. It was not specified how continuous support of the arm should be implemented in practice12. However, continuous support the arm must be ensured not only when sitting, but also when the patient is
mobilised when standing, walking, or during therapy. Consequently, merely positioning on a therapy table or immobilising the arm in a neck slings neither sufficient nor useful.

Ada et al. come to a similar conclusion. In a review, four studies were identified that investigated the effect of an orthosis on preventing subluxation, repositioning the humeral head, reducing pain, and improving the motor function of the shoulder after a stroke. In summary, no clear evidence was found for the use of a shoulder sling. Dajpratham et al. reach the same conclusion. They also found no significant reduction of shoulder subluxation when using two different neck slings.

There is insufficient evidence to conclude whether slings and prevent subluxation, decrease pain, increase function or adversely increase contracture in the shoulder after stroke.

Present study shows the significant effect of using therapeutic shoulder sling in treating the subluxation of shoulder after stroke. In the experimental group Pain is relieved in the corrected position of shoulder by applying the therapeutic shoulder sling. Proximal muscle control exercises also shown significant changes in the post treatment radiological measurements of experimental group supports the Available Observational studies suggesting that orthoses reduce vertical subluxation whilst in-situ conventional group also showed the changes after treatment as in reduction of pain and improvement in the functional scale measured for motor assessment of upper part of arm. The use of therapeutic shoulder sling have benefited patients because it gives the simultaneous effect of pain relief in the corrected position by application of orthosis.

Conclusion
Therapeutic shoulder sling with proximal control exercises shows significant reduction of subluxation in shoulder x-ray as well as it reduces the pain and improves ADL activity.

Ethical Clearance - Taken from Institutional Ethical committee of KIMS DU, Karad

Source of Funding – Krishna Institute of medical sciences Deemed to be University, Karad, ,India

Conflict of Intrest - Nil

References
1. Devayani M Moghe, K Sahoo An orthotic device for supporting a shoulder joint of a user (Biomedical engineering PATENT NO. 201921019049)


Assessment of the Prevalence of Refractive Error among School Children (6-16 Years) of Rural Field Practice Area of Kims, Malkapur, Karad

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¹Resident, ²Associate Professor, ³Professor And Head of Department, Department of Ophthalmology, Krishna Institute of Medical Sciences deemed to be University, Karad, Maharashtra, India

Abstract

Introduction: Refractive errors are among vital causes of visual disability globally and second principal cause of preventable blindness. Refractive errors among school children remains unnoticed which have an impact on overall development of child. This study has been undertaken to estimate the prevalence of refractive errors among school going children (6-16 years).

Materials and Method: This cross-sectional study was conducted in schools of Karad from October 2017 to May 2019. Sample size was determined to be 750. School Going Children of age 6-16 years of selected schools in the rural field practice area of KIMS, Karad fulfilling the inclusion and exclusion criteria were screened on school visit. All suspected students were called to Out Patient Department and subjected to Snellen’s chart, pin-hole test, torch light examination, slit lamp examination, manual refractrometry, direct and indirect ophthalmoscopy and cyclopegic refraction (retinoscopy followed by post mydriatic test) to detect refractive error in children. A questionnaire was structured to gather relevant information from the students. Data was collected from the students after informed consent.

Results: Prevalence of Refractive Errors was 8.4%. Most frequent refractive error found was Myopia (60.3%) followed by Astigmatism (23.8%) and Hypermetropia (15.9%). It shows that only 20.63% students were wearing spectacles whereas remaining 79.37% students were unaware of their problems.

Conclusion: Visual impairment due to refractive error should be addressed as early as possible, which is attainable only by screening at initial age and hence early recognition and management.

Keyword: Refractive error, prevalence, myopia, astigmatism, Hypermetropia, Screen exposure time.

Introduction

Refractive Error is the most common cause of Visual Impairment and second principal cause of preventable blindness¹. Preventable blindness accounts for 80% blindness. Childhood blindness is a global distress. Globally, chief sources of visual impairment are uncorrected refractive errors (Myopia, Hyperopia & Astigmatism) 43%, Cataract 33%, Glaucoma 2%². Roughly 12 million accounts for refractive errors out of 19 million visually disabled children. Addition of uncorrected refractive error would escalate estimates of the global preponderance of visual disability by 61%².

About 2.3 billion people globally have refractive errors, out of which 1.8 billion have ingress to adequate ophthalmic evaluation leaving aside 500 million populations, predominantly in developing countries with optical defect leading to either blindness or impairedvision³.

Data on the preponderance of childhood blindness in India is accessible from few regions- Andhra Pradesh (0.61/1000), West Bengal (0.51/1000) and Delhi (1/1000)⁴. Roughly 1.4 million blind children are less than 15 years age globally, out of whom 2/3rd resides in the developing countries.
Further majority of children of above mentioned age group cannot reveal about the optical defects and complications they encounter, so most of the eye diseases in these children go on undiscovered unless an attempt is made for their disclosure e.g. if amblyopia can be diagnosed at early age and treated strenuously, further sequelae can be curbed. If the vision is grossly poor and cannot be improved much, such children can be advocated vocational training where eyes are not strained much and they can make use of whatever trace vision they have and which will make them capable to take care of oneself and not to be a concern for the society.

National programme for Control of Blindness (1994) proposed School Eye Screening Programme. Another initiative Vision 2020-THE RIGHT TO SIGHT was ventured by WHO in 1999 to annihilate preventable blindness like Cataract, Xerophthalmia, Refractive Errors, Trachoma and other causes of childhood blindness by 2020. In India under Vision 2020, the priority consideration to curtail childhood blindness were refractive error, cataract related amblyopia and corneal diseases.

Schools are best platform to employ health awareness and prior recognition of ocular morbidity. The school survey was endorsed over house to house survey because school procures an organized and disciplined group of children. Hence, this study was conducted to assess the degree of refractive error in school going children of KIMS, MALKAPUR, KARAD.

Materials and Method

STUDY DESIGN - “A CROSS-SECTIONAL STUDY ON PREVALENCE OF REFRACTIVE ERROR AMONG SCHOOL CHILDREN IN THE FIELD PRACTICE AREA OF KIMS, MALKAPUR, KARAD”.

Duration Of Study- 18 Months.

Period of Collection of Data- 12 Months.

Period of Analysis and Compilation- 6 Months

Inclusion Criteria: All children from 6-16 years of age of selected schools in the rural field practice area of KRISHNA INSTITUTE OF MEDICAL SCIENCES, KARAD.

Exclusion Criteria – a) Mentally retarded children. b) Children with congenital disorder. c) Absentees on the day of examination. d) Children below 6 years of age and above 16 years age.

Source of Data – School Going Children of age 6-16 years of selected schools in the rural field practice area of KIMS, MALKAPUR, KARAD fulfilling the inclusion and exclusion criteria from OCTOBER 2017 to MAY 2019.

Rationale of Sample Size -

Considering the study done by Megala.M on Prevalence of Refractive error in school children, the prevalence rate of Refractive error (p) was 20.4%. The sample size is:

\[ \text{Sample size} (n) = \frac{4pq}{L^2} \]

Taking P VALUE as 20.4%

Taking L = 3% and q=100-p

The estimated sample size is 722, roundabout to 750.

Method of Data Collection

Based on existing prevalence of ocular morbidities in school going children, the ideal sample size was about 750. By selecting three schools by simple random sampling by lottery method, we obtained sufficient sample size to derive meaningful results.

All the students in the age group of 6 to 16 years (2nd to 10th standard) present on the day of assessment in those schools were examined. Principal of all the schools were approached before the screening and their granted permission was obtained and a date was fixed for screening. Two visits were given to each school and the students absent on the day of visits were missed.

A questionnaire was structured to gather relevant information from the students. Data was collected from the patient after informed consent. Patients fulfilling the inclusion and exclusion criteria were taken.

Refractive error was tested using following instruments:

1. Snellen’s chart.
2. Direct and Indirect Ophthalmoscopy.


**Results**

In the present study, out of total study participants (750), 51.6% were male students and remaining 48.4% were female students.

Table 1 shows that 53.4% students belong to the age group of 13-16 yrs, 27.9% students belong to the age group 10-12 years and 18.7% students belong to the age group 06-09 years. The mean age of study population is found to be 12.25 with standard deviation of 3.01.

84(11.2 %) out of Total study participants (750 students) were found to have refractive error (vision <6/6). Out of 84 cases detected with defective vision by the

<table>
<thead>
<tr>
<th>Age-Group(in yrs)</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>06-09</td>
<td>140</td>
<td>18.7</td>
</tr>
<tr>
<td>10-12</td>
<td>209</td>
<td>27.9</td>
</tr>
<tr>
<td>13-16</td>
<td>401</td>
<td>53.4</td>
</tr>
<tr>
<td>Total</td>
<td>750</td>
<td>100</td>
</tr>
</tbody>
</table>

**Table-1: Division based on Age-Group.**

Table 2 shows the chief complaints among study participants with refractive error.

<table>
<thead>
<tr>
<th>Complaints</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blurred Vision</td>
<td>26</td>
<td>41.27</td>
</tr>
<tr>
<td>Headache</td>
<td>20</td>
<td>31.75</td>
</tr>
<tr>
<td>Eye Strain</td>
<td>13</td>
<td>20.63</td>
</tr>
<tr>
<td>Half shutting of the eye enhancing vision</td>
<td>4</td>
<td>6.35</td>
</tr>
<tr>
<td>Total</td>
<td>63</td>
<td>100</td>
</tr>
</tbody>
</table>

**Table-2: Chief complaints among study participants with Refractive Error.**

Investigator while screening, 63(8.4%) were confirmed as the true cases of refractive error by Refractionist.

41.27% participants (out of 63) complaint of blurred vision, while rest 58.73% were having other complaints shown in Table 2.

Most frequent refractive error found was Myopia (60.3%) followed by Astigmatism (23.8%) and Hypermetropia (15.9%) in the present study given in Table 3.

**Table-3** shows statistical significant relationship between class 8th-10th students and screen exposure time (>1hr/day) probably due to more exposure to computers/laptops/mobilephones/videogames.
### Table-3: Proportion of types of refractive error among cases and study group.

<table>
<thead>
<tr>
<th>Types</th>
<th>No.</th>
<th>Percent among cases</th>
<th>Percent in Total study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Myopia</td>
<td>38</td>
<td>60.3</td>
<td>5.1</td>
</tr>
<tr>
<td>Hypermetropia</td>
<td>10</td>
<td>15.9</td>
<td>1.3</td>
</tr>
<tr>
<td>Astigmatism</td>
<td>15</td>
<td>23.8</td>
<td>2.0</td>
</tr>
<tr>
<td>Total</td>
<td>63</td>
<td>100</td>
<td>8.4</td>
</tr>
</tbody>
</table>

### Table-4: Class wise allocation of screen exposure time per day.

<table>
<thead>
<tr>
<th>CLASS</th>
<th>N</th>
<th>Screen Exposure Time per day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>30 min</td>
</tr>
<tr>
<td>2nd -4th</td>
<td>190</td>
<td>32</td>
</tr>
<tr>
<td>5th-7th</td>
<td>235</td>
<td>47</td>
</tr>
<tr>
<td>8th-10th</td>
<td>325</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>750</td>
<td>92</td>
</tr>
</tbody>
</table>

### Discussion

In the present study, 51.6% were male students and remaining 48.4% were female students. Study by Vidusha KSS et al (year 2018) showed similar findings – 50.6% male students and 49.4% female students.

The mean age of study population is found to be 12.25. Similar Observation found in study by Naik R et al (9.5 years), Kalkivayi V et al (9.3 years).

8.4% rate of prevalence of refractive error found in present study. Similar prevalence rate was observed in study by Pradhan N et al (7.0%), Naik R et al (7.5%) but contrast findings were seen in Vidusha KSS et al (10.5%) and Sonam Sethi et al (25.32%).

Most frequent refractive error found was Myopia (60.3%) followed by Astigmatism (23.8%) and Hypermetropia (15.9%) in the present study. Similar impression was observed by Sonam Sethi et al - 63.3% students had Myopia followed by Astigmatism (20.4%) and Hypermetropia (11.4%). Pradhan N et al conducted a study on refractive error in Haryana showed – 61.9% had Myopia followed by Astigmatism (24.1%) and Hypermetropia (14%).

The study shows that students with refractive error were complaining more about inability to see blackboard from back benches than those without refractive error. It is also seen that students exposed to screen for longer time (=1hr/day) were having refractive error. Even students reading continuously (<30mins/day) complaint of symptoms relating to refractive errors.
“What our eyes cannot see, our mind cannot read”. Therefore, visual impairment due to refractive error should be addressed as early as possible, which is attainable only by screening at initial age and hence early recognition and management. The present study supports the fact that school age forms a high risk group of refractive error.

**Ethical Approval** : All procedures performed on human participants were in agreement with ethical standards of the Institutional and/or National Ethics Committee.

**Source of Funding** : In this project, the cost of investigations of the study participants was born by the institute research fundings.

**Conflict of Interest** : None

**Acknowledgement** : We acknowledge the cooperation and assistance of the Department of Ophthalmology, Krishna Institute Of Medical Sciences, Karad, Maharashtra, India.

**References**

An Autopsy Study of Fatal Thermal Burns in Married Women: A Prospective Study

Bandenawaz 1, Viswakanth B2

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Abstract

Death of a bride by immolation either self or by the in-laws and their family members is a well-known phenomenon since many centuries in India. Even though our country is developing in all respects, but still we are unable to prevent these deaths due to various reasons. In this study, we have made an attempt to highlight the statistics of fatal thermal deaths in married women in one year with relation to Incidence, Age, element of dowry and cause of death.

Results showed that Incidence of thermal deaths in married females was 75.2% with maximum victims in the 18-22 years age group. Further it was noted that 39% of these victims were due to alleged dowry harassment and the cause of death in majority being septic shock.

Keywords: Burns, Dowry, dowry deaths, immolation, autopsy, thermal injury.

Introduction

India has a number of homicidal deaths of women every year. It may be due to various reasons, known instances include marital infidelity, sexual jealousy and bride burning. India has a number of bride burning cases every year and most heinous of them being dowry related deaths. A majority of these cases do not get reported, invariably being disguised as a kitchen accident. When a Hindu girl gets married, parents give presents to the bride and groom based on their social and financial position. The ancient concept was that the Hindu girl could not get part of the inheritance so the father would provide her material things in lieu. Over time concept of dowry has gotten distorted with the groom’s family making demand for lavish presents like cars, cash, house or gold. When the bride’s family is unable to satisfy these unreasonable demands, the in-laws can take the drastic step of dousing the girl with an inflammable liquid and setting her on fire. Husbands who indulge in this act of bride burning see it as a way of getting rid of their wives so that they can remarry for a bigger dowry.1

According to the Indian Penal Act, giving or asking dowry is prohibited. If anyone is reported, they can be arrested and tried under The Dowry Prohibition Act. According to Time Magazine the numbers of bride burning cases have increased from 400 in early 1980s to 5,800 in 1990s. It is not known whether the bride burning cases had increased or the number of police reports have increased. A women’s group located in Bangalore estimates that three to five women suffering from severe burn injuries are taken to a burns unit at Victoria City Hospital every day.

According to the statistics released by the Government of India in 2001, 7,000 women were killed by husbands and in-laws because of less dowry or inability to pay more dowries. Bride burning is a social stigma which India is trying hard to fight. However, women organizations claim that not enough is being done to protect women and women rights specially when witnesses can be intimidation or police are indifferent during investigation. Today, outdated, mythological misconceptions of women combined with the grossly manipulative practice of dowry means that bride-burning is as rampant today as it was 2,500 years ago and the Indian government and society implicitly sanction dowry murders by not adequately prosecuting it.2

A reality check is sorely needed. In this prospective study we analysed the trends and profile of fatal thermal burns cases involving married woman in around Davangere.
Methodology

A prospective autopsy study of sudden natural deaths which was conducted at JJM Medical College and Cigateri General Hospital, Davangere Karnataka, India for a period of 1 year from 1st November 2009 to 1st November 2010 formed the primary material of the study. Among them, cases of deaths due to burns in married women were selected based on purposive sampling. The objectives were to assess the Incidence, age, element of dowry, socio-economic background and cause of death among married women due to burns. Before starting the post-mortem examination, history from the relatives, police and treatment records if were obtained and recorded on a pre-made detailed proforma. In cases where the death was unwitnessed and the dead body was brought directly from site of death by the police for post-mortem examination, help of the investigating officer was sought to know the manner of death. Data was collected and analyzed statistically using appropriate statistical tools (namely Microsoft Excel 2007 and IBM SPSS V.20) with respect to the aforesaid objectives.

Observations & Results

During this study period, 881 cases were brought for medicolegal autopsies out of which 224 (25.4%) deaths were due to burns. Out of the 224 cases, incidence of married female deaths accounted to 94 i.e. 75.2% of total deaths. Further, incidence of alleged dowry deaths due to burns was found to be 39.3% of the total. [Table 1]. Among the 94 deaths due to burns in married females, maximum numbers of cases i.e. 49%, were observed in the age group of 18-22 yrs. [Table 2]. Majority of the deceased persons (68%) died to a degree of dermo-epidermal burns. [Table 3]. 54 % of the deceased persons were from rural areas of Davangere [Table 4]. Maximum deaths were observed in females belonging to the lower socioeconomic class i.e. 62 % [Table 5]. And majority of the victims (54.2%) died due to septicemic shock [Table 6].

<table>
<thead>
<tr>
<th>S.I No</th>
<th>Feature</th>
<th>Number of deaths</th>
<th>Percentage (%)</th>
</tr>
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<tbody>
<tr>
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<td>Autopsied deaths</td>
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<td>2</td>
<td>Burns deaths</td>
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<td>Total Females</td>
<td>125</td>
<td>55.8</td>
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<td>4</td>
<td>Married Females</td>
<td>94</td>
<td>75.2</td>
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<tr>
<td>5</td>
<td>Alleged Dowry deaths</td>
<td>37</td>
<td>39.3</td>
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Table 1: Incidence of cases

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<th>S.I No</th>
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<th>Number of Deaths</th>
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<tr>
<td>1</td>
<td>18-22</td>
<td>49</td>
<td>50</td>
</tr>
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<td>2</td>
<td>23-25</td>
<td>27</td>
<td>17</td>
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<td>3</td>
<td>26-30</td>
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<td>4</td>
<td>31-40</td>
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<td>4</td>
</tr>
<tr>
<td>5</td>
<td>&gt; 40</td>
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Table 2: Age wise distribution of deaths
Table 3: Degree of burns

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<th>No. of cases</th>
<th>Percentage</th>
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<tr>
<td>Epidermal</td>
<td>24</td>
<td>35</td>
</tr>
<tr>
<td>Dermo epidermal</td>
<td>68</td>
<td>68</td>
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<tr>
<td>Deep</td>
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<td>11</td>
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Table 4: Regional Distribution

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<tr>
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<th>RURAL</th>
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<tr>
<td>28</td>
<td>66</td>
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</table>

Table 5: Socioeconomic Status

<table>
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<th>STATUS</th>
<th>CASES</th>
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<tbody>
<tr>
<td>LOWER</td>
<td>62</td>
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<tr>
<td>MIDDLE</td>
<td>28</td>
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<tr>
<td>UPPER</td>
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Table 6: Cause of Death

<table>
<thead>
<tr>
<th>Cause</th>
<th>No. of cases</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Neurogenic shock</td>
<td>9</td>
<td>9.50%</td>
</tr>
<tr>
<td>Hypovolemic shock</td>
<td>18</td>
<td>19.15%</td>
</tr>
<tr>
<td>Toxemic</td>
<td>16</td>
<td>17.02%</td>
</tr>
<tr>
<td>Septicemic</td>
<td>51</td>
<td>54.26%</td>
</tr>
<tr>
<td>Total</td>
<td>94</td>
<td>100%</td>
</tr>
</tbody>
</table>

Discussion

Seventy-two years after Independence, Indian women are still searching for these ideals visualized by “framers of modern India. Despite the enactment of laws, the formulation of reformatory legal processes, the provision of legal aid to the poor, the extensive use of the provision of legal aid to poor, the extensive use of the provision of Public Interest Litigation, and the creation of woman / family counseling centers etc., women in India still have a long way to go in converting the constitutional goals into reality. Religion, customs and age old prejudices have put Indian woman in a subservient and exploitable position in many domains of life. Factors such as low rates of participation in education, lack of economic independence and value biases operating against them have resulted in woman being dependent on the men folk of the family. They are usually ignorant of their rights and even if they are not, they do not have easy access to justice. The system of dowry is a social practice, which, on its own, has claimed the lives of scores of women. The incidence of cases found by us is in conformity with the study conducted by Naik et al. and Kumar et al. 4

Married outnumbered unmarried in the ratio of 3:1 i.e., married cases were 94 and unmarried cases were 31 out of 125 female victims. This clearly shows the magnitude of young married females being the victims. The married outnumbered unmarried ones in burns deaths. which is also consistent with the study of Naik et al. and Mabrouk AR et al. 5

Age is one of the important factors. Maximum number of deaths 49 occurred during the study of 1 years (2009-2010) in the age group 18-22 years, and second highest deaths occurred in age group of 23-25 years i.e., 21 cases. In age group 26-30 years 13 cases. As people from 18-30 years age group are exposed to high risk, because this is the age group which is involved in cooking purpose. Dowry deaths are also common in this age group. Mabrouk AR et al observed that majority of deaths (46%) occurred in 21-30 years of age group. Naik et al in a study on trends of burn deaths it was found that most of the victims were between 11-40 years with peak at 21-30 years (47.1%). And Mabrouk AR et al 26 in his, found that maximum cases seen in 18-26 years of age group. So, the present study is in accordance with the above studies.

In the Western countries, the old people and children are the most common victims of accidental burns. In our country, this difference may be possible due to better care of young and old people by the family members.

Highest number of cases i.e., 68, showed Dermo-epidermal burns, which is followed by epidermal burns i.e., 18 cases and lastly 8 cases showed deep burns. Sharma SR 6 found that major incidence of death due to burns was dermo-epidermal degree of burns (40%) followed by deep (65%) and epidermal degree of burns (12.1%). So, the present study is in consistent with the other study. The diagnosis of the depth of burns is not
entirely accurate because there are no definite clinical criteria for the depth of burns. There are various gradations of injury in the extensive burns. Also, the thickness of skin varies with age and body location.

In our study maximum cases of married female fatal burns seen in females from rural area than urban area and from lower socioeconomic classes. Similar observations were made by Sharma et al and Mabrouk AR et al.

The findings of the present series noting the sepsis as the most important factor for the cause of death, as the period of survival in maximum number of cases is more than 5 days. In the present study, out of 94 cases, maximum deaths i.e., 54.26% were due to septicemic shock and minimum i.e., 9.5% were due to neurogenic shock. This is because most of the victims of burns, who survived the initial 24 hours after burns, succumbs to infection of the burnt area and its complications. Burns cause devitalization of tissue leaving extensive raw areas, which usually remain moist due to the outflow of serous exudate. The exposed moist area along with the dead and devitalized tissue provides the optimum environment favoring colonization and proliferation of numerous microorganisms, which is further enhanced by the depression of the immune response. All these factors contribute towards sepsis in a burns victim. Tripathi CB et al, found 30.92% death due to septicemia, while Kumar et al found that 53% of cases died due to septicemia. So, the present study is in accordance with the above studies.

**Conclusion**

Accidental burns are mostly preventable by adequate safety measures and safety education. “Bridge burning” is a social evil unmatched in its cruelty and cynicism in today’s civilized society. Any discussion on its etiopathogenesis and remedial measures must take into account the sociocultural and economic ramifications underlying this scourge.

Legal measures however, harsh or deterrent, cannot suffice to combat this scourge due to complete dependence of the woman on her husband and in-laws.

Following measures are recommended:

**Social and Economic**

1. Safety education to combat domestic and industrial burns.
2. Public and professionals should be made to realize the magnitude and gravity of the problem.
3. Discouraging dowry demands and offers.
4. Promoting education among women to make them economically free and independent.
5. Social acceptance and security measures for the single woman who is deserted or left by the dowry seekers.
6. To strive for a social transformation so that both girls and boys choose their life partners.
7. Social boycott of those boys and their families in future marital negotiations by the society.

**Legal**

1. More stringent laws for possession and use of explosive and implosive and inflammable materials to prevent accidents.
2. Police task force-specially trained in the subject for timely investigation of the case and should provide detailed history and sketched diagram showing arrangements in bedroom and kitchen, with special reference to place of incidence and mode of catching fire.
3. Special legal aid cells for the victims and other relations.
4. Special courts to try the cases expeditiously.
5. Inquest by a magistrate in all cases of young female burn death and strict adherence to existing laws in this regard.
6. Visit to the scene of crime should be made compulsory by autopsy surgeon along with the expert in forensic science with a well-equipped team for proper and prompt investigation with modern techniques.

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**Ethical Committee Clearance:** Taken from J.J.M Medical College Ethical Committee

**References**

1. Dube, Dipa & Mukesh Y. Medical Evidence in Dowry Deaths: An Evaluation by Indian


Analysis of Homicidal Deaths among Medicolegal Autopsies Conducted at a Tertiary care Hospital in Karnataka: A Prospective Study

Bandenawaz¹, Viswakanth B²

¹Associate Professor, Department of Forensic Medicine and Toxicology, Navodaya Medical College Hospital and Research Centre, Karnataka, ²Associate Professor, Department of Forensic Medicine and Toxicology, Kanachur Institute of Medical Sciences, Mangalore, Karnataka

Abstract

A Prospective study was conducted in the Department of Forensic Medicine and Toxicology, JJM Medical College and Cigateri General Hospital, Davangere Karnataka, from 2010 to 2014 with regard to demographic, injury and mortality profiles among Medicolegal autopsies conducted in homicidal deaths and the same are presented in this paper. Results showed that male victims of the age group 31-40 years were more in number, with personal revenge being the usual motive of the perpetrators. Most of the deaths were due to combination of both blunt and sharp weapons with hemorrhagic shock as the most common cause of death.

Keywords: Homicidal Deaths, Injuries, Blunt force, Sharp Force, Medicolegal, Autopsy.

Introduction

Homicide in general means killing of one human being as a result of conduct of the other.¹ Several Indian authors have classified homicides into lawful (Excusable, justifiable) and unlawful homicides (Murder, Culpable homicide not amounting to murder) for the ease of understanding albeit no such terminologies exist in any Indian codes of law. ², ³ In this paper, the authors represent only Homicidal deaths amounting to Murder as per section 300 of the Indian Penal Code.

While homicides by death penalty do not involve the forensic pathologist, all other justifiable, excusable and unlawful homicides do include the role for a forensic pathologist in fixing the responsibility.

Murder is a heinous crime committed against a person be it due to any motive. It is indeed a major threat to the society due to its increase at an alarming rate all over the world including India. Such deaths demand a cautiously exercised post mortem examination and analysis of circumstances surrounding them. No part of the world is free from crime, and the city of Davangere is no such exception. Hence a selectively prospective study was undertaken to analyze the profiles of such homicidal deaths and observations thus made may show the impact of them on the society. The magnitude, if keenly observed by law enforcement agencies, can have a better understanding and can strategize a solution.

Material and Method

The study material consisted of 2260 medicolegal autopsies conducted in the department of forensic medicine and toxicology, JJM Medical College and Cigateri General Hospital, Davangere Karnataka, during a period of 4 years (from June 2010 to June 2014). Of these, 112 cases were homicidal deaths amounting to murder, which were studied selectively, descriptively and prospectively after obtaining clearance from the institutional ethical clearance committee.

Data for the study comprised of inquest reports, documented interviews from relatives, friends, and neighbors of the victims. A detailed proforma
for recording history, particulars such as age, sex, educational status and occupation, motive, and weapons/force and cause of death was prepared. The information thus collected, was analyzed using appropriate statistical tools (namely Microsoft Excel 2007 and IBM SPSS V.20).

**Results**

During the study period, 2260 cases were brought for Medicolegal postmortem examination, of which 112 (5%) cases were homicidal deaths amounting to murder.

Year wise analysis between mid-2010 to mid-2014 revealed skewed pattern of numbers not falling truly in ascending or descending order with highest number of homicidal deaths amounting to murder in the year 2013, where we encountered 27 cases (24%) [Table 1]. Maximum number of victims (46%) belonged to the age group ranging between 31-40 years [Table 2]. Observing sex wise death distribution, majority of the victims were found to be males (72%) [Table 3]. Enquiry made into the possible motive behind these deaths revealed that most victims succumbed due to interpersonal enmity and revenge (56%) [Table 4]. Majority of the Perpetuators involved had attained schooling up to primary level, considering their educational status (51%). When we considered occupational status, majority of the perpetrators were employed (72%). Considering the type of weapon or force or method used, maximum number of deaths were found to have been caused by a combination of both sharp and blunt force violence (37%) [Table 5]. Most common cause of death was found to be due to hemorrhagic shock (59%) [Table 6].

### Table 1: Years

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<th>Percentage (%)</th>
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<td>22</td>
<td>20</td>
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<td>23</td>
</tr>
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<td>2013</td>
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### Table 2: Age Wise Distribution (Victims)

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<td>Up to 20</td>
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<tr>
<td>2</td>
<td>21-30</td>
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<td>35</td>
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<tr>
<td>3</td>
<td>31-40</td>
<td>51</td>
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<td>4</td>
<td>41-50</td>
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<td>11</td>
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<td>5</td>
<td>51-60</td>
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<tr>
<td>6</td>
<td>&gt; 60</td>
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<td>Male</td>
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<td>72</td>
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<td>2</td>
<td>Female</td>
<td>31</td>
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### Table 4: Motives of Homicide

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<th>Percentage</th>
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<tr>
<td>1</td>
<td>Enmity &amp; Revenge</td>
<td>63</td>
<td>56%</td>
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<tr>
<td>2</td>
<td>Family dispute</td>
<td>26</td>
<td>23%</td>
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<td>3</td>
<td>Love affair</td>
<td>09</td>
<td>8%</td>
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<td>4</td>
<td>Robbery</td>
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TABLE 5: WEAPONS / FORCE / METHOD USED

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<tr>
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<td>Sharp force only</td>
<td>33</td>
<td>29</td>
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<tr>
<td>2</td>
<td>Blunt force only</td>
<td>21</td>
<td>19</td>
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<tr>
<td>3</td>
<td>Sharp force and blunt force</td>
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<td>4</td>
<td>Firearm</td>
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<td>5</td>
<td>Burns</td>
<td>01</td>
<td>1</td>
</tr>
<tr>
<td>6</td>
<td>Ligature strangulation</td>
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<td>Smothering</td>
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<td>9</td>
<td>Drowning</td>
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</tr>
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<td>Intentional Neglect</td>
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TABLE 6: CAUSES OF DEATH

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<th>S.No</th>
<th>Cause of Death</th>
<th>Number of Cases</th>
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<tbody>
<tr>
<td>1</td>
<td>Hemorrhagic Shock</td>
<td>66</td>
<td>59</td>
</tr>
<tr>
<td>2</td>
<td>Head injury</td>
<td>34</td>
<td>30</td>
</tr>
<tr>
<td>3</td>
<td>Mechanical asphyxia</td>
<td>09</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>Burns</td>
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<td>5</td>
<td>Poisoning</td>
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<tr>
<td></td>
<td>Total</td>
<td>112</td>
<td>100</td>
</tr>
</tbody>
</table>

Discussion

In the present study the total number of homicidal deaths amounting to murder were 112 over a period of 4 years and it is almost similar to the observations made by Jhaveri et al and Kalpesh et al, however their study duration periods varied between One year and Two years respectively. This could only indicate that murder rates are comparatively lesser when taken year wise compared to their region of study. On the other side, when we compared our findings with those made by Shivakumar et al and Parmar et al, it is differing grossly in numbers under similar study duration period and region. While our study showed that bulk of the victims were belonging to 31-40 years age group, it did not correlate with observations made by any of the authors cited in the discussion section except with that of a study made by Rastogi et al. Majority of the victims in our study were males and this finding has correlated with the observations made by all authors cited above in this section. Further, the most common motive was Enmity and revenge which correlated with some authors cited above who once again included this parameter in their study. The Most common weapon or force used by the perpetrators here was a combination of both sharp and blunt force weapons, and the cause of death was Haemorrhagic shock which
also correlated with all authors cited above.\textsuperscript{4-8}

**Conclusion**

There seems to be a slight decrease in murder-related deaths every year, but it goes without mentioning that the numbers are showing a skewed pattern in this study. Moreover, the decrease is only by digits every year which we do not consider significant. The sudden drop noticed in the last year of this study (2014) is only due to the fact that it was conducted up to mid-2014, hence it will not be appropriate to call it ‘significant drop’ in reality. Unlike other conclusions related to homicidal deaths, we personally feel that murder-related death rate is either static or slightly rising, despite living in a sophisticated era of education.

It would be hard to point out where the fault lies, and it is pointless to suggest law enforcement agencies to take even more strict measures than what it is today in Metropolitan cities. We, the authors are of the conclusion that this menace can be overcome only if every individual makes an effort on his own to educate himself, learn civic sense and strictly observes the laws of the land. ['Eye for an eye only makes the whole world blind' – M.K Gandhi]

**Source of Support:** None

**Conflict of Interest:** None

**Ethical Committee Clearance:** Obtained from JJM Medical college Ethical Committee.

**References**

Effectiveness of Abdominal Drawing in Maneuver with Lumbar Pelvic Exercises on Swiss Ball for Spinal Flexibility Among Patients with Low Back Pain

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Abstract

Background: Patients with nonspecific low back pain have difficulty in their activities of daily living. Spinal flexibility problems are neglected in the patients with low back pain. These problems hamper the activities of daily living. Hence this study will help in improving their flexibility and perform ADL easily. Numerous studies have been done on spinal muscle strengthening, muscle activation to improve muscle endurance and posture in patients with low back pain but less attention has been given to spinal flexibility, which will help them to perform their ADL with ease. Low back pain is a big burden, as it causes more global disability and it is increasing among young individuals. There is paucity of studies as far as abdominal exercises in improving spinal flexibility is concerned.

Aim: To find the effect of abdominal drawing in maneuver and lumbar pelvic exercises on swiss ball among patients with non-specific low back pain.

Methodology: There were 35 participants in the study. The type of study is experimental. The participants involved were assessed for strength, pain and functional mobility. The participants are treated for pain, strength and functional mobility.

Result: There is improvement seen in participants. The results of the participants are calculated by mean and standard deviation. The post mean value of lumbar flexion was 5.926 which was more than pre mean value of lumbar flexion that is 5.558. The post mean value of lumbar extension was 1.378 which was more than pre mean value of lumbar extension that is 1.243. The post mean value of right lumbar lateral flexion was 5.565 which was more than pre mean value of right lumbar lateral flexion that is 5.121. The post mean value of left lumbar lateral flexion was 5.578 which was more than pre mean value of left lumbar lateral flexion that is 5.578.

Conclusion: Abdominal drawing in maneuver and lumbar pelvic exercises on swiss ball are effective in improving spinal flexibility among patients with non-specific low back pain.

Keywords: Low back pain, physiotherapy, abdominal drawing in maneuver, spinal flexibility, core.

Introduction

Low back pain (LBP) is the general problem which influences the majority of adults.¹ Low back pain has been and continues to be, one of the enigmas of the modern medicine.² The epidemic of LBP and the disability associated with it has appeared to escalate. Back pain has now become not only a medical problem, but a social, legal and political one as well.³ Minority of population undergoes LBP recurrence while the others feel constant pain.⁴ The majority of low back pain (LBP) patients are labelled as having non-specific LBP, which is defined as back pain of unknown aetiology.⁵
as symptoms without a clear specific cause (unknown origin). Survey suggests that the lifetime incidence of LBP ranges from 60% to 90% within 5% annual incidence. For younger than 45 years, mechanical LBP represents the most common disability than in person aged older than 45 years. It can be classified as acute (<6 weeks), subacute (between 3 weeks and 6 months), chronic (more than 3 months).

Core is a central and often foundational part. Stability is the property of body that causes it when disturb from a condition of equilibrium or steady motion to develop forces or moments that restore the original condition. Core stability is a generic description for training of abdominal and lumbo-pelvic region. Originally it is associated with the technical change of the surrounding tissues of the spine. Patients with LBP have weak deep muscles.

core stabilization dates back 50 years ago. Today using stability balls and balance boards develops core stabilization. The use of stability ball training for core muscle development has been popular for several years. Multiple studies have examined core muscle recruitment during various types of swiss ball abdominal exercises. These exercises are important for increasing the deep abdominal muscles and improving stability.

A good core conditioning program will decrease the likelihood of back and neck pain. We spend more energy maintaining misalign posture thus creating a situation for muscular and joint pain to arise.

**Material and Method**

There were 41 participants in the study. The study was taken place in Krishna institute of medical sciences. The study is effectiveness of abdominal drawing in maneuver with lumbar pelvic exercises on swiss ball for spinal flexibility among patients with low back pain. The treatment protocol was of 4 weeks. The participants were assessed for lumbar flexion, extension and lateral right and left flexion at first. The type of the study is experimental study. Sample size was calculated by the formula \(4pq/l^2\). Inclusion criteria is both male and female, patients diagnosed with non-specific low back pain, age group between 25-45 years, duration = subacute(between 6 weeks and 3 months). Exclusion criteria is any history of recent injury or medical conditions in past 3 months, any systemic illness, malignancy, spinal or disc pathologies, any recent abdominal or spinal surgery. Outcome measure used for assessing spinal flexibility is measuring range of motion using modified Schober’s test.

**Results**

The study was taken place in Krishna institute of medical sciences. The results were calculated by the pre and post assessment. The mean and SD were calculated. The significance of the study was calculated. The instat software was used to calculate all the results. The values are calculated by paired ‘t’ test. The P value for lumbar flexion is 0.044 which is significant, lumbar extension is 0.012 which is significant, right lateral lumbar flexion is 0.077 which is not quite significant, left lateral lumbar flexion is 0.091 which is not quite significant.

**Chart no. 1: Pre and post changes in lumbar flexion after treatment.**

Interpretation: the mean and SD of pre lumbar flexion is less than post lumbar flexion.

**Chart no. 2: Pre and post changes in lumbar extension after treatment.**

Interpretation: the mean and SD of pre lumbar extension is more than post lumbar extension.
Discussion

The study topic is on effectiveness of abdominal drawing in maneuver (ADIM) with lumbar pelvic exercises on swiss ball for spinal flexibility among patients with low back pain. The aim of the study is to determine effect of abdominal drawing in maneuver (ADIM) with lumbar pelvic exercises on swiss ball for spinal flexibility among patients with non-specific low back pain. The treatment was given by a fixed protocol. The study was taken place in Krishna institute of medical sciences. The number of participants included were 41. Female included in the study were 20 in number and male included were 21. The participants were taken according to the inclusion and exclusion criteria. The participants were assessed for lumbar flexion, lumbar extension and lateral flexion before the treatment. The appropriate treatment for improving spinal flexibility is given. Treatment protocol was for 4 weeks. A consent was taken by the participants before the treatment. After the treatment again the assessment is taken.

There are various studies on effectiveness of the core stabilization on swiss ball and floor with non-specific low back pain and core muscle activation during swiss ball and traditional abdominal exercises. According to a study by the author Wontae Gong, which was done in republic of Korea on effect of bridge exercise accompanied by the abdominal drawing in maneuver on an unstable support surface on the lumbar stability of normal adults showed that when using bridge exercise to improve static lumbar stability and dynamic lumbar stability, performing the bridge exercise accompanied by ADIM on an uneven surface is more effective than performing the exercise on a stable surface. This study supports the study as the outcome of the study is beneficial for the participants.6

Stability exercises is clinically applied as a treatment for patients with low back pain. Bridge exercise is a closed kinetic chain weight bearing exercise applied to improve muscle strength of gluteus maximus and hamstrings in patients with LBP.7

ADIM is the main for the strengthening of the deep muscles such as transverse abdominis, internal and external obliques. ADIM is the exercise method which increases the abdominal pressure by pulling the abdominal walls to the inside that transverse abdominis and obliques are contracted. Because of the increased abdominal pressure, lumbar trunk stability training is effectively accomplished.10

In this study, physiotherapy protocol consisted of following exercises:

1) Curl-up on swiss ball
2) Bridging with ADIM on swiss ball
3) Front plank on swiss ball
4) Side plank on swiss ball
5) Back extension on swiss ball
6) Side flexion on swiss ball

Individuals were instructed to do warm up exercises for 5 minutes. They were asked to perform these exercises for 4 weeks with 4 times in a week with 30 seconds break after each exercise with a cool down
period of 5 minutes at the end of each session.

- 1st week- 6 reps
- 2nd week- 9 reps
- 3rd week- 12 reps
- 4th week- 15 reps with 5-10 sec hold

Patients with low back pain have weak deep muscles so these exercises will increase the strength of deep muscles and improve lumbar stability.

**Conclusion**

Abdominal drawing in maneuver and lumbar pelvic exercises on swiss ball are effective in improving spinal flexibility among patients with non-specific low back pain.

**Acknowledgement:** I would like to express my sincere thanks to Dr. G. Varadharajulu Dean, Faculty of Physiotherapy, KIMSDU, all teaching and non-teaching staff of Faculty of Physiotherapy, KIMSDU, for their valuable suggestions and guidance.

I would like to express my most humble and profound gratitude to my respected Professor Dr. S Anandh, Professor, Faculty of Physiotherapy, KIMSDU for his inspiration, motivation, valuable guidance and suggestions throughout this project.

**Conflict of Interest:** There are no conflicts of interest.

**Funding:** Funding is given by Krishna institute of medical sciences, “Deemed to be” University.

**Ethical Clearance:** Ethical clearance (protocol number 060/2019-2020) was taken from institutional committee of Krishna institute of medical sciences, deemed to be university, Karad.

**References**


low back pain. Cochrane database of systematic reviews. 2005(3).


Saliva in identification of ABO Blood Grouping & Rhesus Factor

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Abstract

Aim: To assess the efficacy and reliability of saliva in identification of ABO blood grouping.

Materials and Method: The study was conducted in the outpatient department of Oral Medicine and Radiology. The serum and saliva of 50 participants were collected and the blood group of the individual from serum was identified by the slide agglutination method and from saliva by the absorption elution method.

Results: Data obtained were subjected to statistical analysis using Paerson’s chi square test and it showed high significance (P = <0.001).

Conclusion: The outcome of the present study showed that saliva can be used as an aid in forensics for identification of ABO blood grouping of an individual.

Key word: ABO blood grouping, Saliva, Identification.

Introduction

Karl Landsteiner discovered ABO blood grouping in early 1900. After his invention many other investigators like MN, Lutheran, Kell, Lewis, Duffy, Kidd, Diego, Dombrock have also described other types of blood grouping system, but till now ABO and Rh groups are in practice and considered as Gold standard method. The blood groups remain the same throughout the life of an individual and this forms the basis for the use of blood groups in medico-legal examination [1].Besides blood these antigens are secreted in various other body secretions such as saliva, semen, gastric juice, nasal secretions, vaginal secretions, sweat, tear, urine etc. Individuals could be classified as “secretors” and “non-secretors” according to their ability to secrete ABO blood group antigens in saliva [2].

Saliva was first analysed for the presence of anti-A and anti-B hemagglutinins in 1928 [3]. In some criminal cases like robbery, rape and hanging, saliva may be found in some form or other and may be the most important source in detecting blood group of a victim or suspected culprit in forensics [4].

There are two main methods for detecting ABO blood group in saliva. The Absorption-Inhibition method and the Absorption-Elution method. In this study an attempt has been taken to find the efficacy and reliability of saliva in identification of ABO blood groups through absorption elution method.

Method and Materials:

A cross sectional study was conducted in the outpatient department of Oral Medicine and Radiology after the approval of the Institutional ethical committee (ECR/761/Inst/TN/2015). The study consisted of 50 participants to whom the nature of the study was explained and written consent was obtained. Participants with haematological disorders were excluded from this study.

For ABO blood grouping in serum, slide
agglutination method was followed where blood was collected by capillary puncture method and placed over three glass slides to which Anti serum A, B and D were added and observed for Agglutination.

For ABO blood grouping from saliva whole saliva was collected by suction method and it was transformed to 3 test tubes to which Antiserum A,B and D were added and left for two and half hours at room temperature. This was kept in hot water bath for 10 minutes and after that 2 drops of fresh saline was added to it. Each sample was washed 3 times with cold saline solution (ie. centrifuged and excess removed by pipette sucking). A drop of patient’s blood (known blood group) was added and incubated for 15 mins at 37 degree centigrade and the test tubes were then centrifuged for 1 minute at 2000rpm. Then presence or absence of agglutination was observed in microscope.

Table 1. Blood groups determined from serum and saliva.

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</tr>
</thead>
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</tr>
<tr>
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### Table 2. Statistical analysis using Pearson chi square test

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<th>Pearson Chi Square Test</th>
<th>Contingency Coefficient</th>
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<td>P-Value</td>
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### Table 3. Correlation between the Genders

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<th>Contingency Coefficient</th>
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<td></td>
</tr>
<tr>
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<td>O+</td>
<td>0 .00 0 .00 3 100.00 0 .00 0 .00 0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AB+</td>
<td>0 .00 0 .00 0 0 .00 2 100.00 0 .00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B-</td>
<td>0 .00 0 .00 0 .00 0 .00 3 100.00</td>
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</tr>
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Results

Out of 50 participants, 22 were male and 28 were female. The blood groups determined from serum and saliva are shown in (Table 1). The blood groups B+, AB+, B- have high secretor levels compared to other blood groups. The correlation of blood groups between serum and saliva were statistically analysed using Pearson chi square test. (Table 2) It was seen that there was high statistical significance between serum and salivary ABO blood grouping (P<0.001). Pearson chi square test value was 185.16 and the coefficient value was 0.887. The correlation between Genders is shown in Table 3.

Discussion

Determination of blood group is useful in identification of a subject especially in medicolegal cases like those involving child abuse, rape and murder, etc. In some situations blood may be absent at the scene [5]. In such conditions an alternative is required for identification of an individual. Although ABO and Rh factor in serum is the gold standard method, blood group specific antigens can also be found in other body secretions. Saliva is a biological fluid which not only helps in identification of systemic problems but also in forensic for identification. Saliva might be found on different substances at the scene of a crime.

Yamakami discovered the presence of A and B antigens in saliva [6]. In 1963, Outride compared the absorption elution and absorption inhibition method and concluded that the former is more sensitive [7] and the studies done by Kaur et al.[8] and Aye et al.[9] were in accordance to this. So in this study absorption elution method is followed in identification of ABO blood grouping in saliva. According to the study conducted by Igbeneghu C et al.[10] frequency of secretor was common in blood group O followed by A, B and AB. Emeribe et al. [11] and Jaff [12] reported similar findings in their studies. Saboor M et al.,[13] conducted a study to evaluate the ABH blood group among 101 healthy adult students and concluded that the frequency was highest in blood group B which was in accordance with our study. It is also seen that out of 50 subjects, 48 of them showed the secretor level similar to the study conducted by Pereira M et al.,[14] Kimura A et al.,[15] Parekh P et al.,[16] and Pawan Motghare et al [4]. This study also shows that the ability to secrete ABO blood group antigens in saliva was more common in males than in females. The correlation (Table 2) proves that saliva can be used in identification of ABO Blood grouping and Rh factor (p < 0.001).

The limitation of the study is that it has a small sample size and the segregation of secretors and non-secretors also play a significant role in determining the accuracy of the tests [17].

Conclusion

Saliva plays a major role not just in oral cavity but it also as a mirror of our body system. The outcome of the present study showed that saliva can be used in identification of ABO blood group but further studies on large sample size should be done to ascertain the diagnostic value of saliva in forensic.

Source of Funding—Nil

Conflict of Interest—Nil

References

8. Kaur G, Sharma VK. Comparison of absorption


Pattern of Injuries in Road Traffic Accidents – An Autopsy Study

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Abstract

The present study is a retrospective study conducted in the department of Forensic Medicine and Toxicology at East Point College of Medical Sciences and Research Centre, Bangalore, for a period of one year, from September 2018 to August 2019. During this period a total of 46 cases of road traffic accidents were reported amounting to 34.6% of total medico-legal autopsies conducted (133 cases).

Among 46 cases of road traffic accident majority were males 39 (84.8%) and females account to 7 cases (15.2%). Majority of the victims belonged to age group of 31 - 50 years. According to the road user category involved in the accident the maximum were pedestrians (45.7 %) followed by the two wheeler (43.5 %) and the main offending vehicle involved in the accidents were two wheeler (43.5 %). High proportion of cases showed skull fractures (87 %), 52.2 % shows chest bone fractures, followed by lower limb (32.6 %) and upper limb (21.7 %) fractures. Most of the skull fractures were associated with brain injury (82.6%) in the form of laceration or contusions of brain or brain haemorrhages, followed by thoracic injuries leading to lung lacerations or contusions (30.4%). Following the road traffic accidents, most of the victims (80.4%) died at the scene before reaching the hospital.

Keywords: Road traffic accidents, skull fractures, thoracic injuries, safety measures.

Introduction

The number of road traffic deaths continues to rise, reaching 1.35 million in 2016. It is the eighth leading cause of death among people of all ages worldwide. It is the leading killer among children and young adults aged between 5 to 29 years. More than half of global road traffic deaths are amongst pedestrians, cyclist and motorcyclists who are still neglected in road traffic system design in many countries. However, the rates of death relative to the size of the world’s population has stabilized in recent years.¹

India accounts for about 10 percent of road accident fatalities worldwide, 85% of all road accident deaths occurring in developing countries, and nearly half in the Asia - Pacific region. The increased rate of fatal road traffic accident worldwide has been attributed to population explosion and increased motorization.²³ A road traffic accident can be defined as “an event that occurs on a way or street open to public traffic; resulting in one or more persons being injured or killed where at least one moving vehicle is involved”.⁴

A total of 4,64,910 road traffic accident cases were reported and among these 1,47,913 deaths were reported in India during 2017. In the same year Karnataka state reported 42,542 cases of road traffic accident.⁵ RTA is the public health issue and cost a lot to individuals, families, communities and nations. The estimated cost is around 1 - 2% of a country’s GNP in lower income countries.⁶⁷

In any road traffic accident cases, the pattern of injury, fatal and otherwise, varies considerably depending upon whether the victim is a vehicle occupant, a motorcyclist, a pedal cyclist or a pedestrian.⁸

Material and Method

The present study is a retrospective study of medico legal autopsies of all fatal cases of Road Traffic Accident brought to Morgue, East Point College of Medical Sciences and Research Centre, in east part of Bengaluru for a period of one year from September 2018 to August 2019.
Relevant information was collected from Post mortem registers/records, Inquest papers and Post mortem reports. The relevant details were analyzed and results were presented as frequency and percentage in figures and tables.

Results and Discussion

In the present study period a total of 133 medico-legal autopsies were conducted, among them 46 cases were due to road traffic accident comprising 34.6% of total cases, followed by hanging (26.3%). (Table 1) Among 46 cases of road traffic accident majority were males 39 (84.8%) and females account to 7 cases (15.2%). (Figure 1) Majority of the victims belonged to age group of 31 - 50 years (52.2%). (Table 2). These are similar to the studies done by Jha N9, Azmani w10, Aygencel G11, Menon A12, Montazeri A13, Harish D14, Bansal YS15. The high preponderance of males can be attributed to frequent use of vehicles by males and their high contact with the traffic. The young and middle age groups largely consisted of the working populace who travel using their own vehicles, use public transport or walk. In comparison to other age groups, the younger demographic seem more liable to meet RTA, presumably because their activities require them to travel more than the older demographics.

According to the road user category involved in the accident the maximum were pedestrians (45.7 %) followed by the two wheeler (43.5 %). (Table 3) In our study, main offending vehicle involved in the accidents were two wheeler (43.5 %). Ours being a rural part, the majority of the road users were either pedestrians or two wheeler users. The choice of manner of transportation was often influenced by the working pattern of that particular demographic area. The lack of a transport medium between rural roads to state or national highways requires commuters to either walk or use their personal vehicles to reach the nearest point of accessibility. This creates massive traffic managing issues in most parts of the city, also leads to traffic rule violations and increase in number of RTAs. An amplified number of vehicles and reduced attention of drivers and pedestrians related to the fatigue of the day; failure to follow traffic rules, associated with improper infrastructure like the absence of footpaths were the greatest cause of accidents. Other studies from different parts of the country showed pedestrians being the commonest victims.12,13,19,21,23,24.

In our study most of the skull fractures were associated with brain injury (82.6%) in the form of laceration or contusions of brain or brain haemorrhages, followed by thoracic injuries leading to lung lacerations or contusions (30.4%). (Table 5). A high occurrence of brain injury was due to the fact that majority of two wheeler users were not using helmets while light motor vehicle users were travelling without safety measures like seat belts causing dash-board or wind screen injury and in the pedestrian it can be explained due to the fact that after primary impact, it was produced by vehicle to being run over in most instances. Head injury was the most common cause of death which has also been documented by other researchers.12,13,19,21,23,24.

Following the road traffic accidents, most of the victims (80.4%) died at the scene before reaching the hospital. While (8.7%) of them died within 24 hours after the accident, 6.5% survived for a period of 2-6 days, 4.4% cases survived for a period of 7-10 days. (Table 6). These findings are similar to the studies by Menon A12, Montazeri A13.

In the present study high proportion of cases showed skull fractures (87 %), 52.2 % shows chest bone fractures, followed by lower limb (32.6 %) and upper limb (21.7 %) fractures. (Table 4). These findings are similar to the studies by Chaudhary et al19, Kumar A22, Kyada H C23.

Figure 1 – Sex wise distribution of cases
Table 1: Profile of Medico-legal autopsies conducted during the study Period

<table>
<thead>
<tr>
<th>Type of Case</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTA</td>
<td>46</td>
<td>34.6</td>
</tr>
<tr>
<td>Hanging</td>
<td>35</td>
<td>26.3</td>
</tr>
<tr>
<td>Natural Death</td>
<td>19</td>
<td>14.3</td>
</tr>
<tr>
<td>Poisoning</td>
<td>17</td>
<td>12.8</td>
</tr>
<tr>
<td>Electrocution</td>
<td>6</td>
<td>4.5</td>
</tr>
<tr>
<td>Drowning</td>
<td>4</td>
<td>3.0</td>
</tr>
<tr>
<td>Fall from Height</td>
<td>3</td>
<td>2.2</td>
</tr>
<tr>
<td>Assault</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>Snake bite</td>
<td>1</td>
<td>0.8</td>
</tr>
<tr>
<td>Total</td>
<td>133</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2: Age and Gender wise distribution of cases of RTA

<table>
<thead>
<tr>
<th>Age Group (in Yrs)</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>0-10</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>11-20</td>
<td>6</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>21-30</td>
<td>7</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>31-40</td>
<td>12</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>41-50</td>
<td>11</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>51-60</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>61-70</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>7</td>
<td>46</td>
</tr>
</tbody>
</table>

Table 3: Road User Category of cases of RTA

<table>
<thead>
<tr>
<th>Road User Category</th>
<th>No. Cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two wheeler</td>
<td>21</td>
<td>45.7</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>20</td>
<td>43.5</td>
</tr>
<tr>
<td>Light Motor Vehicle</td>
<td>2</td>
<td>4.3</td>
</tr>
<tr>
<td>Heavy Motor Vehicle</td>
<td>1</td>
<td>2.2</td>
</tr>
<tr>
<td>Three wheeler</td>
<td>2</td>
<td>4.3</td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
<td>100</td>
</tr>
</tbody>
</table>
### Table 4: Distribution of cases of RTA on Fracture of Bones

<table>
<thead>
<tr>
<th>Type of Bone Fractured</th>
<th>Motorcycle Rider</th>
<th>Pillion Rider</th>
<th>Pedestrians</th>
<th>Vehicle Drivers</th>
<th>Front/Rear Seat Occupants</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>Skull</td>
<td>14</td>
<td>87.0</td>
<td>1</td>
<td>5.0</td>
<td>20</td>
<td>13.0</td>
</tr>
<tr>
<td>Facial Bones</td>
<td>2</td>
<td>13.0</td>
<td>1</td>
<td>5.0</td>
<td>2</td>
<td>13.0</td>
</tr>
<tr>
<td>Vertebrae</td>
<td>2</td>
<td>13.0</td>
<td>1</td>
<td>5.0</td>
<td>3</td>
<td>13.0</td>
</tr>
<tr>
<td>Chest Bones</td>
<td>9</td>
<td>52.2</td>
<td>3</td>
<td>15.0</td>
<td>10</td>
<td>62.0</td>
</tr>
<tr>
<td>Upper Limb</td>
<td>5</td>
<td>21.7</td>
<td>0</td>
<td>0.0</td>
<td>4</td>
<td>25.0</td>
</tr>
<tr>
<td>Lower Limb</td>
<td>5</td>
<td>32.6</td>
<td>1</td>
<td>5.0</td>
<td>8</td>
<td>50.0</td>
</tr>
<tr>
<td>Pelvis</td>
<td>2</td>
<td>8.7</td>
<td>1</td>
<td>5.0</td>
<td>1</td>
<td>6.25</td>
</tr>
</tbody>
</table>

### Table 5: Distribution of cases of RTA on Tissue / Visceral Injuries

<table>
<thead>
<tr>
<th>Tissue / Viscera</th>
<th>Motorcycle Rider</th>
<th>Pillion Rider</th>
<th>Pedestrians</th>
<th>Vehicle Drivers</th>
<th>Front/Rear Seat Occupants</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>Brain</td>
<td>12</td>
<td>82.6</td>
<td>1</td>
<td>5.0</td>
<td>20</td>
<td>13.0</td>
</tr>
<tr>
<td>Spinal Cord</td>
<td>2</td>
<td>6.5</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>6.5</td>
</tr>
<tr>
<td>Lungs</td>
<td>5</td>
<td>30.4</td>
<td>2</td>
<td>12.5</td>
<td>6</td>
<td>37.5</td>
</tr>
<tr>
<td>Heart</td>
<td>1</td>
<td>4.4</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>6.5</td>
</tr>
<tr>
<td>Liver</td>
<td>2</td>
<td>15.2</td>
<td>1</td>
<td>5.0</td>
<td>3</td>
<td>18.8</td>
</tr>
<tr>
<td>Spleen</td>
<td>2</td>
<td>10.9</td>
<td>1</td>
<td>5.0</td>
<td>2</td>
<td>12.5</td>
</tr>
<tr>
<td>Kidney</td>
<td>0</td>
<td>6.5</td>
<td>0</td>
<td>0.0</td>
<td>3</td>
<td>18.8</td>
</tr>
</tbody>
</table>

### Table 6: Distribution of cases of RTA on Time of Survival of Victims

<table>
<thead>
<tr>
<th>Survival Period</th>
<th>Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
</tr>
<tr>
<td>Died on Scene</td>
<td>37</td>
</tr>
<tr>
<td>&lt; 24 Hrs</td>
<td>4</td>
</tr>
<tr>
<td>2 – 6 Days</td>
<td>3</td>
</tr>
<tr>
<td>7 – 10 Days</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
</tr>
</tbody>
</table>
Conclusion and Recommendations

This study showed that road traffic accidents contribute to majority of deaths, more common in the younger age groups and male sex. Majority of victims were pedestrians and main offending vehicle involved in the accidents were two wheelers. Higher incidence of skull fractures was observed along with associated brain injuries.

Road traffic accidents are an evolving problem in our country as the number of vehicles are increasing day by day. Stringent laws regarding speed limit, use of safety belts and helmets and other traffic violations together with better quality roads, provision for pedestrian walking and crossing and roadside illumination will go a long way in preventing much of such tragedies. A multidisciplinary approach consisting of public education, a proper pre-hospital trauma care system and definitive trauma care facilities coupled with rehabilitation is required to be put in place if any impact is foreseen on this ever growing epidemic on the roads.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Taken from the Institutional Ethical Committee.

References


Chromatographic Analysis of General OTC Anti-Allergic Drug: Cetirizine

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Abstract

Cetirizine as general OTC anti-allergic drug was evaluated through paper chromatography. Twelve cetirizine compositions were analysed wherein each tablet and syrups were six in number. Seven solvent systems were experimented from which chloroform and methanol in ratio 50:50 proved to be best solvent system for both cetirizine tablet and syrup compositions. Other solvent system that showed clear separation of spots were n-hexane, toluene and diethyl ether in ratio 65:25:10 and acetone and methanol in ratio 90:10 for tablet and syrup preparations respectively. Iodine fuming technique and UV radiations were also utilized for visualising some unidentified and invisible spots during the examination procedures.

Keywords: Cetirizine, OTC drug, Paper chromatography, Iodine fuming, UV radiations.

Introduction

OTC medications are as opposed to professionally prescribed medications that do not require a specialist’s order and can be straightforwardly taken from any therapeutic shop \textsuperscript{1-2}. There are an expected 350,000 OTC medications which can be acquired from drug stores, supermarkets and comfort stores with no prescription. They incorporate analgesics, cold and hack drugs, stomach settling agents, antihistamines, narcotics and so on. The majorly abused OTC drugs included dextromethorphan, acetaminophen, ibuprofen, diet pills, sexual performance medicines, herbal ecstasy, cetirizine etc. in light of their simple accessibility, they can be used to ease assortment of day by day medical issues\textsuperscript{3}. Some OTC medications, when taken with liquor cause sleepiness, tipsiness, elation, anxiety, obscured vision, ringing in ears and so on. At a higher portion, these impacts are escalated alongside different side effects, for example, disarray, muscle jerking, sporadic heartbeat, tremors, seizures and so forth. They may weaken the capacity to securely drive a vehicle since they can cause laziness or edginess. Cases may incorporate mishaps because of the abuse of medications or conscious overdose or they could add to vehicle mishaps etc\textsuperscript{4}. The misuse of these medications is a genuine and developing general medical issue everywhere throughout the world. Enormous portions of OTC medications can be destructive. At the point when taken in overabundance sum reliance can be created. Maltreatment of OTC medications causes physiological reliance, mentally reliance or both. Cases had been reported in which death occurred due to toxic effects induced by ingestion of high amounts of cough–cold preparations\textsuperscript{5}.

Cetirizine is also a OTC drug that reduces brain activity and produces sleepiness, dizziness and low body activity when taken in prescribed amount. It will work as depressant for CNS if taken in excessive amount. A study demonstrated that 38 percent of illegal medication use among young people and kids from 1990 to 1999 included OTC medications. Studies suggest that teenagers and youthful grown-ups are at most serious danger of OTC medication misuse \textsuperscript{6-11}.

Number of studies for detection and quantification of active components in OTC cough and cold preparations using thin layer chromatography, high performance thin layer chromatography, reverse phase high performance liquid chromatography have been discussed in literature.
So far ultraviolet spectrophotometer for estimating the combined dosage of levocetrizine hydrochloride and phenylephrine hydrochloride has been used. Gas chromatography–mass spectrometry, liquid chromatography–tandem mass spectrometry and ultra-performance liquid chromatography–tandem mass spectrometry has been also mentioned to be used in identification of active components and their metabolites in toxicological samples using. Therefore, the present work has been attempted to analyse the Cetirizine as OTC drug by paper chromatography in both powder form as well as syrup form.

**Material and Method**

For evaluating the potentiality utility of chromatography in assessing cetirizine through chromatography twelve preparations of OTC drug was purchased in the form of tablets and syrups were purchased from the local market (Table No. 1). The standard sample of cetirizine hydrochloride was procured from the local chemical supplier. The samples were prepared from each six tablets by crushing them in pestle-mortar individually to powdered form. 0.5 mg powder from each tablet was taken and dissolved in 4-5 drops of acetone thoroughly in six different test tubes and kept for a few minutes. The contents were then filtered through Whatman filter paper no. 1. The filtrate was collected and centrifuged. The supernatant was transferred to another clean test tube for TLC analysis. Therefore, six test tubes were ready with tablet samples. Similarly, six Cetirizine hydrochloride syrup preparations were taken and two drops from each was dissolved in 10-15 drops of acetone in six different test tubes. Similarly, the standard Cetirizine hydrochloride powder of 0.5 mg was taken in a test tube and dissolved thoroughly. Hence, total 12 test tubes were ready to develop the each samples in each seven different solvent systems. Seven solvent systems were selected for the study and were prepared in different ratios to assess their potentiality in chromatographic analysis of cetirizine preparations (Table no. 2). The Whatman filter strips with 150 GSM were selected as stationary phase and cut into different sizes such as 3 X 8 cm, 6X 12 cm and 8 X 12 cm. Then TLC chamber of 300 ml was taken and was rinsed with acetone to remove dirt or oil. The solvent systems chosen were poured in twelve different chambers and kept aside for few minutes. In the mean time, spotting of samples was carried with micro capillary tube at the height of 1.5 cm above the base of paper. After that, strip was kept aside for a minute. Later on, each strip carrying the samples was placed in the TLC chambers vertically till completely run. The strips were taken out and allowed to dry and then examined physically, under UV light and with iodine fuming technique.

**Result and Discussion**

The results of chromatographic development of 12 samples of OTC cetirizine drugs have been tabulated Table no. 3-6. The samples were developed in seven different solvent systems. The developed strips were then examined physically, with UV light as well as by iodine fuming method too. The results were obtained in terms of number of spots and their respective hRf values were calculated and found to be different with different solvent system.

**FOR TABLETS:** It was noticed from table no.3 that solvent systems A was most suitable in developing and separating the cetirizine from all the five tablets and some spots were clearly visible physically and some were developed with iodine fuming techniques (Figure 1). The hRf were calculated for all the samples developed with mobile phase of chloroform and methanol with ratios 50:50. No spot developed under UV light in strips developed with solvent system A. Other mobile phases that showed positive results were D and E in tablet no 2 and 1 respectively whereas solvent system G had separated out the component in tablet no. 1,2 and 4. No spot was developed with solvent system B,C and F with any tablet. The hRf values were came to be 32, 49, 47,66, 70 for the 1-5 no. Tablets with A solvent system. The rest hRf values were 24 and 54 of tablet no 1 with E and G, 34 and 38 with tablet no 2 with D and G solvents system and 47 and 49 of tablet no 4 with E and G mobile phases.

**FOR SYRUPS:** It is apparent from table no.4 that solvent systems A and E was most suitable in developing and separating the cetirizine from all the six syrup preparations whereas mobile phases C,D and F showed positive results in few tablets [Figure 2]. No spot was developed with solvent system B,C and F with any syrup. The hRf were calculated for all the samples developed with mobile phase of chloroform and methanol with ratios 50:50 and n-hexane: toluene: diethyl ether in ratio 65:25: 10. No spot developed under UV light in strips developed with solvent system A. Other mobile phases that showed positive results were D and E in tablet no 2 and 1 respectively whereas solvent
system G had separated out the component in tablet no. 1, 2 and 4. The hRf values were came to be 76, 50, 79, 35, 34 and 15 for the 1-6 no. syrups with A solvent system and 23, 54, 79, 29, 28 and 42 with E solvent system. The rest hRf values were 54 and 46 of tablet no 1 and 4 with F, 42 with tablet no 1 with C and 51 and 29 with tablet no. 2 and 5 respectively with D solvents system.

Rest all the solvent systems showed no results under UV or with treatment to iodine fuming. Similar studies have reported where chloroform: ethanol (90:10) was found to be most suitable for cough cold tablets and syrups medications. Another studied and found the ethyl acetate, methanol and concentrated ammonia in the ratio of 85:5:10 is a suitable mobile phase to separate different components analyzed dextromethorphan hydro bromide using TLC.

Likewise, dextromethorphan hydro bromide was successfully examined under short UV radiation in toluene: methanol: chloroform: glacial acetic acid (65:1.5:1.5:0.5) as the best solvent.

Therefore, in the present study chloroform (70:30) was found to be the best solvent system for syrups as well as tablets. Iodine fuming was non-destructive method of visualization of invisible spots for the subsequent instrumental analysis of the eluted active components. Each sample of Cetirizine medicines showed a different number of spots. The prospective of the paper chromatography for separation of active ingredients of cetirizine medication in the study were found to be exceptional good. Hence, it can be utilised with great confidence for the analysis of citrezine components in syrups and tablets.

Table 1 showing description of cetirizine used used in study.

<table>
<thead>
<tr>
<th>Code of sample</th>
<th>Sample name</th>
<th>Color</th>
<th>Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cizine</td>
<td>White</td>
<td>Tablet</td>
</tr>
<tr>
<td>2</td>
<td>Cetirizine dihydrochloride</td>
<td>White</td>
<td>Tablet</td>
</tr>
<tr>
<td>3</td>
<td>Citraclor</td>
<td>White</td>
<td>Tablet</td>
</tr>
<tr>
<td>4</td>
<td>Cetzine</td>
<td>White</td>
<td>Tablet</td>
</tr>
<tr>
<td>5</td>
<td>Cold M</td>
<td>White</td>
<td>Tablet</td>
</tr>
<tr>
<td>6</td>
<td>Allercet</td>
<td>White</td>
<td>Tablet</td>
</tr>
<tr>
<td>7</td>
<td>Cetirizine drops</td>
<td>Transparent</td>
<td>Liquid</td>
</tr>
<tr>
<td>8</td>
<td>Okacet</td>
<td>Yellow</td>
<td>Liquid</td>
</tr>
<tr>
<td>9</td>
<td>Klavin</td>
<td>Light pink</td>
<td>Liquid</td>
</tr>
<tr>
<td>10</td>
<td>Zyrtec</td>
<td>Transparent</td>
<td>Liquid</td>
</tr>
<tr>
<td>11</td>
<td>Relent plus</td>
<td>Transparent</td>
<td>Liquid</td>
</tr>
<tr>
<td>12</td>
<td>Montair</td>
<td>Transparent</td>
<td>Liquid</td>
</tr>
</tbody>
</table>

Table 2 showing ratios of solvent systems chosen for the study.

<table>
<thead>
<tr>
<th>Code of Mobile phase</th>
<th>Solvent systems</th>
<th>Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>A.</td>
<td>Chloroform:methanol</td>
<td>80:20</td>
</tr>
<tr>
<td>B.</td>
<td>Chloroform: acetone</td>
<td>60:40</td>
</tr>
<tr>
<td>C.</td>
<td>Chloroform: Methanol</td>
<td>50:50</td>
</tr>
<tr>
<td>D.</td>
<td>Cyclohexane: toluene</td>
<td>30:70</td>
</tr>
<tr>
<td>E.</td>
<td>n-hexane: toluene: diethyl ether</td>
<td>65:25:10</td>
</tr>
<tr>
<td>F.</td>
<td>Petroleum ether: liquid paraffin</td>
<td>85:15</td>
</tr>
<tr>
<td>G.</td>
<td>Acetone: methanol</td>
<td>90:10</td>
</tr>
</tbody>
</table>
Table 3: showing the Rf values calculated for the tablets developed in different mobile phases.

<table>
<thead>
<tr>
<th>Solvent system</th>
<th>Cizine</th>
<th>Citrazine dihydrochloride</th>
<th>Citraclor</th>
<th>Cetazine</th>
<th>Cold –M</th>
<th>Allercet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chloroform: methanol (A)</td>
<td>32</td>
<td>49</td>
<td>47</td>
<td>66</td>
<td>79</td>
<td>-</td>
</tr>
<tr>
<td>Chloroform: acetone (B)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Chloroform: ethanol (C)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cyclohexane: toluene (D)</td>
<td>-</td>
<td>34</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>n-hexane: toluene: diethyl ether (E)</td>
<td>24</td>
<td>-</td>
<td>-</td>
<td>47</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Petroleum ether: liquid paraffin (F)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Acetone: methanol (G)</td>
<td>54</td>
<td>38</td>
<td>-</td>
<td>49</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 4: showing the Rf values calculated for the syrups developed in different mobile phases.

<table>
<thead>
<tr>
<th>Solvent system</th>
<th>Citrazine drops</th>
<th>Okacet</th>
<th>Klavin</th>
<th>Zyrtec</th>
<th>Relent plus</th>
<th>Montair</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chloroform: methanol</td>
<td>76</td>
<td>50</td>
<td>79</td>
<td>35</td>
<td>34</td>
<td>15</td>
</tr>
<tr>
<td>Chloroform: acetone</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Chloroform: ethanol</td>
<td>42</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Cyclohexane: toluene</td>
<td>-</td>
<td>51</td>
<td>--</td>
<td>-</td>
<td>29</td>
<td>-</td>
</tr>
<tr>
<td>n-hexane: toluene: diethyl ether</td>
<td>23</td>
<td>54</td>
<td>79</td>
<td>29</td>
<td>28</td>
<td>42</td>
</tr>
<tr>
<td>Petroleum ether: liquid paraffin</td>
<td>54</td>
<td>-</td>
<td>-</td>
<td>46</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Acetone: methanol</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Figure 1 showing developments of spots for tablets with cetirizine composition in Acetone: methanol (90:10) solvent.

Figure 2 showing developments of six spots for six syrups with cetirizine composition in chloroform: methanol (70:30) solvent.

Conclusion

The complexity of OTC medication arrangements makes the distinguishing proof of their dynamic components very troublesome sometimes. Paper chromatography system is fast and economical strategy for the breaking up of dynamic segments in complex OTC medication. From this study, it has been established that chloroform and methanol in ratio 50:50 proved to be best solvent system for both cetirizine tablet and syrup compositions. Along with this, n-hexane, toluene and diethyl ether in ratio 65:25:10 and acetone and methanol in ratio 90:10 for tablet and syrup preparations respectively were the solvent systems that demonstrated unambiguous separation of spots. Iodine fuming technique was considered to be best for visualising some unidentified and invisible spots during the examination procedures than the UV radiations.

Ethical Clearance- Not required.

Source of Funding- Self.

Conflict of Interest – Nil.

References


Pattern of Injuries Observed in Drivers Involved in Fatal Road Traffic Accidents in Tirupati

B. Venkatesulu1, Vishnu Vardhan Poluru2, M. Abdul Khalid3

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Abstract

Road Traffic Accidents (RTA) constitute a significant health problem. They constitute the 8\textsuperscript{th} leading cause of death. The aim of this study was to analyse road traffic accidents in Tirupati city and find out the pattern of injuries in drivers who were victims of fatal road traffic accidents.

This retrospective study was conducted at the Department of Forensic medicine, S.V Medical College, Tirupati during period 2016 to 2018. Specific findings regarding the injuries sustained to the drivers were noted.

A total of 904 people were killed in RTA and were brought to the morgue for postmortem examination. Out of all victims 170 (18.80\%) were drivers. Most common age group involved was 30 – 39 yrs. Most of the drivers were males. Polytrauma with lower limb injuries accounted for most common injury in drivers (40.35\%) followed by head injury (19.29\%) and thoracic injury (12.28\%). This study has shown the vulnerability of the vehicle drivers to fatal injuries during RTA. Hence, there is a need for road safety awareness, usage of seat belts, strict enforcement of laws, maintaining vehicle fitness etc. to protect the vulnerable group of people, to decrease the associated morbidity, mortality and reduce the economic burden to the society/ country at large.

Key words: Road traffic accidents, Drivers, Autopsy, Injury patterns

Introduction

Accidents are killing more people in India than terrorism or natural disasters and yet we never talk about them' Mr. Nitin Gadkari, surface transport minister\textsuperscript{1}.

Each year an estimated 1.35 million people die as a result of road traffic collisions with more than 3700 deaths each day\textsuperscript{2}. Road traffic injuries are estimated to be the eighth-leading cause of death globally for all ages and the leading cause of death in children and young people of 5 – 29 years of age\textsuperscript{2}.

India ranks 1 in the number of road accident deaths across the 199 countries reported in the World Road Statistics, 2018 followed by China and US. As per the WHO Global Report on Road Safety 2018, India accounts for almost 11\% of the accident related deaths in the World. In the year 2018, 1,51,417 persons got killed and 4,69,418 were injured in about 4,67,044 road accidents\textsuperscript{2}.

This study reviews the various postmortem reported injuries sustained by vehicle drivers among the road traffic accidents victims. The results of this study shall contribute for better understanding of RTA.
Materials and Methodology

This study is a retrospective review of various autopsy diagnosed injuries of drivers involved in RTA. Study was conducted at the Department of Forensic Medicine, Sri Venkateshwara Medical College, Tirupati, Andhra Pradesh. The data was collected from postmortem records spanning from 2016 to 2018.

The data extracted was grouped according to Age, sex and diagnosis. RTAs reported cases involving vehicle drivers were included in this study except those with incomplete or missing information on type of injury and cause of death. The data collected comprised of the following parameters
- Characteristics of road traffic accidents
- Year wise death of drivers
- Types of accidents
- Injury characteristics

Data was entered into SPSS version 20 database.

Permission for access to records was taken from appropriate authorities at the inception of this study. This study was approved by Institutional ethical committee, Sri Venkateshwara Medical College, Tirupati, Andhra Pradesh.

Results and Observations

A total of 904 RTA related deaths occurred during 2016 to 2018 (Table 1). This study had 167 (98.23%) males and 03 (1.76%) female drivers. The minimum and maximum age being 20 and 65 respectively with highest number of victims, 59 (34.70%) between 30-39 years age group (Table 2).

The most common trauma was fractures with 77 (45.29%) cases, followed by internal haemorrhage 40 (23.52%), lacerations 23 (13.52%) (Table 3). Extremities were most involved (45.61%) followed by head injury, 33(19.29%) and thoracic injury 21(12.28%). Spine injury had the least incidence with 3 (1.76%) cases (Figure 1).

The highest male driver incidence was between the ages of 30 -39 sustained more injuries than any other age groups. This age group being most active, working is more prone for RTAs. Kochar et al7 has reported that maximal fatal accidents have occurred in the age group of 31–40 years. Bener8 recorded high prevalence between 10 to 40 years while the nodal age range of Jha et al3 was from 20 to 49 years.

The least incidence was in 60 - 69 years age group, accounting for 3.52% of all injury cases. Jha et al3 and Ossie et al5 reported similar findings.

Most of the incidences in study period occurred in 2018, with 68 (40.0 %) cases followed by 2017, 55(32.35%) indicating the increase in number of driver fatalities. Rise in the number of vehicles and rapid industrialisation has led to overall increase in RTAs.

Among the type of injuries recorded, fractures were at the pinnacle accounting for 45.29% of all injuries, followed by internal haemorrhage, 23.52%. Similar findings were reported by Jha et al3 and Supriya et al9. In contrast Seid et al4 and Ossei et al5 recorded higher incidence of head injuries. The present study found that lower limbs (22.94%) were the commonest site for fracture, followed by fracture of upper limb (10.58%) and skull (6.47%). Similar findings were reported by Abdul Hameed Ali et al10.

According to the site of injuries, extremities (upper and lower limbs) accounted for 45.61% of all injuries followed by head injuries (19.29%), thoracic injuries (12.28%), pelvic injury (8.77%), abdominal injury
(7.01%) and neck injury (4.69%). Similar findings were recorded by B. Mishra et al\textsuperscript{11}, P.L. Chalya\textsuperscript{12} and P.J. Bhuyan et al\textsuperscript{13}.

Majority of the driver deaths, 135 (79.41%) were due to collision accidents with other vehicles or fixed objects. 35 (20.58%) cases were due to overturning accidents. Similar results were seen in study by Abdul Hameed Ali et al\textsuperscript{10}.

### Table 1: Year wise distribution of RTAs involving drivers

<table>
<thead>
<tr>
<th>Year</th>
<th>RTA in which drivers were involved</th>
<th>Drivers dead in RTA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>270</td>
<td>47</td>
</tr>
<tr>
<td>2017</td>
<td>303</td>
<td>55</td>
</tr>
<tr>
<td>2018</td>
<td>331</td>
<td>68</td>
</tr>
<tr>
<td>Total</td>
<td>904</td>
<td>170</td>
</tr>
</tbody>
</table>

### Table 2: Year, Age and Sex wise distribution of cases

<table>
<thead>
<tr>
<th>Year</th>
<th>20-29(%)</th>
<th>30-39(%)</th>
<th>40-49(%)</th>
<th>50-59(%)</th>
<th>60-69(%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>13</td>
<td>16</td>
<td>11</td>
<td>6</td>
<td>1</td>
<td>47</td>
</tr>
<tr>
<td>2017</td>
<td>15</td>
<td>18</td>
<td>11</td>
<td>8</td>
<td>3</td>
<td>55</td>
</tr>
<tr>
<td>2018</td>
<td>17</td>
<td>25</td>
<td>12</td>
<td>12</td>
<td>2</td>
<td>68</td>
</tr>
<tr>
<td>Total</td>
<td>45</td>
<td>59</td>
<td>34</td>
<td>26</td>
<td>9</td>
<td>170</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sex</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>45</td>
<td>2</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>57</td>
<td>1</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>33</td>
<td>-</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>-</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>-</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>167</td>
<td>3</td>
<td>170</td>
</tr>
</tbody>
</table>

### Table 3: Types of injuries sustained by the drivers

<table>
<thead>
<tr>
<th>Type of injury</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fracture</td>
<td>77</td>
<td>45.29</td>
</tr>
<tr>
<td>Dislocation</td>
<td>10</td>
<td>5.88</td>
</tr>
<tr>
<td>Crush injury</td>
<td>04</td>
<td>2.35</td>
</tr>
<tr>
<td>Cut wound/laceration</td>
<td>23</td>
<td>13.5</td>
</tr>
<tr>
<td>Blunt injury</td>
<td>16</td>
<td>9.41</td>
</tr>
<tr>
<td>Internal haemorrhage</td>
<td>40</td>
<td>23.52</td>
</tr>
<tr>
<td>Total</td>
<td>170</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 4: Distribution of cases according to accident type

<table>
<thead>
<tr>
<th>Accident type</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overturning accident</td>
<td>13</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>Collision with other vehicles</td>
<td>21</td>
<td>27</td>
<td>35</td>
</tr>
<tr>
<td>Collision with fixed objects</td>
<td>15</td>
<td>16</td>
<td>21</td>
</tr>
<tr>
<td>Total</td>
<td>49</td>
<td>53</td>
<td>68</td>
</tr>
</tbody>
</table>

Conclusion

This study evidently points to an increasing mortality in RTAs especially among the drivers. Most of the drivers are the sole bread earners of their families. Thus the loss of sole bread earner is devastating to their family, leading to fall in income of the household and lowering of the living standards. This knowledge of injury pattern could be helpful while planning emergency and trauma care services and in designing and implementation of safety measures. There is also a need for road safety education directed towards the road users and strict adherence to driving rules and regulations.

Conflict of Interest: None

Source of Funding: Self

Ethical Clearance: Taken from Institutional ethical committee.

Acknowledgement: Staff of Department of Forensic Medicine, Sri Venkateswara Medical College, Tirupati.

References


Profile of Medicolegal Autopsy Cases Conducted at Tertiary Care Centre, Kalaburagi, Karnataka

Manish K1, Khaja Azizuddin Junaidi2, Deepak S3, Umesh SR4

1Associate Professor; 2Tutor; 3Assistant Professor; 4Professor and HOD, Department of Forensic Medicine, Gulbarga Institute of Medical Sciences, Kalaburagi, Karnataka

Abstract

Objectives: The profile of medico legal autopsy cases is important in order to know the death statistics in a region due to unnatural causes. The main objectives of the study were: a) To ascertain the various aspects of unnatural deaths, b) To analyze the probable reasons for the same & c) To find remedial measures to bring down the incidence.

Materials and Method: The present study is a retrospective study of autopsies performed at GIMS, District Hospital, Kalaburagi, Karnataka from January 2018 to December 2018. During this period a total of 647 autopsy cases were conducted. Relevant information and subjective data like age, sex, marital status & manner of death have been collected from medicolegal autopsy register from January 2018 to December 2018.

Results: Out of 647 cases analyzed, maximum number of autopsies were in the age group of 21-30 years with 204 cases (31.5%). Majority of victims were males 437 (67.5%). Hindus were majority in number with 540 cases (83.4%), married were 432 (66.8%) & unmarried were 215 cases (33.2%). In our study 73% were rural residents & only 27% were urban. Accident, Suicide and Homicide deaths were 282 (43.6%), 331 (51.2%) & 34 (5.2%) cases respectively. Natural deaths were seen in 14% cases. Maximum number of deaths were due to road traffic accidents with 212 cases (32.8%) followed by poisoning with 85 cases (13.1%). Out of total 647 cases maximum number of autopsy cases 317 (49.1%) were conducted in the month of May to August.

Conclusion: In our present study it is observed that maximum cases were in 3rd decade of life, Males outnumbered females, rural residents were more in number. Hindus being majority formed bulk of cases. RTA, Poisoning & burns were seen as leading cause of death & maximum deaths were in the month of May to August.

Keywords: Medico legal Autopsy, Road traffic accidents, Poisoning

Introduction

Autopsy means (autos=self, opis=view) to see for oneself. Necropsy (necros=dead, opis=view) is most accurate term for the investigative dissection of the dead body, but the term autopsy is commonly used and is more popular. Post-mortem (post= after, mortem=death) examination is an alternative term used but suffers from lack of precision about the extent of examination. In some countries, many bodies are disposed off after external examination without dissection, in such situation; the procedure is called as post-mortem examination.¹

The objective of medico legal post-mortem examination is to establish the identity of a body, when not known; to ascertain the time since death and the cause of death; and whether the death was natural or unnatural and if unnatural, whether it was homicidal, suicidal or accidental. In case of new born infants, the question of live birth and viability assume importance and should
The term “post-mortem examination” is often used as a simile for “autopsy”. Basically, it is not. In 2001 an estimated 1.26 million people died due to road traffic accidents worldwide, 90% of them in low and middle income countries. Mortality rate was 20.8 per 100,000 population. As per UN report Crude death rate between 2015-2020 is 8.1. By 2020 death & disabilities resulting from road traffic accidents in comparison to other diseases will rise from current 9 to 3 spot & the developing nations will account for 90% of world traffic fatalities.

A post-mortem examination means only what it says that the body was examined after death. It can mean and often does mean that the physician merely looked at the body, fully clothed, or that he “viewed” the body at a funeral home or in a morgue. A complete autopsy involves opening all body cavities and all organs of the trunk, chest, and head. In all cases, a complete and not a partial examination are more necessary in this country on account of the imperfectness of the preliminary evidence as to the possible cause of death.

Material and Method

The present study is a retrospective study of medico legal autopsies conducted at the mortuary attached to Gulbarga Institute of medical sciences, Kalaburagi, Karnataka, India from January 2018 to December 2018. Permission was not taken from Institutional Ethics Committee as it was a record based study without involving any live subjects or experimentation. Detailed information regarding the circumstances of death was collected from inquest, panchanama, hospital records and post-mortem register. During the study period 647 medico legal autopsies were conducted in the mortuary of district hospital, Kalaburagi. Data was compiled and analyzed as per age, sex, marital status, religion, calendar month, residence, causes of death & manner of death. Causes of death were grossly classified as trauma, thermal injuries, violent asphyxia, poisoning and other natural causes.

Results

A total of 647 medico legal autopsies were conducted during the period of 1 year from January 2018 to December 2018. Males outnumbered females (67.5%) with male to female ratio of 3:1. It was observed in the study that the maximum number of autopsy cases i.e. 204(31.5%) in both sexes were in the age group of 21-30 years followed by the age group of 31-40 years and 41-50 years.

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>16</td>
<td>6</td>
<td>22</td>
<td>3.4%</td>
</tr>
<tr>
<td>11-20</td>
<td>24</td>
<td>15</td>
<td>39</td>
<td>6.0%</td>
</tr>
<tr>
<td>21-30</td>
<td>138</td>
<td>66</td>
<td>204</td>
<td>31.5%</td>
</tr>
<tr>
<td>31-40</td>
<td>112</td>
<td>73</td>
<td>185</td>
<td>28.6%</td>
</tr>
<tr>
<td>41-50</td>
<td>123</td>
<td>29</td>
<td>152</td>
<td>23.6%</td>
</tr>
<tr>
<td>51-60</td>
<td>18</td>
<td>12</td>
<td>30</td>
<td>4.6%</td>
</tr>
<tr>
<td>61-70</td>
<td>4</td>
<td>6</td>
<td>10</td>
<td>1.5%</td>
</tr>
<tr>
<td>&gt;70</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>0.8%</td>
</tr>
<tr>
<td>Total</td>
<td>437</td>
<td>210</td>
<td>647</td>
<td>100</td>
</tr>
</tbody>
</table>

From Table 2- Majority of cases were seen during the month of May to August, followed by January to April, as shown in table 2.
Table 2: Month wise distribution of cases

<table>
<thead>
<tr>
<th>Month</th>
<th>No. of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan-April</td>
<td>215</td>
<td>33.2%</td>
</tr>
<tr>
<td>May-August</td>
<td>317</td>
<td>49.1%</td>
</tr>
<tr>
<td>Sept-Dec</td>
<td>115</td>
<td>17.7%</td>
</tr>
<tr>
<td>Total</td>
<td>647</td>
<td>100%</td>
</tr>
</tbody>
</table>

From Table 3- 83.4% were Hindus being majority in number, followed by 14.5% Muslims, & 2.1% cases were other cases in which religion could not be determined as they were unidentified bodies.

Table 3: Distribution of Cases according to Religion

<table>
<thead>
<tr>
<th>Religion</th>
<th>No. of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hindus</td>
<td>540</td>
<td>83.4%</td>
</tr>
<tr>
<td>Muslims</td>
<td>94</td>
<td>14.5%</td>
</tr>
<tr>
<td>Others</td>
<td>13</td>
<td>2.1%</td>
</tr>
<tr>
<td>Total</td>
<td>647</td>
<td>100%</td>
</tr>
</tbody>
</table>

From Table 4- Majority of cases were from rural locality with 73% of cases and 27% cases were from urban locality.

Table 4: Distribution of Cases according to Residence

<table>
<thead>
<tr>
<th>Region</th>
<th>No. of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>175</td>
<td>27.0%</td>
</tr>
<tr>
<td>Rural</td>
<td>472</td>
<td>73.0%</td>
</tr>
<tr>
<td>Total</td>
<td>647</td>
<td>100%</td>
</tr>
</tbody>
</table>

From Table 5- Out of 647 cases autopsied, 66.8% cases were married and 33.2% cases were unmarried.

Table 5: Distribution of Cases according to Marital Status

<table>
<thead>
<tr>
<th>Status</th>
<th>No. of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>432</td>
<td>66.8%</td>
</tr>
<tr>
<td>Unmarried</td>
<td>215</td>
<td>33.2%</td>
</tr>
<tr>
<td>Total</td>
<td>647</td>
<td>100%</td>
</tr>
</tbody>
</table>

From Table 6- Out of 556 unnatural deaths, deaths due to road traffic accidents(32.8%) outnumbered compared to other causes, followed by poisoning(13.1%) and hanging(8.6%).
Table 6: Distribution of Cause of death cases according to Manner of death

<table>
<thead>
<tr>
<th>Cause of death</th>
<th>Accidental</th>
<th>Suicidal</th>
<th>Homicidal</th>
<th>Natural</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTA</td>
<td>212</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>212</td>
<td>32.8%</td>
</tr>
<tr>
<td>Poisoning</td>
<td>4</td>
<td>81</td>
<td>--</td>
<td>--</td>
<td>85</td>
<td>13.1%</td>
</tr>
<tr>
<td>Burns</td>
<td>11</td>
<td>40</td>
<td>--</td>
<td>--</td>
<td>51</td>
<td>7.8%</td>
</tr>
<tr>
<td>Electrocution</td>
<td>11</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>11</td>
<td>1.8%</td>
</tr>
<tr>
<td>Fall from height</td>
<td>30</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>30</td>
<td>4.7%</td>
</tr>
<tr>
<td>Snake bite</td>
<td>18</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>18</td>
<td>2.8%</td>
</tr>
<tr>
<td>Hanging</td>
<td>--</td>
<td>56</td>
<td>--</td>
<td>--</td>
<td>56</td>
<td>8.6%</td>
</tr>
<tr>
<td>Drowning</td>
<td>--</td>
<td>10</td>
<td>--</td>
<td>--</td>
<td>10</td>
<td>1.6%</td>
</tr>
<tr>
<td>Lightening</td>
<td>01</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>01</td>
<td>0.2%</td>
</tr>
<tr>
<td>Assault</td>
<td>--</td>
<td>--</td>
<td>34</td>
<td>--</td>
<td>34</td>
<td>5.2%</td>
</tr>
<tr>
<td>Railway accidents</td>
<td>12</td>
<td>36</td>
<td>--</td>
<td>--</td>
<td>48</td>
<td>7.4%</td>
</tr>
<tr>
<td>Others</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>91</td>
<td>91</td>
<td>7.5%</td>
</tr>
<tr>
<td>Total</td>
<td>299</td>
<td>223</td>
<td>34</td>
<td>91</td>
<td>647</td>
<td>100</td>
</tr>
</tbody>
</table>

From Table 7 - Out of 212 cases, maximum number of RTA deaths involved 2 wheeler vehicles (50.0%), followed by 4 wheeler vehicles (20.3%) & Pedestrian (17.4%).

Table 7: Distribution of cases according to Type of RTA cases

<table>
<thead>
<tr>
<th>Type of RTA cases</th>
<th>No. of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pedestrian</td>
<td>37</td>
<td>17.4%</td>
</tr>
<tr>
<td>2 Wheeler</td>
<td>106</td>
<td>50.0%</td>
</tr>
<tr>
<td>4 Wheeler</td>
<td>43</td>
<td>20.3%</td>
</tr>
<tr>
<td>Heavy Vehicle</td>
<td>26</td>
<td>12.3%</td>
</tr>
<tr>
<td>Total</td>
<td>212</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 8: shows trends of deaths, there were 556(85.9%) unnatural deaths and 91(14.1%) natural deaths of total 647 cases autopsied.
Table 8: Trends of deaths at Autopsy.

<table>
<thead>
<tr>
<th>Cause of death</th>
<th>No. of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unnatural deaths</td>
<td>556</td>
<td>85.9%</td>
</tr>
<tr>
<td>Natural deaths</td>
<td>91</td>
<td>14.1%</td>
</tr>
<tr>
<td>Total</td>
<td>647</td>
<td>100</td>
</tr>
</tbody>
</table>

Discussion

During the study period a total of 647 cases of medicolegal autopsies were performed at District hospital mortuary, GIMS, Kalaburagi. Out of 647 cases maximum number of autopsy cases was in the age group of 21-30 years which is the most productive year in one’s life. These findings are in consistency with findings of other authors [2,3,10,11]

In our study majority of victims were males(67.5%). Similar findings are seen in other studies by Murthy et al [6] who studied 150 cases out of which 123(82%) were males & 27(18%) females. Mugadlimath et al [7] studied 64 cases out of which 39(61%) were males & 25(39%) females. Bansude et al [8] studied 722 cases out of which 62.74% were males & 37.26% were females. Bhullar et al [9] and Sharma et al [10] found 66.5% males & 33.5% females. Similarly Singh et al [11] found 74.8% males & 24.2% females in their study and KV Radha Krishna et al [12] in which males were 69%.

The reason being that as males are bread earners and females usually doing household work, which makes the males more vulnerable to accidents, violence and stress & also males predisposed for addiction & risk taking behaviour.

In our study out of 647 cases autopsied, 83.4% were Hindus, and 14.5% were Muslims, the reason being Hindus are majority in number. In 2.1% of cases autopsied were unknown bodies in which religion could not be determined. Similar findings are observed in studies by other authors [2,3,12]. Rural residents were 73% and only 27% were from Urban locality. This finding is contradicting to results of other studies in which Urban residents were in majority [2,3,12]. This difference is due to our centre serves more rural population where in cases are referred to our hospital & hospital deaths for bulk of autopsies performed.

Deaths due to road traffic accidents & its complications constituted majority of cases 32.8 % followed by poisoning 13.1%, hanging 8.6% and burns 7.8%. Similar findings are observed in studies by other authors [2,3,12,13]. The reason being that in our centre, most of the accident cases and other medicolegal cases are referred to our hospital including from rural areas.

According to month wise distribution of cases, findings of our study showed more number of cases between May to August. These findings are in contrast with the studies by Patel et al [12] and similar findings were seen with findings of Awdesh et al [13] and Mugadlimath et al [7].

Maximum number of deaths due to poisoning were suicidal(95.2%) followed by accidental(4.8%).

Conclusion

Study conducted at Gulbarga Institute of Medical Sciences Kalaburagi, to know the profile of medicolegal autopsies during a period of one year from January 2018 to December 2018 comprising a total of 647 medicolegal autopsies. In our study we found that majority of cases were in 3rd decade of life, males outnumbered females, rural residents were more in number, Hindus being majority in number formed bulk of cases, RTA, Poisoning, hanging and burns were seen as leading cause of death, among road traffic accidents 2 wheeler accidents were more in number. Maximum number of cases were seen in the period between May-August. This study helps to interpret different types of medicolegal autopsy cases, thereby providing an insight to the policy makers, law custodians, and the community to look into the specific aspects of the cases and then to take proper measures accordingly for the benefit of the community people at large of this place. Following measures can be implemented to bring down the mortality rate especially due to road traffic accidents where in strict implementation of traffic rules with special attention to
be paid to drunken drivers, use of mobile phones and smoking while driving, rash and negligent driving and education the general public about road safety measures. The existing stringent laws against dowry death cases need to be further strengthened. Various other socio-economic factors responsible for high incidence of suicidal poisoning need early Government Policies. The sale of agrochemicals and other pesticides should be controlled through strict regulations & implemented by the concerned authorities.

**Conflict of Interest** - None

**Source of funding** - Nil

**Ethical Clearance** - Permission was not taken from IEC as it was a record based study without involving any live subjects or experimentation.

**References**


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Liver Pathology in Autopsy Cases: A Retrospective Study in A Tertiary Care Center

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Abstract

Background: Liver is the site of many diseases, many become symptomatic while few are diagnosed only on autopsy. The cause of chronic liver disease varies in different geographic areas and influenced by socioeconomic status, diet, life style and regional diseases.

Method: This retrospective study was carried out in a tertiary care hospital in the department of pathology over a period of one year. A total of 40 cases of liver specimens, received as part of liver, constituted the material for the study. All were autopsy cases and the organs were received in 10% formalin. Routine grossing and staining with H&E stain were performed. Slides were analysed and the findings were noted in percentages.

Results: A total of 40 specimens were studied. Age ranges from new born to 70 years, with 92.5 % male cases. 32.5% of cases were autolysed. 25% were showing chronic venous congestion followed by fatty change (22.5%), hepatitis (12.5%). 2.5% each of cirrhosis, steatohepatitis and normal liver.

Conclusion: 1. Autopsy has an important role in identifying the cause of death.

2. To overcome the autolysis of the specimen, the medical practitioner performing the autopsies should be trained about how to carry post mortem and to preserve the viscera for histopathological examination so that cause of death could be noted.

Key words: Autopsy, Fatty change, Cirrhosis, Hepatitis, Congestion, Steatohepatitis, autolysis

Introduction

Even the chronic liver diseases in advanced stage may go undiagnosed because of delayed sign and symptoms. Mostly diagnosed incidentally on routine health check-ups, surgery or at autopsy.¹ Liver is susceptible to variety of diseases with aetiologies including metabolic disorders, microbial infections, toxins and circulatory disturbances. Rightly liver is called as “Custodian of milieu interior. To find out the cause of death and planning of treatment autopsy is beneficial.² Underlying cause of death varies in different parts of world.

Diseases in liver can be – congenital malformations, chronic venous congestion, hepatitis, fatty change, cirrhosis, Steatohepatitis, Pyogenic and amoebic abscess, hydatid cyst, storage disorders, hemosiderosis, tuberculosis, infarcts, actinomycosis, hepatocellular carcinoma, hepatoblastoma, metastatic deposits etc.³

Material and Method

This retrospective study was carried out in a tertiary care hospital in the department of pathology over a period of one year. A total of 40 cases of liver specimens, received as part of liver, constituted the material for the
study. All were autopsy cases and the organs were received in 10% formalin. Routine grossing and staining with H&E stain were performed. Slides were analysed and the findings were noted in percentages.

**Results**

**Table 1: AGE AND SEX DISTRIBUTION OF CASES (n=40)**

<table>
<thead>
<tr>
<th>AGE (yrs)</th>
<th>MALE</th>
<th>FEMALE</th>
<th>TOTAL</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>10-20</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>21-30</td>
<td>8</td>
<td>1</td>
<td>9</td>
<td>22.5%</td>
</tr>
<tr>
<td>31-40</td>
<td>8</td>
<td>1</td>
<td>9</td>
<td>22.5%</td>
</tr>
<tr>
<td>41-50</td>
<td>7</td>
<td>0</td>
<td>7</td>
<td>12.5%</td>
</tr>
<tr>
<td>51-60</td>
<td>6</td>
<td>0</td>
<td>6</td>
<td>12.5%</td>
</tr>
<tr>
<td>61-70</td>
<td>6</td>
<td>0</td>
<td>6</td>
<td>15%</td>
</tr>
</tbody>
</table>

Table 1 shows Maximum number of cases (18) were in the age group 21-40 years constituting 45%. Males are 92.5% and females are only 7.5% of the total number of cases.

**Table 2: HISTOPATHOLOGICAL FINDINGS ALONG WITH SEX-WISE DISTRIBUTION (n=40)**

<table>
<thead>
<tr>
<th>FINDINGS</th>
<th>MALE</th>
<th>FEMALE</th>
<th>TOTAL</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>Fatty Change</td>
<td>8</td>
<td>1</td>
<td>9</td>
<td>22.5%</td>
</tr>
<tr>
<td>Congestion</td>
<td>10</td>
<td>0</td>
<td>10</td>
<td>25%</td>
</tr>
<tr>
<td>Hepatitis</td>
<td>4</td>
<td>1</td>
<td>5</td>
<td>12.5%</td>
</tr>
<tr>
<td>Cirrhosis</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>Steatohepatitis</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2.5%</td>
</tr>
<tr>
<td>Autolysed</td>
<td>12</td>
<td>1</td>
<td>13</td>
<td>32.5%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>37</td>
<td>3</td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 shows that 32.5% of cases were autolysed. 25% were showing chronic venous congestion followed by fatty change (22.5%), hepatitis (12.5%). 2.5% each of cirrhosis, steatohepatitis and normal liver.

**Discussion**

Out of total 40 cases maximum number falls in the age group of 21-40 years constituting 44.5%. Similar to the studies of Bhagat et al showing 22% of cases in 21-30 years. Patel et al and Behera et al also studied that maximum cases were in age group 31-40 years (30.13%) and 20-40 years (23.44%) respectively.

Liver disease was most commonly seen in males 92.5% than females 7.5%, comparable to the studies done by Sotoudehamaesh R et al (86.7%), Behera et al (82.81%) and Bal MS et al. This may be attributed to
the alcohol consumption in male population.

### Table 3: COMPARISON OF FINDINGS OF OUR STUDY WITH OTHER STUDIES

<table>
<thead>
<tr>
<th>Findings</th>
<th>Present (%)</th>
<th>Bhagat (%)</th>
<th>Behera (%)</th>
<th>Bal MS (%)</th>
<th>Selvi (%)</th>
<th>Smita (%)</th>
<th>Alagarsamy (%)</th>
<th>Patel (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>2.5</td>
<td>21.7</td>
<td>26.56</td>
<td>30</td>
<td>26.9</td>
<td>22</td>
<td>35.69</td>
<td></td>
</tr>
<tr>
<td>Fatty Change</td>
<td>22.5</td>
<td>32.5</td>
<td>21.87</td>
<td>39</td>
<td>26.9</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Congestion</td>
<td>25</td>
<td>10</td>
<td>20.31</td>
<td>9</td>
<td>16.7</td>
<td>26</td>
<td>1.22</td>
<td></td>
</tr>
<tr>
<td>Hepatitis</td>
<td>12.5</td>
<td>18.3</td>
<td>12.5</td>
<td>3</td>
<td>13.9</td>
<td>10</td>
<td>0.98</td>
<td></td>
</tr>
<tr>
<td>Cirrhosis</td>
<td>2.5</td>
<td>7.5</td>
<td>9.37</td>
<td>14</td>
<td>7.4</td>
<td>4.43</td>
<td>16</td>
<td>2.44</td>
</tr>
<tr>
<td>Steatohepatitis</td>
<td>2.5</td>
<td>3.12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Autolyzed</td>
<td>32.5</td>
<td>5.8</td>
<td>3.12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In our study 32.5% of the received specimens were autolysed, contributing the bulk which is not seen in any other study. Bhagat et al\(^1\) and Behera et al\(^5\) noted 5.8% and 3.12% respectively. The reason for the autolytic changes were:

1) Poor preservation of the specimen: The specimens were not received in formalin.

2) Number of Viscera’s and the size of container: All the viscera of a patient were received in a single container.

3) Delay in receiving the viscera.

So, to overcome the autolysis of the specimen, the medical practitioner performing the autopsies should be trained about how to carry post mortem and to preserve the viscera for histopathological examination so that cause of death could be noted.

Among the liver diseases, Congestion was the most commonly encountered (25%) which was in concordance with the studies of Behera et al\(^5\) (20.90%) and Alagarsamy et al\(^7\) (26%).

In present study Fatty change was seen 22.5% of cases. Behera et al\(^5\), Selvi et al\(^8\) and Alagarsamy et al\(^7\) also noted almost similar percentages of Fatty change in their respective studies (21.87%, 26.9% and 20%). Regular intake of alcohol between 40-80gm increases the liver weight and frequency of fatty changes in liver.\(^3\)

Hepatitis constituted 12.5% of total cases our study. This is in accordance to the studies conducted by Behera et al\(^5\) (12.5%), Bhagat et al\(^1\) (18.3%) and Selvi et al\(^8\) (13.9%).

Cirrhosis contributed only 2.5% of the liver diseases in the present study. This is similar to the study of Smita et al\(^9\) (4.43%) and Patel et al\(^1\) (2.44%). It is an end stage liver disease.

Steatohepatitis was seen in 2.5% cases showing concordance with Behera et al\(^5\) with 3.12% of hepatitis cases.

2.5% cases show normal histopathology which was very low as compared to the other studies of Bhagat et al\(^4\), Behera et al\(^5\) and Bal et al\(^2\).

### Conclusion

1. Most common age group involved was 21-40 years.
2. Liver diseases were most commonly seen in males 92.5% than females 7.5%.

3. Autopsy has an important role in identifying the cause of death.

4. To overcome the autolysis of the specimen, the medical practitioner performing the autopsies should be trained about how to carry post mortem and to preserve the viscera’s for histopathological examination so that cause of death could be noted.

Funding- Self

Conflict of Interest- Nil

Ethical Clearance- Taken from ethical committee PGIMS Rohtak.

References
Histopathological Study of the Freshwater Fish
*Ctenopharyngodon Idella* Exposed to Λ-Cyhalothrin 5% EC

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**Abstract**

Present study Lambda cyhalothrin is a synthetic pyrethroid widely used for pest management and public health applications to control insects. It is categorized as a restricted use pesticide in Extension Toxicology Network for its toxicity to fish. But its usage for the control of major pest in agriculture is being continued in developing countries like India. The freshwater fish *Ctenopharyngodon idella* were exposed in sub-lethal concentrations (1/10 of lethal concentrations) of lambda cyhalothrin 5%EC for 1 and 12 days along with controls to study histopathological changes under light microscope in the selected tissues viz., liver, kidney and gill were examined. Swelling of the hepatocytes with diffuse necrosis and marked swelling of blood vessels were observed in the liver tissue. Tubules of the kidney were distended, with tubular cells of posterior kidney exhibiting marked necrotic changes. Pathology of the gill tissue showed shortened primary lamellae, loss of secondary lamellae and congestion of blood vessels and hyperplasia of branchial plates and the pathology increased with increasing exposure periods.

**Keywords:** *Ctenopharyngodon idella*, Lambda cyhalothrin 5% EC, Sublethal exposure, histopathology of Gill, Liver and Kidney.

**Introduction**

The toxicity of any environmental contaminant is either acute or chronic, and the chronic studies of the organisms; physiological studies alone do not satisfy the complete understanding of pathological conditions of tissues under toxic stress. Hence, it is useful to have consequence of the concentration of the toxicant and it is depend on exposure time. The damage of the particular tissue depends on the toxic potentiality of a particular contaminant accumulated in the tissue4. Aquatic vertebrates are susceptible to non-target effects, because of their relatively restricted mobility and also due to pesticide residue dispersion leading to lengthy period of exposure. Most of the histopathological changes can be interpreted as non-specific response to stress and a wide spectrum of pollutants, including pesticides, heavy metals and organic contaminants exposed to fish and other organisms16.

**Results and Discussion**

Histopathological studies provide information about the health status and functionality of different organs. Tissue injuries and damages in organs can
result in the reduced survival, growth and fitness, the low reproductive success or increase of susceptibility to pathological agents. The extent severity of tissue damage is a consequence of the concentration of the toxicant and is time dependent. Hence, in the present study, an attempt has been made to observe possible histopathological changes in certain vital tissues like gill, liver and kidney of the Indian major carp *Ctenopharyngodon idella* exposed to sublethal concentration of lambda cyhalothrin 5% EC for 1 and 12 days. In the case of 1 day sublethal there was no significant change was observed between control and 1 day sublethal of gill, liver and kidney.

**Pathology of Gill tissue under Lambda Cyhalothrin toxicity:**

Gills apart from being the primary respiratory organ in fishes, are also responsible for other vital physiological functions like excretion of nitrogenous wastes, acid base balance and ion regulation. So when fish are exposed to environmental pollutants, these vital functions are deleteriously affected and the functional impairment of gills can significantly damage the health of fish. The biological function of the inflammatory response is to destroy “WALL OFF” Irritating substance so that damaged tissue might heal. So the pesticide exposure causes severe alterations in the tissue biochemistry and histology of fish.

Present study Lambda Cyhalothrin exposed to the fish *Ctenopharyngodon idella* and the pathological changes in fish gills includes bulging in tips of primary gill filaments. The secondary gill filaments lost their original shape and curling of gill filaments was observed. The pillar cell nucleus showed necrosis and development of vacuoles in the secondary gill epithelium, and a tendency in fusion of disorganized secondary gill filaments. Shortened and clubbing ends of the secondary gill lamellae, fusion of adjacent secondary gill lamellae and necrosis in the primary lamellae were identified. Hyperplasia and hypertrophy of nuclei were also seen. The epithelial layer of secondary lamellae of gills forms a barrier between the fish blood and surrounding water. In fish, gills are the main organs to contact with the pollutant. Hence, it is more vulnerable to damage than any other tissue and the proliferation of gill lesions observed in some places after exposure to water soluble toxicants (Plate 1.B).

**PLATE- 1 (GILL)**

Fig.A .Control Fig.B.12 days sublethal


Degenerative changes in lamellar hyperaemia, lamellar oedemas, clumping, cellular, lamellar atrophy in gill of rainbow trout exposed to chlorpyrifos for 24, 48, 72 and 96 hrs. It also observed in the secondary lamellae and respiratory epithelium of the fresh water teleost *Channa punctatus* under exposure to Alachlor and states that the degeneration of respiratory epithelium and damages of gills tissue causes a decrease in energy metabolism. Toxicity of Formalin cause of pathological damage in the gill, gill dysfunction, osmoregulatory
and respiratory imbalance in ornamental fish Amazon blue spotted corydora (*Corydoras melanistius*) 17. Present study lamellar fusion caused by the filamentary epithelium proliferation and some lamellar aneurisms were also found. Hypertrophy; hyperplasia, lifting of epithelial cells and fusion of secondary gill lamellae were pronounced in the treatment of λ-cyhalothrin exposed to *Ctenopharyngodon idella*. The main histopathological changes in gills were showed edema, lifting of lamellar epithelia and an intense vasodilation of the lamellar vascular axis20.

**Pathology of Liver tissue under Lambda Cyhalothrin toxicity**

Hepatic cells are roundish polygonal, containing clear spherical nucleus and they are located among sinusoids forming cord like structures known as hepatic cell cords. In fish, these structures are generally obscure. Bile canaliculi, is centrally located in each cord and large quantities of lipid glycogen granules are also observed in the cytoplasm of fish hepatic cell cords (Plate.2 & Fig. A). Toxicity discrete pathological changes were observed in the liver tissue of the test fish *Ctenopharyngodon idella* (Valenciennes). These changes were degeneration of cytoplasm in hepatocytes, atrophy, formation of vacuoles, rupture of blood vessels, necrosis and disappearance of hepatocyte cell wall and disposition of hepatic cords. Formation of vacuoles cytoplasm in hepatocytes, atrophy, blood streaks among hepatocytes, intercellular empty space and blood cognation were observed and there was decrease in the size of nucleus of the hepatocytes also observed. (Plate: 2. & Fig: B).

Necrosis with inflammatory infiltration, vacuoles in the hepatocytes and hepatic sinusoids congestion in albino rats treated with dimethoate 10, 2. The changes may be attributed to direct toxic effects of pollutants on hepatic cells, since the liver is the site of detoxification of all types of toxic substances19. The sublethal effects of pesticide lambda cyhalothrin affect the liver histology of *Oreochromis mossambicus* under long term exposure to 0.0025 ppm of sublethal concentration the liver was comprised of polygonal hepatocytes with centrally placed nucleus15.

**PLATE-2 (LIVER)**

**Fig.A Control Fig.E.12 days sublethal**


Cytoplasm with nuclear degradation; cellular degradation and damaged hepatocytes were observed in fish *Cyprinus carpio* exposed to cadmium23. The necrosis of hepatocytes with enlarged sinusoid in freshwater fish *Cirrhinus mrigala* exposed to acute and chronic levels of cythion and also reported that significant alterations in the hepatocytes, pyknotic nuclei and necrosis in the liver of *Clarias gariepinus* exposed to cypermethrin24. Moderate focal necrosis, granular glycogen, nuclei piknosis, loss of architecture structure; onion-like cells were observed in fish *Cyprinus carpio* due to the presence of microcystins1. Vacuolization and presence of sinusoid spaces were reported.
in liver tissue of *Danio rerio* exposed to 200µg/L of chlorpyrifos for 24, 48, 72 and 96h\(^4\). Hyperaemia and degenerative changes in liver and lamellar hyperaemia, lamellar oedemas, clumping, cellular degeneration, hyperplasia and lamellar atrophy in gill were noted in the fish rainbow trout exposed to 2.25, 4.5 and 6.75 µg/L of chlorpyrifos for 24, 48, 72 and 96h\(^2\).

In the present study there is a strong link between liver damage and toxicants. Vacuolar degeneration, hemorrhage and necrosis noticed. It might be due to the presence of toxicants. Necrosis, haemorrhage, degeneration of hepatocytes and pyknosis in the liver tissue were witnessed in *Labeo rohita* exposed to zinc\(^9\). Vacuole formation, degeneration of hepatic cells, haemorrhage and necrotic lesions were noted in *Heteropneustes fossilis* exposed to sewage for 180 days\(^13\). In the present study degenerative changes are intensified in liver to sublethal exposures. They include degeneration of cytoplasm in hepatocytes, atrophy, formation of vacuoles, rupture in blood vessels, necrosis and disappearance of hepatocyte wall disposition of hepatic cords decrease in size of nucleus pyknotic and vacuolar degeneration within the nucleus was evident (Plate: 2, Fig B). The same degenerative changes in *Catla catla*, *Labeo rohita*, *Ctenopharyngodon idella* and *Channa punctatus* under Chloropyrifos, fenvelarate and butachlor toxicants\(^21\).

Pathology of Kidney tissue under Cyhalothrin toxicity:

The renal tubules are composed of cuboidal epithelial cells with densely arranged microvilli in the tubular lumen. In segment II, renal tubules are composed of cuboidal epithelial cells. Cilia and microvilli are found in the tubular lumen. In the distal convoluted segment, epithelial cells have no microvilli. The cells of this segment are stained with eosin more faintly than those of proximal convoluted segment (Plate. 3& Fig. A). Present study indicates the freshwater fish *Ctenopharyngodon idella* (Valenciennes) under cyhalothrin toxicity evidenced marked pathological changes in renal tissues. Highly degenerative changes were observed in haemopoietic tissue which include severe necrosis, cloudy swelling in renal tubules, cellular hypertrophy and granular cytoplasm. The epithelial cells of the distal convoluted tubule decreased in size. The interstitial renal tissue was less affected. It showed formation of vacuoles and cellular contours were not clearly distinguished (Plate.3 & Fig. B).

Lesions in the kidney tissues of fish exposed to deltamethrin, Tubular degenerations were noted in catfish, *Ictalurus punctatus* upon exposure to methyl mercury \(^8\). Diethyl phthalate induce changes in fish *Clarias gariepinus* had necrosis of epithelial cells of renal tubule, pyknotic in haemopoietic tissues and degeneration of glomerulus\(^12\). Degenerative changes such as necrosis in renal epithelium, Cloudy swelling in renal tubules, cellular hypertrophy granular cytoplasm and swelling of mitochondria in the renal tubules were observed in animals administered Pyraclostrobin\(^3\).

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**PLATE -3(KIDNEY)**

Fig.A.Control Fig: B.12 days sublethal

**LEGEND FOR FIGURES:** PCS: proximal Convulated Segment, DCS: Distal Convulated tubule. DART: Degeneration and atrophy in renal tubules, DL: Decreased Lumen in tubules, DGHTE: Degenerating haemopoietic tissue with erythrocytes and FVRIT: Formation of Vacuoles in the renal interstitial tissue.
Reduced glomerular filtration rate, glomerular lesions, degeneration of cellular boundaries and clumping of glomeruli were reported at some places in the kidney of rainbow trout \((Onchorhynchus mykiss)\) exposed to fungicide captan.\(^6\) Disorientation in glomerular structure, cloudy swelling, dilation in the inter space urinary tubular. Necrosis in the haematopoietic tissue, appearance of vacuoles indicates the effects of toxicity in fish rainbow trout \((Onchorhynchus mykiss)\).\(^5\) The present observations are in agreement with the reports of all the above reports. Thus, when fish is exposed to pesticide, they suffer reparable architectural changes in various vital organs making the fish less fit for better survival. These histopathological changes can alter various physiological activities of the fish.

**Conclusion**

The present study title proved pyrethroid compounds damaged the fish active organs like gill, liver and kidney and the susceptibility of the fish in the context of environmental monitoring and the biomarker approach. The histopathological studies showed that \(\lambda\)-Cyhalothrin 5% EC at different sublethal concentration causes significant morphological and pathological changes in the selected tissues of *Ctenopharyngodon idella* at higher dose of toxicant than the lower dose level. In gill progressive degeneration, severe necrotic changes were noticed in the epithelial cells of secondary gill lamellae and it also caused profound pathological changes in liver tissue of the test fish such as degeneration of cytoplasm in hepatocytes, atrophy, and formation of vacuoles, necrosis. It showed severe cloudy swelling of renal tubules, disintegration of interstitial tissue, pyknotic nucleic, etc., in kidney.

**Acknowledgment:** The authors thank the aquaculture fish forms for the supply of fish in time for conducting experiments.

**Ethical Clearance:** The test fish *Ctenopharyngodon idella* is an edible fish so there is no need to take ethical clearance.

**Source of Funding:** Self

**Conflict of Interest:** No competing Interests

**References**

12. Ikele, Chika Bright, Mgbenka, Bernard Obialo


Original Article-

Vocal Nodule and Polyp by Microlaryngoscopy and Cold Instruments

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Abstract

Aim and Objective: To evaluate the usefulness of voice handicap index and seventy degree endoscopy for assessment of speech.

Materials and Method: The study was conducted in the department of Otorhinolaryngology, tertiary care hospital, between 2018 to 2019.

Results: Total of 42 cases underwent micro laryngeal surgery without any complications. Voice Handicap Index (VHI) and 70 degree scopy assessed after 10 days, 1st month and 3rd month interval. All cases improved voice on 10th day and symptoms were gradually decreased. Before surgery mean was 82.43 changed to 17.31 on 10th day to 1.45 on 3rd month follow up. p value <0.005

Conclusion: Early diagnosis is important to rule out malignant changes in cases with hoarseness of voice and early treatment with microlarynoscopy is very effective shows significant improvement on voice handicap index and endoscopy and with patients satisfaction.

Keywords: Hoarseness, speech, endoscopy, voice

Introduction

Your voice is one of the most important components of your identity. Each human being has a voice that is distinct and different from everyone else’s. We can identify someone from their voice fairly easily. Change in voice (hoarseness) affects person’s confidence level and behavior. There are many different etiological factors for hoarseness like voice abuse, smoking, laryngoparyngeal reflux, recurrent dry cough, foreign body sensation, vocal fatigue. Benign laryngeal lesions like vocal nodules and polyps are seen commonly in ENT OPD caused by voice abuse. With conventional indirect laryngoscopy and newer techniques like seventy degree rigid endoscopy or flexible fiber optic scope and stroboscopy helps for proper diagnosis. Medical Management of these lesions include antireflux therapy, speech therapy. There are different options available for surgical treatment. CO2 laser, cold instruments powered instruments. In our study surgical method used is micro laryngoscopy using cold instruments. Voice handicap index is currently gold standard for subjective assessment of voice which score between 0 to 120 accordingly severity of voice.

Material and Method

A prospective study was carried out at Otorhinolaryngology department, in tertiary care teaching hospital during July 2018 to June 2019. Total of forty two clinically diagnosed cases of vocal nodule and polyp found by seventy degree endoscopy were evaluated having age in between 20 to 60 years, irrespective of gender and willing to participate in the study were included. All cases having previous history of laryngeal surgery, malignant lesions, immunocompromised and
diabetes mellitus were excluded from the study. After pre anesthetic checkup cases were posted for micro laryngeal surgery under general anesthesia. Micro laryngoscopy were performed to expose lesions on vocal cord using operating ENT microscope with 400 mm objective lens, and the lesions were examined clearly. The cold laryngoscopic microsurgical instruments included microsurgical laryngeal forceps, scissors, and other instruments used for surgery. There are different methods like micro flap surgeries and direct cutting method. After sub mucosal injection of 2% lignocaine with Adrenaline in the vocal cord, lesions removed after pulling it in midline. Haemostasis achieved with 4% lignocaine with adrenaline solution. Postoperative care we used injection dexamethasone 8mg for 3 days with other antibiotic and analgesic cover and tincture benzoin inhalation and complete voice rest for 5 days. We assessed voice and vocal cord on 10th day, 1 month and 3 month interval.

**Table1:** Voice handicap index (VHI) assessment

For the subjective assessment, the tools used were voice Handicap index (VHI).(Refer table 1)

<table>
<thead>
<tr>
<th>Score Range</th>
<th>Severity</th>
<th>Common Association</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-30</td>
<td>Mild</td>
<td>Minimal amount of handicap</td>
</tr>
<tr>
<td>31-60</td>
<td>Moderate</td>
<td>Often seen in patients with vocal nodules, polyps, or cysts</td>
</tr>
<tr>
<td>60-120</td>
<td>Severe</td>
<td>Often seen in patients with vocal fold paralysis or severe vocal fold scarring.</td>
</tr>
</tbody>
</table>

**Statistical Method**

Using statistical analysis the frequency distribution of collected data was obtained with the help of IBM SPSS (Statistical Packaging for Social Sciences) IBM, INDIA, version 20.0 software.

**Observation and Results**

All patients underwent micro laryngeal cold instrument surgery without any complications assessed with voice Handicap index (VHI) and 70 degree scopy after 10days, 1 month and 3 month interval.

**Table2: Improvement of voice after vocal cord lesion treatment.**

<table>
<thead>
<tr>
<th>Study Parameters</th>
<th>Before Surgery</th>
<th>On 10th Day</th>
<th>After 1 Month</th>
<th>After 3 Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>82.43</td>
<td>17.31</td>
<td>9.14</td>
<td>1.45</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>10.25</td>
<td>6.76</td>
<td>3.02</td>
<td>1.62</td>
</tr>
<tr>
<td>ANOVA F-value</td>
<td>1425</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>p-value</td>
<td>&lt;0.0001</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All cases improved voice on 10th day and symptoms were gradually decreased. Before surgery mean was 82.43 changed to 17.31 on 10 day to 1.45 on 3rd month.

p value<.0001 on all three post surgery readings which is significant.(Refer table 2)
Table 3: Seventy degree rigid endoscopy.

<table>
<thead>
<tr>
<th>Vocal cord lesions</th>
<th>Phonatory gap</th>
<th>Irregular edges</th>
</tr>
</thead>
<tbody>
<tr>
<td>B/L nodule</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>U/L Nodule</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>B/L Polyp</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>U/L Polyp</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

On 70 degree endoscopy vocal cord shows irregular edges with formation of pseudo membrane in 3 cases on 10th day then, 1 and 3 months follow up, the laryngoscopic examination shows a good healing, glottic closure and normal vocal cord movement. On 70 degree scopy 5 cases of bilateral vocal nodule and 3 cases with vocal polyp shows phonatory gap on 10th day which disappears completely on 3rd month follow up except 1 case. Postoperatively, 1 case had persistent of the symptoms and 1 vocal polyp had recurrence during the 3rd month of follow-up period. (Refer table 3)

Discussion

“Alexa, who am I?”...but no answer this is Amazon Echo’s voice-controlled virtual assistant, device cannot answer that question – yet. Artificial intelligence technology with other applications of speech technology, computer algorithms can recognise and identify individuals from voice recordings. Your voice is one of the most important components of your identity, each human being has a voice that is distinct and different from everyone else’s. we can identify someone from their voice fairly easily. Voice is produced by air column coming from lungs passing through larynx and vibrate vocal cords. Then it is modified by articulators (i.e. tongue, lips, teeth, jaw, cheeks) to make speech sounds. Each person has a unique voice which distinguishes them from another person. Voice has a number of features like pitch, volume, quality and resonance, which shows persons emotions.

Voice handicap index is currently gold standard for subjective assessment of voice assessment done on 3 parameters functional physical and emotional. Vocal nodules (e.g. singer’s nodes), also caused by vocal misuse. Typically these nodules are bilaterally symmetrical in the middle third of the vocal fold and located superficially on the vibrating free edge of the cord it is often difficult to diagnose different lesions of the lamina propria histologically (eg. nodules, polyps and Reinke’s edema) [1]. Therefore, the correct diagnosis cannot be made purely on histological examination, but requires a complete assessment including history, voice assessment and laryngoscopic [2]. The available therapeutic measures for nodules are conservative voice hygiene and voice therapy. The patient’s motivation, vocal requirements in social and professional life together with the correct diagnosis allows an appropriate conservative treatment plan to be formulated. The specifically tailored program, including targeted voice therapy, achieves better results than a generic program [3]. Surgical management methods like CO2 laser treatment and conventional microsurgery. Chances of CO2 laser thermal damage deepens the surgical trauma and delays healing. Micro surgery treatment as benefit of precise visualization of lesion complete excision with less intervention minimal invasive with early functional improvement and less hospital stay [4]. In our study patients voice gradually improved on 10th day, 1 month and 3rd month assessment. These results are consistent with the results of clinical studies maximum recovery seen on 1month bilateral vocal nodule voice Handicap index (VHI) changed to less than 10 on 1month and less than 2 on 1 month.

In study comparison of CO2 laser and conventional laryngomicrosurgery treatments of polyp and leukoplakia of the vocal fold by Ya Zhang et al shows that CO2 laser laryngomicrosurgery will not cause high impact on the vocal cords for benign vocal cord lesions. For precancerous lesions, it can improve significantly the morphology of vocal cords and the quality of pronunciation. CO2 laser laryngomicrosurgery is more effective than conventional surgery (cold instruments) [4].

Conclusion

Early diagnosis is important to rule out malignant changes in patients with hoarseness of voice and early treatment with Microlarynoscopy is very effective shows significant improvement on voice handicap index and rigid laryngeal endoscopy and with patients satisfaction.

Ethical approval: All procedures performed on human participants were in agreement with ethical standards of the Institutional and/or National Ethics Committee.
Source of Funding: In this project the cost of investigations of the study participants was born by the Institute research fundings.

Conflict of Interest: None.

Acknowledgement: We acknowledge the cooperation and assistance of Krishna Hospital and Medical Research Center, Karad, India.

References


Knowledge Among Parents about Importance of Primary Dentition

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Abstract

Aim: Dental caries is very common in primary dentition because of improper oral hygiene and increased intake of sucrose. The parents are the one who take care of their children and make decision for them. Often parents are responsible for the oral care of their children. The aim of this study is to evaluate the knowledge among parents about importance of primary dentition.

Objectives: To evaluate the attitude and knowledge of parents towards importance of maintaining primary dentition in their children.

Materials and Method: The study was conducted among parents visiting dental institution, Chennai. A total of 200 questionnaire containing 15 questions were prepared for data collection and were personally distributed to parents. A number of 100 fathers and 100 mothers were included in the study.

Results: The study shows that literate parents had more knowledge about primary dentition when compared to illiterate parents.

Conclusion: Knowledge about primary dentition can be increased in parents by conducting oral awareness program in schools. There is a need cultivate positive attitude among parents to raise their knowledge about dental awareness.

Keywords: Parents, dental caries, primary teeth, oral habits.

Introduction

“Health is wealth”. Health is not only merely absence of disease but also complete state where in the person is physically, emotionally and mentally sound. General wellbeing is directly co-related to the oral health and vice-versa. Thus, general health cannot be maintained well with poor oral hygiene.

Dental caries is very common in primary dentition because of improper oral hygiene and increased intake of sucrose. The parents are the one who takes care of their children and make decision for them\textsuperscript{1}. Often parents who are responsible for the oral care of children believe that since primary teeth eventually shed off, it is not worthwhile to spend time/money on providing good oral health to children\textsuperscript{2}. Poor attitude of parents towards oral health of infants and young children are associated with increased caries prevalence\textsuperscript{3}. Hence they should have knowledge about primary teeth, their health and caring in order to build confidence in their children through primary teeth\textsuperscript{4}.

Objectives

To evaluate the attitude and knowledge of parents towards importance of maintaining primary dentition in their children.

Materials and Method

The study was conducted among parents visiting dental institution, Chennai. The ethical clearance was obtained from institutional review board and consent was obtained from the study participants. A preformed structured questionnaire preformed was designed in English and then translated in Tamil for illiterate parents.

All parents of children aged below 12 years who
reported to dental colleges in Chennai were invited to participate in the study. A total of 200 questionnaire containing 15 questions were prepared for data collection and were personally distributed to parents. A total number of 100 fathers and 100 mothers were included in the study.

The demographic details of the parents were collected such as name, age, gender and educational qualification. The responders were then asked to indicate the most appropriate answers form the given list of option in order to assess the knowledge, awareness and perception regarding the importance of primary tooth.

The answers were evaluated to assess the knowledge and awareness about the primary teeth, their function and effects on permanent teeth. Further assessment of parent’s attitude towards treatment of decayed or infected primary teeth and their willingness to comply with the treatment option for such teeth.

Collected data were tabulated and subjected for stastical analysis using statistical package for social sciences (SPSS) version 13.0.Distributed frequency which includes number and percentage were calculated. Chi-square analysis was used for comparison was done based upon the educational qualification grouped under literate and illiterate. The level of significance was set at p<0.05.

### Results

Caries related conditions such as pain, food impaction, sensitivity were found to be the common reason for visit to dental clinic.

**TABLE 1: Gender distribution among parents accompanying children for dental treatment**

<table>
<thead>
<tr>
<th>Gender</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Female</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>100</td>
</tr>
</tbody>
</table>

There exists a highly significant P value difference between literate and illiterate parents in relation to the knowledge about reason for the visit to the dentist. Literates had better knowledge than illiterates. Most of parents stated that chronic pain or trauma as the main reason to visit to the dentist which was followed by 22% of esthetics, 17% for caries, 7% for bad breath and bleeding gums. (Chart 1)

Approximately 46.5% of literate parents had good knowledge about treating primary tooth. (Chart 2)

Most of the parents visit General Physicians nearby in case of child’s dental problem whereas 25% of parents visit Pedodontist in case of child’s dental problem. (Chart 3)

62% of parents were unaware of fluoridated tooth paste. (Chart 4)

About 80% of parents said that oral deleterious habits can harm the developing dentition, 9.5% of parents were unaware of oral habits and 10.5%of parents had no knowledge about the effect of oral habits over developing dentition.(Chart 5)

71% of parents said that night time bottle feeding can cause dental caries and 7.5% of parents said that night time bottle feeding is not the cause for dental caries. (Chart 6)

### Discussion

Attitude and practice among parents are the important factors influencing the prenatal health care of the children[5]. Earlier studies reveal that regular dental care among children is uncommon in developing countries. It was contraindicating to American Academy of Pediatric dentistry recommendation which states that ideally infant’s oral health begins with prenatal oral health counselling for parents[6].

Many studies found that these recommendations are not taken because of unawareness by the parents about the importance of primary dentition. In most of the studies we found that parents didn’t take care of their child’s primary tooth because of their unfamiliarity about dental treatment and poor socioeconomic status which was truly correlating with our study[7].

In our study 68% of parents stated that waste of money as the reason for not treating primary tooth which correlates with the study done by AnjanaMounissamy et al[8].

Relevant to prevention of caries, in our study 67% of parents selected the option all the above (reducing snack content, brushing twice a day, getting provision advice) but in the study of Mahesh Ramakrishnan et al 68% of parents reported reducing snack containing
sugar prevent caries. We found that there is increased awareness about prevention of caries among the parents in our study\[^{9}\].

In our study, when questioning to parents regarding the child’s dental problem 77% of parents visit the General Physician nearby which corresponds to study conducted by AnjanaMounissamy et al. Majority of illiterate participants in our study were not aware of consulting Pedodontist at right time\[^{8}\].

In case of treating primary tooth, most of the parents prefer to leave the treatment decision to the Dentist which truly correlates with the study conducted with the study conducted by JyothsnaVittobaSetty et al\[^{10}\].

In our study we found that 54% of parents took their child to dental clinic when child complains of pain which was similar to study conducted by Janhvi et al\[^{11}\].

We found that 62% of parents were unaware of regarding fluoridated tooth paste which correlates with the study done by Bhavneet Kaur et al. Our study shows that both literate and illiterate parents have low awareness of fluoridated tooth paste\[^{12}\].

The outcome of our study recommends effective oral awareness program among parents regarding caries prevention. However, all parents agreed that dentist played a most important role in achieving best oral health outcome in their children. We need to initiate more dental awareness program for parents as well as to spread the oral health awareness in our society.\[^{13}\]

**Conclusion**

Parents play an important role in promoting good oral habits in their children. There is a need cultivate positive attitude among parents to raise their knowledge about dental awareness.

**Conflict of Interest:** There are no conflicts of interest.

**Source of Funding:** Self–sourcing.

**Ethical Clearance:** Ethical committee approval is obtained from the university (DR.MGREDUCATIONAL AND RESEARCH INSTITUTE, MADURAVOYAL CHENNAI).

**References**


Clinical Profile of Amblyopia in Young Adults

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Abstract

Aim: To study clinical profile of amblyopic patients in relation to refractive status, socio economic status, use of glasses and social impact on society.

Results: Myopes improving with spectacles are 45% and mixed astigmatism 69%. Most common age group for detection of amblyopia in young adults is 21-30 years(47.1%) with predominance of female(55.7%) belonging from middle class families (81.4%) having studied mostly from Government Marathi medium school(45.7%) with previously not using given glasses(57.1%) and with taken amblyopia of only (7.1%) and with spectacles maximum correction with mixed astigmatism (54.2%) between 6/36-6/9 in right eye (43%) and in left eye (30%). Hypermetropes’ improving to 6/12 is only 13%. So there’s very few cases improving with the spectacles in hypermetropes in amblyopia.

Interpretation: Lack of school screening programs and awareness for health check-up delays the diagnosis of amblyopia leading to non-improvement of vision and due to lack of knowledge and social stigma girls especially avoid wearing glasses even after prescribing leading to amblyopia.

Conclusion: School health camps, proper health education, timely examination, and proper use of spectacles is must.

Keyword: MYOPICS: (M), HYPERMETROPICS: (H), Visual acuity: (VA)

Introduction

Amblyopia is a “developmental defect of spatial visual processing that occurs in the central visual pathways of the brain.” It presents most dramatically as loss of visual acuity in one or, rarely, both eyes, but amblyopia is more than this; certain forms of amblyopia also present with diminished contrast sensitivity, Vernier acuity, gratating acuity, and spatial localization of objects. These defects may be explained by the mechanism of lack of use of an eye because of media opacity or extreme refractive errors that cause a chronically blurred image to form on the fovea of that eye; however, the cause of amblyopia in an eye that has strabismus is not as straightforward and is the result of abnormal binocular interaction¹.

Types of amblyopia²:

1. Strabismic
2. Stimulus deprived
3. Anisometropic
4. Bilateral ametropic
5. Meridonal

• In the absence of an organic lesion, a difference in best corrected VA of two Snellen lines or more (or >1 log unit) is indicative of amblyopia³.

• Visual acuity in amblyopia is usually better when reading single letters than letters in a row. This ‘crowding’ phenomenon⁴ occurs to a certain extent in

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normal individuals but is more marked in amblyopes and must be taken into account when testing preverbal children.

**Aim:**

To study clinical profile of amblyopic patients in relation to refractive status, socio economic status, use of glasses and social impact on society.

**Inclusion Criteria:**

- Patients of age <30 years
- Visual acuity less than log mar 0.2 in one eye or both eyes without any organic cause

**Exclusion Criteria:**

Vision affected due to any cause anterior segment or posterior segment cause

**Study Design:**

- Hospital based longitudinal non-randomized study.

**Materials and Method**

- All the young adults up to the age of 30 years coming to Department of ophthalmology, KIMS DU Hospital, Karad were screened out by taking visual acuity and correction with refraction for amblyopia over a period of 1 year from August 2018 to July 2019.

**SAMPLE SIZE:**

- 70 patients were enrolled

**Observations and Results**

**Observation:**

- **TABLE 1** This table shows that sample size of 70 cases when given the vision correction with refraction the result comes out to be 43 patients that is 50.2% of patients had spherical correction and amongst them 26 patients that is 37.1% are myopic correction and 17 patients that is 24.2% are hypermetropia correction.

This table also shows about the cylindrical correction which is minimum only in 8 patients that us 11.4% and remaining 19 patients that is 27.14% patients have mixed correction.

- **TABLE 2:** Taking results from above table now further extending our discussion regarding correction and its visual acuity relation, this table will discuss about relation of hypermetropies with its visual acuity correction.

Amongst the hypermetropies that is total 17 patients so here n=17 , out of them 10 patients power for refraction comes out to be between (+2.5- +5) and amongst the 10 patients only 3 patients that is 30% have full correction but 60% that is 6 patients have correction till log mar 0.4-1 and only 1 patient could have correction till log mar 1.

Rest of 23.07% patients have correction till +2 in which 75% patients have good visual correction ranging from log mar 0-0.3.

- **TABLE 3:** This table gives you the Relation of myopia with visual acuity correction. The total patients which comes out to be myopic are 26 that is 37.1% and amongst them 76.8% Patients who had myopic correction had spectacles of more than -2 power

  - Precisely, 38.4% patients’ spectacles range from 2-5sph and amongst them 70% patients their visual acuity correction is up to logmar0-logmar 0.3 which Is almost full correction and rest 38.4% patients have spectacles no. more than 5sph for which spectacles correction for 50% patients is > logmar1.

  - Rest 23% patient having spectacles correction <-2 visual correction ranges from log Mar o-logmar0.3

- **Conclusion—low myopic number have good spectacles correction but very high myopic number do not have full correction even if higher refraction is given.

  - **MOST OF AMBLYOPIC MALE (42.3%) AND FEMALE (53. %) ARE MYOPIC.**

**TABLE 4: RELATION OF AMBLYOPICS WITH THE TYPE OF SCHOOL STUDIED FROM:**

This table shows that out of 70 students, 56 students have studied from Marathi medium government school and 10 from semi-government and only 4 from private school.

**TABLE 5:**

This table shows the relation between the type of school to its regular school health check-up, and the socio-economic status regarding glasses advised and
still not using.

The results show that out of 56 Marathi medium students only 23 had school health check-up, and amongst them only 20 were advised glasses previously and only 10 students were using it.

Semi-govt schools are better in position as out of 10, 9 had school check-up and 5 were advised previously to wear glasses but only 4 are wearing.

Private schools are conducting school check-ups regularly as all 4 had previously school health check-up done and all 4 are wearing spectacles though not regularly.

**TABLE 1: WITH N=70, PATIENTS WITH DIFFERENT SPECTACLES NUMBER ARE AS FOLLOWS:-**

<table>
<thead>
<tr>
<th>SPHERICAL -MYOPIA</th>
<th>26(37.1%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPHERICAL -HYPERMETROPIA</td>
<td>17(24.2%)</td>
</tr>
<tr>
<td>CYLINDRICAL</td>
<td>08(11.42%)</td>
</tr>
<tr>
<td>MIXED</td>
<td>19(27.14%)</td>
</tr>
</tbody>
</table>

**TABLE 2: Relation of HYPERMETROPIA with visual acuity (N=17)**

<table>
<thead>
<tr>
<th>SPECTACLES</th>
<th>+2</th>
<th>+2.25 - +5</th>
<th>&gt;+5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO. OF PATIENTS</td>
<td>4(23.5%)</td>
<td>10(58.8%)</td>
<td>3(17.6%)</td>
<td>17</td>
</tr>
<tr>
<td>Log0-0.3</td>
<td>0.4-1</td>
<td>&gt;log1</td>
<td>Log0-0.3</td>
<td>0.4-1</td>
</tr>
<tr>
<td>3(75%)</td>
<td>0(0%)</td>
<td>1(25%)</td>
<td>3(30%)</td>
<td>6(60%)</td>
</tr>
</tbody>
</table>

**TABLE 3: Relation of MYOPIA with visual acuity (N=26)**

<table>
<thead>
<tr>
<th>SPECTACLES</th>
<th>-2</th>
<th>-2.25 - -5</th>
<th>&gt;-5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO. OF PATIENTS</td>
<td>6(23.07%)</td>
<td>10(38.4%)</td>
<td>10(38.4%)</td>
<td>26</td>
</tr>
<tr>
<td>Log0-0.3</td>
<td>0.4-1</td>
<td>&gt;log1</td>
<td>Log0-0.3</td>
<td>0.4-1</td>
</tr>
<tr>
<td>5(83.3%)</td>
<td>1(16.7%)</td>
<td>0</td>
<td>7(70%)</td>
<td>2(20%)</td>
</tr>
</tbody>
</table>

**TABLE 4: REALTION OF AMBLYOPIC STUDENTS WITH THEIR TYPE OF SCHOOL**

<table>
<thead>
<tr>
<th>N=70</th>
<th>MARATHI MEDIUM</th>
<th>SEMI- GOVT</th>
<th>PRIVATE SCHOOLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>56</td>
<td>10</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>
TABLE5: RELATION between type of school and previously done school health check-up.

<table>
<thead>
<tr>
<th>SCHOOL CHECK UP</th>
<th>ADVISED GLASSES (FROM SCHOOL /OUTSIDE)</th>
<th>WEARING GLASS</th>
</tr>
</thead>
<tbody>
<tr>
<td>MARATHI (56)</td>
<td>23</td>
<td>20</td>
</tr>
<tr>
<td>SEMI GOVT (10)</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>PRIVATE (4)</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Discussion

- This study is conducted on all the young adults up to the age of 30 years coming to Department of ophthalmology, KIMSDU Hospital, Karad by taking visual acuity and correction with refraction for amblyopia over a period of 1 year from August 2018 to July 2019. This study was approved from institutional ethics committee. This study is done with the primary aim to see clinical profile of amblyopic patients in relation to refractive status, socio economic status, use of glasses and social impact on society.

- In this study the sample size of 70 cases when given the vision correction with refraction the result comes out to be 43 patients that is 50.2% of patients had spherical correction and amongst them 26 patients that is 37.1% are myopic correction and 17 patients that is 24.2% are hypermetropia correction.

- And this study also shows about the cylindrical correction which is minimum only in 8 patients that us 11.4% and remaining 19 patients that is 27.14% patients have mixed correction.

- Rest of 23.07% patients have correction till +2 in which 75% patients have good visual correction ranging from log mar 0-0.3.

- In our study we also get the relation of myopia with visual acuity correction.

- The total patients which comes out to be myopic are 26 that is 37.1% and amongst them 76.8% Patients who had myopic correction had spectacles of more than -2 power.

- Precisely, 38.4% patients’ spectacles range from 2-5 sph and amongst them 70% patients their visual acuity correction is up to logmar 0-logmar 0.3 which Is almost full correction and rest 38.4% patients have spectacles no. more than 5 sph for which spectacles correction for 50% patients is > logmar 1.

- Rest 23% patient having spectacles correction <-2 visual correction ranges from log Mar 0-logmar 0.3.

- In our study we also correlate with the type of school which is in direct proportion to its socio economic status like Marathi medium and semi-govt school students are considered from lower status and private school students are higher socio-economic students.

- This study shows that out of 70 students, 56 students have studied from Marathi medium government school and 10 from semi -government and only 4 from private school.
• In this study shows the relation between the type of school to its regular school health check-up, and the socio-economic status regarding glasses advised and still not using.

• The results show that out of 56 Marathi medium students only 23 had school health check-up, and amongst them only 20 were advised glasses previously and only 10 students were using it.

• Semi-govt schools are better in position as out of 10, 9 had school check-up and 5 were advised previously to wear glasses but only 4 are wearing.

• Private schools are conducting school check-ups regularly as all 4 had previously school health check-up done and all 4 are wearing spectacles though not regularly.

**Conclusion**

• This study gives us following points to note down:
  1) Spherical number is more common than mixed or astigmatism
  2) Myopia is more common than hypermetropia (37.73%)
  3) Amongst demographic distribution male and female both have more percentage of myopic number.
  4) 58.8% of hypermetropies have spectacles number between 2-5sph with visual acuity improving up to logmar0.4-1
  5) Low myopic number have good spectacles correction but very high myopic number do not have full correction even if higher refraction is given.

• Most of the amblyopia detected patients (70%) are from marathi medium school and from middle class families where routine school health check ups are not conducted properly so not diagnosed on time, only 30% of students who studies in english medium private schools have proper school health check up so were detected for amblyopia.

• Out of those only 10% students were wearing spectacles so had full correction, but students belonging to middle class or low socio-economic status who had lesser awareness about the disease had not wore glasses due to which they donot had full correction.

• Our study focuses on the fact:

  Early detection of amblyopia by proper school health check-up and then treatment of amblyopia and also to avoid those factors causing amblyopia since childhood like proper use of glasses.

Why treats amblyopia? Direct benefits include potentially improved stereoptic appreciation and the occasional realignment of strabismic eyes with attainment of improved visual acuity. For most patients, the creation of a better-sighted “spare tire” should trauma or disease claim the sound eye is all that can be promised logically. Of interest is a study that showed a threefold greater risk of loss of the sound eye if the other is amblyopic.

• Ethical approval: All procedures performed on human participants were in agreement with ethical standards of the Institutional and/or National Ethics Committee.

• Source of Funding: Self

• Conflict of Interest: None.

**References**


Psychometric Properties of Hindi Version of Physical Activity
Recall Assessment for People with Spinal Cord Injury

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Abstract

Objectives: The most widely used type of physical activity measure is the self-report survey. Of the available self-report physical activity measures, the vast majorities were developed for use in the general population and typically focus on measuring participation in recreational and sport activities. As a result, the existing self-report measures are insufficiently sensitive to measure very low intensity activities that might account for the bulk of daily energy expenditure among people with SCI. The content of these measures also fails to capture activities that are part of SCI lifestyle. ‘Physical Activity Recall Assessment for People with Spinal Cord Injury’ [PARA-SCI] was published in August 2005. PARA-SCI is a measure of physical activity for individuals with SCI who use a wheelchair as their primary mode of mobility. It has been translated in various languages, thus the aim of the study is to study the psychometric properties of Hindi version of physical activity recall assessment-SCI.

Methods: PARA SCI was translated in phase 1 of the study and the reliability and validity of the instrument was done.

Results: There was significant correlation observed in test – retest reliability and Vo2 max calculated by 12 minute wheelchair test correlated with the subcomponent of PARA SCI.

Conclusion: The Hindi version of PARA-SCI is a reliable and valid instrument.

Keywords: Spinal Cord Injury, Physical Activity Recall Assessment - Spinal Cord Injury, Activity Daily Living, Leisure time physical activity.

Introduction

The spinal cord is the major conduit through which motor and sensory information travels between the brain and body. Spinal cord injury (SCI) affects conduction of sensory and motor signals across the site(s) of lesion(s), as well as the autonomic nervous system. 1

The incidence as well as the prevalence of SCI has been on the rise with the incidence rate being estimated to be from 15-40 cases per million world-wide. The number of people sustaining SCI has increased over the past 3 decades. 1

Persons with SCI face unique health challenges throughout their life and their injury dissociate the normally well integrated homeostatic responses of body system known to accompany physical activity. Depending upon level and type of cord lesion, persons with SCI are the most physically deconditioned of all humans. The physical activity limitation comes with secondary impairments like loss of cardio-respiratory and muscular function, metabolic and systemic dysfunctions.

Assessment of cardio respiratory fitness in persons with SCI requires specialized knowledge of both Exercise-Testing (ET) procedures and unique physiology that ensures SCI. ET modalities for these individuals commonly employed over the ground wheelchair propulsion on a treadmill or wheelchair rollers, cyclical arm ergometry and variations of electrically stimulated exercise. The mode commonly used in ET of person with SCI is the arm crank ergometer. It follows the same general protocols for as normals, but here as the VO2 peak is dependent on level of SCI, lower intensity loads are applied than those used in standard exercise testing. 3)
Exercise training has been shown to reduce pain and depression too among people with SCI. There is evidence that among persons with SCI, physical activity is associated with positive changes in disease risk factors such as triglyceride levels, body fat and insulin resistance. However, the specific activity types, durations, and intensities that produce these health outcomes have not yet been established within the SCI population. The lack of such information makes it virtually impossible to develop physical activity guidelines for the SCI population, and study in this area has been impeded by the lack of a valid and reliable self-report measure of physical activity for people with SCI.

The most widely used type of physical activity measure is the self-report survey. However, independent ambulation is uncommon among people with SCI and most of their energy expenditure is accounted for by activities of daily living and passive leisure activities. As a result, the existing self-report measures are insufficiently sensitive to measure very low intensity activities that might account for the bulk of daily energy expenditure among people with SCI. The content of these measures also fails to capture activities that are part of this population’s lifestyle.

An SCI-specific physical activity measure would help researchers to fill a number of voids in the SCI and physical activity literature. In particular, a measure that assesses the performance of specific activities and their associated intensities would facilitate collection of epidemiological data necessary to develop health-promoting, physical activity prescription guidelines for people with SCI. An SCI-specific measure would also allow researchers to develop and test activity-enhancing interventions for the SCI population.

‘Physical Activity Recall Assessment for People with Spinal Cord Injury’ [PARA-SCI] was published in August 2005. PARA-SCI is a measure of physical activity for individuals with SCI who use a wheelchair as their primary mode of mobility. PARA-SCI is widely used, it is already present in 13 other language Chinese, Czech, Dutch, English, French, German, Greek, Italian, Portuguese, Punjabi, Swedish, Spanish, Russian. It is self report physical activity measure for people with SCI. The assessment is completed using a semi-structured interview protocol. It aims to measure frequency, type, intensity, duration of physical activity performed by persons of SCI who use wheelchair as their primary mode of mobility. It utilizes 3 day recall and can be used in paraplegia and tetraplegia, and is designed to capture three categories of physical activity: first Leisure time physical activity (LTPA) that one chooses to do during free time, such as playing sports or working out at the gym. Activities of Daily Living (ADL) that are part of one’s daily routine, such as personal hygiene, household chores, work-related activity, passive leisure activity. And Cumulative activity: The combination of LTPA and lifestyle activity.

The English version of PARA-SCI is a valid and reliable measure. This type of self report instruments are able to access the fundamental dimensions of physical activity (i.e., frequency, intensity, type, duration) and can be easily administrated to large segments of population relatively easily and inexpensively. Given these advantages, it has played a crucial role in generating epidemiological data used to formulate physical activity prescriptions and guidelines for general populations. But till date there is no Hindi scale available for the same. So this study deals with the psychometric properties of Hindi version of physical activity recall assessment-SCI.

WORK PLAN

Study Centre – Indian Spinal Injury Centre, Institute of Rehabilitation Sciences, New Delhi. India

Study design – Methodological study

Sample size – 100

PROCEDURE OF STUDY-

First of all permission for Hindi translation from the author of “PHYSICAL ACTIVITY RECALL ASSESSMENT –SCI”, Kathleen Martin Ginis was taken through an e-mail.

Procedure consist of following two phases

1) Translation of instrument to Hindi language.

2) Psychometric Evaluation of Hindi version of PARA-SCI instrument.

PHASE 1 – Translation Phase

Forward translation

As per the procedure, two translators were recruited for forward translation; having there native
Hindi language speakers bilingual in English. They were provided with the original English version of questionnaire and was asked to independently translate it in Hindi language avoiding any technical language. Hence first phase of translation gave us two Hindi version of PARA-SCI questionnaire English version. This two versions were combined to form a single Hindi translated PARA-SCI questionnaire.

**Backward translation**

It involves English translation of Hindi translation obtained from forward translation this step again required two translators who had translated the Hindi version, without having any access to original English version of questionnaire. As per the procedure, the back translation was checked against original English version of PARA-SCI questionnaire and their accuracy was determined.

The scale was reviewed by the expert review committee. The comments and suggestion of the review committee was then sent back to the translators for corrections into the next intermediate Hindi version of the scale.

After repeating this process several times the final translate Copy had then used for pilot study.

**PHASE 2- Psychometric evaluation-** Test retest reliability and validity of scale was established.

**Test retest reliability**

The PARA-SCI scores are calculated by assessing the LTPA, ADL and Cumulative activity where, Leisure time physical activity (LTPA) that one chooses to do during free time, such as playing sports or working out at the gym. Activities of Daily Living (ADL) that are part of one’s daily routine, such as personal hygiene, household chores, work-related activity, passive leisure activity. And Cumulative activity: The combination of LTPA and lifestyle activity.

Test retest reliability was done by administrating the questionnaire to SCI patients with in a gap of seven days as the questionnaire is a three days recall questionnaire.

**Construct validity –**

The convergent validity of a physical activity scale is typically indicated by demonstrating expected relationships between the scale scores and measures of physical fitness.

**Inclusion criteria-**

- Subjects with traumatic spinal cord injury of duration more than 3 months.
- Age -18-60 years.
- Subject should understand Hindi.
- Subject should be a case of traumatic spinal cord injury below T1-L5 level.
- Subject should be able to propel manual wheelchair.

**Exclusion criteria-**

- Subjects diagnosed with any systemic/psychiatric illness, any infectious disease.
- Subjects having any neurological impairment which might hamper his/her participation in the study.
- Subjects diagnosed with any kind of visual or vestibular deficits.
- Subjects with memory deficit.
- Professional wheelchair sportsperson.

**Physical Fitness-**

**Muscle strength** - Muscle strength was assessed to determine the maximal load that could be lifted in one repetition (1RM) for chest press (unilaterally) and biceps curl (unilaterally). Tests was terminated at the participant’s point of fatigue.

Attainment of 1RM confirmed by participants indication that their last lift was “heavy intensity” activity, as defined by the PARA-SCI activity intensity classification system.

**Aerobic fitness** – The 12 min wheelchair performance test for cardio respiratory endurance.

Equipment required- 400 m running track, marking cones, recording sheets and stop watch.

Procedure – place markers at set intervals (i.e.) at every 50 m to aid measuring the completed distance. Participant wheel around track for 12 min, and the distance covered was recorded.
Scoring – Recorded the completed distance to the nearest 100 meters.

Calculate VO2 max from following formula:

\[ \text{VO2 max} = (29.623 \times \text{Distance}) - 10.916 \text{ mg/kg/min} \]

Data analysis –

Correlation was computed between the scores of PARA-SCI and muscular strength and cardio respiratory endurance. Factor analysis was done for validity.

Result

In first phase, The final synthesized version was reviewed by the committee members and the author and a final Hindi version of physical activity recall assessment for spinal cord injured people was obtained

In phase two, the participants were interviewed twice with a gap of seven days with the instrument and simultaneously the aerobic capacity and muscular strength was also measured to correlate it with PARA-SCI scores. The number of patients recruited was 40. (Table 1.1 Mean, S.D.)

Test retest reliability

Test retest reliability was tested with a gap of seven days with the scores of subscales of day 1 was compared with day 7 with pearsons correlation. Here day 1 ADL was significantly correlating with ADL (r >0.00) and LTPA (r >0.00) and with cumulative (r > 0.028) of day7. LTPA of day 1 was significantly correlating with ADL(r >0.00) and LTPA(r >0.00) only. There was an over lapping in assumption of physical activity division by patients which has affected the results. Where the cumulative activity of day 1 was significantly correlating with cumulative activity(r >0.00) and ADL (r >0.022).

Convergent validity

The convergent validity of a physical activity scale is typically indicated by demonstrating expected relationships between the PARA-SCI scores and measures of physical fitness.

The convergent validity Pearson’s method was used. PARA-SCI scores were correlated with chest press, biceps curl, vo2 max where the chest press was significantly correlated with biceps curl(r >0.00), distance (r >0.041) and vo2 max (r >0.041).here a negative correlation was found of chest press with LTPA (r >0.010) as due to overlapping of the physical activity subscales. (patients were confused for physiotherapy inactive an passive sessions where it should lie in ADL or LTPA.)

Biceps curl was significantly correlated with distance (r>0.006) and vo2 max (r>0.006). Distance was correlated with vo2 max (r >0.00).ADL was correlated with LTPA (r >0.00) and Cumulative (r >0.018).

TABLE 1.1- The Mean and S.D. were calculated. The number of patients recruited was 40.

<table>
<thead>
<tr>
<th></th>
<th>SCI (TOTAL)</th>
<th>TETRAPLEGICS</th>
<th>PARAPLEGICS</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE(years)</td>
<td>29.30±9.00</td>
<td>32.45±10.27</td>
<td>28.10±8.35</td>
</tr>
<tr>
<td>(MEAN ±S.D.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GENDER</td>
<td>5.25:1</td>
<td>4.5:1</td>
<td>3.8:1</td>
</tr>
<tr>
<td>(M:F)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MODE OF INJURY</td>
<td>T= 46 NT=4</td>
<td>T= 11 NT=0</td>
<td>T=25 NT=4</td>
</tr>
</tbody>
</table>
Discussion

The objective of study was to establish the psychometric properties of Hindi version of physical activity recall assessment-SCI. The physical activity recall assessment (PARA-SCI) has been proposed as an essential measure for assessing SCI patients or a self reporting survey but till date there is no Hindi scale available for the same.

The whole study was done in two phases. Where in phase one, we have obtained the Hindi translated copy, which was reviewed by the expert review committee. The comments and suggestion of the review committee was taken and sent back to the translators for corrections. After repeating this process several times the final translate Copy was used for pilot study.

In phase two, Test retest reliability and validity of scale was established by administrating the questionnaire to SCI patients with in a gap of seven days. The convergent validity of a physical activity scale was typically indicated by demonstrating expected relationships between the scale scores and measures of physical fitness.

Limitations of Study-

- Overlapping was seen in ADL and LTPA activities as physiotherapy comes as a daily routine and active and passive physiotherapy both are part of routine.

- For assessing aerobic capacity instead of 12 min wheelchair test instrument gas analyzer could have been used.

- Cannot assess the physical activity of high cervical quadriplegics with AIS- A.

- Because of field method used to assess the aerobic capacity, minimum of 300 meters the patient should be able propel wheelchair as below that score the VO2 max value was going in negative.

Future Recommendations

- Other Psychometric properties in subscales of quadriplegics and paraplegics can be done and factor analysis using the age groups can be done.

- Study can be carried out on a large population.

Ethical Clearence- Taken from Institutional Ethics Committee, ISIC, NEW-DELHI

Source of Funding- N/A

Conflicts of Intrest- Nil

References


15. 12 min wheelchair cooper test.
Comparative Study on Different Modified Techniques Used For DNA Isolation From Teeth Samples for Obtaining Optimized Output

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Abstract

DNA isolation is a process used for isolation of DNA from different types of samples using a combination of physical and chemical methods. A comparative study is made to isolate DNA from 30 teeth samples with some pre PCR and post PCR modifications in the organic Phenol: Chloroform: isoamyl alcohol, Automate Express™ prepfiler BTA kit and QIAamp® DNA Investigator Kit. Our result showed significant results which will be helpful in short listing the array of these techniques.

Key Words: DNA, RT-PCR, PCR, STR Analysis, Forensic Science

Introduction

DNA fingerprinting analysis is used to solve the cases of murder, rape, paternity, child swapping, immigration, genealogical and medical research. DNA fingerprinting has proved to be very useful in the identification of victims of war, air crash, flood, earthquakes, Tsunami and mass disasters cases. Friedrich Miescher was the first person to formulate the process of DNA isolation in 1869. Various automated DNA isolation instruments have been designed by various companies to carry out the DNA isolation process in a very short time without the risk of contamination of the DNA isolates. The phenol–chloroform method is conventional and the most effective method used in the various laboratories to isolate the DNA from the samples. Automate Express™ with BTA prepfiler kit (applied biosystem) is an automated DNA isolation process using magnetic beads during isolation.

The QIAamp DNA Investigator Kit can be manually operated for the isolation of DNA from a variety of biological samples. Isolation steps involve: (a) disruption of cellular membranes (b) binding of DNA to the silica-based membrane (c) washing of contaminants and (d) DNA elution. The QIAamp DNA Investigator Kit is simple and easy to use yielding of good quality of DNA.

UV light was the first sterilization technique used to eliminate amplification products carryover contamination. The principle behind Ultra-violet light irradiation is the property of UV light to induce thymidine dimers and other covalent modifications of DNA that render the contaminating nucleic acid inactive as a template for further amplification. The technique is simple, inexpensive, and does not require modification of existing protocols.

Materials and Method

Thirty three (30) teeth samples from different cases...
were used for identification related to legal assessment.

Cleaning and grinding of teeth samples

Each teeth surface was cleaned. Soft tissue, dirt from teeth surfaces were removed. Teeth fragments were immersed in distilled water for 30 sec, followed by 100% ethanol for 30 sec. and dried at 50°C for 2 hours. Teeth fragments were pulverized under sterile conditions. The resulting teeth powder was then divided into three tubes. 50 mg were placed in each tube for the standard organic isolation method, for Automate Express™ and QIAamp® DNA Investigator Kit method. Weighing of powdered teeth samples was performed in a pre-PCR weighing room under sterile conditions using a Citizen balance.

PROCEDURE

1. Phenol-Chloroform-Isoimyl Alcohol : PCI is a manual method for DNA extraction. For each sample, a total of 50 mg of teeth powder was taken into 1.5 mL tube. The samples were decalcified three times with EDTA 0.5 M pH 8.0 (HIMEDIA) for 24 hours. The samples were centrifuged at 10000 rpm for 5 min. The supernatant was discarded, and the remaining teeth powders were resuspended in 1000 µl of milique water, mixed for 10 sec, and spun down at 1000 rpm for 5 min. The supernatant was discarded, and the milique water wash was repeated two more times. Then, 500 µl of Forensic Buffer (HIMEDIA), 100 µl SDS (HIMEDIA) and 15 µl proteinase K (20 mg/ml) (HIMEDIA) were added and incubated at 37°C for overnight. After centrifugation, the supernatant was transferred to a 1.5 mL tube containing 500 µl of phenol. The samples were mixed and the aqueous phase was separated by centrifugation at 10000 rpm for 10 min. The supernatant was transferred to a 1.5 mL tube containing 250 µl of phenol+250 Chloroform–isoamyl alcohol (24:1) (HIMEDIA).

The samples were mixed and the aqueous phase was separated by centrifugation at 10000 rpm for 10 min and transferred to a new tube. This extraction step was followed by another extraction, this time with 500 µl of chloroform–isoamyl alcohol (24:1). The aqueous phase was mixed with 500 µl isopropanol and 50 µl 3M sodium acetate (HIMEDIA) and samples were kept to rest for 30 minutes at -20°C. Samples containing DNA were put for centrifugation at 10000 rpm for 10 min. then washed with 70% ethanol (HIMEDIA) for centrifugation at 10000 rpm for 10 minutes for two times. Final washing was done with 100% ethanol (HIMEDIA) and put to dry at room temp. for an hour then eluted with 1X TE (HIMEDIA) in thermo mixture at 65°C for 45 minutes.

2. Automate Express™ (PrepFiler BTA Kit): The Automate Express™ (Applied BioSystem) Nucleic Acid Extraction System is an easy-to-use benchtop instrument that enables hands-free automation of the nucleic acid extraction process. For each sample, a total of 50 mg of the teeth powder was suspended into 1.5 mL tube with 300 µl PrepFiler BTA Buffer (Applied BioSystem) provided with kit and incubated for overnight at 37°C. Next day the incubated sample was centrifuged through Lysate tubes provided with kit and put the clear lysate sample in AutoMate Express™ in instrument as per the manual provided with the instrument. After 20 min. DNA isolate was obtained 10.

3. QIAamp® DNA Investigator Kit : For each sample placed 50 mg of powdered teeth into a 1.5 ml microcentrifuge tube. To each sample added 360 µl Buffer ATL and 20 µl proteinase K (20mg/ml) (QIAGEN) and incubated overnight at 37°C. Added 300 µl Buffer AL (QIAGEN) and mixed by pulse-vortexing for 10 sec. and incubated at 70°C with shaking at 900 rpm for 10 min. Centrifuged the tubes at speed 14,000 rpm for 1 min. and transferred the supernatant to a new 1.5 ml microcentrifuge tube. Added 150 µl ethanol (100%) (HIMEDIA) and mixed by for 15 sec. Transferred the entire lysate to the QIAamp MinElute column and centrifuged at 8000 rpm for 1 min. and discarded the collection tube containing the flow-through. Added 600 µl Buffer AW1 (QIAGEN) to the QIAamp MinElute column and centrifuged at 8000 rpm for 1 min. and discarded the collection tube containing the flow-through. Added 700 µl Buffer AW2 to the QIAamp MinElute column and centrifuged at 8000 rpm for 1 min. and discarded the collection tube containing the flow-through. Added 700 µl of ethanol (100%) to the QIAamp MinElute column and centrifuged at 8000 rpm for 1 min. and discarded the collection tube containing the flow-through. Centrifuged QIAamp MinElute column at speed 14,000 rpm for 3 min. to dry the membrane completely discarded the collection tube containing the flow-through. Dried the QIAamp MinElute column at 56°C for 3 min. Applied 50 µl Buffer ATE (QIAGEN) to the center of the membrane. Incubated at room temperature (25°C) for 1 min. and centrifuged at speed 14,000 rpm for 1 min. Now the microcentrifuge tube contains 20–30 µl Buffer ATE (QIAGEN) with DNA 11.
DNA Quantification

DNA samples were quantified by realtime PCR (Applied BioSystem). The internal PCR control (IPC) included in each sample was used to detect PCR inhibitors in the DNA isolates. PCR inhibitors retard the onset of exponential amplification in the PCR, which can be detected as an increase in the cycle threshold (Ct) value for IPC. Negative controls and reagent blanks were included in every step of the study\textsuperscript{12}.

Amplification and Analysis

DNA samples obtained from all the three methods were used for STR analysis using the AmpFlSTR Identifier Plus PCR amplification kit (Applied BioSystem). The DNA was diluted/concentrated to obtain 1 ng of DNA per µl of the DNA sample isolated with all these methods. PCR amplification consisted of a first cycle at 95°C for 11 min, 28 cycles at 94°C for 20 seconds, 59°C for 3 min and 1 cycle at 60°C for 10 min. STR fragments were analyzed on an Applied Biosystems 3500,3500 XL Genetic Analyzer (Applied BioSystem) using POP4 polymer (Applied BioSystem), Gene Scan\textsuperscript{TM} 500 LIZ Size Standard (Applied BioSystem), HiDi\textsuperscript{TM} Formamide (Applied BioSystem). Positive controls (provided by the manufacturer), negative controls, and reagent blank controls were analyzed in each run. The final data were analyzed by using GeneMapper ID-X v1.4 software (Applied BioSystem) to assign allele calls based on allelic ladders provided by the manufacturer with allele peak heights of at least 100 RFU.

Pre PCR modifications

Out of the 30 teeth samples subjected for DNA isolation through Organic PCI method, 18 samples gave complete DNA profiles. The 30 teeth samples were re-subjected to DNA isolation through organic PCI method. This time the incubation period was just for 4 hours at 56°C. After pre PCR modifications 3 more DNA isolates give a complete DNA profiles. Thus pre PCR modification gave 10% more increased DNA isolates.

Out of the 30 teeth samples subjected for DNA isolation through QIAamp® DNA Investigator Kit (QIAGEN) method, 12 samples gave complete DNA profiles. The 30 teeth samples were re-subjected to DNA isolation through QIAamp® DNA Investigator Kit (QIAGEN) method. This time the incubation period was just for 4 hours at 56°C. After pre PCR modifications 4 more DNA isolates give a complete DNA profile. Thus pre PCR modifications gave 13% more increased DNA isolates.

Out of the 30 teeth samples subjected for DNA isolation through QIAamp® DNA Investigator Kit (QIAGEN) method, 12 samples gave complete DNA profiles. The 30 teeth samples were re-subjected to DNA isolation through QIAamp® DNA Investigator Kit (QIAGEN) method. This time the incubation period was just for 4 hours at 56°C. After pre PCR modifications 4 more DNA isolates give a complete DNA profile. Thus pre PCR modifications gave 13% more increased DNA isolates.

Post PCR modifications

All the amplification PCR tubes, pipettes, pipette tips etc. were exposed to UV light (combination of 300-400 nm) for 10 min. followed by the addition of target DNA.

Out of 30 amplicons amplified with the DNA isolated through PCI method that were subjected to capillary electrophoresis, 19 amplicons gave complete DNA profiles while there were some allele drops in the DNA profiles of 2 amplicons. When these 30 amplicons were transferred to new UV sterilized PCR tubes and further subjected to Ultraviolet exposure in combination of 300-400nm for about 2 minutes. These 2 amplicons gave complete DNA profiles thus increasing the DNA profile up to 7%.

Out of 30 amplicons amplified with the DNA isolated through AutoMate Express™ (Applied BioSystem) method that were subjected to capillary electrophoresis, 19 amplicons gave complete DNA profiles while there were some allele drops in the DNA profiles of 1 amplicon. When these 30 amplicons were transferred to new UV sterilized PCR tubes and further subjected to Ultraviolet exposure in combination of 300-400nm for about 2 minutes. This 1 amplicon gave compete DNA profile thus increasing the DNA profile up to 4%.

Out of 30 amplicons amplified with the DNA isolated through AutoMate Express™ (Applied BioSystem) method that were subjected to capillary electrophoresis, 19 amplicons gave complete DNA profiles while there were some allele drops in the DNA profiles of 1 amplicon. When these 30 amplicons were transferred to new UV sterilized PCR tubes and further subjected to Ultraviolet exposure in combination of 300-400nm for about 2 minutes. This 1 amplicon gave compete DNA profile thus increasing the DNA profile up to 4%.

Out of 30 amplicons amplified with the DNA isolated through QIAamp® DNA Investigator Kit (QIAGEN) method that were subjected to capillary electrophoresis, 14 amplicons gave complete DNA profiles while there were some allele drops in the DNA profiles of 2 amplicon. When these 30 amplicons were transferred to new UV sterilized PCR tubes and further subjected to Ultraviolet exposure in combination of 300-400nm for about 2 minutes. These 2 amplicons gave compete DNA profile thus increasing the DNA profile up to 4%.
Results and Discussions

The quality and efficiency of a standard organic PCI DNA isolation method, Automate Express™ and QIAamp® DNA Investigator Kit were compared to obtain human DNA and short tandem repeats (STRs) profiles from 30 teeth samples. DNA samples were quantified by real-time PCR, and STR profiles were obtained using the AmpFISTR Identifier plus PCR amplification kit. After pre-PCR modification the Organic method recovered most DNA ranging from 0.19 to 2.95 ng/µl (average 1.43 ng/µl) followed by Automate Express™ BTA prepfiler kit ranging from 0.16 to 2.12 ng/µl (average 1.08 ng/µl) and QIAamp® DNA Investigator Kit ™ method recovered least DNA ranging from 0.11 to 1.98 ng/µl (average 0.84 ng/µl).

Out of 30 teeth samples tested, complete genetic profiles (15 STR loci plus amelogenin) were obtained from 21/30 (70%) DNA samples isolated using the organic extraction protocol, only 20/30 (67%) isolated with the AutoMate Express™ (Applied BioSystem) gave complete profiles while 16/30 (53%) profiles were obtained using QIAamp® DNA Investigator Kit.

After pre-PCR modification there has been an increase in the DNA STR profile by 10% from 60% to 70% by using the PCI method, an increase by 7% from 60% to 67% by using the Automate prepfiler BTA kit and an increase by 13% from 40% to 53% by using the QIAamp® DNA Investigator Kit [Figure1]. After post-PCR modification there has been an increase in the DNA STR profile by 7% from 63% to 70% by using the PCI method, an increase by 4% from 63% to 67% by using the Automate prepfiler BTA kit and an increase by 6% from 47% to 53% by using the QIAamp® DNA Investigator Kit [Figure2].

Rucinski et al. in their study “comparison of two methods for isolating DNA from human skeletal remains for STR analysis” described that EDTA decalcification steps used in organic extraction method significantly improved the amount of DNA recovered from bone. In our study by making simple pre-PCR and post-PCR modification, there is still the possibility of obtaining for better quality DNA for generating STR profiles from human teeth. Our aim was to optimize and standardize a DNA isolation method to improve the quality and quantity of the DNA isolates from degraded and decomposed human teeth which have very little chances to provide DNA Typing evidence in Forensic Sciences.

The amount of DNA recovered was greater from the organic extraction method than from Automate Express™ and QIAamp® DNA Investigator Kit Manual method. We cannot rule out pipetting errors. Different conditions of environmental temperature, fungal, bacterial growth, humidity and the presence of inhibitors might be factors that affect the quality and quantity of DNA obtained.

The principle behind the increase in the useful DNA STR profiles through pre-PCR modification may be inhibitors are co-purified and are still present in the DNA isolates. Re-isolation of the teeth samples with some modification increases the chance of removal of these inhibitors from the previous DNA isolates increasing the chances of better STR profiles. The principle behind the increase in the useful DNA STR profiles through post-PCR modification may be the property of UV light to induce thymidine dimers and other covalent modifications of DNA that render the contaminating nucleic acid inactive as a template for further amplification.
Figure 1: Result obtained after pre PCR modifications in 30 teeth samples

Figure 2: Result obtained after post PCR modifications in 30 teeth samples
Conclusion

After thorough and extensive work on the above three DNA isolation methods, our results indicate that the organic DNA isolation method is the most suitable and reliable method of DNA isolation for obtaining DNA quantity and DNA quality followed by Automate Express™ and then QIAamp® DNA Investigator Kit™ method. The present study has proved that simply by making some pre-PCR and post-PCR modifications these three techniques still hold the potential for providing better results.

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Ethical Clearence: NOC taken from Department.

References

Maternal age ≥ 35 years, Nulliparity, High Blood COHb Levels, and Low Serum Nitric Oxide Levels Increased Risk of Preeclampsia

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Abstract

Objective: To find out the risk factors for preeclampsia.

Materials and Methods: a case-control study was between March 2018 and December 2018. Pregnant women who with gestational age of at least 22 weeks live in residential areas, exposed to smoke from combustion of tile or brick were divided into two groups. Cases were those diagnosed with preeclampsia. Controls were normotensive pregnant women who had a history of preeclampsia in previous pregnancy. CO (carbon monoxide) exposure in pregnant women was determined by examining COHb levels in the blood. Serum Nitric Oxide levels were measured using the ELISA (Enzyme-Linked Immunosorbent Assay) method. Data were analyzed by Chi-square test or Fisher’s exact test, Independent T-Test and regression analysis. Adjusted odds ratio (ORs) with 95% confidence interval (CI) was calculated.

Results: The results of Blood COHb levels were significantly higher in preeclampsia (4.58±1.2) than the case of control group (2.85±0.4). Serum nitric oxide levels in preeclampsia were significantly lower in preeclampsia (18.28±4.1) than the case of control group (35.15±7.2). Maternal age ≥ 35 years, nulliparity, high blood COHb levels > 3.5%, and low serum Nitric Oxide levels < 25 μmol/L were significantly associated with increased risk of preeclampsia.

Conclusion: Low serum Nitric Oxide levels (< 25 μmol/L) due to exposure to CO from the smoke of combustion of tiles or brick carried an increased risk of developing preeclampsia (ORs 25.5;95% CI 4.3-29.7). These results can help health workers in pregnancy care counseling and prevention of preeclampsia in pregnant women located in areas exposed to carbon monoxide from the smoke of combustion of tiles or brick.

Keywords: Nitric oxide, Carbon monoxide exposure, Tiles-brick smoke burning, Preeclampsia.

Introduction

Preeclampsia (PE) is the main cause of pregnancy and the development of 3-7% of pregnant women. Hypertension in pregnancy affects about 8% of pregnancies worldwide and significantly contributes to maternal and fetal morbidity and mortality.1,2 The high number of maternal deaths in Indonesia, as compared to neighboring countries in other ASEAN regions dominated by hypertension in pregnancy or PE. Likewise, the cause of death in Jepara District was 85.7% due to preeclampsia, both of which occurred during pregnancy and postpartum.3-5

PE is a pregnancy-specific disorder that is defined as the new onset of maternal hypertension and proteinuria after 20 weeks of pregnancy.6 Although until now there
is no known exact cause of preeclampsia.\(^{(2,7)}\)

PE is characterized by the migration of disturbed extravillous trophoblasts to the uterine spiral arteries which causes increased uteroplacental vascular resistance and vascular dysfunction, which results in reduced systemic vasodilation. Its pathogenesis is mediated by the bioavailability of biological Nitric Oxide (NO) and tissue damage caused by increased levels of Reactive Oxygen Species (ROS). Coagulopathy caused by ROS causes placental infarction and disrupts uteroplacental blood flow in PE. However, placental ischemia in PE reduces antioxidant activity, which results in increased oxidative pressure that causes the emergence of PE pathological conditions including hypertension and proteinuria.\(^{(6,8,9)}\)

In developing countries, pollution exposure also comes from burning biomass fuels (wood, cow oil and plant waste). Combustion by products include carbon dioxide, carbon monoxide, nitrogen oxides, sulfur dioxide, and small solids and liter.\(^{(10)}\) Carbon Monoxide (CO) is the pollutant that is most widely emitted from biomass combustion fumes that affect health.\(^{(11,12)}\) Examination of COHb blood taken through venous blood vessels is the only biological monitoring method to determine the level of CO exposure in the body.\(^{(13)}\) CO poisoning can increase Nitric Oxide (NO) activity and form free radical formation which stimulates leukocyte adhesion and activates the brain microvascular and then forms xanthine oxidase formation resulting in oxidative stress from radical superoxide (O\(^{2-}\)). Oxidative stress in pregnant women can cause placental ischemia and interfere with uteroplacental blood flow, finally produces lipid peroxidation in PE.\(^{(14)}\)

Materials and Method

A case-control study was carried out at Nalumsari Health Center, Mayong 2 Health Center, and Kalinyamatan Health Center, Jepara District between March 2018 and December 2018. Data from this study were collected from medical records of pregnant women at Nalumsari Health Center, Mayong 2 Health Center, and Kalinyamatan Health Center, Jepara District. Pregnant women with gestational age of at least 22 weeks, who live in residential areas exposed to smoke from combustion of tile or brick (Nalumsari Health Center, Mayong 2 Health Center, and Kalinyamatan Health Center, Jepara District) dan were inclusion criteria. Subjects were divided into two groups. Cases were those diagnosed with preeclampsia. Controls were normotensive pregnant women who had a history of preeclampsia in previous pregnancy. Pregnancies complicated with chromosomal or structural anomalies, incomplete clinical data and not willing to be a respondent were excluded.

The medical records of pregnant women were reviewed. CO exposure in pregnant women was determined by examining COHb levels in the blood. In accordance with ACGIH (2008), Biological Exposure Indices or permissible COHb levels in the blood were 3.5%.\(^{(15)}\) Nitric Oxide levels examined in this study were Nitric Oxide levels in the respondent’s serum. Normal serum Nitric Oxide levels were 25-45 μmol/L.\(^{(16)}\) Blood collection was carried out with the help of a Clinical Pathology Laboratory officer at the General Hospital of Kumalasiwi Kudus and then centrifuged on blood samples so that the Nitric Oxide serum was obtained for further analysis using the ELISA method while analyzed Blood COHb levels using spektotofometri.

Preeclampsia was defined as new-onset hypertension (systolic blood pressure of at least 140 mmHg; diastolic blood pressure of at least 90 mmHg), accompanied by proteinuria of at least 300 mg per 24 hours, or at least 1+ on dipstick testing after 20 weeks.\(^{(6,17)}\) Gestational age [GA] was calculated from the last menstrual period and confirmed by first or second-trimester ultrasonography.

All data were analyzed with SPSS. Continuous variables were compared using Independent T-Test and presented as mean. The normality of data distribution is recorded by the Kolmogorov-Smirnov test. Categorical variables were analyzed with Chi-square test or Fisher’s exact test as appropriated and presented as the percentage. Multivariate regression analysis was used to evaluate the association between preeclampsia and the various risk factors. The risk factors that produced a point estimate at a p-value of < 0.1 on the univariate analysis were entered into a multivariate regression analysis. Adjusted odds ratio (ORs) with 95% confidence interval (CI) was calculated. A p-value < 0.05 was considered statistically significant.

Results

The maternal and pregnancy demographics are shown in Table 1. The mean maternal age, and nulliparity proportion significantly higher in the preeclampsia group than in controls. However, gestational age at first
antenatal visit, family history of hypertension were not significantly different between the two groups.

### Table 1. Demographic characteristic of both groups

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Preeclampsia (n=32)</th>
<th>Control (n=32)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal age (years), mean ± SD</td>
<td>32.18±5.3</td>
<td>30.25±5.6</td>
<td>0.011</td>
</tr>
<tr>
<td>Parity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nulliparity</td>
<td>18 (56.25)</td>
<td>17 (53.12)</td>
<td>0.023</td>
</tr>
<tr>
<td>Multiparity</td>
<td>14 (43.75)</td>
<td>15 (46.87)</td>
<td></td>
</tr>
<tr>
<td>Gestational age at first ANC (Weeks), mean ± SD</td>
<td>12.18±1.3</td>
<td>10.25±1.6</td>
<td>0.052</td>
</tr>
<tr>
<td>Family history of hypertension</td>
<td>12 (31.25)</td>
<td>5 (68.75)</td>
<td>0.074</td>
</tr>
</tbody>
</table>

Values are given as mean ± SD; n: number; ANC = Antenatal care; BMI = Body Mass Index

Table 2 shows the comparison of Blood COHb and serum Nitric Oxide levels in preeclampsia than control groups. The results of Blood COHb and Serum Nitric Oxide levels between both groups were significant (p-value < 0.05). Blood COHb levels were significantly higher in preeclampsia. Blood COHb levels > 3.5% was found in 21 cases (66%) of preeclampsia. Serum nitric oxide levels were significantly higher in control groups. Serum nitric oxide levels in preeclampsia were low (18.28 μmol/L). There was no maternal death in the present study.

### Table 2. Comparison of Blood COHb and Serum Nitric Oxide levels of both groups

<table>
<thead>
<tr>
<th></th>
<th>Preeclampsia (n=32)</th>
<th>Control (n=32)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood COHb levels (%)</td>
<td>4.58±1.2</td>
<td>2.85±0.4</td>
<td>0.023</td>
</tr>
<tr>
<td>Serum Nitric Oxide levels (μmol/L)</td>
<td>18.28±4.1</td>
<td>35.15±7.2</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Values are given as mean ± SD; n: number

Table 3 provides the information regarding the risk factors in women with preeclampsia and controls through univariate analysis. Maternal age, parity, Blood COHb levels, and Serum Nitric Oxide levels were significantly associated with increased risk of preeclampsia.

### Table 3. Risk factors for preeclampsia

<table>
<thead>
<tr>
<th>Risk factors</th>
<th>Preeclampsia (n=32)</th>
<th>Control (n=32)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal age (years) :</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 20</td>
<td>4 (12.50)</td>
<td>8 (25.00)</td>
<td>0.065</td>
</tr>
<tr>
<td>20-34</td>
<td>17 (53.12)</td>
<td>14 (43.75)</td>
<td>Reference</td>
</tr>
<tr>
<td>≥35</td>
<td>11 (34.38)</td>
<td>10 (31.25)</td>
<td>0.021</td>
</tr>
</tbody>
</table>
Table 4 shows the results of multivariate logistic regression analysis. The risk factors that were significantly associated with increased risk of preeclampsia were: maternal age ≥ 35 years (odds ratio (ORs) 2.2; 95% CI 1.3-3.4), nulliparity (odds ratio (ORs) 1.1; 95% CI 0.8-2.1), high blood COHb levels > 3.5% (odds ratio (ORs) 1.7; 95% CI 1.1-2.9), and low serum Nitric Oxide levels < 25 μmol/L (odds ratio (ORs) 25.5; 95% CI 4.3-29.7) were significantly associated with increased risk of preeclampsia. On the other hand, maternal age < 20 years (odds ratio (ORs) 0.5; 95% CI 0.3-0.9), and multiparity (odds ratio (ORs) 0.9; 95% CI 0.6-1.7) were significant protective factors against the development of preeclampsia.

Table 4. Results of multivariate logistic regression analysis

<table>
<thead>
<tr>
<th>Risk factors</th>
<th>Adjusted ORs</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Age ≥35</td>
<td>2.2</td>
<td>1.3, 3.4</td>
</tr>
<tr>
<td>Nulliparity</td>
<td>1.1</td>
<td>0.8, 2.1</td>
</tr>
<tr>
<td>High Blood COHb levels &gt; 3.5%</td>
<td>1.7</td>
<td>1.1, 2.9</td>
</tr>
<tr>
<td>Low serum Nitric Oxide levels &lt; 25 μmol/L</td>
<td>25.5</td>
<td>4.3, 29.7</td>
</tr>
</tbody>
</table>
Discussion

The results of blood COHb levels were significantly higher in preeclampsia than the case of control groups. Blood COHb levels > 3.5% was found in 24 cases (75%) of preeclampsia. This is due to exposure to carbon monoxide from the smoke of combustion of tiles or brick (CO poisoning). Carbon Monoxide (CO) is the most pollutant emitted from biomass combustion fumes such as engine combustion, gas, oil, wood or coal-fired equipment, and solid waste disposal that affects health. (11,18) Meanwhile, CO poisoning can increase Nitric Oxide (NO) activity and form free radical formation, which stimulates leukocyte adhesion and activates the brain microvascular and then forms xanthine oxidase formation resulting in oxidative stress from radical superoxide (O2-). Oxidative stress in pregnant women can cause placental ischemia and interfere with uteroplacental blood flow, finally produces lipid peroxidation in PE. (14)

Serum nitric oxide levels were significantly lower in preeclampsia than the case control groups. Nitric oxide production has decreased in preeclampsia mothers associated with endothelial dysfunction so that it is thought to have an effect on vasoconstriction and hypertension in preeclampsia. (18) Its pathogenesis is mediated by the bioavailability of biological Nitric Oxide (NO) and tissue damage caused by increased levels of Reactive Oxygen Species (ROS). Coagulopathy caused by ROS causes placental infarction and disrupts uteroplacental blood flow in PE. However, placental ischemia in PE reduces antioxidant activity which results in increased oxidative pressure, that causes the emergence of PE pathological conditions including hypertension and proteinuria. (6,8,9) superoxide (O2-)

Nulliparity and maternal age ≥ 35 years were associated with a significantly increased risk of preeclampsia. This was consistent with previous studies. (19–21) In both animal and human models, increased blood pressure has been associated with oxidative stress in blood vessels. Excessive endothelial production of reactive oxygen species (ROS) can be a cause and effect of hypertension. In addition to nitric oxide synthase can also be considered as a major source of Specific Reactive Oxygen (ROS), possibly contributing to the development of hypertension. (22) The authors found that blood COHb levels increase to cause a decrease in serum Nitric Oxide levels. Therefore, prevention of preeclampsia can be conducted by pregnant women by avoiding exposure of combustion.

The present study has mentionable limitations. First, this study was not reviewing other smoke exposures besides tile and brick smoke were not examined in this study such as smoke from motor vehicles and cigarette smoke. Second, the 6-month duration of the present study, may not have been long enough to elucidate the long-term effects of this combustion.

Conclusion

The research results show blood COHb levels are significantly higher in preeclampsia than the case of control groups. However, serum Nitric Oxide levels are significantly lower in preeclampsia than control groups. Maternal age ≥ 35 years, nulliparity, high blood COHb levels > 3.5%, and low serum Nitric Oxide levels < 25 μmol/L were significantly associated with increased risk of preeclampsia. This study serves information about the roles of health workers as counselor to the prevention of preeclampsia especially pregnant women, which are located in areas exposed to carbon monoxide from the smoke of combustion of tiles or brick. Furthermore, prevention of PE by especially risk factors for exposure to carbon monoxide from tile and brick burning smoke should be encouraged to reduce the prevalence of PE. This role is very important in developing countries to cost efficiency.

What is already known on this topic?

Serum Nitric Oxide levels are significantly lower in preeclampsia. Low serum Nitric Oxide levels (< 25 μmol/L) due to exposure to carbon monoxide from the smoke of combustion of tiles or brick carried an increased risk of developing preeclampsia.

What does this study add?

This research has confirmed that blood COHb levels increase to cause a decrease in serum Nitric Oxide levels. Therefore, PE especially risk factors for exposure to carbon monoxide from tile and brick burning smoke can be prevented through reducing the intensity of carbon monoxide exposure.

Acknowledgment

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Potential Conflicts of Interest: None.

Ethical Clearance: The present study was approved by the Research Ethics Committee of the Faculty of Public Health Diponegoro University No.194/EC/FKM/2018.

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Effect of Unilateral and Bilateral Shoulder Rehabilitation Exercise Protocol in Patients Secondary to Radical Mastectomy

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Abstract

**Background:** Mastectomy is an operation which causes many changes in a woman’s body. Its consequence is, among other things, lymphatic edemas, limitation of movements and strength of the upper limb of the patient, experiences in the emotional sphere, difficulties related to the postoperative scar and the results of supplementing treatment such as radiotherapy or chemotherapy. Recent studies have shown the result of effective physiotherapy treatment postoperatively. There is a paucity of literature available showing the effect of bilateral approach rather than a unilateral one for the recovery

**Objective:** Objective of the study was to find out the effect of unilateral and bilateral shoulder rehabilitation exercise protocol in patients secondary to radical mastectomy

**Method:** A total of 20 females who underwent mastectomy procedure along with chemotherapy were included in the study. Demographic data and consent form were taken from the patients. Group A was received treatment for the unilateral i.e. the affected side and group B received treatment bilaterally for five days per week for eight weeks and pre and post assessment was done with shoulder pain and disability index (SPADI), range of motion (ROM) and manual muscle testing (MMT)

**Results:** Statistics results within the group values for Group A SPADI (p=0.6385) and mean difference (MD) was

**Conclusion:** A proper knowledge regarding ergonomics is important to avoid the development of musculoskeletal disorders, taking stretch breaks in between long working hours can provide a healthier working environment for nursing staff and maximize human resource efficiency.

**Keywords:** Shoulder rehabilitation, Mastectomy, Shoulder pain and disability index(SPADI), Range of motion (ROM), Manual muscle testing(MMT).

Introduction

Cancer is an abnormal growth of cells which tend to proliferate in an uncontrolled way and in some cases, to metastasize. When cancer cells metastasize to nearby tissues or to distant areas of the body it is known as malignant tumor. When cancer grows but does not spread it is known as benign tumor. prevalence of breast cancer in India is 25.8 per 100000 due to alterations in dietary habits, reproductive risk factors and increasing life expectancy there is a rapid rise in incidence of breast cancer. Most breast cancers start in the duct cells and only some in cells of lobules and other tissues. Breast cancer can be invasive carcinoma (malignant) or non-invasive carcinoma (benign). Invasive carcinoma is further divided into invasive ductal carcinoma, invasive lobular carcinoma, tubular carcinoma, medullary carcinoma. Non-invasive carcinoma includes ductal

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carcinoma and lobular carcinoma.

Surgical mastectomy is the only curative treatment for the females with breast cancer. Among the other mastectomy procedures, radical mastectomy results in the removal of the breast tissue, axillary lymph nodes and the chest wall muscles. Mastectomy is an operation which causes many changes in a woman’s body. Its consequence is, among other things, lymphatic edemas, limitation of movements and strength of the upper limb of the patient, experiences in the emotional sphere, difficulties related to the postoperative scar and the results of supplementing treatment such as radiotherapy or chemotherapy. Significant complications after mastectomy are changes in body posture caused both by disorders in body static as a result of amputation and limitation of movements and soreness of the spine. The problem of changes in body posture, as a result of mastectomy is not well known. It seldom appears in scientific literature. It is, however, an important problem, both from the point of view of medical and psychological rehabilitation. Incorrect body posture may cause other somatic anomalies. For the patients good-looks related to body posture is the basis for better well-being 1,2.

Lower mortality risk and a higher quality of life are associated with higher levels of muscle strength.8 The increasing incidence of surgical mastectomy places breast cancer survivors at risk for development of upper extremity strength imbalances. Pectoralis major, serratus anterior, upper trapezius, rhomboid muscles, latissimus dorsi are involved in management of breast cancer that is these muscles are cut during surgery or exposed to radiation during radiotherapy) which causes difficulty in flexion, abduction, internal rotation, scapular elevation, protraction and retraction.10 Anthracyclines used in chemotherapy cause oxidative stress by two mechanisms: interaction with mitochondrial respiratory chain and through a nonenzymatic reaction with ferric iron. Anthracyclines based chemotherapy negatively affects noncancerous tissue along with striated muscles, which causes muscle fatigue and weakness in patients.11 It is seen that though the complications develop on the ipsilateral side, the contralateral side is also affected to a great extent. But the contralateral side is often neglected due to a greater number of complications on the ipsilateral side.

In healthy women, upper extremity strength should be equal bilaterally. However, compared to healthy women, breast cancer survivors have greater upper extremity loss of strength, leading to functional impairment. Side to side muscle imbalances increase the risk for acute and chronic injury and that bilateral shoulder rehabilitation can resolve these imbalances and decrease risk for injury.

Material and Methodology

Study Design

This study was an Interventional study.

Place of study

The study was conducted in the Oncology department in Krishna Hospital, Karad.

Sample size

The sample size was 20 subjects

Sampling method

The subjects were selected by simple random sampling technique.

Study duration

The duration of the study was 6 months

Treatment duration

The treatment was given for 1 hour per day and 5 days/ week.

Inclusion criteria were as follows: 1. Females between 30 to 50 years 2. Subjects who underwent modified radical mastectomy procedure along with chemotherapy or radiotherapy for breast carcinoma 3. Subjects who are interested to participate in the study

Exclusion criteria were as follows: 1. Bilateral mastectomy 2. Pregnancy 3. Open Wounds 4. Previous history of trauma to shoulder, surgery, untreated pathology or dysfunction.

Material used were: 1. Weights 2. Wand 3. SPADI Questionnaire 4. Shoulder ladder 5. Shoulder wheel

Resistance exercises – Shoulder flexion, extension, abduction, adduction, internal rotation and external rotation. Exercises are started with 2-3 sets of 10-15 reps with half a kg weight. Gradual progression is made to 1kg when the individual is able to perform complete 3 sets of 10-15 reps.
**Outcome Measures**

1) Shoulder pain and disability index (SPADI) – It is a self-administered questionnaire that consists of two dimensions, one for pain and the other for functional activities. The pain dimension consists of five questions regarding severity of an individual’s pain. Functional activities are assessed with eight questions designed to measure the degree of difficulty an individual has with various activities of daily living that require upper extremity use.

2) Manual Muscle Testing (MMT) – It is an integral part of physical examination as it provides information which is useful in differential prognosis and treatment of musculoskeletal and neuromuscular disorders. It is used to evaluate contractile units and their ability to generate forces. Muscle testing is an important evaluative tool to assess impairments and deficits in muscle performance, including strength, power and endurance. It is graded from 0 to 5 which is determined by the patient’s ability to move he tested body depending on muscle contractility, gravity assisted and antigravity position.

3) Range of motion (ROM) – It is a measurement of movement around a specific joint or body part. It is used to evaluate the integrity of the particular joint. Both active as well as passive range of motion should be evaluated. It should be compared with the normal range of motion of the joint.

**Procedure**

This study was conducted to find the Effect of Unilateral and Bilateral shoulder rehabilitation exercise protocol in patients secondary to Radical Mastectomy. Protocol and ethical clearance were done. Ethical consent was taken from the Institutional ethics committee of Krishna Institute of Medical Sciences “Deemed To Be University”, Karad. The subjects were divided into 2 groups based on the inclusion and exclusion criteria using simple random sampling. Informed consent was taken from the subjects. Subjects were assessed for shoulder pain and disability index, range of motion and strength prior intervening with the treatment. Subjects were explained about the procedure of the study.

Group A was conventional group and group B was experimental group.

Group A received treatment to the affected upper extremity. Shoulder flexion, extension, abduction, internal and external rotation was performed with weights, started with 2-3 sets of 10-15 reps. Exercises were started with weight of 0.5kg and progressed to 1kg. Low load long duration stretch was performed using 0.5kg weight. Pectoralis muscle stretch over the wall was done. Shoulder range of motion exercises using shoulder wheel, shoulder ladder and wand was done. The treatment was done 5 times a week for 6 weeks.

Group B received treatment bilaterally. Both the upper extremity was given the same protocol as above.

After six weeks the post treatment assessment for disabilities, range of motion and strength using assessment tools (SPADI, ROM and MMT) were done. The interpretation of the study was done on the basis of comparing pre and post test assessment of SPADI, Shoulder ROM and MMT. The study was concluded by statistical analysis of all the outcome measures.

**Results**

**SPADI**

**INTERPRETATION**

The above table shows pre and post comparison within the group.

<table>
<thead>
<tr>
<th>Parameters (Group A)</th>
<th>Pre</th>
<th>Post</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPADI</td>
<td>77.800</td>
<td>53.600</td>
<td>0.0494</td>
</tr>
</tbody>
</table>

**Shoulder ROM**

**Interpretation**

The above table shows pre and post comparison within the group.
Group A

<table>
<thead>
<tr>
<th>Parameters (Group B)</th>
<th>Pre</th>
<th>Post</th>
<th>Mean diff</th>
<th>t value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHD Flex</td>
<td>95.70</td>
<td>116.0</td>
<td>20.300</td>
<td>1.346</td>
<td>0.1949</td>
</tr>
<tr>
<td>SHD Ext</td>
<td>19.50</td>
<td>24.60</td>
<td>5.100</td>
<td>2.132</td>
<td>0.8823</td>
</tr>
<tr>
<td>SHD Abd</td>
<td>112.50</td>
<td>128.40</td>
<td>15.900</td>
<td>1.684</td>
<td>0.9269</td>
</tr>
</tbody>
</table>

Shoulder MMT

**INTERPRETATION**

The above table shows pre and post comparison within the group.

Group A

<table>
<thead>
<tr>
<th>Parameters (Group B)</th>
<th>Pre</th>
<th>Post</th>
<th>Mean diff</th>
<th>t value</th>
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<tbody>
<tr>
<td>SHD Flex</td>
<td>1.60</td>
<td>2.20</td>
<td>0.6000</td>
<td>2.012</td>
<td>0.7699</td>
</tr>
<tr>
<td>SHD Ext</td>
<td>1.70</td>
<td>2.40</td>
<td>0.7000</td>
<td>2.278</td>
<td>0.9179</td>
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<tr>
<td>SHD Abd</td>
<td>2.30</td>
<td>3.30</td>
<td>1.000</td>
<td>1.928</td>
<td>0.3207</td>
</tr>
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</table>

SPADI

**Interpretation**

The above table shows pre and post comparison within the group. Post treatment there was significant improvement noted in shoulder and arm mobility.

Group B

<table>
<thead>
<tr>
<th>Parameters (Group B)</th>
<th>Pre</th>
<th>Post</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPADI</td>
<td>81.80</td>
<td>52.60</td>
<td>0.0039</td>
</tr>
</tbody>
</table>

Shoulder ROM

**Interpretation**

The above table shows the pre and post comparison within the group. Post treatment there was significant improvement in the flexion, extension and abduction range of motion.
Group B

<table>
<thead>
<tr>
<th>Parameters (Group A)</th>
<th>Pre</th>
<th>Post</th>
<th>Mean diff</th>
<th>t value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHD Flex</td>
<td>106.90</td>
<td>117.60</td>
<td>10.700</td>
<td>5.802</td>
<td>0.0003</td>
</tr>
<tr>
<td>SHD Ext</td>
<td>19.500</td>
<td>21.700</td>
<td>2.200</td>
<td>5.659</td>
<td>0.0003</td>
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<tr>
<td>SHD Abduction</td>
<td>84.600</td>
<td>94.100</td>
<td>9.500</td>
<td>5.787</td>
<td>0.0003</td>
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</tbody>
</table>

Shoulder MMT

Interpretation

The above table shows the pre and post comparison within the group. Post treatment there was significant improvement in the strength of shoulder flexors, extensors and abductors.

Group B

<table>
<thead>
<tr>
<th>Parameters (Group B)</th>
<th>Pre</th>
<th>Post</th>
<th>Mean diff</th>
<th>t value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHD Flex</td>
<td>1.700</td>
<td>2.800</td>
<td>1.100</td>
<td>11</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>SHD Ext</td>
<td>2.300</td>
<td>3.200</td>
<td>0.900</td>
<td>5.014</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>SHD Abd</td>
<td>2.200</td>
<td>2.900</td>
<td>0.700</td>
<td>4.583</td>
<td>0.0013</td>
</tr>
</tbody>
</table>

Discussion

This study on “Effect of Unilateral and Bilateral shoulder rehabilitation exercise protocol in patients secondary to Radical Mastectomy” was conducted to compare the effect of unilateral and bilateral shoulder rehabilitation protocol in post mastectomy status. Strengthening was conducted using weights and find the efficiency on shoulder muscle strength and shoulder pain and disability index, range of motion exercises using wand and shoulder wheel and stretching using low load. Breast cancer survivors are benefited using free exercises to shoulder and progression is made to resistance training as it is effective in reducing muscle fatigue, increasing muscle strength and flexibility.

Conventional group showed improvement in shoulder pain and disability index (p=0.0494) with mean difference (MD=2.42), but did not show a significant result in strength for all the shoulder muscles and increase in the shoulder ranges. ROM for shoulder flexion (p=0.1949), MD=20.3, extension (p=0.8823) MD=5.1 and abduction (p=0.9269) MD=15.9. MMT for shoulder flexion (p=0.7699) MD=0.6, extension (p=0.9179) MD=0.7 and abduction (p=0.3207) MD=1.0. Experimental group showed improvement in SPADI score (p=0.0039) MD=29.2 and also exhibited better improvement in shoulder muscle strength and ranges. ROM for shoulder flexion (p=0.0003) MD=10.7 extension (p=0.0003) MD=2.2 and abduction (p=0.0003) MD=9.5 MMT for shoulder flexion (p<0.0001) MD=1.1, extension (p<0.0001)
MD= 0.9 and abduction (p=0.0013) MD=0.7. The between group values for SPADI (p=0.2365), ROM for shoulder flexion (p=0.0606), extension (p=0.0171) and abduction (p=0.0098), MMT for shoulder flexion (p=0.0378), extension (p=0.0260) and abduction (p=0.0041). The result concluded that bilateral approach for treating the post mastectomy is more effective than a unilateral approach. Treatment of the affected side is commonly followed in the treatment of the breast cancer patients; the bilateral approach would provide an overall improvement in the quality of life of the patient. The patient would have a full functional independence and be able to perform activity of daily living. The recovery of the patient would be occurring at a faster rate, further disuse atrophy of the muscles and better range of motion can be achieved if a bilateral treatment is given.

**Conclusion**

The present study with the statistical results that the group treated with a bilateral approach improved better than the group with unilateral approach with greater improvement in flexion, extension and abduction which promotes all the activities of daily life and that is confirmed again with the improvement of values in SPADI scores.

**Acknowledgement:** We acknowledge the guidance and constant support of Dean, Faculty of physiotherapy, KIMSDU Karad, Dr Poonam Patil, Dr SV Kakade for help in statistical analysis.

**Conflict of Interest:** Nil

**Source of Funding:** This study was funded was Krishna Institute of Medical Sciences Deemed To Be University Karad, Maharashtra.

**Ethical Clearance:** Taken from institutional ethical committee of Krishna Institute of Medical Sciences Deemed To Be University Karad, Maharashtra.

**References**


Effectiveness of Oropharyngeal Exercises on Daytimesleepiness, Snoring and Risk of Obstructive Sleep Apnea Among adults: Review

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Abstract

Introduction: Sleep disorders are very frequent among general population. The prevalence of sleep disturbances varies between 25 and 45%. Types of sleep abnormalities in which snoring is the common among all the adults. Oropharyngeal exercises are new, non-invasive, cost effective treatment modality for individuals having risk of obstructive sleep apnea, daytime sleepiness and snoring.

Methods: The study design was systematic review and it includes studies from databases of PUBMED, MEDLINE, Cochrane library, SCOPUS, Science direct, and Google scholar (2002-2017).

Result: Total 14 relevant articles were under taken. Studies included are related to prevalence, assessment, effect of different modalities and oropharyngeal exercises on daytime sleepiness, snoring and risk of obstructive sleep apnea and excludes those studies that involve other sleep disorders like insomnia, narcolepsy and circadian rhythm disorder etc. Abstracted information is related to their design, population characteristics, intervention and outcomes.

Conclusion: Oropharyngeal exercises are effective in reducing the daytime sleepiness, snoring and risk of obstructive sleep apnea among adults having snoring. Several studies came out with the result that oropharyngeal exercises are beneficial in reducing sleep disorders.

Key words: Oropharyngeal exercises, risk of obstructive sleep apnea, daytime sleepiness, snoring, adults.

Introduction

Sleep is one of the important factor in individual’s life.1 If sleep disturbance occur daily and creates a problem one may suffer from a sleep disorder. Fifty to seventy million US adults have a sleep disorder.2

Snoring is more prevalent in middle aged and older adults ranging from 10% to 20% in women and 29% to 30% in men. It is now suggested to be indicative of a significant clinical problem such as obstructive sleep apnea.3 Anatomical factors like congenital narrowing of nasal and or pharyngeal cavity, inferior position of hyoid bone, obesity, local deposition of fat in the pharynx and submental region and also supine position etc. More prevalent in males as compare to females.4 It progress over the course of years and leads to obstructive sleep apnea and it impairs ventilation raising nocturnal hypoxemia.5

Daytime sleepiness is one of the common sleep-wake complaints reported by older adults and has been associated with multiple adverse outcomes, including psychiatric disorders, metabolic abnormalities,

A frequency of 5 to 15 apneas and hypoapneas per hour of sleep is generally considered as mild sleep apnea, and a frequency >15/h indicates moderate to severe sleep apnea. Obstructive sleep apnea syndrome is a well-known cause of daytime sleepiness that is often associated with snoring.

Snoring is frequently denied, because it is a stigmatizing symptom that is poorly perceived by the beholder. Denial is the most common first reaction after hearing about the problem. Even people hesitate to take treatment for it hence non-invasive treatment is required for treating snoring which is affordable for them. Oropharyngeal exercises reinforce the oropharyngeal muscles and increase their tone, thereby dilating the upper airways during sleep. It is more physiological and may bring long-lasting benefits to the people.

**Materials and Method**

**Research design:** Systematic Review

**Inclusion criteria:** It includes the studies related to prevalence, assessment of snoring, daytime sleepiness and risk of obstructive sleep apnea among adults and also the effect of different modalities and oropharyngeal exercises on these phenomenon.

**Exclusion criteria:** The study excludes the studies those discussed about the other sleep disorders rather than snoring, daytime sleepiness and risk of obstructive sleep apnea

**Data Analysis:** Relevant article on the topic of snoring, daytime sleepiness and risk of obstructive sleep apnea and effect of other modalities and oropharyngeal exercises were identified by search of significant articles PubMed/Medline, Science direct, SCOPUS, CINAHL, Elsevier and Google scholar.

**Results**

A cross-sectional study was carried out to determine the prevalence of excessive daytime sleepiness and its associated with sleep habits, sleep problem and school performance in a sample of high school students of both genders between September and December. A total of 11 schools were randomly selected. Overall selected sample consisted of 3871 students (2703 boys and 1168 girls) in the 11th grade. It was measured using the Epworth sleepiness scale. The increased risk of EDS was related to perceived sleep insufficiency (p<0.001).

A study was conducted to assess the daytime sleepiness and the association of gender with sleep duration and daytime sleepiness was assessed among sixth to 12th grade students in Mangalore, India. The adolescents were randomly selected using stratified random sampling method. A total of 58 adolescents, 29 males and females each. Data was collected in July and August 2013. Daytime sleepiness was assessed using Cleveland adolescents sleepiness questionnaire. Sleep duration and daytime sleepiness by gender showed no statistically significant differences between male and female adolescents.

A prospective study was conducted to assess the gender difference in symptoms related to sleep apnea in a general population. A second cohort included patients referred for sleep apnea investigation in the same geographic region. A representative sample of 5,424 subjects aged 20 to 69 years living in northern Sweden were taken. Responses were obtained from 4,648 subjects (85.7%). The prevalence of snoring and witnessed apneas increased with age. The referral rate ratio for men/women after correction for population and prevalence of symptoms was 1.25:1 (p=0.012).

A descriptive study was done to assess the evaluation of Berlin Questionnaire Validity for Sleep Apnea Risk in Sleep Clinic Populations. Total 100 patients recruited to Kermanshah University of Medical Sciences. Patients completed a Persian version of BQ and underwent one night of PSG. For each patient, Apnea-Hypopnea Index (AHI) was calculated to assess the diagnosis and severity of OSA. BQ results categorized 65% of the patients as high risk and 35% as low risk for OSA. The sensitivity and the specificity of BQ for OSA diagnosis with AHI>5 were 77.3% and 23.1%, respectively.
A cross sectional study was done to assess the comparison of sleep questionnaire for screening obstructive sleep apnea. They took 234 patients. For sleep questionnaire (Berlin, Epworth sleepiness scale, STOP BANG sleep apnea questionnaire) were administered to the patients. Overnight attended polysomnography was done for all the patients. Out of 234 screened patients 87.1% had OSA, whereas 93.3%, 90.02%, 95.5% and 68.3% were classified as being risk by the Berlin, STOP-BANG questionnaire and ESS respectively.  

A population based survey done to determine the excessive daytime sleepiness assessed by the Epworth sleepiness scale and its association with health related quality of life in China. Total 3600 residents was selected randomly. The demographic information, Mandarin version of the ESS and 36-item short form health survey were collected. The average response rate of its 8 items was 97.92%. The ESS scores showed positive skewness in the selected sample with a median (Q1, Q3) of 6 (3, 0). 644 (22.16%) respondents reported subjective EDS.

Review related to the different modalities used for daytime sleepiness, snoring and risk of obstructive sleep apnea.

A randomized, placebo-controlled, double-blind study done to assess the effectiveness of the training given for tongue muscles improvement by giving Intraoral Electrical Neuro-stimulation among patients suffering from Apnea at University of Witten/ Herdecke, Germany. 67 patients were randomly assigned to 2 groups. Tongue related training was given in morning for 20 minutes and performed twice a day. Snoring is improved but not apnea improved with stimulation. Treatment efficacy was examined by polysomnography. Stimulation training, 47.5 ± 31.2; P< .05 but not with placebo training 62.1 ± 23.8 NS.  

Review related to effectiveness of oropharyngeal exercises on daytime sleepiness, snoring and risk of obstructive sleep apnea.

A randomized controlled trial done on 39 patients having diagnosed with snoring and also having the symptoms of mild-to-moderate sleep apnea. Patients are assessed at starting of study and asked about sleep questionnaires (Epworth, Pittsburgh sleep quality index) and check through polysomnography. No significant changes occurred in the control group and randomized to therapy experienced a significant decrease in the Snore Index, p = .017.

A semi-experimental study done on 30 patients with primary snoring, at Amiralmomen university hospital, Iran. They were provided with the sets of exercises for 1month and 30 min a day under the guidance of the speech therapist. It assessed snoring with the help of Visual Analogue Scale and Snoring Scale Score criteria before and after giving the session of exercises, Mean SSS before the study was 7.01 ± 1.72, while it was 3.09 ±2.7 after the study; and the mean VAS scores were 8.54 ± 1.89 and 4.69 ± 2.94 before and after the study, respectively (P = 0.0001).

A randomized study was conducted on patients with moderate obstructive sleep apnea syndrome. They take thirty-one patients with moderate sleep apnea in sleep laboratory, pulmonary division, heart institute, university of sa’o paulo medical school. They give daily 30 min exercises in experimental group (n=15), no exercises were given. It significantly decrease (P=0.05) neck circumference, snoring frequency, snoring intensity, and the sleepiness in day time obstructive sleep apnea severity.

A systematic review and meta-analysis was done to assess the effect of myofunctional therapy to treat obstructive sleep apnea in adults having snoring, and sleepiness. Data was taken from web of science, scopus,
MEDLINE, and the cochrane library. Nine adult studies (120 patients) reported polysomnography, snoring, and/or sleepiness outcomes. The pre- and post- MT apnea hypopnea indices (AHI) decreased, $P < 0.0001$. Polysomnography snoring decreased from $14.05 \pm 4.89\%$ to $3.87 \pm 4.12\%$ of total sleep time, $P < 0.001$, and snoring decreased. Epworth Sleepiness Scale decreased from $14.8 \pm 3.5$ to $8.2 \pm 4.1$. 21

A randomized control trial was conducted among 20 patients suffering from mild to moderate obstructive sleep apnea syndrome and were given oropharyngeal exercise therapy for 3 months. Epworth daytime sleepiness and Berlin sleep questionnaire, and full polysomnography were performed. There was significant reduction in the neck circumference ($38.4\pm1.3$ to $37.8\pm1.6$) after giving intervention. Significant improvement was seen in symptoms of daytime sleepiness, witnessed apnea, and snoring intensity. 22

**Discussion**

In the present study, the daytime sleepiness and risk of obstructive sleep apnea was found to be significant in experimental after giving oropharyngeal exercise intervention $p=0.001$, 0.01 respectively. The results were consistent with the findings of Guimaraes who reported the daytime sleepiness and risk of obstructive sleep apnea score in experimental group was significant $p<0.005$, $p=0.02$ respectively. 2

In the present study, the mean snoring score of adults in experimental and comparison group after intervention was $11.43\pm5.42$ and $15.13\pm5.16$ respectively ($p=0.01$). The findings were consistent with Shadman nemati et.al who reported the mean snoring scale score after the intervention in control and experimental group was $7.01\pm1.72$, $3.09\pm2.7$ respectively ($p=0.000$).29

**Conclusion**

The goals of oropharyngeal exercises are to tighten and strengthen the upper respiratory muscles at the back of the mouth, within the throat, and at the front of the neck. With the help of evidence based practice, literature can be added into the body of nursing knowledge to help the nurses and other health care professionals to reduce the problem of sleep related disturbances among people. Researchers should focus more on this area related to sleep disorders as most of the times people are unaware of their sleep related problems and less attention is given towards it.

**Conflict of Interest** - There is no conflict of interest between authors.

**Funding** - This research received no grant from any funding agency.

**Ethical Clearance** - Institutional ethical committee (IEC- 959) of Maharishi Markandeswarp (Deemed to be University), Mullana.

**References**


Effects of Aerobic Exercises for General Anxiety Disorders in Adolescents

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1Student, Krishna College of Physiotherapy, KIMS, Karad , Maharashtra, India,
2Associate Professor, Department of Pediatric physiotherapy, Krishna College of Physiotherapy, KIMS, Karad.

Abstract

Objective: The objective of the study were to determine the effect of aerobic exercises for the patients who were suffering from the general anxiety disorders such as depression, stress, and anxiety in adolescents.

Method: In this experimental study, 46 generally anxiety disorders patients were taken for the study, subjects were from the schools nearby with adolescents age group. Subjects were treated with aerobic exercises.

Result: The total of 46 cases were taken for the study who underwent through aerobic exercises. With statistical analysis of pre and post treatment, the exercises were found extremely significant with a p value of <0.0001.

Conclusion: The study concluded that aerobic exercises are effective in the management of generally anxiety disorders in adolescents.

Key words: Generally anxiety disorder, aerobic exercises, adolescents.

Introduction

Mental illness is a serious public health issue. It is expected to account for 15% of the global burden of disease by 2020, which would make it the leading disease burden.7 Suicide, depression, eating disorder, and anxiety are some of the conditions that affect young people in disproportionate rate in comparison to many other population groups.8

Mental health problems cause huge public health burden in juveniles globally, as evidenced by a 20% prevalence.1,2 Research has demonstrated that physical activity (PA) may provide physiological and psychological benefits.5,6 Several studies have described an improvement in mood of health of persons after participation in a physical activity programme.3,4

In seeking to understand the beneficial effects of exercise and how they are produced, it is important to consider separately what happens to mood and well-being immediately after an exercise workout and what the longer term benefits are of maintaining an exercise regimen. Two studies support the notion that physical activity improves mood and well-being immediately following an exercise workout. The effect of physical activity on mental health in children and adolescents has received significantly less attention than in adult population.9

For teenagers, it is suggested that low SE predicts adolescents’ report of mental status and health compromising behaviours, such as depression, anxiety, problem in eating and suicidal ideation. Low level of self-esteem in children and adolescents also predicts poor health, criminal behaviour, and limited economic prospects during adulthood. Thus it is important to determine effective interventions for improving self-esteem and self-concept for juveniles.16

Medications used to treat severe mood disorders such as quetiapine and lithium, are often associated with weight gain.10 Thus, alternative augmentation strategies
that target mental health and physical would be desirable.

Exercise represents a cost-effective and easily disseminated intervention that includes the benefits of minimal side-effects and improved physical health and mental health. The data on the efficacy of exercise as an intervention for MDD and Bipolar disorder have yielded effect sizes comparable to medications.11-15

Aims and Objectives

Aim:

The study is to find the effect of group aerobic exercise for psychological disturbed adolescents.

Objectives:

1. To assess the stress by the aerobic exercises in day to day life.

2. To overcome the psychological disturbances in adolescents by group aerobic exercises.

Materials and Methodology

- **Type of study**- Observational Study
- **Study Design**- Survey
- **Place Of Study**- Karad
- **Sample Size**- 46
- **Sampling Method**- Simple Random Sampling
- **Statistical Analysis** - with the help of pie diagrams and bar diagram.

Inclusion Criteria

- Patients with psychologically disturbed adolescents.
- Those are willing to participate.

Exclusion Criteria

- Patients with cardiovascular conditions.
- Patients with orthopaedic conditions.
- Patients other than depression, anxiety, etc.

Materials

- Assessment chart
- Writing Material
- Computer for online accessing

Outcome Measure:

0 = Not at all
1 = Just a little
2 = Somewhat
3 = Moderately
4 = Quite a lot
5 = Very much

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<td>0 1 2 3 4 5</td>
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<td>3.</td>
<td>It is hard for me to concentrate on reading</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>4.</td>
<td>The pleasure and joy has gone out of my life</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>5.</td>
<td>I have difficulty making decisions</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>6.</td>
<td>I have lost interest in aspects of life that used to be important</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>7.</td>
<td>I feel sad, blue, and unhappy</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>8.</td>
<td>I am agitated and keep moving around</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>9.</td>
<td>I feel fatigued</td>
<td>0 1 2 3 4 5</td>
</tr>
<tr>
<td>10.</td>
<td>It takes great effort for me to do simple things</td>
<td>0 1 2 3 4 5</td>
</tr>
</tbody>
</table>
11. I feel that I am a guilty person who deserves to be punished
   0 1 2 3 4 5

12. I feel like a failure
   0 1 2 3 4 5

13. I feel lifeless—more dead than alive
   0 1 2 3 4 5

14. My sleep has been disturbed; too little, too much, or broken sleep
   0 1 2 3 4 5

15. I spend time thinking about HOW I might kill myself
   0 1 2 3 4 5

16. I feel trapped or caught
   0 1 2 3 4 5

17. I feel depressed even when good things happen to me
   0 1 2 3 4 5

18. Without trying to diet, I have lost, or gained, weight
   0 1 2 3 4 5

Table no.1. The Goldberg Depression Scale

**Procedure:**
- An approval for the study was obtained from the protocol committee and institutional ethical committee of Krishna Institute of Medical Science ‘Deemed to be University’.
- Subjects taken for my study was from outdoor.
- On the day of enrolment, subjects were undergone detailed assessment to fulfil inclusion and exclusion criteria.
- As the subject fulfilled the criteria they were explained about the study and detailed information was given to them.
  - They were explained about:
    1. Pattern of study
    2. Need of study
    3. Information generated out of the study

4. Importance about the information generated
5. Its effect on general population.
6. Aerobic exercises were explained and performed
   - Consent was taken detailed, information was gathered and statistical analysis was then done in order to derive conclusion.

**Statistical Analysis and Result**

Statistical Analysis: It was done manually and by using the statistics software INSTAT so as to verify the results derived. Un-paired ‘t’ test was used for interpretation of post interventional values. According to standard deviation and the pearsons test we calculated the p value of each question in Goldberg scale for pre and post treatment, and they were extremely significant.

Result: In this study, the statistical analysis for Goldberg depression scale shows the extremely significant in post intervention. There is improvement in reduction of anxiety, depression and stress level after doing aerobic exercises for 6 weeks.

Table no.2. Representation of pre and post values of Goldberg depression scale.

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>QUESTIONS</th>
<th>PRE</th>
<th>POST</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I do things slowly</td>
<td>4.04</td>
<td>1.89</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>2.</td>
<td>My future seems hopeless</td>
<td>4.10</td>
<td>1.97</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>
3. It is hard for me to concentrate on reading 3.93 1.86 <0.0001

4. The pleasure and joy has gone out of my life 4.02 1.89 <0.0001

5. I have difficulty making decisions 4.02 1.76 <0.0001

6. I have lost interest in aspects of life that used to be important 3.97 2.08 <0.0001

7. I feel sad, blue, and unhappy 3.93 1.93 <0.0001

8. I am agitated and keep moving around 4.04 1.76 <0.0001

9. I feel fatigued 3.91 1.82 <0.0001

10. It takes great effort for me to do simple things 3.71 2 <0.0001

11. I feel that I am a guilty person who deserves to be punished 3.97 2.06 <0.0001

12. I feel like a failure 4.23 1.65 <0.0001

13. I feel lifeless—more dead than alive 4.10 1.76 <0.0001

14. My sleep has been disturbed; too little, too much, or broken sleep 3.69 1.95 <0.0001

15. I spend time thinking about HOW I might kill myself 3.97 2 <0.0001

16. I feel trapped or caught 4.15 1.89 <0.0001

17. I feel depressed even when good things happen to me 3.95 1.78 <0.0001

18. Without trying to diet, I have lost, or gained, weight 3.76 1.97 <0.0001

**Discussion:**

Mental illness is a serious public health issue and mental health problems are causing serious issues in adolescents. This leads to depression, anxiety, stress and which causes the increase in rate of suicide and many more disorders. This project was done in 6 weeks with sample size of 46 patients suffering through generally anxiety disorder. This research was undertaken with the aim to study the effect of aerobic exercises for generally anxiety disorder in adolescents. The study is to see the effect of aerobic exercises such as jumping jacks, burpees, jump rope, squat jumps, kickboxing, jogging in place on the adolescents to see the effect on generally anxiety disorders. The exercises were perform everyday with 10 repetitions of 3 sets each day with the pre and post examination of Goldberg depression scale. Prior consent was taken from the patients suffering from generally anxiety disorder. The outcome measure for this experimental study was goldberg depression scale and the intervention was aerobic exercises followed by
6 weeks. The results were extremely significant after the intervention and was confirmed by the Goldberg depression scale. The results were compare with pre and post values and the p values were <0.0001 for each question asked in scale. Hence, the exercises were beneficial for the patients suffering from generally anxiety disorder.

**Conclusion**

From this study, we can conclude that there is an effect of aerobic exercises in generally anxiety disorder for adolescence which shows aerobic exercises are effective to reduce anxiety, depression and stress level in age group of 18-21.

**Conflict of Interest:** There is no conflict of interest.

**Ethical Clearance:** An approval for the study was obtained from the protocol committee and institutional ethical committee of Krishna Institute of Medical Science ‘Deemed to be University’.

**Sources of Funding:** Self

**Acknowledgement:** Krishna College of Physiotherapy. Paediatric physiotherapy department of Krishna Hospital of Karad.

**References**


Gender Wise Difference in Presenting Signs and Symptoms of Stroke: Observational Study

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Abstract

Objective: The objective of this study was to find the various presenting signs and symptoms of stroke, in association of presenting signs and symptoms with age, sex and to establish the correlation in gender.

Method: All patients with first ever stroke and of both ischaemic and haemorrhagic stroke with age group of 40 to 60 years, subjects were of Karad. Signs and symptoms were collected from the medical records, patient themselves and their relatives. Differences were calculated using standard deviation.

Results: The total of 260 cases were taken for the study, 130 were male and 130 were female. The presenting signs and symptoms of stroke were differed in gender. Women were most commonly seen with generalised weakness (p=0.0076) and headache (p=0.0152). Men were most commonly seen with pain (p=0.0001), nausea (p=0.0060), fever (p=0.0081).

Conclusion: This study concluded that, there were gender differences in signs and symptoms of stroke and due to lack of awareness many people ignored the signs and symptoms of stroke by making it less important.

Key words: Stroke, Signs, symptoms, age, gender difference.

Introduction

Stroke is defined by the ‘World Health Organisation’ as the clinical syndrome consisting of rapidly developing clinical signs of focal (or global) disturbance of cerebral functions with symptoms lasting for 24 hours or longer or leading to death, with no apparent cause other than vascular origin.8

There are two major categories of stroke:

A. ISCHEMIC STROKE:-

This is the most common type of stroke, 80% of individuals are affected by these. It is caused by a clot or other blockage within an artery leading to the brain. It is further divided into two types: -

1. Thrombotic Stroke :

If blood clots from inside of the arteries of the brain, then it leads to thrombotic stroke.

2. Embolic Stroke :

If blood clotted in other parts of the body’s arteries subsequently entering the brain, it leads to embolic stroke.

B. HEMORRHAGIC STROKE:-

It is caused by the blood vessel in the brain interrupting in result of blood leaking into the brain.9

Early Warning Signs of Stroke:

1. Sudden numbness or weakness of face, arm, or leg; especially on one side of the body.

2. Sudden confusion, trouble speaking or understanding.

3. Sudden trouble seeing in one or both eyes.

4. Sudden trouble walking, dizziness, loss of balance or co-ordination.
5. Sudden severe headache with no known cause.9

Risk factors:

Risk factors for stroke can be categorized as modifiable and non-modifiable. Age, sex, and race/ethnicity and genetics (family history) are non-modifiable risk factors for both ischemic and hemorrhagic stroke, while hypertension, smoking, diet, hypercholesterolemia, diabetes mellitus, obesity and physical inactivity are some of the more commonly reported modifiable risk factors.10

A number of stroke risk factors are specific to women such as early menopause (before 42 years of age), pregnancy, birth, first 6 weeks of postpartum especially in older women, preeclampsia, and etc.9

The correlation between the age and the stroke is that the risk for stroke increases with age, which means women have a higher risk of stroke. Although women have a lower age-adjusted stroke incidence than men. However, this reversed in the older ages, women live longer and at the oldest age have an elevated risk compared to men and making them more prone to die from stroke. Mostly many women’s are unaware of their atypical signs and have increased delay to treatment. More women than men die from stroke each year because older women outnumber older men.1

As the stroke is the leading cause of death and disability. The estimated adjusted prevalence rate of stroke range, 84-262/100,000 in rural and 334-424/100,000 in urban areas (approximately). 2

Aims and Objectives

Aim:

• To study the gender difference in presenting signs and symptoms of stroke.

Objective:

• To study the various presenting signs and symptoms in stroke.
  • To study the association of presenting signs and symptoms with age, sex.
  • To establish the correlation of presenting signs and symptoms and gender.

Materials and Method

□ Assessment chart
□ Writing Material
□ Computer for online accessing

Methodology

TYPE OF STUDY – Observational study

STUDY DESIGN – Survey

SAMPLE SIZE – Supposed to be 260 Subjects.

STUDY DURATION – 6 months.

PLACE OF STUDY – Karad.

Estimation of Sample size- Formula: \( n=\frac{4(SD)^2}{(M \times Ɛ)} \)

By assuming SD=14.5, M=73, Ɛ= 0.025

N=260

Inclusion Criteria

• Patients with both haemorrhagic and ischaemic stroke.
• Patients with first ever stroke.
• Both male and female data.
• Age: 40-60 years

Exclusion Criteria

• Neurological ill patients other than stroke
• Patients with Transient Ischaemic Attack.

Outcome Measures

• Signs and symptoms of stroke.

Procedure

• An approval for the study was obtained from the protocol committee and institutional ethical committee of Krishna Institute of Medical Science ‘Deemed to be University’
  • Department of medicine, neurosurgery has been explained about the topic make them aware for sample that are required to conduct the study.
• Subjects taken for my study was from indoor as well as outdoor.

• On the day of enrolment, subjects were undergone detailed assessment to fulfil inclusion and exclusion criteria.

• As the subject fulfilled the criteria they were explained about the study and detailed information was given to them.

• They were explained about:
  1. Pattern of study
  2. Need of study
  3. Information generated out of the study
  4. Importance about the information generated
  5. Its effect on general population.

• Consent was taken detailed, information was gathered and statistical analysis was then done in order to derive conclusion.

**Statistical Analysis and Result**

Statistical Analysis: According to the standard deviation and the pearsons test we calculated the p value of each sign and symptom and every sign and symptom has a different p value with significance.

Result: The results shows that in 50%(130) of female subjects were having pain 33%, generalized weakness 64%, ataxia 37%, headache 60%, language disorder 42%, visual disturbance 35%, weakness 45%, drowsiness 43%, dizziness 44%, nausea 38%, seizure 38%, dyspnoea 45%, loss of consciousness 44%, and fever 43% and in 50%(130) of male subjects were having pain 67%, generalized weakness 36%, ataxia 63%, headache 40%, language disorder 58%, visual disturbance 65%, weakness 55%, drowsiness 57%, dizziness 56%, nausea 62%, seizure 62%, dyspnoea 55%, loss of consciousness 56%, and fever 57%. In 260 subjects the p value of each sign and symptom is <0.0001 and was considered extremely significant.

Therefore, result of this study is that there are differences by gender in presenting signs and symptoms at presentation of stroke and suggest that there should be focus of stroke prevention education and awareness of signs of symptoms of stroke should be given to decrease the rate of stroke.

**Table No.1: Representation of signs and symptoms of stroke in males and females.**

<table>
<thead>
<tr>
<th>SIGNS AND SYMPTOMS</th>
<th>Female (%) n=130</th>
<th>Male (%) n= 130</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>33</td>
<td>67</td>
<td>0.0001</td>
</tr>
<tr>
<td>Generalized weakness</td>
<td>64</td>
<td>36</td>
<td>0.0076</td>
</tr>
<tr>
<td>Ataxia</td>
<td>37</td>
<td>63</td>
<td>0.0104</td>
</tr>
<tr>
<td>Headache</td>
<td>60</td>
<td>40</td>
<td>0.0152</td>
</tr>
<tr>
<td>Language disorder</td>
<td>42</td>
<td>58</td>
<td>0.0179</td>
</tr>
<tr>
<td>Visual disturbances</td>
<td>35</td>
<td>65</td>
<td>0.0001</td>
</tr>
<tr>
<td>Weakness</td>
<td>45</td>
<td>55</td>
<td>0.0049</td>
</tr>
<tr>
<td>Drowsiness</td>
<td>43</td>
<td>57</td>
<td>0.0169</td>
</tr>
<tr>
<td>Dizziness</td>
<td>44</td>
<td>56</td>
<td>0.0104</td>
</tr>
<tr>
<td>Nausea</td>
<td>38</td>
<td>62</td>
<td>0.0060</td>
</tr>
<tr>
<td>Seizure</td>
<td>38</td>
<td>62</td>
<td>0.0399</td>
</tr>
<tr>
<td>Dyspnoea</td>
<td>45</td>
<td>55</td>
<td>0.0490</td>
</tr>
<tr>
<td>Loss of Consciousness</td>
<td>44</td>
<td>56</td>
<td>0.0058</td>
</tr>
<tr>
<td>Fever</td>
<td>43</td>
<td>57</td>
<td>0.0081</td>
</tr>
</tbody>
</table>
Discussion

Stroke is the leading cause of mortality and impairment, because many people are unaware of presenting signs and symptoms of stroke that are different in male and female. This project was done in 6 months with sample size 260. This research was undertaken with the aim to study the gender difference in presenting signs and symptoms of stroke. This observational study of presenting signs and symptoms of stroke in gender difference was conducted on 260 subjects, amongst which 130 were female (50%) and 130 were male (50%). This shows that there is a difference in presenting signs and symptoms of stroke in male and female.

Prior consent was taken from the patients suffering from stroke in hospitals. The outcome measure for this study was: - signs and symptoms of stroke.

Headache and generalized weakness were most commonly seen in female as sign and symptom. Pain, nausea, and fever were most commonly seen in male as sign and symptom. Other signs and symptoms including ataxia, language disorder, visual disturbance, weakness, drowsiness, dizziness, seizure, dyspnoea, and loss of consciousness were also seen in stroke patients.

Conclusion

Following the hospital based study, it was concluded that there are various signs and symptoms of stroke such as pain or generalized weakness are the most common seen in the patients as an early sign or symptom of stroke. There are also different signs and symptoms like headache which is mostly seen in the females as a warning before the stroke and fever seen in the male as a warning before the stroke and due to lack of awareness many people ignore the signs and symptoms of stroke by making it less important.

Conflict of Intreset: There is no conflict of interest.

Ethical Clearance: An approval for the study was obtained from the institutional ethical committee of Krishna Institute of Medical Science ‘Deemed to be University’

Source of Funding: Self.


LIST OF ABRIVATIONS:

<table>
<thead>
<tr>
<th>Sr No</th>
<th>Abrivation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>LOC</td>
<td>Loss of consciousness</td>
</tr>
<tr>
<td>2.</td>
<td>F</td>
<td>Female</td>
</tr>
<tr>
<td>3.</td>
<td>M</td>
<td>Male</td>
</tr>
</tbody>
</table>

References


Pattern and Distribution of Scalp Injuries in Fatal Road Traffic Accidents in Rohtak Region of Haryana - An Autopsy based Study

Jitender Kumar Jakhar¹, Naveen Yadav², Taitiksh Jakhar³, Sunil Dahiya², Kunal Gaba², S.K. Dhattarwal⁴

¹Associate Professor; ²Residents, Department of Forensic Medicine, Pt. B. D. Sharma PGIMS, Rohtak, Haryana, ³MBBS Student SDUMC, Kolar; ⁴Sr. Prof. and Head Department of Forensic Medicine, Pt. B. D. Sharma PGIMS, Rohtak, Haryana

Abstract

Head injuries are one of the leading cause of death worldwide as head being the most vulnerable part of the body. The present study was performed on 100 cases of road traffic accidents in which head injuries were present. In this study, males clearly outnumbered females. The highest incidents were seen in the age group 21 - 30 years (26%), followed by the age group 11 - 20 years (20%). In this study, special attention was given to the pattern and distribution of scalp injuries. Commonest scalp injury noticed in the present study was contusion, seen in 33% of cases, followed by lacerated wounds in 30% cases.

Key Words: Road traffic accidents, Scalp injury, Abrasion, Contusion, Laceration.

Introduction

An accident has been defined as “an unexpected unplanned occurrence which may involve injury”. In 1956, a WHO advisory group defined accidents as “an unpremeditated event resulting in recognizable damage.” India accounts for about 10 % of road accident fatalities worldwide. In age group of 5 to 44 years, mortality is as high as 10 percent. Among the various fatal injuries in road accident, head injury is the principal killer. Head injury usually refers to traumatic brain injury but is a broader category because it can involve damage to structures other than the brain, such as the scalp and skull. Scalp contusions are difficult to see with naked eyes but better felt. If, scalp laceration continue bleeding, it may lead to death. In this study, patterns of scalp injuries in road traffic accidents with regards to age, sex, season, type of injured and scalp injuries were recorded at the time of post-mortem examination.

Observations & results:

1. As per the Table no. 1, males accounted for 81 % victims females were involved in 11 % cases only.

<table>
<thead>
<tr>
<th>Serial Number</th>
<th>Sex</th>
<th>Number of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>89</td>
<td>89</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

2. Age-wise, maximum cases of road side accidents were seen in the 21- 30 years age group (26 %), followed by 11- 20 years age group (16%). (Table 2)
Table: 2. Age wise distribution of cases.

<table>
<thead>
<tr>
<th>Serial Number</th>
<th>Age group (In years)</th>
<th>Number of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>01-10</td>
<td>03</td>
<td>03</td>
</tr>
<tr>
<td>2.</td>
<td>11-20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>3.</td>
<td>21-30</td>
<td>26</td>
<td>26</td>
</tr>
<tr>
<td>4.</td>
<td>31-40</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>5.</td>
<td>41-50</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>6.</td>
<td>51-60</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>7.</td>
<td>61-70</td>
<td>09</td>
<td>09</td>
</tr>
<tr>
<td>8.</td>
<td>71-80</td>
<td>01</td>
<td>01</td>
</tr>
<tr>
<td>9.</td>
<td>81-90</td>
<td>01</td>
<td>01</td>
</tr>
<tr>
<td>10.</td>
<td>91-100</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

3. Road traffic accidents were more common in Monsoon season (35%) and least in post monsoon season (19%). (Table 3)

Table: 3. Distribution of cases according to seasonal variation of accidents.

<table>
<thead>
<tr>
<th>Serial Number</th>
<th>Season</th>
<th>Number of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Monsoon (June, July, Aug, Sept)</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>2.</td>
<td>Summer (March, Apr, May)</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>3.</td>
<td>Winter (Dec, Jan, Feb)</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>4.</td>
<td>Post monsoon (Oct, Nov.)</td>
<td>19</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

4. Most common vehicle used was two wheeler (54%) and least common was 9 tire truck (1.23%) (Table 4)
Table: 4 Distribution of cases according to type of vehicle used by victim.

<table>
<thead>
<tr>
<th>Serial Number</th>
<th>Type of vehicle</th>
<th>Number of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>a. Two wheelers</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. Motorcycle</td>
<td>Rider 41</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pillion rider 13</td>
<td>74.09</td>
</tr>
<tr>
<td></td>
<td>c. Scooty</td>
<td>Rider 05</td>
<td>06</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pillion rider 01</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Three wheelers</td>
<td>12</td>
<td>14.81</td>
</tr>
<tr>
<td>3.</td>
<td>a. Four wheelers</td>
<td>Car Driver 01</td>
<td>03</td>
</tr>
<tr>
<td></td>
<td>b. Front seat occupant</td>
<td>02</td>
<td></td>
</tr>
<tr>
<td></td>
<td>c. Back seat occupant</td>
<td>00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>d. Tractor</td>
<td>Driver 00</td>
<td>02</td>
</tr>
<tr>
<td></td>
<td>e. Co passenger</td>
<td>02</td>
<td></td>
</tr>
<tr>
<td></td>
<td>f. Tata truck (Four wheeler)</td>
<td>Driver 01</td>
<td>03</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Co passenger 02</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>More than four wheelers</td>
<td>Truck (9 Tires )</td>
<td>Driver 01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>81</td>
<td>100</td>
</tr>
</tbody>
</table>

5. Among two wheelers, most of the victims were not wearing the helmet (65%) and 33.33 % died despite of using the helmet. (Table 5)

Table: 5. Distribution of cases according to percentage of helmet used or not used by accident victims of two wheelers.

<table>
<thead>
<tr>
<th>Serial Number</th>
<th>Use of helmet</th>
<th>Number of victims</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Not wearing helmet</td>
<td>39</td>
<td>65.00</td>
</tr>
<tr>
<td>2.</td>
<td>Wearing helmet</td>
<td>20</td>
<td>33.33</td>
</tr>
<tr>
<td>3.</td>
<td>Not known</td>
<td>01</td>
<td>01.67</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>60</td>
<td>100</td>
</tr>
</tbody>
</table>

6. Among scalp injuries contusions were most common (33%) and combination of abrasion and laceration was least common (1%). (Table 6)
Table: 6. Distribution of cases according to type of injuries of scalp.

<table>
<thead>
<tr>
<th>Serial Number</th>
<th>Type of injury</th>
<th>Number of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Abrasion</td>
<td>09</td>
<td>09</td>
</tr>
<tr>
<td>2.</td>
<td>Contusion</td>
<td>33</td>
<td>33</td>
</tr>
<tr>
<td>3.</td>
<td>Laceration</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>4.</td>
<td>Abrasion and contusion</td>
<td>09</td>
<td>09</td>
</tr>
<tr>
<td>5.</td>
<td>Abrasion and laceration</td>
<td>01</td>
<td>01</td>
</tr>
<tr>
<td>6.</td>
<td>Contusion and laceration</td>
<td>02</td>
<td>02</td>
</tr>
<tr>
<td>7.</td>
<td>No Scalp injury</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Discussion

In this study, males outnumbered the females. Similar results were observed by Arora sandhya et al\textsuperscript{6}, Soni et al\textsuperscript{7} and Giri S et al\textsuperscript{4}.

In the age group analysis of the victims, maximum incidence was observed in age group of 21-30 years which was also noticed by the other authors in their studies like Arora sandhya et al\textsuperscript{6}, Soni et al\textsuperscript{7} and Giri S et al\textsuperscript{4}.

It is observed in this study that the road accident victims largely constitute young people in the productive age groups its major implication on economic cost of road accidents, apart from their emotional and psychological impact.

On seasonal analysis, maximum numbers of accidents occurred in monsoon season which was also observed in the studies conducted by Honnun gar SR et al\textsuperscript{8}, Banzal RK et al\textsuperscript{9} and Shiva Kumar BC et al\textsuperscript{10}.

In India, there is a big problem of destruction of roads during monsoon season due to heavy raining. The road pavement deteriorates due to various factors like poor drainage, low quality of pavement materials let the rain water to penetrate through the pavement due to which severe failure like cracks, potholes, depressions, rutting, ravelling etc. take place. The impacts of these failures also occurred on road transport system, accident is the major problem due to wet surface and widening of potholes.

Two wheeler occupants were most commonly involved victims which is similar to the findings of the studies conducted by the Kumar N et al\textsuperscript{11}. Two-wheeler accounted for the highest vehicle category-wise share in road accidents, because this is the category of vehicle preferably used by youngsters and this is the category which is also dominates the composition of registered vehicles in the country.

Among two wheelers, most of them were not using the helmet. Similar findings were observed in the studies conducted by Thumbe HR et al\textsuperscript{12}, Gupta V\textsuperscript{13} et al and Kumar P R\textsuperscript{14}.

Among scalp injuries, when taken in isolation, contusions were most common. Similar findings were observed in the studies conducted by Chakraborty Pradipta Narayan\textsuperscript{15}, Soni SK et al\textsuperscript{7} and Giri S et al\textsuperscript{4}.

Conclusion

The substantial increase in the use of two wheelers, particularly in developing countries like India, is being accompanied by an increase in the number of head and traumatic brain injuries. Head is the most vulnerable part of the body as shown in the various studies so raising awareness about traffic rules especially in two wheelers can decrease the morbidity and mortality in road side
accidents.

**Conflict of Interest:** None

**Financial Assistance:** None

Ethical clearance was taken from ethical committee of PGIMS Rohtak during the submission of plan.

**References**


Comparative Analysis of Associated Risk Factors Amongst Young and Old Stroke Survivors

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Abstract

Background: Stroke is an important health condition and is one of the leading cause of death worldwide. Disability and impairments following stroke makes the management challenging.

Aims and objectives: 1.To analyze the associated risk factors in young and old stroke. 2.To find the associated risk factors in young age patients having stroke. 3.To find the associated risk factors in old age patients having stroke. 4.To compare between the associated risk factors in young and old stroke.

Material and Method: Survey study was carried out in the department of medicine, neurosurgery and department of physiotherapy, KIMSDU, Karad. Sample size: 696 subjects with first ever stroke, both male and female above 18 years. Data was anonymously coded and entered into spreadsheet program before analyzed using statistical method. Statistical analysis was done using instat software. The chi square test was used. Percentage and frequency was calculated to summarize the response.

Results: The study included 434 were Male (62%) and 262 were Female (38%). The age distribution was, 335 people were belonging to 20-50 years (48%) and 361 people to 50 to 96 years (52%). This is analyzed that association of these risk factors is increased in young age stroke survivors. Patients with older age had higher frequency of Hypertension (HTN) and Diabetes Mellitus (DM). There is more no. of smokers in young age group. There is a more no. of male stroke survivors than female.

Conclusion: The influence of risk factors at different ages is different. Risk factors like HTN and DM were frequent in older age while more smokers in young age group. Awareness of stroke risk factors and preventive measures can reduce the burden of stroke.

Keywords: Stroke, age distribution, risk factors

Introduction

Stroke is defined by World Health Organization as ‘a clinical syndrome consisting of rapidly developing clinical signs of focal (or global in case of coma) disturbance of cerebral function lasting more than 24 hours or leading to death with no apparent cause other than vascular origin.'¹ Stroke is considered one of the leading cause of death and disability in India.² The Estimated prevalence rate of stroke range, 84-262/100000 in rural and 334-424/100000 in urban area.²

Stroke can be classified as follows:¹

- **On the basis of etiological categories:**
  - Ischemic stroke
  - Hemorrhagic stroke

- **On the basis of specific vascular territory:**
  - Anterior cerebral artery syndrome, middle cerebral artery syndrome and so forth

- **On the basis of Management categories:**

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Transient ischemic attack, minor stroke, major stroke deteriorating stroke, young stroke.

Young stroke is defined as a stroke affecting people younger than age 50. Young stroke has disproportionately large economic impact by leaving the individuals disabled before their most productive years. And this stroke in young adult causes morbidity in socioeconomically active age group. However, older stroke patients, with age 60-70 years above, were more dependent and disabled beforehand and after stroke, relatively even more dependent than young age people. So, to reduce stroke burden, preventive strategies are important.

Risk factors:

Risk factors for stroke can be classified as modifiable and nonmodifiable. Age, sex and race/ethnicity and family history are nonmodifiable risk factors for both ischemic and hemorrhagic stroke, while HTN, smoking, diet, hypercholesterolemia, obesity and physical inactivity are some of the more common modifiable risk factors.

Particularly in urban areas, potential triggers for stroke include sepsis, air pollution. Identification of these risk factors is important component of primary care.

Older patient group had higher frequency of HTN and DM while younger had obesity and elevated serum triglyceride level. Younger patients are more likely to be exposed to western type diet, which contains higher total fat.

Studies have concluded that prevalence of stroke is higher in individuals with family history of stroke, HTN, hyperlipidemia and physically inactive individuals mostly in males.

Changing lifestyle, physical inactivity, HTN, obesity are becoming the cause of stroke leading to premature death and disability in developing countries. Early detection of these risk factors leading to stroke, will help for better treatment. This early detection will also help to improve health condition in old age people. So, this comparative analysis of associated risk factors in young and old stroke survivors is necessary.

Aims and Objectives:

1. To analyze the associated risk factors in young and old stroke.
2. To find the associated risk factors in young age patients having stroke.
3. To find the associated risk factors in old age patients having stroke.
4. To compare between the associated risk factors in young and old stroke.

Methods & Methodology

Ethical approval was obtained from ethical committee of KIMSDU, Karad. An Observational study was carried out in KIMSDU, Karad. Study duration was 6 months with the sample size 696 calculated by the formula

\[ n = 4pq \]

Subjects with first ever stroke, both male and female, above 18 years were included in the study. Study was carried out with an outcome measure, distribution of risk factors for stroke.

Data was anonymously coded and entered into a spreadsheet program before being analyzed using statistical method. Statistical analysis was done using instat software. The chi square test was used for the study. Percentage, frequency was calculated to summarize the response.

Procedure:

Department of medicine, neurosurgery, physiotherapy and Hospital Record Room were explained about the topic to make them aware for sample that were required to conduct the study.

Subject taken for my study were from indoor as well as outdoor. On the day of enrolment, subjects underwent detailed assessment to fulfill inclusion and exclusion criteria.

Once the subject fulfilled the criteria they were explained about the study and detailed information was given to them. Subjects were explained about: Pattern of study, Need of study, Information generated out of the study, Importance about the information generated, Its effect on general population. Once the consent was taken detailed information was gathered and statistical
analysis was done in order to derive conclusion.

**Result**

Out of 696 patients, the age distribution was 335 people belonging to 20-50 years and 361 people to 50 to 96 years. (Table 1) There is a more no. of male stroke survivors than female. (Table 2) Multivariate analysis shows that difference among various risk factors is statistically significant. (Table 3) The frequencies of the various risk factors in different age groups are shown in Table 3.

**Table 1: Age distribution**

<table>
<thead>
<tr>
<th>AGE GROUP</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-50</td>
<td>335(48%)</td>
</tr>
<tr>
<td>50-96</td>
<td>361(52%)</td>
</tr>
<tr>
<td>Total</td>
<td>696</td>
</tr>
</tbody>
</table>

**Table 2: Gender distribution**

<table>
<thead>
<tr>
<th>GENDER</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>MALE</td>
<td>434(62%)</td>
</tr>
<tr>
<td>FEMALE</td>
<td>262(38%)</td>
</tr>
<tr>
<td>Total</td>
<td>696</td>
</tr>
</tbody>
</table>

**Table 3: Distribution of risk factors according to age groups**

<table>
<thead>
<tr>
<th>Risk factors</th>
<th>Age Groups</th>
<th>Chi Square Test</th>
<th>Relative Risk</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>20-50 years (n=335)</td>
<td>51-96 years (n=361)</td>
<td></td>
</tr>
<tr>
<td>HTN</td>
<td>157(47)</td>
<td>225(62)</td>
<td>16.156</td>
<td>0.7250</td>
</tr>
<tr>
<td>DM</td>
<td>67(20)</td>
<td>173(48)</td>
<td>58.735</td>
<td>6.4750</td>
</tr>
<tr>
<td>Hearts disease</td>
<td>33(10)</td>
<td>144(40)</td>
<td>81.099</td>
<td>0.3204</td>
</tr>
<tr>
<td>Smoking</td>
<td>244(73)</td>
<td>202(56)</td>
<td>20.783</td>
<td>1.503</td>
</tr>
<tr>
<td>Alcohol and drug intake</td>
<td>201(60)</td>
<td>108(30)</td>
<td>62.487</td>
<td>1.879</td>
</tr>
<tr>
<td>Kidney diseases</td>
<td>27(8)</td>
<td>64(18)</td>
<td>13.455</td>
<td>0.5828</td>
</tr>
<tr>
<td>Obesity</td>
<td>144(43)</td>
<td>108(30)</td>
<td>12.288</td>
<td>1.328</td>
</tr>
<tr>
<td>Hypercholesterolemia</td>
<td>40(12)</td>
<td>21(6)</td>
<td>7.399</td>
<td>1.412</td>
</tr>
</tbody>
</table>
Table 3 shows that maximum prevalence was found to be of HTN in older age group is 62% and 47% in younger age group and DM was found to be 48% and 20% in older and younger age group respectively. So, the risk factors HTN and DM were more frequent in the older group than in the younger group. Smoking was relatively common in younger age group than in older.

**Discussion**

Stroke is one of the leading cause of death and disability in India. This stroke registry based study analyzed the relation between different stroke risk factors and age. This study was done with duration of 6 months. This research was undertaken with the aim of comparative analysis of the associated risk factors in young and old stroke. Objectives of the study were to analyze the associated risk factors in young and old stroke survivors, to find the associated risk factors in young age patients having stroke, to find the associated risk factors in old age patients having stroke and to compare between the associated risk factors in young and old stroke. This study, Comparative analysis of associated risk factors in young and old stroke survivors was conducted on 696 subjects, amongst which 434 were Male (62%) and 262 were Female (38%). The age distribution was 335 people were belonging to 20-50 years (48%) and 361 people to 50 to 96 years (52%) i.e. above 50 yrs. This shows that, there is a more no. of old age male stroke survivors. But now days, even in young age also stroke is seen because of changing dietary habits, work habits, and changing lifestyle.

Prior consent was taken even from the hospital record room. The outcome measure for this study was: Distribution of risk factors. Patients were considered hypertensive if the average systolic blood pressure and diastolic blood pressure is 140 mm hg and 90 mm hg respectively. Prevalence of HTN in older age group is 62% and 47% in younger age group. Diabetes was defined by either of the following criteria: (1) if the patient is diagnosed with diabetes and (2) if at least two fasting glucose readings were 126 mg/dl or higher. And prevalence of DM was found to be 48% and 20% in older and younger age group respectively. So, the risk factors HTN and DM were more frequent in the older group than in the younger group. A patient is defined as smoker if he had been a current smoker in the past 6 months or more than 6 months. There is increased prevalence of smoking in younger age group (73%) Obesity is having body mass index above 25. Younger patients are more likely prefer to western type diet, which contains higher total fat. Changing dietary habits and lifestyle has increased the prevalence of obesity in younger age (43%) than older age (30%). Prevalence of Hypercholesterolemia was comparatively very less in older age group. Cardiac disorders like rheumatic valvular heart disease, endocarditis, coronary artery bypass graft, Atrial fibrillation increase the risk of stroke. Prevalence of heart disease was found to be 10% in younger and 40% in older age group. Alcohol and drug intake is also another considerable risk factor having prevalence 60% and 30% in younger and older age. Prevalence is increased in younger age than in the older age. Another risk factors for stroke are end stage renal diseases, chronic kidney disease, sleep apnea. Kidney diseases have prevalence about 8% and 18% in young and old age stroke survivors respectively. Patients with marked elevations of hematocrit are at an increased risk of occlusive stroke. Identification of these risk factors is important component of primary care.

Previous studies found that, Older patient group had higher frequency of HTN and DM while younger had obesity and elevated serum triglyceride level. Studies have concluded that prevalence of stroke is higher in individuals with family history of stroke, HTN, hyperlipidemia and physically inactive individuals mostly in males.

Early detection of these risk factors leading to stroke will help for better treatment. This early detection will also help to improve health condition in old age people.

**Conclusion**

Following this hospital based study, it was concluded that influence of risk factors at different ages is different. Risk factors such as HTN and DM were frequent risk factors in older age group. There is a more no. of male stroke survivors than female. Risk factors such as smoking and alcohol and drug intake is more common in young age group. Risk of heart disease is more in older age and less in younger age.

**Conflict of Interest:** There were no conflict of interest in this study.

**Source of Funding:** Self

**Ethical Clearance:** Ethical clearance was taken from institutional committee of Krishna institute of medical sciences.
References

Knowledge and Practice of Bio Medical Waste Management in a Mortuary and Casualty of Tertiary Care Hospital

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Abstract

Bio Medical waste management has been receiving highest priority in hospitals after the act was introduced by the Ministry of Environment and Forest, titled Bio Medical Waste Management and Handling Rules 1998. About 0.33 million tons of waste is generate per annum in India. Hospital acquired infections are on the rise due to improper waste management practice. A cross sectional, longitudinal study on Bio Medical waste management practice in a mortuary and casualty was conducted at a tertiary care teaching hospital from 1st July 2018 to 31st December 2018. The study focused on knowledge and practice of waste management in the casualty and mortuary. Interestingly, the practice of Bio Medical waste management was excellent in casualty and mortuary. Awareness of the hazards of improper waste management was poor among sanitary workers whereas doctors, nurses and other paramedical staff were well aware of the hazards.

Key words: Bio Medical waste management(BMW). Medical professionals. Mortuary. Casualty.

Introduction

Bio Medical waste is defined as waste generated in the hospital during diagnosis, immunisation, treatment and research activities1,3,4. Infections acquired from the hospital are known as nosocomial infections. Millions of the patients are affected by health-care associated infections. In fact, WHO statistics reveal that for every 100 hospitalised patients at any given point of time2, 7 in developed countries and 10 in developing countries will acquire nosocomial infections. WHO survey states that 8.7% of hospitalised patients suffered from hospital acquired infections. Similar to other developing countries, the magnitude of this problem is large in India2.

Mortuary is one of the locations in a hospital, where large amount of Bio Medial waste is generated. Potential for transmission of infectious diseases like Tuberculosis, diarrheal diseases, lung infections, Hepatitis, HIV and other communicable diseases increases due to improper medical waste management in the mortuary.

Health hazards due to infections in the mortuary not only affect the doctors and handlers of the bodies of the deceased, but also those in vicinity of the mortuary. Biomedical waste disposal practice is still primitive in mortuaries. Unfortunately, majority of the waste generated in mortuary is human anatomical waste which is very dangerous to the handlers.

Casualty is an emergency department; all types of waste is generated in this department, barring human anatomical waste. Most of the cases kept here for observation.

Most of the studies revealed that, lack of knowledge and awareness among the sanitary staff is the main reason for improper management of bio medical waste3,4.

Legal Aspects:

Bio Medical waste management and Handling rules 19981,4:

- Act means the Environment Protection (Protection)

• Authorization means permission granted by the prescribed authority.

• Authorized person means an occupier or operator authorized by the prescribed authority.

• Bio-medical waste means any waste, which is generated during diagnosis, treatment, immunization or in research activities.

• Bio-medical waste treatment facility means any facility wherein treatment and disposal of bio-medical waste is carried out.

• Occupier means a person who has control over that institution.

• Operator of a bio-medical waste disposal means a person who owns or operates a facility for the collection, storage, transport, treatment and disposal of bio-medical waste.

• AUTHORIZATION: Every occupier of an institution handling bio-medical waste shall make an application in Form 1 to the prescribed authority for grant of authorization.

• ADVISORY COMMITTEE: The Government of every State/Union Territory shall constitute an advisory committee. The State Pollution Control Board shall be represented. The committee shall advise the Government about matters related to the implementation of these rules.

• ANNUAL REPORT: Every occupier/operator shall submit an annual report to the prescribed authority in Form 11 by 31 January every year.

• MAINTENANCE OF RECORDS: Every authorized person shall maintain records related to the generation, collection, reception, storage, transpiration, treatment and disposal of bio-medical waste in accordance with these rules and any guidelines issued.

• ACCIDENT REPORTING: Any accidental injury while handling the bio medical waste to be recorded and report immediately to the authority.

• As per the Bio-medical Waste management rules, it shall be the duty of every occupier of Health Care Facility & operator of Common Bio-Medical Waste Treatment Facility to take all the steps to ensure that the Bio-Medical waste is properly handled and disposed off without any adverse effect to human health and the environment.

Segregation, Storage and Disposal of Bio Medical waste1,5,6:

Category Yellow: waste must be collected in yellow colored non-chlorinated plastic bags. The following waste should be collected in yellow color bags.

(a) Human Anatomical Waste: Human tissues, organs, body parts and fetus below the viability period. yellow colored non-chlorinated plastic bag

(b) Animal Anatomical Waste: Experimental animal carcasses, body parts, organs, tissues, including the waste generated from animals used in experiments or testing in veterinary hospitals or colleges or animal houses.

(c) Soiled Waste: Items contaminated with blood, body fluids like dressings, plaster casts, cotton swabs and bags containing residual or discarded blood and blood components.

(d) Expired or Discarded Medicines: Pharmaceutical waste like antibiotics, cytotoxic drugs including all items contaminated with cytotoxic drugs along with glass or plastic ampoules, vials etc.

(e) Chemical Waste: Chemicals used in production of biological and used or discarded disinfectants.

(f) Discarded linen, mattresses, beddings contaminated with blood or body fluid.

(g) Microbiology, Biotechnology and other clinical laboratory waste: Blood bags, Laboratory cultures, stocks or specimens of microorganisms, live or attenuated vaccines, human and animal cell cultures used in research, dishes and devices used for cultures.

Waste collected in yellow color bag/bin should be treated by Incineration or Deep Burial.

Category Red: Red colored non-chlorinated plastic bags or containers must be used to collect waste. All plastic and rubber contaminated Waste (Recyclable)
Wastes generated from disposable items such as tubing, bottles, intravenous tubes, catheters, urine bags, syringes and gloves. This waste can be treated by autoclaving or microwaving followed by shredding and recycling.

**White (Translucent) category:** All sharp material including Metals: Needles, syringes with fixed needles, needles from needle tip cutter or burner, scalpels, blades or any other contaminated sharp object that may cause puncture and cuts, these waste can be treated by Autoclaving or Dry Heat Sterilization followed by shredding and dispose by concrete waste sharp pit.

**Blue category:** Glassware: Broken or discarded and contaminated glass including medicine vials and ampoules except those contaminated with cytotoxic wastes and metallic Body Implants to be segregated in blue color bags. These waste can be treated by Disinfection or autoclaving or microwaving and then sent for recycling.

The points to be noted are:

1. Bio-medical waste shall not be mixed with other wastes.
2. Bio-medical waste shall be segregated into containers/bags at the point of generation in according to their color codes.
3. Biomedical waste shall be transported only in such vehicle which was authorized for the purpose by the competent authority as specified by the government.
4. No untreated bio-medical waste shall be kept stored beyond a period of 48 hours.
5. Instruments used in the mortuary during dissection can be reused after through washing and disinfecting with 1% sodium hypo chlorite solution.

**Precautions for Handlers:**

No one should handle Bio Medical waste with a bare hand, Handlers must wear gloves, head cap, mask, goggles and body apron. Every staff member must follow universal work precautions to protect from infections.

**Punishment:**

Whoever fails to comply with or contravenes any of the provisions of the act or rules made or directions issued there under, shall in respect of each such failure or contravention shall be punishable with an imprisonment for a term up to Five years or with a fine up to one lakh rupees or both, (EPA Act 1986).

**Aim of the study:**

The aim of this study is to assess practice of biomedical waste management in casualty and mortuary by doctors, nurses, technicians, and sanitary staff.

To identify any lacunae in the existing practice and guide the modifications deemed necessary.

**Materials and Method**

A cross sectional study on biomedical waste management knowledge and practice in a mortuary and casualty was conducted at tertiary care teaching hospital in Ranga Reddy Dist. from 1st July 2018 to 31st December 2018, after receiving permission from the hospital authority. We observed the existing method of practice regarding collection, storage and disposal of biomedical waste in the mortuary and casualty.

We also assessed the knowledge of BMW management among medical professionals handling waste by administering the questionnaire. However, before administering the questionnaire, the purpose of the study was explained to all participating employees and their names were left anonymous.

The following observations were made regarding the practice of biomedical waste management:

1. Whether the bins were available as per the color-coding system and maintained.
2. Whether the bins were located in accessible locations in the department.
3. Whether segregation of BMW was proper.
4. Availability of needle cutters.
5. Whether disinfection solution was available.
6. Any other specific observations.

The information collected into a data sheet for scientific evaluation.

**Findings**

Doctors, nurses, and technicians have better knowledge than sanitary staff regarding biomedical
waste management.

Knowledge regarding color-coding, waste segregation, transportation and disposal of waste was found to be better among doctors and nurses compared to sanitary staff.

Interestingly the Practice of waste collection, storage and transportation was excellent in casualty and mortuary even though the knowledge levels among sanitary workers were poor. All the storage bins with appropriate color and a symbol of bio medical waste were available in casualty and mortuary. The storage of the waste also found to be in accord with the existing guidelines. Needle cutters were available and in utilisation in casualty along with freshly prepared disinfecting solution. The storage bins were kept at proper accessible location in both mortuary and casualty.

Disposal facilities are not available in the institution, waste have been collected and disposed at common treatment facility.

All the staff members both casualty and mortuary were following universal safety precautions while handling biomedical waste. Staff was using a trolley for transportation of Bio Medical waste.

The amount of waste generated in casualty is high when compared to the mortuary. BMW in mortuary was very low in this institution due to lack of conduction of medico legal autopsies in the institution. Occasionally, however, pathological autopsies were conducted.

**Conclusion**

Bio medical waste management is an attitude and knowledge related programme. In majority of the studies we observed a lack of knowledge and awareness in sanitary staff is the main culprit for poor management of the programme. Though doctors and nurses are well trained but the practice is not up to the mark due to lack of knowledge at low level sanitation staff. For effective implementation, periodical training programmes focusing on practical aspects should be conducted to all the staff and sanitation workers of the hospital. Best team work and effective supervision is very much essential for better implementation of the programme.

**Conflict of Interest:** Nil

**source of the Funds:** self

**Ethical Clearance:** Yes

**Acknowledgement:** We thanks to our management and hospital administrators of their constant support and encouragement for this study.

**References**

Profile of Fatal Cases of Organophosphorus Poisoning at a Tertiary Care Centre, Mandya

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Abstract

Organophosphorus Compound (OP) poisoning is the most common and the highest amongst fatal cases of poisoning consumption deal in MIMS hospital. It is the commonly abused poison amongst rural and urban population more so amongst our Farmers. Fatal cases of organophosphorus poisoning were analyzed during the study period from 01.01.2016 to 31.12.2018. The analysis was done on age, sex, occupation, socio economic status, motive of poison consumption and result.

Mandya District being dominated by agriculturists and sugarcane being the cash crop, drought, insufficient rain fall, raising costs of living, high debts, Cauvery water non available for agricultural use due to water sharing between neighboring states like Tamilnadu, Pondichery etc., increasing number of bore wells and ground water depletion, leading to crop failures and thereby resulting in Farmers suicide.

The major cause of death in these cases treated at MIMS were Respiratory failure.

Key words: Organophosphorus poisoning, Farmers suicide, Respiratory Failure.

Introduction

Despite the apparent benefits of Organophosphorus compounds (OPC’s) acute Organophosphate (OP) pesticide poison is a global increasing problem. It is very common pesticide used rampantly in agricultural fields and is easy accessibility is increasing the incidence of suicidal and accidental poisoning rates. Its action is by inhibiting the enzyme Cholinesterase, thereby the accumulation of Acetylcholine at myoneural and synaptic junction leading to cholinergic over activity.

The incidence of organophosphorus poisoning has steadily increased in recent past and has reached a level where it can be called a “Social Calamity”. Organophosphorus compound is seen with increasing frequency and carries 15-30% mortality in studies carried out at India. Respiratory failure is common complication of organophosphorus poisoning leading to high mortality therefore effective and timely treatment becomes crucial for survival. Hereby the retrospective study was undertaken to know the incidence and prevalence of fatal organophosphorus poisoning in cases autopsied at MIMS, Mandya.

Material and Method

This autopsy based retrospective study was conducted between Jan 2010 – Dec 2018 in Department of Forensic Medicine & Toxicology, Mandya Institute of Medical Sciences, Mandya. The data was collected from the postmortem reports. Out of 1581 cases OP Poisoning deaths autopsied at MIMS was 600 (3.79%). All the fatal cases autopsied confirmed by either clinical diagnosis RFSL reports were included in the study. The data analysis was done on the age, sex, motive of poisoning, cause of death, professional status, marital status, types of organophosphorus compound consumed.

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Results

The age of patients varied from 11 yrs. – 80 yrs. (Table No1). The vast majority of patients were males 90% (Table No.2) with male to female ration being 8:1 period of survival ranged from 1day to 15 days. The commonest motive of poisoning was suicidal in both males 88.83% and females 9.16% followed by accidental 1.18% males and 0.83% in females. There was one case of homicidal poisoning (Chart 1). Financial debts (90%) followed by chronic health ailments reasons (05%) coupled with crop failures and loans was the reason. One case of homicidal poisoning was a deaf and dumb husband poisoned by wife and her paramour to get rid of him and gain his property, which the convicted lady admitted too. Respiratory failure 95% was the leading cause of death followed by Myocardial Infarction, Renal failure and Multi organ failure in (5%) cases noted. Agriculturists / Farmers (75%) students (13.33%) house wives(10%) own business / self-employed (1.6%) not known (0.7%). 85% of the study population were married 20%, 15% males and 5% females were unmarried. Dichlorvos 73%, 18.33% of cases showed Diazinon and 8.3% Parathion consumption.

Discussion

Acute organophosphorus compound poisoning is one of the commonest causes of acute poisoning in Mandya. In my study majority of the persons were males (88.83%) and they were aged between 11-80 years similar observation were noted in other studies5-9. Commonest motive of poisoning was suicide10. The probable cause of mortality relied on various factors like its easy availability, inadequate rainfall, low procurement prices for sugarcane, lack of of prompt payment of dues from sugar factories and high input costs and inability to move away from water – intensive sugarcane crop leading to financial crisis11. In other cases, it was because of failure in exams, financial midlife crisis, love failures.

Conclusion

Organophosphorus poisoning is the most common poisoning encountered at Mandya Institute of Medical Sciences, Mandya with a male predominance. Commonest motive of poisoning was suicidal 12-14. Economic crisis faced by Farmers and easy availability were the common cause of poisoning 15-16. To prevent and reduce the incidence of organophosphorus compound poisoning it is better to change the economic policies of the Government, waiving of Farmers loans, insuring the crops, educating the farmers about alternate methods of farming which is less dependent on water, promoting animal husbandry, creating more jobs to the youth. Similarly, strict implementation of pesticide act, Banking and Government sectors to change their policy decision, drought management schemes, educating the public and youth about the life-threatening effects of organophosphorus compounds can certainly make difference in the life of farmers and youths and reduce the mortality rates thereby due to organophosphorus pesticide consumption.

Conflict of Interest: Nil

Source of Funding: None

Ethical Clearance- Taken from Institutional Ethical committee, MIMS, Mandya, Copy Enclosed

References


13. Kandu AK, Mukhopadhyay JD, Das S. Predictors of mortality in organophosphorus poisoning – Hospital based study from sub urban West Bengal JAPI Vol. 49, Jan 2001, 91.


Study of Pattern & Distribution of Injuries in Fatal Road Traffic Accident Cases Autopsied at MIMS, Mandya

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Abstract

Accidents are now one of the major causes of death. The present study was carried out between Jan 2016 to Dec 2017 at Department of Forensic Medicine, Mandya Institute of Medical Sciences, Mandya, to study the type of injury, pattern and distribution of injuries, body parts involved, fatal injuries and causes of deaths noted at the actual autopsy examination of the victim. During the period of study 1013 total autopsies were conducted, out of which 15 cases were of road traffic accidents.

Keywords: Road traffic injuries, head injury, visceral injuries.

Introduction

The term accident has been defined as an occurrence in the sequence of events which usually produced unintended injury or death or property damage. (1)

Among all types of accidents, those caused by motor vehicles claim the largest toll of life and tend to be serious. There are almost 98,000 deaths from road accidents annually in India and total causalities worldwide is 1.2 million each year. Studies done by WHO shows that road traffic accidents accounts for 5% of total deaths in India and in age group of 10-50 years is amongst top three leading causes of death. (2)

According to study conducted by National Transportation Planning and Research Centre, Delhi, a person is killed or injured in every 4 minutes in traffic accidents in India.

Accidents constitute a complex phenomenon of multiple causation. There is steep rise in vehicular accidents in present Era due to urbanization, growth in transport sector, population explosion, compounded by high speeding, consumption of alcohol and inadequate traffic planning for the rising growth of population. (3)

The present study has been carried out at MIMS, Mandya regarding Epidemiological, medico-legal aspects of vehicular accidents in Mandya district making an effort to establish various causative factors, pattern and distribution of injuries and therapy to plan measures to prevent them in future.

Material and Method

150 cases of fatal road traffic accidents brought to mortuary department of Forensic Medicine, MIMS Mandya, during 2 years period 01/01/2016 to 31/12/2017 compromised the study population. Various demographic and Epidemiological characters related to victim’s accidents were gathered from Police or from guardians and relatives. The gender distribution, type of injury, body parts involved, cause of deaths were noted at actual autopsy examination of victim and analysed statistically.

Results

It was observed that out of 1013 cases received for postmortem examination at our department, 150 (14.80%) cases were of road traffic accidents. It was observed that 113(75.33%) subjects were males and 37 (24.66%) were females. As per WHO guidelines, cases were divided into five groups with respect to age wise...
distribution and the observation made was that maximum age group involved was between 20-40 years (56.66%).

Table No 1- Age wise distribution

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-20 years</td>
<td>40</td>
<td>28</td>
<td>12</td>
<td>26.66%</td>
</tr>
<tr>
<td>20-40 years</td>
<td>85</td>
<td>65</td>
<td>20</td>
<td>56.66%</td>
</tr>
<tr>
<td>40-60 years</td>
<td>18</td>
<td>14</td>
<td>04</td>
<td>12%</td>
</tr>
<tr>
<td>60-80 years</td>
<td>06</td>
<td>05</td>
<td>01</td>
<td>4.12%</td>
</tr>
<tr>
<td>&gt;80 years</td>
<td>01</td>
<td>01</td>
<td>0</td>
<td>0.66%</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>113</td>
<td>37</td>
<td>100%</td>
</tr>
</tbody>
</table>

Motorcyclist (Two wheelers) compromised 70 (46.66%), followed by pedestrian 50(33.33%), occupants of four wheelers 20(13.33%) and three-wheeler 10(6.66%) maximum deaths in motorcyclist followed by pedestrian.

Table No 2 - Type of Road Commuters

<table>
<thead>
<tr>
<th>Type of Road Commuters</th>
<th>No. of Person</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor cyclist</td>
<td>70</td>
<td>46.66%</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>50</td>
<td>33.33%</td>
</tr>
<tr>
<td>Occupants of 4 wheelers</td>
<td>20</td>
<td>13.33%</td>
</tr>
<tr>
<td>Three wheelers</td>
<td>10</td>
<td>6.66%</td>
</tr>
</tbody>
</table>

It was observed that commonest external injury was abrasions, contusion 70% followed by 65% fractures and lacerations.

Head injury seen in 93 cases (62%), thoraco abdominal in 50 cases (33.33%), multiple injuries in 04 cases (2.66%), cervical spinal cord injury in 02 cases (2.66%). (4)

Table No 3: Distribution of cases according to type of victim and injury.

<table>
<thead>
<tr>
<th>Type Of Victim</th>
<th>Type of Injury</th>
<th>Abrasion</th>
<th>Contusion</th>
<th>Fractures</th>
<th>Laceration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motorcyclist (70)</td>
<td></td>
<td>35</td>
<td>20</td>
<td>30</td>
<td>28</td>
</tr>
<tr>
<td>Pedestrian (50)</td>
<td></td>
<td>33</td>
<td>18</td>
<td>28</td>
<td>20</td>
</tr>
<tr>
<td>Occupant of 4 wheelers</td>
<td></td>
<td>10</td>
<td>17</td>
<td>11</td>
<td>07</td>
</tr>
<tr>
<td>Occupants of 3 wheelers</td>
<td></td>
<td>06</td>
<td>05</td>
<td>05</td>
<td>04</td>
</tr>
<tr>
<td>Total (150)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table No 4: Type of victim & Body Parts involved

<table>
<thead>
<tr>
<th>Type of Victim</th>
<th>Injuries present over body region</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Head</td>
</tr>
<tr>
<td>Motorcyclist (70)</td>
<td>35</td>
</tr>
<tr>
<td>Pedestrian (50)</td>
<td>25</td>
</tr>
<tr>
<td>Occupants of 4 wheelers (20)</td>
<td>15</td>
</tr>
<tr>
<td>Occupants of 3 wheelers (10)</td>
<td>10</td>
</tr>
</tbody>
</table>

The maximum victims had succumbed within one hour 75(50%), 35 cases (233.33%) within 48 hours and 20 cases (13.33%) by 72 hours and 20 cases (13.33%) within 2 weeks of road accidents.5

Deaths at different kinds after road accidents (survival periods)

**TABLE NO 5: The commonest cause of death was head injury 93 cases (62%) followed by shock and hemorrhage due to thoraco- abdominal visceral injuries in 57 (38%) cases. (6&9)**

<table>
<thead>
<tr>
<th>Survival Period</th>
<th>Motorcyclist</th>
<th>Pedestrian</th>
<th>Occupants of 4 wheelers</th>
<th>Occupants of 3 wheelers</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-1 hr</td>
<td>35</td>
<td>30</td>
<td>05</td>
<td>05</td>
</tr>
<tr>
<td>1 hr – 48 hrs</td>
<td>15</td>
<td>10</td>
<td>04</td>
<td>03</td>
</tr>
<tr>
<td>48 hrs – 72 hrs</td>
<td>13</td>
<td>04</td>
<td>02</td>
<td>01</td>
</tr>
<tr>
<td>3 days – 2 weeks</td>
<td>11</td>
<td>04</td>
<td>03</td>
<td>02</td>
</tr>
</tbody>
</table>

**Discussion**

Motor vehicle accidents rank first among all total accidents throughout the world. The 150 cases of deaths due to road traffic accidents out of 1013 cases constituting (14.80%). This is accordance with Srivastav and Gupta. The most common age group involved was between 20-40 years and males outnumbered females. This study is similar to studies conducted by Mc Carrolet al, PK Ghosh and Tirpude et al 4, 8, 10.

Motorcyclist are commonest group of victims involved 70 cases (46.66%) followed by pedestrians. Similar trends were seen by Gallway & Patel, Sevitt.7

**Conclusion**

A total of 1013 cases of postmortem conducted out of which 150 deaths were due to road traffic accidents (14.80%). It was observed that males had out membered the females and maximum number of victims were motorcyclist and pedestrians, with cranio- cerebral injuries being cause of fatality.

This district being predominantly rural and agricultural population, human errors in the form of not wearing helmets and not obeying traffic rules, consuming alcohol and driving the vehicles were leading causes of mortality and morbidity. The other causes were mud roads / bad rural roads, absences of street lights and pavements for pedestrians in rural areas, no traffic signals or Police to monitor the traffic resulted in preventable human error related deaths. Following measures could reduce deaths due to road traffic accidents like compulsory helmet wearing for both Pillion rider and riders irrespective of age and sex, providing safe crossings, sidewalks for pedestrians, increasing public transport, improving the street lights at night, segregating two wheelers and pedestrians from
high ways, zebra crossing, avoiding drunk driving by strictly enforcing legislation and frequent checking by Police, emergency medical care training the medics and paramedics at Taluk and hobli level about intubation, airway maintenance transportation to tertiary care centers can certainly reduce the mortality.

There is no Panacea that will prevent road traffic accidents, what is required is an organized team work by multi disciplinaries like law enforcement agencies, Engineering and Medical graduates, public education and awareness creation.\textsuperscript{11}

\textbf{Ethical Clearance:} Taken From Institutional Ethical Committee Mandya Institute Of Medical Sciences ( Letter Enclosed)

\textbf{Source of Funding:} Self

\textbf{Conflict of Interest:} Nil

\textbf{References}

Variations of Dermatoglyphic Patterns among Smoking and Smokeless Forms of Tobacco in Oral Potentially Malignant Disorders and Oral Cancer- A Review of Literature

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Abstract

Dermatoglyphics is a scientific study which involves the study of fingerprints, lines, mounts and shapes of hands. This dermatoglyphics origin dates back to ancient India, were this ridge pattern study was known as “Samuda Sashtra. These dermatoglyphic patterns are usually genetically determined. In dentistry, dermatoglyphics have been applied for identifying syndromic cases and also been useful for determining caries susceptibility, identification of cleft lip and cleft palate. Here the variations of dermatoglyphic patterns among smoking and smokeless forms of tobacco in oral potentially malignant disorders and oral carcinoma has been reviewed.

Keywords: Dermatoglyphics, Fingerprints, Genetics, Oral Potentially Malignant Disorders

Introduction

Dermatoglyphics is a scientific study which involves the study of fingerprints, lines, mounts and shapes of hands.¹ The history and origin of dermatoglyphics dates back to 1823 with the work of Jan Evangelista Purkyne who had first studied the papillary ridges of hands and feet.² Sir Edward Henry in 1893 published a book on “The classification and uses of fingerprints” which gave way to the basis of fingerprint identification and other related systems.³

The term “dermatoglyphics” was first coined by Cummins and Midlo in 1926 and it is derived from the Greek wherein ‘derma’ means skin and ‘glyph’ means carving.⁴ The fingerprints are always unique for an individual as they are genetically determined with a polygenic pattern of inheritance.⁵

Dermatoglyphic analysis may help in personal growth as in strengthening the interpersonal communication and interaction skills, it can also enhance the emotional quotient (EQ) and adversity quotient (AQ).⁶

Dermatoglyphics in identification of genetic abnormalities

Dermatoglyphics have also been associated with various genetic abnormalities which can be useful in the diagnosis of congenital malformations. In case of Klinefelter syndrome, there is excess of arches on the first digit, increased frequency of ulnar loops in the second digit, overall there are fewer whorls and lower ridge counts for loops and whorls and significant reduction of the total finger ridge count.⁷ In Noonan’s syndrome, there is increased frequency of whorls on the fingertips and the axial triradius.⁸ In Turner’s syndrome, there is increased incidence of single transverse palmar crease and predominantly they have whorl patterns.⁹ In people with congenital blindness, they have an increased frequency of whorls on the fingertips and the axial triradius. In individuals affected with Down’s syndrome, they have increased ulnar loops and a distinct angle between the triradia a,t and d(‘atd’ angle).¹¹

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In Rubinstein Taybi syndrome, individuals manifest with broad thumbs, low mean ridge count and fingerprint patterns in interdigital areas. In schizophrenia, the A-B ridge counts are lower compared to normal healthy individuals. In pseudohypoparathyroidism, there are short broad bands, high axial triradius and increased arch patterns.

**Methods of dermatoglyphic analysis**

The dermatoglyphic analysis procedure including collection of fingerprints, palmprints and foot prints. There are various methods of recording dermatoglyphics which includes the ink method, Faurot inkless method, transparent adhesive tape method, photographic method and other special methods.

The ink method is the most commonly used method and first begins with the application of ink (normally Kore’s duplicating ink is used) on the fingers and palms and stamped on a sheet of paper with firm, uniform pressure. The prints are then scanned into a computer software database and then the prints are analysed. The genetic sequence is then analysed. Based on the existing databases, the fingerprints are identified.

In Faurot inkless method, they use commercially available solutions with a specially treated sensitised paper.

Transparent adhesive tape method involves the application of a dry colouring pigment to the skin and lifting it off with a transparent adhesive tape.

Photographic method involves principles of total internal reflection which occurs when an object is pressed against a prism. The magnified image is photographed by a polaroid camera.

**Dermatoglyphics in Oral Potentially Malignant Disorders and Oral Cancer**

Oral Potentially Malignant Disorders (PMD) include a variety of lesions and conditions characterised by an increased risk of malignant transformation to oral squamous cell carcinoma. A study by David and Sinha on dermatoglyphic patterns in subjects with potentially malignant disorders and oral carcinoma revealed that the mean number of loops and the mean total ridge count were found to be higher in case of subjects with potentially malignant disorders and oral carcinoma when compared with controls. In patients with oral cancer, arches were more predominant.

In a study done by Lakshmana et al. in 2016 on the role of digital and palmar dermatoglyphics in early detection of oral leukoplakia, oral submucous fibrosis and oral squamous cell carcinoma patients, it was found that loops were found to be the predominant finger ridge patterns in these patients with oral leukoplakia whereas whorl pattern was found in controls.

In a cross sectional study done by Aditya et al. in 2016 on the analysis of fingerprints pattern in patients with potentially malignant disorders, they found that in patients with preleukoplakia, oral leukoplakia and OSMF there was an increased frequency of arches and loops whereas in the control group, the whorls and loops were more frequently seen.

A cross-sectional study by Shetty et al. in 2016 on dermatoglyphics as a genetic marker for oral submucous fibrosis, it was found that percentage of whorls in study groups was 24% and 20% in the right and left hand respectively as compared to 7% and 5% in controls group. The percentage of arches in the study group was 0% and 1% in the right and left hand as compared to the 8% and 7% in the control group. These results indicate that dermatoglyphics can be used to determine the genetic susceptibility of individuals to develop oral submucous fibrosis.

Gupta and Karjodkar et al. in their study on the role of dermatoglyphics as an indicator of precancer and cancerous lesions of the oral cavity in 120 individuals who were divided into four groups; where Group 1 consisted of 30 male patients with history of tobacco/areca nut intake with occurrence of oral squamous cell carcinoma, Group 2 had 30 male patients with history of tobacco/areca nut intake with occurrence of oral submucous fibrosis, Group 3 included 30 males with habit of tobacco/areca nut without any evidence of oral lesions while Group 4 had 30 males without any habit and oral lesions which were the control group. Overall, there was a significant increase in the arch and loop pattern frequency.

A dermatoglyphic study was done by Ganvir et al. in 2014 on the detection of genetic predisposition in OSCC and OSMF patients by qualitative analysis of finger and palm-print patterns. So in their study, they had mentioned that a predominance of whorl type fingerprint pattern can be used as a screening marker for identifying the susceptibility of OSMF and OSCC.
A qualitative and quantitative analysis of palmar dermatoglyphics among smokeless tobacco users by Vijayaraghavan and Aswath in 2015 was a prospective comparative study among 40 patients (Group 1- 10 samples of smokeless tobacco users with OSMF, Group II-10 samples of smokeless tobacco users with OSCC, Group III- had 10 samples without smokeless tobacco and Group IV-had 10 samples without smokeless tobacco habit without OSMF and OSCC and they were the control group). They found that there was a predominance of arches and loops configurations, presence of hypothenar pattern, decrease in the mean ATD angle (P<0.001) and total AB ridge count (P=0.005) in OSMF and OSCC patients.

Vinothini et al. in 2017 did a cross sectional study to evaluate the relation between palmar dermatoglyphics with OSCC and OSMF patients. They had included 15 individuals with OSMF, 15 individuals with OSCC and 15 individuals were controls with no habits or lesions. They found that loops were frequent among the cases, whereas whorl patterns were common among the controls (P<0.05). Loops were also common in the interdigital areas than in control (P<0.05).

A dermatoglyphics study by Dutta et al. in 2016 on the comparison of fingerprint patterns in patients with and without oral submucous fibrosis. In their cross sectional study they had included 30 subjects with history of gutkha chewing of 10 years wherein 15 patients had developed OSMF and 15 patients without OSMF. They found a decrease in arches pattern, radial loop pattern, whorl pattern and atd angle in patients with OSMF. The results were statistically significant in individuals with ulnar patterns (P<0.05).

In a study to assess palmar dermatoglyphics in oral leukoplakia and oral squamous cell carcinoma patients by Venkatesh in 2006, where they comprised of 30 subjects with oral leukoplakia and 30 individuals with habits and no lesions as controls. Arches and loops were more frequent in cases than in controls whereas whorls were more frequent in control group (P<0.01). The loop pattern were at a higher frequency in the interdigital areas in cases than in controls (P<0.05).

In a study by Munishwar et al. in 2015 on the qualitative analysis of dermatoglyphics in oral submucous fibrosis, 25 subjects were gutkha chewers with OSMF, 25 were gutkha chewers without OSMF and 25 subjects were healthy controls. There was significant increase in the percentage of loops among gutkha chewers with OSMF and controls and increase in the whorl patterns among control group. Among the digits, there was increase in the whorl pattern in the right index and right ring finger (P=0.0328 and P=0.0368 respectively).

A study by Patil et al. in 2017 on dermatoglyphics in oral potentially malignant disorders and oral cancer revealed that among the dermatoglyphic patterns, 60.66% of patients with potentially malignant disorders and 46% of the oral cancer patients had whorl patterns. There was also a significant decrease in the mean accessory tri-radii digital angle (37.13 degrees).

In a cross sectional study done by Singh et al. in 2016 where the fingerprints and palm prints were studied in 180 patients who were randomly divided into three groups: Group A consisted of 60 subjects with oral leukoplakia, OSMF and OSCC, Group B consisted of 60 patients with habits but no lesions, Group C consisted of 60 healthy controls. The arch pattern was the predominant pattern (60.7%) with a decrease in the whorl pattern (29.3%) in group A when compared with the controls (group B and C) (P=0.01). There was an increase in the mean total finger ridge count (P<0.675).

**Variations of dermatoglyphic patterns among smoking and smokeless forms of tobacco in OPMDs and oral cancer**

In general, there are many studies which state that the nicotine content is higher in the smoking form of tobacco like bidis, cigarettes in comparison to the smokeless form of tobacco which includes pan, gutkha chewing. In one such study by Amit et al. in 2018 where they had evaluated the nicotine content in smoking and smokeless forms of tobacco, they found that bidis had the highest content of nicotine, followed by chewed tobacco (pan masalas) and cigarettes. With increasing nicotine content, literature states that there is an increased malignant transformation risk of these OPMDs.

In a study by Gandham and Thajuddeen in 2018 wherein they had compared the dermatoglyphic patterns in 250 alcohol and/or tobacco smokers with 250 non consumers, they found a decrease in ‘ATD’ angle in both hands of male (P<0.001) and female (P<0.001) cases as compared to the controls. The percentage of ulnar loops (p=0.020), arches (p=0.010) and composite patterns (p=0.005) were less among males compared to male controls, the percentage of whorls was more
among males compared to male controls (P<0.001), the percentage of radial loops was more among the female cases group in comparison with the female controls (P=0.017).

Conclusion

Dermatoglyphics analysis play a very important role in identifying the susceptibility of an individual to a particular syndrome, disease or certain other disorders as it is based on the genetic makeup of an individual. This scientific study was mainly used in the branch of criminology for solving various crimes. In dentistry, now this scientific study has been gaining importance and is been mainly used for identification of syndromes as most of them are genetically inherited, useful in determining the susceptibility of an individual to dental caries, periodontal diseases, cleft lip and palate, OPMDs and oral cancer. More studies have to be conducted for bringing this dermatoglyphics method as routine identification systems in the future perspective.

Conflicts of Interest : Nil

Source of Funding : None

Ethical Clearance : Not applicable (Review of Literature)

References


Polymorphism in Superoxide Dismutase, Catalase Genes and Their Role in Cervical Cancer Susceptibility among Rural Population of Maharashtra: Findings from A Hospital based Case Control Study

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Abstract

Background: The present study was planned to investigate the possible association between polymorphisms of superoxide dismutase, SOD1 (Cu,Zn-SOD), SOD2(Mn-SOD), SOD3(EC-SOD) and catalase genes and the risk of cervical cancer in rural population of Maharashtra.

Methods: A case control study included 350 proven cervical cancer cases and 400 healthy age matched control women. Genotyping of isoforms of SOD and CAT were done by polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP) method.

Results: When we studied genotype frequencies of codon 326 and 262 region of promoter of CAT gene, there was no significant association between A to T transition at codon 326 (p=0.45) and CAT C262T polymorphism (p=0.30) with susceptibility to cervical cancer. The variant G allele of SOD1 at codon 251 significantly increased in cervical cancer patients as compared with the control women (OR=3.02, 95% CI: 1.72-5.31; p<0.0001).

Conclusion: Findings from this investigation confirms conceivable association of A251G of SOD1 and G172A of SOD3 genes with risk of cervical cancer in women of Maharashtra.

Keywords: Genetic polymorphism, Superoxide dismutase, Catalase, Cervical cancer.

Introduction

Cervical cancer (CC) is 4th most common cancer in women worldwide representing 570,000 new cases and 311,000 deaths in 2018 where 90 % of deaths from CC occurred in low or middle income and developing nations [1]. CC is the 3rd leading public health crisis in India where, the burden of CC is increasing with alarming rate accounting 97,000 new cases and 60,000 deaths occurred in women between age ranges (15 to 69yrs) because of this dreaded disease in 2018 which represent one-fourth of global burden of cervical cancers. It is surprisingly noted that the women residing at rural regions of India are at higher risk of developing CC as compared to their urban counterparts[2].The rate of CC causing deaths in women was highest in southern states of India which was followed by Maharashtra[3]. The predominant risk factors causing CC remained unnoticeable, but the epidemiological factors contributing to development

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and progression of CC in underprivileged areas are early marriage age, sex at early age, poor genital hygiene, use of oral contraceptives, Human Papillomavirus (HPV) are considered. Apart from these factors the interactions between genetic and environmental factors have been shown to be associated with cervical carcinogenesis[4]. However, the exact mechanism of cervical carcinogenesis has not been fully elucidated till date. Growing studies evidenced that the reactive oxygen species (ROS) produced through inevitable consequences of oxidative stress may damage to cellular macromolecules and contribute to promotion of carcinogenesis[5].

To control the deleterious effects of ROS, the cellular machinery have antioxidant enzymes such as superoxide dismutase (SOD) and catalase (CAT) to brace against oxidative stress.

A single nucleotide polymorphism (SNP) in SOD or CAT genes may affect the stability and activity of enzymes, ultimately leading to altered expression of functional protein important for ROS detoxification. Several SNPs have been identified in SOD isoforms including, transition of A to G at 251 position of codon 251 in exon 10 of SOD1, Ile58Thr polymorphism at codon 58 in exon 3 of SOD2, transition mutation of G to A at position 172 in alanine to threonine substitution (Ala40Thr) in SOD3 gene associated with different types of cancers [6-10]. Similarly several studies have reported CAT gene polymorphism including A to T point mutation in codon 326 of exon 7 in the promoter region of CAT gene and C262T polymorphism in 262 region of promoter of CAT gene in multiple cancer risk [11-16]. However, the results remain inconsistent and inconclusive. Limited number of epidemiologic studies from India reported association of polymorphisms in SOD and CAT gene with series of cancers [8,17], but studies on SNPs in either SOD or CAT gene and their association with cervical cancer risk in any of Indian population are missing. Therefore in this study we hypothesized that the polymorphism in isoforms of SOD i.e, SOD1 (Cu, Zn-SOD), SOD2 (Mn-SOD), SOD3 (EC-SOD) and CAT genes which may contribute to etiology of CC in rural women of Maharashtra.

Materials and Method

Study subjects

350 women with proven cervical carcinoma and 400 healthy and age matched women as controls were included in this hospital based case-control study. All cases ranged in age from 20-80 years (yr) (Mean ± SD) (48.67 ±13.78) were enlisted immediately after being diagnosed during the year 2013-2018. Informed consent was obtained from all participants.

Genomic DNA isolation from whole blood

Genomic DNA was isolated from blood samples of 350 cases and 400 controls by the standard method describer earlier by Datkhile et al 2019 [18].

Genotyping assays.

Genotyping of SOD and CAT gene was performed by PCR-RFLP. The primers selected to amplify the specific SNPs of interest were; Forward primer (FP); 5’-AGTACTGTCAACCACTAGCA-3’ Reverse primer (RP); 5’-CCAGTGTGCGGCCAATGTG-3’ for codon 251of SOD1, 5’-AGCTGTGCTCCATATATTAG-3’RP ;5’TCAATTCAGGGCTGAGAT-3’ for codon 399 of SDO2, FP; 5’-GACATGTCGCGGAAAGGCAC- RP; 5’-AATCAGAGGCCAGTCCCTCCC- RP; 5’-TCGGGGAGCACAGAGTGTAC -3’ for codon 326 of CAT gene and FP: 5’-AATCGAGAGCCGCAGTCCCTCCC- RP; 5’-TCGGGGAGCACAGAGTGTAC -3’ for codon 326 of CAT gene and FP: 5’-AGAGCCCTGCACCCGGCGGACC-3’RP ; 5’-TAAGAGCTGAGAAAAGGCATAGCT-3’ for promoter region of CAT gene. The PCR reactions performed seperately in 20 µL reaction volume containing 100 nanogram of genomic DNA, 5 picomoles of each above mentioned primers, 200 micromolar each dNTPs, 10 mili molar (mM) Tris-HCl (pH 9.0), 50 mM KCl 1.5 mM MgCl2 and 1U of Taq DNA polymerase. After confirmation of amplification of specific fragments by agarose gel electrophoresis, each PCR products were allowed for restriction digestion with specific restriction enzymes at 37°C. 1 unit of MspI, EcoRV and BssHII restriction enzymes were used respectively for digestion of SOD1, SOD2 and SOD3 gene. Similarly HinFI and SmaI enzymes were used to digest codon 326 and 262 region of promoter of CAT gene. The restriction products were resolved on 2 or 3 % agarose gels according to the fragment sizes thereafter documented with UV transilluminator system.

Statistical Analysis

The association between the SOD, CAT genotypes and risk of developing CC were studied by logistic
regression model which was used to calculate the Odds ratio (OR) and 95% confidence intervals (CI).

**Results**

Total number of 350 cases (20-80 yr; median age of 50 yr) were included in this study. Clinically, most of the cases were in stage III well differentiated squamous cell carcinoma, enrolled in the study before receiving any of the cancer treatment. It was observed that CC occurred in patients (78.90 %) who were married at younger age and pregnant soon (15-20 yr) which showed significant association when compared to the controls ($p=0.01$). Surprisingly, age of cervical cancer occurrence in cases were below 50 years (61.40%; $p=0.03$) in rural population.

**SOD genotyping:**

The frequency distribution of SOD1 A251G, SOD2 C399T and SOD3G172A genotypes were determined in CC cases and control groups are shown in Table 1. When we observed the genotypic frequencies of SOD1 A251G polymorphism we found AA genotype (52.3%) in cases whereas controls with 63.00%. But, variant GG genotype frequency in cases was 12.60% which was significantly deviated from expected frequencies of controls which was not more than 5% which revealed that variant GG genotypes (OR=3.02, 95% CI: 1.72-5.31; $p=0.0001$) heterozygous AG (OR=1.55, 95% CI: 1.16-2.08; $p=0.003$) increased the risk of CC. The results of genotype frequency of SOD2 C399T showed C allele frequency of cases (4.9%) and that of control (1.2%) whereas variant T allele of cases (31%) and controls (33.2%) which did not show significant difference as expected frequencies on Hardy-Weinberg equilibrium.

**CAT genotyping:**

We also studied the genotype frequencies of codon 326 and 262 region of promoter of CAT gene summarized in Table 1. When we analyzed frequency distribution of A326T genotypes in codon 326 of exon 7, the A allele of cases (52 %) and controls (49.2%) where T allele in cases (7.4%) and control group (10.5%) which showed no association of either TT genotype or a combination of AT+TT genotype with CC risk. When we studied C/T and T/T genotypes of 262 promoter of CAT gene, we observed that T/T genotypes of cases (33.7%) and controls (28.5%) and C/T +T/T genotypes of cases (90.6%) and controls 89.5%) which also showed no association of C262T polymorphism with CC risk. However, there was no significant association between the CAT A326T polymorphism and susceptibility to CC, (T allele vs A allele, OR=0.67, 95% CI=0.39-1.13, $p=0.13$; AT+TT vs AA, OR=0.89, 95% CI=0.67-1.19, $p=0.45$).

**Table 1: The genotype frequencies of SOD and CAT gene variants and their association with cervical cancer in untreated CC patients and healthy controls.**

<table>
<thead>
<tr>
<th>GENE</th>
<th>Genotype</th>
<th>CASES (n=350) (%)</th>
<th>CONTROL (n=400) (%)</th>
<th>Odds’ Ratio (95% CI)</th>
<th>p value</th>
<th>Adjusted Odds Ratio (95% CI)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SOD1</td>
<td>Cu,Zn-SOD</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>codon 251</td>
<td>AA/AA</td>
<td>183(52.3%)</td>
<td>252(63%)</td>
<td>1.000</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>exon-10</td>
<td>AA/GG</td>
<td>123(35.1%)</td>
<td>128(32%)</td>
<td>1.300</td>
<td>0.07</td>
<td>1.300</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>GG/GG</td>
<td>44(12.6%)</td>
<td>20(5%)</td>
<td>3.000</td>
<td>0.0001</td>
<td>2.800</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>AA/GG+GG/GG</td>
<td>167(47.7%)</td>
<td>148(37%)</td>
<td>1.500</td>
<td>0.003</td>
<td>1.500</td>
<td>0.005</td>
</tr>
<tr>
<td>SOD2</td>
<td>C399T</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>codon 399</td>
<td>CC/CC</td>
<td>17(4.9%)</td>
<td>5(1.2%)</td>
<td>1.000</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>exon-3</td>
<td>CC/TT</td>
<td>224(64%)</td>
<td>262(65.5%)</td>
<td>0.250</td>
<td>0.007</td>
<td>0.280</td>
<td>0.017</td>
</tr>
<tr>
<td></td>
<td>TT/TT</td>
<td>109(31.1%)</td>
<td>133(33.2%)</td>
<td>0.240</td>
<td>0.0001</td>
<td>0.280</td>
<td>0.021</td>
</tr>
<tr>
<td></td>
<td>CC/TT +TT/TT</td>
<td>333(95.1%)</td>
<td>395(98.8%)</td>
<td>0.240</td>
<td>0.006</td>
<td>0.270</td>
<td>0.013</td>
</tr>
</tbody>
</table>
Cont ... Table 1: The genotype frequencies of SOD and CAT gene variants and their association with cervical cancer in untreated CC patients and healthy controls.

<table>
<thead>
<tr>
<th></th>
<th>GG/GG</th>
<th>74(18.5%)</th>
<th>1(Reference)</th>
<th>1(Reference)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOD3 EC-SOD</td>
<td>GG/AA</td>
<td>208(52%)</td>
<td>1.14(0.75-1.74)</td>
<td>0.42</td>
</tr>
<tr>
<td>exon3</td>
<td>AA/AA</td>
<td>118(29.5%)</td>
<td>2.02(1.30-3.14)</td>
<td>0.001*</td>
</tr>
<tr>
<td>(rs2536512)</td>
<td>GG/AA + AA/AA</td>
<td>326(81.5%)</td>
<td>1.46(0.98-2.17)</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catalase</td>
<td>AA/AA</td>
<td>197(49.2%)</td>
<td>1(Reference)</td>
<td>1(Reference)</td>
</tr>
<tr>
<td>codon326</td>
<td>AA/TT</td>
<td>161(40.2%)</td>
<td>0.95(0.70-1.29)</td>
<td>0.76</td>
</tr>
<tr>
<td>exon-7</td>
<td>TT/TT</td>
<td>42(10.5%)</td>
<td>0.67(0.39-1.13)</td>
<td>0.13</td>
</tr>
<tr>
<td>(rs7943316)</td>
<td>AA/TT + TT/TT</td>
<td>203(50.8%)</td>
<td>0.89(0.67-1.19)</td>
<td>0.45</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catalase</td>
<td>CC/CC</td>
<td>42(10.5%)</td>
<td>1(Reference)</td>
<td>1(Reference)</td>
</tr>
<tr>
<td>C262T Promoter</td>
<td>CC/TT</td>
<td>244(61%)</td>
<td>1.03(0.63-1.69)</td>
<td>0.88</td>
</tr>
<tr>
<td>(rs1001179)</td>
<td>TT/TT</td>
<td>114(28.5%)</td>
<td>1.31(0.78-2.22)</td>
<td>0.30</td>
</tr>
<tr>
<td></td>
<td>CC/TT + TT/TT</td>
<td>358(89.5%)</td>
<td>1.12(0.69-1.82)</td>
<td>0.62</td>
</tr>
</tbody>
</table>

Significance p< 0.005

Discussion

Cervical cancer is a major public health problem differentially distributed across different regions particularly abundant in rural parts of India. Comprehensive case-control study was attempted to discover the relationship of SNPs of SOD and catalase genes which could manipulate the risk of CC in the women representing rural population of Maharashtra. When we studied association of polymorphisms in isoforms of SOD and catalase genes with the help of logistic regression analysis, we observed that amongst three SNPs of superoxide dismutase genes (rs2070424, rs1141718, rs2536512), women carrying G/G genotype in SOD1 and A/A genotype in SOD3 were at higher risk of developing cervical cancer but there was no association of SOD2 C399T polymorphism with CC risk. Similarly, we assessed two SNPs in catalase gene (rs7943316, rs1001179) and found no association of polymorphism in this gene with risk of CC in rural women population of Maharashtra. Limited literature available on polymorphisms in oxidative stress associated antioxidant genes and their role in cancer development. SOD and catalase genes are briefly studied for their association with certain pathological disorders along with cancer. Up till now several studies reported positive association of polymorphism in SOD and catalase genes with cancer risk but with inconclusive results\textsuperscript{11, 19}. The polymorphism in SOD as well as catalase genes have found to be associated positively with increased risk of breast cancer\textsuperscript{6} but, in contrast no association was found in bladder\textsuperscript{20}, oesophagus\textsuperscript{21} and colorectal cancer\textsuperscript{22}.

Studies with limited information on association of polymorphism in either SOD or catalase gene and risk of cervical cancer is available in literature. The association of SOD\textsuperscript{23} and catalase polymorphism\textsuperscript{24} with cervical cancer susceptibility was revealed in some studies however, no association of SOD with cervical cancer
was reported by Attatippaholkun and Wikainapakul 2013(25). Earlier studies discovered the association of SOD2 gene polymorphism with multiple cancer risk(7, 26) but, surprisingly our results interpreted that SOD1 and SOD3 polymorphisms are associated with CC risk. Till date none of the Indian studies reported involvement of polymorphism in SOD and catalase with the risk of cervical cancer. To the best of our knowledge, present study is first to investigate the relationship of SOD and catalase gene with CC risk, where we found no association of SOD2 and catalase gene with risk of cervical cancer. Thus our results revealed for the first time that the SNPs rs2070424 of SOD1 and rs2536512 of SOD3 could increases the susceptibility of women towards CC risk from a pool of unexplored rural population of Maharashtra.

**Conclusion**

In conclusion, present study for the first time provides the evidence that SOD1 (G allele of rs2070424) and SOD3 (A allele of rs2536512) polymorphisms may express genetic susceptibility of CC in women of rural Maharashtra but the rs1141718 polymorphism of SOD2 and rs7943316, rs1001179 polymorphisms of catalase gene did not show association with cervical cancer development.

**Acknowledgement:** The authors gratefully acknowledge all the facilities and financial support provided by the Krishna Institute of Medical Sciences “Deemed to be University” Karad, India for experimental work.

**Conflict of Interest:** None declared.

**Ethical Clearance:** The study protocol was approved by Institutional Ethics Committee of Krishna Institute of Medical Sciences. (Reference: KIMSDU/IEC/06/2019)

**References**


Prevalence of de Quervain’s Tenosynovitis in Buffalo Milkers

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Abstract

Background: Buffalo milkers are more prone to de Quervain’s tenosynovitis due to their working process and repeated use of thumb, wrist and fingers. If there is any pain or problem in hand or wrist can have impact on milking ability which can lead to change in their economic status and quality of life. There are only few studies done on the population of buffalo milkers and problems regarding their occupation. Thus this study is designed to find prevalence of de quervain’s tenosynovitis in buffalo milkers.

Aim: The aim of this study was to find out prevalence of de Quervain’s tenosynovitis in buffalo milkers and aware them about this condition to avoid further damage.

Material and Method: Study was conducted with 92 subjects in and around Karad. Subjects were selected as per inclusion and exclusion criteria and consent was taken. Both males (43) and females (49) subjects were included for study. Then they were assessed with help of Finkelstein test and Visual analogue scale the data was collected and analysed accordingly.

Statistical Analysis: The simple random sampling is used to select the subjects for study and it is conducted in and around Karad Taluka. The sample size was calculated by de quervain’s tenosynovitis taken at 64%. Hence for calculation of sample size p=64% and q=100-p=36% sample size n=4pq/L² therefore n=92. Statistical analysis of the recorded data was done by using the software instat. MS Excel was used for drawing various graphs with given frequencies and the various percentages that were calculated with the software.

Result: After analyzing the data, it was found that there is a prevalence of de Quervain’s tenosynovitis. In all participants 43% people have de Quervain’s tenosynovitis. It is found that prevalence of de Quervain’s tenosynovitis is more in females than males and pain distribution is more in age group of 41 to 45 years.

Conclusion: The prevalence of de Quervain’s tenosynovitis is more in females and precautions should be taken by buffalo milkers by modifying their work strategies to avoid further damage.

Keywords: De Quervain’s tenosynovitis, Buffalo milkers, abductor pollicis longus, extensor pollicis brevis tendons.

Introduction

De Quervain’s Tenosynovities is a disease in which there is pain and swelling over the radial styloid process.

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There is inflammation of common sheath of abductor pollicis longus and extensor pollicis brevis tendons.[1] The origin of abductor pollicis longus is ulna, radius, interosseous membrane and the action of it is abduction and extension of thumb, the origin of extensor pollicis brevis is radius and interosseous membrane and the action of extensor pollicis brevis is extension of thumb.[2]

There is tenderness over radial styloid process takes place.[1] Adducting the thumb across palm and forcing ulnar deviation causes aggravation of pain. The pain
causes due to thickening of fibrous sheath. The pain radiates proximal or distal from the first dorsal wrist compartment [1,2].

The confirmation of De Quervain’s Tenosynovitis is done by positive findings on finkelstein test. In this test, ask the patient to place his thumb in the palm of the hand and flex the digits around the thumb, if there is tenderness over the first dorsal wrist compartment then the test is positive[3,4].

De Quervain’s Tenosynovitis is associated with occupations which include over use of wrist and thumb. It is also associated with repetitive trauma.[5]

Buffalo milking is done by using hand. Because of hard teat sphincter muscle and their slow milk ejection reflex buffaloes are slow and hard milkers.[6] In hand milking there is massaging and pulling down on the teats of the udder and collecting the milk in bucket takes place. It includes two methods:

1. Between the finger and thumb, the top of teat is pinched and shut to trap milk in the lower part and squeeze by other fingers, the milk will come out through the tip of teat

2. By the finger and thumb, the top of the teat is pinching then slid down the teat to push milk towards the bottom.[7]

In buffalo milkers there is repetitive use of thumb and fingers associated with wrist takes place. De Quervain’s disease is a significant cause of musculoskeletal pain among people.[7,8]

**Methodology**

This study is cross sectional study undertaken to find out prevalence of de Quervain’s tenosynovitis in buffalo milkers and to create awareness about it in them. Buffalo milkers with age group of 30 to 50, both males and females were included. Buffalo milkers who have already undergone from fingers and wrist related surgery and those who are unwilling to participate are excluded. Written consent of the patient was taken. The study is ethically approved. The Finkelstein test and Visual analogue scale is used as study tool.

**Statistical Analysis**

The sample size was calculated by de Quevain’s tenosynovitis taken at 64%(as a study has shown as frequency of de Quervain’s tenosynovitis and its association with SMS texting is 64% as in SMS texting there is also repeated thumb movements takes place therefore 64% was taken into consideration for de Quervain’s tenosynovitis). Hence for calculation of sample size \( p=64\% \) and \( q=100-p=36\% \) sample size \( n=4pq/L^2 \) therefore \( n=92 \). The simple random sampling is used to select the subjects for study and it is conducted in and around Karad Taluka.

A. Graph 1:

![Graph 1](image)

**Interpretation:** According to the graph above 11(27%) of males and 32(73%) of females have
dequervain’s tenosynovitis. It also shows that 23 of buffalo milkers had dequervains tenosynovitis in age group 46-50 yrs. in 41-45yrs 12 subjects, in 36-40yrs 4subjects and in 30-35yrs 1of buffalo milkers had dequervain’s tenosynovitis and at rest, 20(50% ) people had mild pain, 7(18% )people had moderate pain, 13(32% )people with no pain and on activity 21(53% ) of people had severe pain,16( 40%) people had moderate pain and 3(7% )had mild pain.

Based on this study it was found that heel pain in farmers is statistically significant (p< 0.0001).

Discussion

The aim was to study the prevalence of dequervain’s tenosynovitis in buffalo milkers. Inclusion criteria was, Buffalo milkers both males and females. Age group of 30-50 years and Participants those are willing to participate. Exclusion criteria was Buffalo milkers who have already undergone surgery of wrist and fingers.

The study was conducted with 92 subjects in and around Karad. Subjects were selected according to the inclusion and exclusion criteria. Both male (43) and Female (49) subjects were included for the study. Subjects were explained about the procedure of the study. Written consent was taken from them and they were also asked if they suffered any other musculoskeletal problems. Then they were assessed with finkelstein test and visual analogue scale, survey was done according to the results obtained and hence the conclusion was given.

Buffalo milking is second most important way to earn money in farmers. Buffalo milking is done by using hand in which over use of wrist thumb and fingers takes place which causes pain swelling over radial styloid process. Inflammation can cause reduction in workability and impact on daily living activities.

Many studies have been conducted on De quervain’s tenosynovitis in another population like students, nursing staff etc.

As per the previous studies it has been seen that personal and work related factors were associated with de quervain’s tenosynovitis in working population in which there is bending and twisting movement of wrist takes place.

Previous studies are carried out to see risk factors of de quervain’s tenosynovitis in French working population by Audrey Petit Le Menac’h, the purpose of this study was to assess the relative importance of personal and occupational risk factors for de quervains tenosynovitis in working population.

So in buffalo milkers de quervain’s tenosynovitis can cause due to repetitive thumb movement and bending movement, that’s why it is necessary to find prevalence of de quervain’s tenosynovitis in buffalo milkers.

Even this study helped to create awareness amongst buffalo milkers about the de quervain’s tenosynovitis and its risk factors that might cause pain which would eventually affect their work. And benefit for betterment of them and help them to prevent further problems or injuries to surrounding structures.

In this study we came to know that females are primarily affected by this condition. De quervain’s tenosynovitis was also found statistically significant in present study. It was shown that 43% subjects are having de quervain’s tenosynovitis and 46-50 years of age group is mostly.

Conclusion

After analysing the data, it was found that there is a prevalence of de quervain’s tenosynovitis in buffalo milkers. 43% of subjects are having de quervain’s tenosynovitis. It is found that prevalence of de Quervain’s tenosynovitis is more in females than males and pain distribution is more in age group of 41 to 45years.

Acknowledgement: I sincerely thank the management of KIMSDU for allowing me to conduct this study by providing me the necessary requirements. I thank dean Dr.Vardharajulu sir for his support and guidance. My sincere thanks to guide Dr Pragati Salunkhe for helping me in my research. I take this opportunity to thank all those who helped to complete this study.

Conflict of Interest: There were no conflict of interest in my study

Source of Funding: This project is funded by self.

Ethical Clearance: The institutional committee has hereby given permission to initiate the research project titled, “Prevalence of de Quervain’s tenosynovitis in buffalo milkers.”

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Study of the Closure of Sagittal Suture in Relation with Age of the Individuals in Native of Gujarat

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Abstract

Background: Age estimation is an integral part of the biological profile employed by forensic anthropologists in order to assist in achieving an identification of an unknown deceased individual. Its estimation is of paramount importance and requires special attention in cases where bodies are found in decomposed, mutilated state or only fragmentary remains are discovered.

Material and Method: The present study has been done on post-mortem cases referred to GMERS Medical College, Himmatnagar which is referral center. Very few studies have been conducted on sagittal suture closure in Himmatnagar region. Total 150 post mortem cases were taken and data collected.

Result: Present study reveal that Ectocranial obliteration of the various segments of the three main sutures of the skull is so inconclusive that neither does it help in estimating the age of the deceased nor does it provide any supportive evidence in determining the age of skeletal remain. Age was determined on the basis of endocranial suture fusion.

Conclusion: It was found that closure of Sagittal suture started in age of 20-29 yrs and closure completed at the age of 61 to 65 yrs.

Key words: Sagittal suture, Age, Relation

Introduction

Age estimation can be done in several ways by macroscopic examination of dental development and eruption, epiphyseal union of long bones, degeneration of pelvic articular surfaces, sternal rib ends and cranial sutures, as well as microscopic examination of bone in histological analysis.¹ Since the bone resists putrefaction and destruction by animals, they can lead to the reliable determination of age, sex, race, stature in decomposed bodies.²

Use of suture closure for age estimation is predicated upon the hypothesis that suture closure is part of the aging process. However, when suture closure patterns were first studied at the beginning of this century, there were two schools of thought (British and Italian) on this issue (Hershkovitz et. al. 1997:393). The British school maintained that sutural ossification and cranial immobility were normal conditions, whereas the Italian school maintained that they were pathologic in mature human adults (ibid.). In time, probably due to the increasing prominence of the English language in the scientific literature, the British approach toward suture closure became the dominant model in physical anthropology (without actually testing that hypothesis) (Hershkovitz et. al.1997:394).³

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Reasonably a correct estimation of age in elderly people is essential in legal, medical, social and administrative matters i.e. to fixing of age for regularization of employment, superannuation, pension settlements, senior citizen benefits, old age and good behavior of the prisoner (Ullas Shetty ref).

This study was done to specify the relationship between progression of union of cranial suture and age of the subject. It also done to formulate practical method of estimation of age based on the status of the progression of the closure of sutures using the data collected and to establish a data base of fusion of cranial sutures for the population of Gujarat.

**Materials and Method**

The study was conducted on cases coming for medico-legal post mortem examination to the Department of Forensic medicine, GMERS Medical College, Himmatnagar, Gujarat during a period from November 2018 to November 2019.

**Study design:** A descriptive cross-sectional study.

Inclusion criteria:

1. The cases of known age coming for medico legal postmortem examination. Age was confirmed by documentary evidences like birth certificate, identification cards, ration card etc.

2. Subjects of more than 20 years of age were taken.

**Exclusion criteria:**

1. Unknown, unclaimed bodies where exact age cannot be confirmed.

2. Cases showing deformed or diseased or fractured skull, which may hamper the study of suture closure.

**Method**

150 cases of age 20 years and above were studied. After reflecting the scalp sagittal suture was studied by applying Acsadi-Nemeskeri scale ectocranially. For endocranial suture, same score system was applied after removing the calvaria by craniotome with taking due care to include complete sagittal suture. The calvarium was cleaned of soft tissues on both sides and was dried, which made the suture more prominent. Photographs were taken in all cases. The obliteration of the sutures was ascertained endocranially as well as ectocranially. In both cases degree of closure was scored in 16 parts of the main cranial sutures as has been done by Acsadi-Nemeskeri scale. We have studied the sagittal suture in four parts. Ectocranially the different sections were distinguished by differences in the character of the suture. Endocranially the sutures do not show these differences in character. Consequently the endocranial sutures were simply divided in sections of equal length.

**Scale for closure: Acsadi-Nemeskeri complex method:**

0 = open. There is still little space left between edges of adjoining bones.

1 = incipient closure. Clearly visible as a continuous often zigzagging line.

2 = closure in process. Line thinner, less zigzags, interrupted by complete closure

3 = advanced closure. Only pits indicate where the suture is located

4 = closed. Even location cannot be recognized.

Statistical Method

To estimate the possible relation between suture closure and age at death, analysis was done in excel and Epi info software.
### Results

Table 1: Age and sex wise distribution of subjects

<table>
<thead>
<tr>
<th>Sr.No</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-29</td>
<td>31(46.5%)</td>
<td>19(12.66%)</td>
<td>50(33.33%)</td>
</tr>
<tr>
<td>30-39</td>
<td>25(16.66%)</td>
<td>10(6.66%)</td>
<td>35(23.33%)</td>
</tr>
<tr>
<td>40-49</td>
<td>14(9.33%)</td>
<td>11(7.33%)</td>
<td>25(16.66%)</td>
</tr>
<tr>
<td>50-59</td>
<td>21(14%)</td>
<td>6(4%)</td>
<td>27(18%)</td>
</tr>
<tr>
<td>60-69</td>
<td>6(4%)</td>
<td>0(0%)</td>
<td>6(4%)</td>
</tr>
<tr>
<td>70-79</td>
<td>3(2%)</td>
<td>0(0%)</td>
<td>3(2%)</td>
</tr>
<tr>
<td>80-89</td>
<td>0(0%)</td>
<td>4(2.66%)</td>
<td>4(2.66%)</td>
</tr>
<tr>
<td>Total</td>
<td>100(66.66%)</td>
<td>50(33.33%)</td>
<td>150(100%)</td>
</tr>
</tbody>
</table>

Above table describes age wise distribution of subjects in this study. Out of Total 150 subjects, 33.33% were females and 66.66% were males. Majority of subjects(33.33%) were in 20-29 years age group and fewer(4.66%) were above 70 years. The minimum age was 20 years and maximum was 90 years and range was 70. Median was 40, standard deviation for age was 15.43 and standard error of mean was 1.26.
Table 2: Ectocranial sagittal suture grade 1 and grade 4 distribution among subjects

<table>
<thead>
<tr>
<th>Sr.no</th>
<th>Age group</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td>Male</td>
<td>Female</td>
</tr>
<tr>
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<td>20-29</td>
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<td>10</td>
<td>11</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>30-39</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>40-49</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>50-59</td>
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<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>60-69</td>
<td>0</td>
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<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>&gt;=70</td>
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<td>0</td>
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</tr>
</tbody>
</table>

Ectocranial sagittal suture grade 4 present among subjects

<table>
<thead>
<tr>
<th>Age group</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Female</td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>0</td>
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<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>5</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
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<td>7</td>
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<tr>
<td>6</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

Ectocranial sagittal sutures by Ascadi Nemeskeri complex incipient closure - grade 1, seen in 20-29 years age.

Ectocranial sagittal suture by Ascadi Nemeskeri complex closure in process - grade 2 seen in 40—49 years of age group. Advanced closure that is grade 3 seen in 50-59 years of age group.

Ectocranial sagittal suture Ascadi Nemeskeri complex closure that was grade 4 seen in 50-59 years age.
Table 3: Endocranial sagittal suture grade 1 and grade 4 present among different age group subjects

<table>
<thead>
<tr>
<th>Sr.no</th>
<th>Age group</th>
<th>S1</th>
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<th>S3</th>
<th>S4</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Female</td>
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<td>Female</td>
</tr>
<tr>
<td>1</td>
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<td>12</td>
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<tr>
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<td>40-49</td>
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<td>0</td>
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</tr>
<tr>
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<td>50-59</td>
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<tr>
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<td>60-69</td>
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<td>&gt;=70</td>
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</tr>
</tbody>
</table>

Endocranial sagittal suture grade 4 present among different age group subjects

<table>
<thead>
<tr>
<th>Age group</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
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<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>1</td>
<td>20-29</td>
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<td>0</td>
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</tr>
<tr>
<td>2</td>
<td>30-39</td>
<td>10</td>
<td>4</td>
<td>10</td>
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<td>6</td>
<td>&gt;=70</td>
<td>4</td>
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</tr>
</tbody>
</table>

Endocranial sagittal suture grade 1 that is incipient closure found in 20-29 years age group.

Endocranial sagittal suture grade 2 that is closure in process is found in 20-29 majority but fewer subject found in 30-39 years age group during analysis.

Endocranial sagittal suture grade 3 that was advanced closure found in 40-49 years age group in majority subjects during analysis.

Endocranial sagittal suture grade 4 that closed found in 50-59 age groups in majority of subjects.

Table 4: Endocranial and Ectocranial suture relations with age

<table>
<thead>
<tr>
<th></th>
<th>S1 (Age in years)</th>
<th>S2 (Age in years)</th>
<th>S3 (Age in years)</th>
<th>S4 (Age in years)</th>
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</thead>
<tbody>
<tr>
<td><strong>Endocranial</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade 1</td>
<td>20-29</td>
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<td>20-29</td>
</tr>
<tr>
<td>Grade 2</td>
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<td>20-29</td>
<td>20-29</td>
<td>20-29</td>
</tr>
<tr>
<td>Grade 3</td>
<td>40-49</td>
<td>40-49</td>
<td>40-49</td>
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<tr>
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<td>50-59</td>
<td>50-59</td>
<td>50-59</td>
</tr>
<tr>
<td><strong>Ectocranial</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade 1</td>
<td>20-29</td>
<td>20-29</td>
<td>20-29</td>
<td>20-29</td>
</tr>
<tr>
<td>Grade 2</td>
<td>30-39</td>
<td>40-49</td>
<td>40-49</td>
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<td>Grade 4</td>
<td>50-59</td>
<td>50-59</td>
<td>50-59</td>
<td>50-59</td>
</tr>
</tbody>
</table>
Discussion

In this study, Age range can be given in range of 5 years. Whereas age from suture closure of skull can be given only in a range of decades.\(^8\) Study by Dr. S. V. Khandare et al range has been given in range of 5 yrs.\(^9\) According to J.B.Mukherjee, estimation of age from suture closure of skull can be given in a range of 5-10 yrs in age of 30-60 yrs, the range may even be more in higher age groups.\(^{10}\) In our study at Himmatnagar, we have observed that the sagittal suture, endocranially fusion started in first part at 20-29 years and completion at age of 50-59 years age group. In second, third and fourth part, fusion started in 20-29 years age group and completion in 50-59 years age group. This finding was compared with study by Dr.S.V. Khandare et all found that the sagittal suture, endocranially, started fusing at the end of 26 years and completion at the age of 61-65 years in 1\(^{\text{st}}\) part of sagittal suture, 46-50 yrs in II\(^{\text{nd}}\) part of sagittal suture, 41-45 yrs in III\(^{\text{rd}}\) part of sagittal suture and 26-30 yrs in IV\(^{\text{th}}\) part of sagittal suture.\(^9\) In study by Ullas Shetty have found that the sagittal suture, endocranially, starts fusing at the end of 20-29 years and completion is perfected at the age of 60-69 years. Similar finding also found in observation with that reported by Todd & Lyon (1924).\(^{11}\) It was in contrast to the observation reported by Pommerol (1869), and Topinard (1885), who indicated endocranial commencement of sagittal suture at a much later age at about 40 years. These latter workers have reported on very few specimens so it could not be considered as authentic.\(^{12,13}\) The other study for cranial suture closure of skull was done by Krogman(1978), Rentoul & Smith (1973) , T LPatil (1981) & Robert Shapiro (1960), had concluded that the study of ectocranial fusion was less significant than endocranial fusion because suture along the outer table were more or less serrated while at inner table they were comparatively straight, whereas the process was speedy and more uniform and complete in the endocranial surface.\(^{14,15,16,17}\) The phenomenon of lapsed union was more common in the Ectocranial surface, Todd & Lyon (1924).\(^{13}\) From this study we concluded that endocranial was more important than ectocranial fusion, similar finding also found from the study by Dr.S.V.Khandare et all it was evident that endocranial union was far better parameter for age determination than ectocranial union as also had been established byTodd & Lyon (1924 & 1925).\(^9\),\(^{11}\)

Conclusion

Ectocranial suture closure cannot be used for age estimation. Lapsed union is a major deterrent for age estimation. Suture obliteration starts earlier on endocranial surface than on the ectocranial. There is some correlation between endocranial suture closure and age upto 40 years, but then after there is no significant correlation. Any attempt to derive a reliable formula to estimate the age from score of suture closure was met with failure for the following reasons: 1) the trend of correlation is neither increasing nor decreasing with age, 2) the sample size is too small to derive a formula, 3) unequal distribution of males and females in the study sample. Although cross-sectional in nature, suture obliteration patterns (totally open, totally closed, partially open, and partially closed) are not temporary progressive stages on an age scale, but rather independent permanent phenomena. Ectocranially: Within the sagittal suture segments, pars lambdica (S4) closes earlier followed by pars bregmatica(S1), pars vertices(S2) and pars obelica(S3).

Endocranially: Within sagittal suture segments, pars lambdica (S4) closes earlier followed by pars bregmatica(S1), pars vertices(S2) and pars obelica(S3).

Endocranial union started at 20-29 age groups but progression is not uniform. Complete closure (mean value > 3.5) of sagittal suture occurs in the age group of 50-59 years. Ectocranial union started in 20-29 age group, but its progression is very erratic. Complete closure (mean value > 3.5) never occurred in ectocranial sutures. Maximum closure occurred in the above 70 years age group.

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4) Shetty U. Macroscopic study of cranial suture closure at autopsy for estimation of age. Anil


9) Dr. S. V. Khandare, Dr. S.S.Bhise, Dr A. B. Shinde. Age estimation from cranial sutures – a Postmortem study Original article: International J. of Healthcare and Biomedical Research, Volume: 03, Issue: 03, April 2015, P. 192-202. www.ijhbr.com ISSN: 2319-7072


Effect of Blended Learning on Academic Achievements and Attitude of Nursing Students: A Systematic Review

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Abstract

Introduction: Technological advances have revolutionized teaching and learning processes. With the emergence of technologies and need for cost-effective teaching methods have led to the molding of teaching-learning practices. Considering these constant and rapid changes, it is crucial that learners in health care area should be taught with latest knowledge and keep pace with up to date information.

Method: The study design was systematic review and it includes studies from databases of PUBMED, MEDLINE, Cochrane library, SCOPUS, Science direct, and Google scholar (2008-2019). The included studies were focusing on the effectiveness of blended learning on nursing students’ knowledge, skills and attitude and the studies that discussed about other methods of teaching and conducted on other specialty students were excluded.

Result: The data was grouped and analyzed in terms of meta-analysis. Total 21 relevant articles were undertaken. Abstracted information is related to study design, population characteristics, intervention and outcomes.

Conclusion: Blended learning as a teaching method is effective in improving the learning outcomes in terms of academic achievements and performance of nursing students regarding various topics/ procedures. Students also possess favorable attitude towards blended learning. Several studies came out with the conclusions that blended learning is beneficial in improving the learning outcomes.

Key words: Blended learning, nursing students, learning outcomes, attitude

Introduction

All around the world, the online network is considered to be one of the rapidly flourishing and the most accessed technologies. Internet World Stats has shown a diffusion rate in Asia related to Internet is as high as 51.7% with about 40.9% in India.¹ Education in Modern World has been transformed into learning which is, occurring immediately, self-driven and online or it can be said as on the go learning. One of the important milestones developed and established in India is E-learning.²

Considering the constant presence of the Internet everywhere and the benefits it provides, it is obvious that educators would want to take advantage of it for educational purposes.³ Nursing education is most of the time delivered via the traditional approach of lecture as large number of nurses can be given information at the same time. But Nursing Educators nowadays are becoming much aware about the fact that E-learning is an innovative method for delivering education that is learner centered and interactive.⁴

The role of traditional classroom cannot be overlooked in the light of E-learning environment. Thus, a new teaching environment has been suggested by the
researchers named as blended learning to get the best of both worlds of learning, traditional classroom and online learning. Since the advent of blended learning, many institutes have started adopting blended learning so as to provide maximum benefit in the form of best learning environment to the students. [5–7]

**Materials and Method**

**Research design:** Systematic Review

**Inclusion criteria:** It includes the studies related to evaluation of blended learning on nursing students’ knowledge, skills, clinical-decision-making and attitude.

**Exclusion criteria:** The study excludes the studies those discussed about the other teaching interventions on learning outcomes and attitude of nursing students.

This review article was written after doing a systematic review of several studies, journals and articles on web. Ethical issues have been addressed as there is no direct involvement of human subjects in this study. The referred articles and studies have been properly cited in the reference section.

**Data Analysis:** Relevant articles on the topics of effectiveness of blended learning on knowledge, skills and clinical decision-making and those involving views and perceptions towards e-learning were identified by search of significant articles PubMed/Medline, Science direct, SCOPUS, CINAHL, Elsevier and Google scholar.

**Results**

A systematic review was done and total of 157 studies were selected for review, out of which 21 were found to be appropriate. Data was divided into two sections:

**Literature related to effect of blended learning on students’ outcomes**

Out of a total of 14 studies, nine (64.29%) were quasi-experimental studies and among these, 66.7% of the studies have concluded that blended learning was effective in improving knowledge, skills, satisfaction and critical thinking among nursing students. [8–10] The results of two (22.2%) studies have reflected that although there was an increase in students’ achievement scores when exposed to blended learning, but it was not a significant increase. [11,12] One study (11.1%) reported that there was no significant difference in the scores of nursing students’ when compared blended learning and traditional learning method of teaching. [13] Four (28.6%) out of 14 studies were RCTs or true experimental; results of these studies were in favor of blended learning. Although, three of these studies reported a significant increase in learning outcomes within the group but no statistically significant differences were found between the groups. [14–16] The results of a descriptive survey revealed that both classroom and blended methods of teaching are equally effective in improving the learning outcomes of nursing students. [17]

A quasi experimental research using non-equivalent control group design was conducted with the aim to verify the effects of blended learning on the critical thinking and learning satisfaction of nursing students. The content included watching a simulation video on nursing skills, discussion class and application of nursing examples using standardized patients. Convenience sampling technique was used to select a sample of 79 second-year nursing students, composed of 39 students in the control group and 40 students in the experimental group. The findings revealed that blended learning group had a statistically significant high score for critical thinking (t=-6.21, p<.001) and had a high but not statistically significant score for learning satisfaction (t=-.52, p=.683). It was therefore concluded that blended learning in nursing education was more effective in improving the critical thinking of nursing students than the existing nursing education curriculum. [10]

A randomized control trial was carried out to assess the effectiveness of a blended-teaching intervention using Internet-based tutorials coupled with traditional lectures in an introduction to research undergraduate nursing course. The study participants included 112 nursing students selected randomly. The effects of intervention were compared with conventional, face-to-face classroom teaching in terms of knowledge, satisfaction, and self-learning readiness. The results of the study indicated no direct impact on knowledge acquisition, satisfaction, and self-learning readiness among the students in both the groups. However, there was an interaction effect of motivation and teaching method on acquisition of knowledge. The students who were less motivated and received blended learning intervention were able to perform better. The conclusion drawn from the study findings was that the blended teaching method could suit the students according to their degree of motivation and level of self-directed learning readiness. [16]
A descriptive survey was conducted to compare classroom and online student perceptions of learning across the seven affective topics of the course. The study also examined the contribution of various technology-enhanced learning activities to the students’ perceptions of learning. Participants were enrolled in a master’s of occupational therapy professional program in the Midwestern United States. A sample of 25 students attended classroom teaching while 64 students received teaching by blended learning in groups of two. The results of the study indicated that while both formats increased students’ perceived understanding of topics related to affective learning, the blended learning group perceived a significantly greater understanding in four affective topic areas. Furthermore, blended learning students cited reading, online discussions, and unstructured out-of-classroom discussions as contributing to their learning significantly more than the classroom group. The conclusion of the study was that blended learning is an effective method of teaching when coupled with innovative components like discussion forum and availability of offline classes. [17]

Literature related to nursing students’ perception, views and attitude towards e-learning

Out of seven studies selected, six (85.7%) were descriptive studies highlighting the views and perceptions of nursing students towards e-learning or blended learning. The results showed that students had different views for blended learning based on their learning styles. [18] Most of the studies (83.3%) reflected high perception, increased learning satisfaction, positive reactions among students towards e-learning and they also mentioned it to be highly valued. [19–23]

A descriptive study was undertaken with the purpose to examine the students’ learning styles and their views on blended learning. The study was conducted among thirty-four students at Hacettepe University, Ankara, Turkey. The instruments used for the study were questionnaires to identify students’ views on blended learning and Kolb’s Learning Style Inventory (LSI) to measure students’ learning styles. Additional data were gathered from achievement scores of students; and records demonstrate students’ participation to e-learning environment. Results revealed that students’ views on blended learning process, such as ease of use of the web environment, evaluation, face to face environment etc., differ according to their learning styles. Results also revealed that the highest mean score corresponds to face aspect of the process when students’ evaluation concerning the implementation is taken to consideration. The overall findings showed no significant differences between students’ achievement level according to their learning styles. [18]

A quantitative cross-sectional survey was conducted to assess the attitudes of undergraduate nursing students towards e-learning at the University of the Western Cape, South Africa. A sample of 249 nursing students was selected by stratified random sampling technique. A questionnaire was used to assess knowledge and skills and a five-point Likert scale was utilized to assess the attitude of students. The findings revealed that learner satisfaction was influenced by perceived ease of use, gender, and study-year level of respondents. The findings also demonstrate a favorable attitude towards e-learning among nursing students. [24]

Discussion

A study conducted by Bloomfield J. et al. (2010) established a significant increase in Knowledge scores of nursing students. [14] Another study conducted by Hee-Jung J. et al. (2016) also reported that the students who participated in blended learning had a significantly high score for critical thinking. [10]

There were studies that found no significant difference between the scores of nursing students. Ahmad Al Sai et al. (2011) where it was found that there was not any significant difference between the different instructions in improvement scores of the students. The findings were also similar to the results given by Mehrdad N. et al. (2011) where it was also reported that students’ scores in e-learning and lecture method were not having any significant difference. Zhigang G et al. (2014) too reported that that there was a non-significant difference in students’ performance in academics before and after the administration of blended learning. [25–27]

Conclusion

Blended learning in the recent times, has shown a rapid growth and is now being widely used in Nursing education. Several studies in this review came out with a conclusion that blended learning is effective in improving the academic achievement scores and satisfaction of nursing students. Studies also concluded that a positive attitude and views are developed for blended learning among nursing students. Thus, it is recommended to
carry out more extensive research in this area so as to provide maximum benefits to the nursing students which in turn will favor provision of quality patient care as well.

Conflict of Interest- There is no conflict of interest between authors.

Funding- This research received no grant from any funding agency.

Ethical Clearance- Ethical consideration for conducting the study was obtained from the institutional ethical committee (ECR/296/Indt/PB/2019/ISFCP/40).

References


Development of Submerged Latent Fingerprints on Non-Porous Substrates with Activated Charcoal based Small Partial Reagent

Kavleen Kaur1, Tina Sharma2, Ridamjeet Kaur2

1M.Sc Student, 2Assistant professor, Department of Forensic Science and Toxicology, Chandigarh University, Gharuan, India

Abstract

The practice of using small partial reagent (SPR) for the visual development of latent fingerprints is the preferred choice, particularly concerning wet surfaces. In the present study, non-porous surfaces impinged with latent prints submerged in the water simulating acidic basic and salty water bodies were developed with activated charcoal based small particle reagent method. As evident from the observations, the activated charcoal-based SPR method was able to develop latent fingerprint submerged on the glass surface for up to 11 days and on aluminium substrate, up to 12 days but the quality of fingerprint observed was better on the glass substrate. The shelf life of the activated charcoal-based SPR method was found to be 52 days. The results have shown that the time-lapse of submersion and quality of fingerprint developed are inversely prepositional to each other. Although pond water submerged substrates showed good quality developed fingerprints for a longer period than other mediums but with increasing period of submersion the quality degraded.

Keyword: Forensic Science, Fingerprint visualization, SPR, Small particle reagent, latent fingerprint development.

Background

Fingerprints are formed by chemical and biological components present on the friction ridged skin 1. Different techniques for the visualization of latent fingerprints have been established to obtain clear ridge details 2. The choice of a specific technique for a specific substrate is advisable for the visualization of the latent fingerprint. The fingerprint residue constitute two types of components i.e. water-soluble components and non-water-soluble components depending upon the availability of the above-mentioned component at specific time and substrate, the choice of visualization method should be undertaken. The Visualization of latent fingerprints on wet submerged objects is quite difficult. Most of the previously tested methods demonstrate effective development with dry substrates. The development of latent fingerprints on wet porous substrates is one of the very difficult unsolved scientific problems. The use of Ninhydrin, DFO, and silver nitrate could not detect these latent prints on such surfaces, as the development of these type of fingerprints are mostly dependant on non-water-soluble components and the above-mentioned techniques mostly work with water-soluble components of fingerprints 3-7. In contrast to that, the probability of developing latent marks containing lipid / Non-water-soluble components left on the substrate is quite high concerning the SPR method. Some research studies have attempted to study various technical aspects of developing latent fingerprints on submerged surfaces. From the perusal of literature, it was observed that there is existence of direct correlation between choice of developing reagent, type of latent component(WSC or NWSC) present, type of substrate

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on which latent fingerprint is present, time since submersion of latent fingerprint and nature of medium in which the submerged latent fingerprint is studied. The Visualization of latent fingerprints on underwater surfaces had been tried for eccrine rich and sebaceous rich marks with small particle reagent (black and white), Oil Red O, Sudan Black and gentian violet methods and cyanoacrylate on various substrates like glass and metal surfaces [7-9]. The results suggested the positive visualization of sebaceous-rich marks in comparison to eccrine-rich marks. It relies on the adhesion between sebaceous components present in traces and the hydrophobic tails of the reagent. The suspension is generally applied by immersion or spraying methods [10]. Very less work has been carried out on latent fingerprint development on submerged surfaces and effects of different mediums like pond water, salty, basic and acidic water on latent print visualization particularly with activated charcoal-based SPR. Henceforth the main goal of the present research work was to carry out the comparative analysis of small particle reagent to develop fingerprint submerged in different media concerning time-lapse and quality of the fingerprint developed.

Materials and Methods

Working solution formulation: Small particle reagent was prepared using activated charcoal black powder (Kerala Naturals). The suspension solution was prepared by dissolving 5 grams of activated charcoal in 75 ml of distilled water with the addition of 3 drops of surfactant (commercial liquid detergent).

The study was conducted in the month of summer season with a temperature range between 25°C to 40°C and relative humidity between 15-40%.

Simulation of Sea Water:
23.39 grams of NaCl was dissolved in 1 liter of distilled water. To the prepared solution, KCl (0.715grams), MgCl₂ (10.633 grams), CaCl₂ (1.455grams), Na₂SO₄ (4g) and Tris base (2.4 g) was added [6]. The solution was stirred with the help of magnetic stirrer for 1 hour and the pH of the solution was maintained 8 to 8.2 throughout the experiment.

Simulation of lake water Acidic:
To acidic simulate lake water pH of 11 distilled water was maintained near 5.5 to 7 with the help of HCl and NaOH solutions

Simulation of lake water Basic:
The deeper lakes with stratification constitute pH range slightly higher than neutral freshwater. To simulate lake water pH of 11 distilled water was maintained near 7.5 to 9 with the help of HCl and NaOH solutions

Muddy water:
The muddy water was collected from a natural pond, Mohali Punjab with pH 6

Sample Preparation: In the present study, five individuals were asked to deposit latent fingerprints on non-porous substrates like aluminium foil and glass slide. The fingerprints were immersed in different mediums like salty water, muddy pond water, acidic and basic lake mediums. These mediums were used to simulate the different conditions with respect to water bodies like the sea, ditches, drainage, etc where the offender could try to dispose of the evidence.

Visualization of Latent Fingerprints: 20 sets of each substrate i.e glass slide and aluminium foil containing latent fingerprints were immersed in 4 mediums. Each substrate was taken and sprayed with SPR formulation every day till viable results were available. The SPR was allowed for 1 min to react with the wetted latent fingerprint, which was then washed with distilled water to remove excess reagent then dried for photography. The composition of the developing reagent was tested under laboratory conditions. The shelf life of regent was observed to be about 52 days.

Results
The fingerprint score was accessed using (Soltyszewski et al. 2007) fingerprint quality assessment scale [11]. Fig-1 showcased the score with respect to the quality of fingerprints obtained. As evident from the observations, among all the mediums the best results were obtained in muddy medium on by aluminium foil followed by a glass slide. The SPR based reagent gave results on glass slide up to 5 days and on aluminium foil 8 days though a significant decline in quality of fingerprints was observed due to deposition of mud on print in subsequent days. The shelf life of SPR reagent was observed to be 52 days.
Simulated Sea water

Graph-1 shows very good quality fingerprints up to 3 days on aluminium foil followed by good quality fingerprints up to 5th day. Poor quality fingerprints were observed on the 6th to 7th day. On 8th-day bad quality fingerprints were observed followed by blur fingerprints on 10 and 11th day of observation. No fingerprints were observed on the 12th day.

Fig 1- Quality of Fingerprints depicted grade wise (a) Grade 5 (very good quality) (b) Grade 4 (Good quality) (c) Grade 3 (Poor quality) (d) Grade 2 (Bad quality) (e) Grade 1 (Blur quality)
On the glass substrate, high-quality marks were developed up to 2nd day of submersion in the medium. Poor to bad quality marks were obtained from 3rd to 4th day of submersion and blur fingerprints were observed between 5th day onwards until day 8. No fingerprints were observed on 9th day.

Salty water has a destructive effect on the quality of fingerprints due to its salinity thus the quality of fingerprint declined rapidly with an increasing period of submersion. So clear ridge density can be observed till day 5 in case of aluminium and day 2 in case of the glass substrate.

**Simulated Lake water Acidic**

Graph- 2 shows very good quality fingerprints were developed on aluminium foil up to 5 days of submersion, followed by the good quality on day 6th, poor quality on day 7 and blur fingerprints were obtained on day 8. No fingerprints were observed on the 9th day onwards.
On glass slide very good quality was developed up to 2 days of submersion in the medium and poor and bad quality fingerprints were developed between 3rd – 4th days. Blur fingerprints were recorded on the 5th -6th day. After 6th day no fingerprint visualization was observed. The quality of the fingerprints declined significantly with an increasing period of submersion because of the destructive effect of acid. Aluminium showed good viable results till day 6 in contrast to the glass substrate which showed comparable fingerprints only up to 2nd day of observation.

Simulated Lake water Basic

Graph-3 shows blur fingerprint Visualization up to 3 days of submersion and it was recorded that the aluminum foil degraded in the medium because of the corrosive action of NaOH.

![Graph 3- Developed fingerprint quality index depicted till day 11 on aluminium and glass surfaces submerged in simulated basic lake water](image)

Good quality fingerprints were obtained up to the 4th day of submersion followed by the good quality on the 5th day. Poor and bad quality fingerprints were observed on the 6th to 7th day. Very blur fingerprints were observed on the 7th day. Afterward, no fingerprint Visualization was possible. On the glass surface, high-quality fingerprints were obtained up to 4th days of submersion. No comparable fingerprints could be obtained on aluminium foil.

Pond water

Graph-4 shows the comparative analysis of fingerprints concerning the number of days successful Visualization of the latent fingerprint was observed. Out of the four mediums, pond water submerged latent fingerprints on aluminium substrate showed very good quality fingerprints up to 5 consecutive days, followed by good quality fingerprints up to 9th day and 10th day showed poor quality fingerprint. Although fingerprints got developed on 11th and 12th day yet very bad quality was observed. In the case of glass substrate high-quality fingerprints were observed up to 4th day, 5th-day good quality a shown in Fig-9 followed by 6th-8th day poor quality fingerprints were observed. Very blur fingerprints were observed on 10 and 11 days, yet on 12th day no fingerprint was observed.
Graph 4- Developed fingerprint quality index depicted till day 11 on aluminium and glass surfaces submerged in Pond water

SPR reagent on aluminium foil gave high quality marks up to 8th days as shown in fig and

Glass surface gave fairly good results up to 4th days as shown in Fig-1 with clear distinct ridges and medium quality marks were obtained from 6-8 days.

**Discussion**

The present examination uncovered the possibility of developing scores 4 and 5 quality fingerprints from submerged substrates. Usually, the weapon of crime is disposed of in nearby water bodies in order to destroy the possibility of identification. (Soltyszewski et al., 2007). In this present work, an SPR based reagent has been used to develop latent fingermarks on non-porous substrates soaked in a different medium, (muddy water, salty water medium, acidic medium and basic medium). As evident from the observations, among all the mediums the best results were obtained in pond water from aluminium foil followed by a glass slide. The SPR based reagent gave good quality results on glass slide up to 5 days and on aluminium foil 8 days. Afterward, though a significant decline in the quality of fingerprints was observed due to the deposition of mud on print in subsequent days.

As the time-lapse increased, the quality of latent fingerprints developed with SPR decreased. It may be because of the degradation of fatty deposits on latent fingerprints with a persistent stay in the water (Cadd et al., 2015). Basically in the SPR method lipid components of latent fingerprints are utilized to develop visualized fingerprints (Girod et al., 2012). The small particles of charcoal in the presence of surfactant is adsorbed on the fatty residues of latent prints thus visualizing latent prints, with time these deposits deteriorate thus resulting in bad quality fingerprints. Soltyszewski et al., 2007 used different methods to visualize latent fingerprints on submerged surfaces. This study utilized aluminum powder, ferromagnetic powder, and superglue fuming for the development of fingerprints with aluminum. On glass slides submerged in river, sea, tap, or distilled water and still alike inferences were drawn regarding the relationship between submersion time and quality of developed fingerprint despite the method used. The study also mentioned the significance of temperature as decreased temperature resulted in good quality fingerprints for a longer period of time.

Trapecar 2012 conducted a similar study on glass and metal substrates submerged in stagnant water with aluminum powder, ferromagnetic powder, and CA, the study concluded cyanoacrylate fuming as the best method for fingerprint visualization. In contrast to Trapecar 2012, the present study showed charcoal-based small particle reagent is the best method for visualization.
of fingerprints on aluminium and glass substrates submerged in pond water. The nature of water has a direct effect on the development process of fingerprints, concerning different substrates. Highly saline water causes serious damage to latent fingerprints which can be inferred from the quality of the prints developed. In the present study, good quality prints were observed up to day 5 on the aluminium substrate in comparison to the glass which showed good results only for two days.

Conclusion

The likelihood of developing latent fingerprints on submerged surfaces has been validated in the present research study with activated charcoal-based Small particle reagent. The study validated the relationship of time-lapse and quality of fingerprints, as with increasing time duration the quality of fingerprints deteriorates. The best results for a longer duration were observed on pond water. The acidic and basic medium lake water showed mixed results and suggested a straight association between the substrate on which latent fingerprint is being developed and the pH of the water. With increasing pH, the clarity of fingerprints on aluminium foil decreases, in contrast to that, with decreasing pH quality of latent fingerprint visualization increases. The results suggested the positive visualization of sebaceous-rich marks in comparison to eccrine-rich marks and studies also revealed the clarity of marks is directly correlated to the time since submersion and type of substrate on which latent fingerprints are present.

Ethical Clearance- Not required

Source of Funding- Self

Conflict of Interest- Nill

References


GC-MS Analysis of Methanol Extracts of Five Toxic Plant Seed For Detection of Bioactive Compounds

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Abstract

The present work was carried out to explore the qualitative analysis of bioactive phyto-constituents present in methanolic extracts of five toxic plant seeds by using gas chromatography-mass spectrometry. The analysis of extracts revealed the presence of the different biologically active compounds including alkaloids, glycosides, flavonoids, phenols, fatty acid, ester, epoxide, steroids, and protein etc. Forensic toxicological chemistry deals with the chemistry and analysis of various types of poisons including plants. Diagnosing plant poisoning especially their seeds can be difficult and must be quickly done. In conclusion, the recovery of various toxic and therapeutically constituents could be helpful for forensic toxicologist.

Keywords: GC-MS, plant extracts, NIST, formulation

Introduction

Being habitat of wide diversity of traditional herb and herbal products, India is rightly called as the botanical garden of the world. There are approximately 4,00,000 species of vascular plants be present on the Earth. They produce thousands of metabolites but actual composition, function and supplementary other utility of many such phytochemicals are yet to be investigated. Phytochemicals are plant produced chemical compounds that are generally helpful against various types of pathogens. Some of these can act as poison be used as poisons whereas others for medicinal purpose. Plants synthesize a wide variety of medically (antibacterial and antifungal etc) important chemical compounds, which are classified as primary metabolites and secondary metabolites. They also show a number of protective functions for human consumers. These bioactive constituents may also act as cardiotoxic and neurotoxic on human beings and livestock. In the last few decades, the GC-MS has been considered one of the most efficient, easiest and fastest technique to identify the bioactive constituents in both plant and non-plant species. The analyses of bioactive constituents in plant material can play an important role in the development, modernization and quality control of herbal formulations. Considering a valuable addition to plant sciences and pharmacology, the current study was attempted to generate GC-MS based database of photochemicals in methanolic extract of seed of samples of Thevetia neriifolia, Jatropha curcus, Abrus precatorius, Datura inoxia, and Ricinus communis from Rohtak district of Haryana, India. This study is supposed to be a valuable addition to the literature based on the GC-MS analysis of bioactive compounds in toxic plant seed.

Materials and Methods

Collection and identification of plants: Five toxic plant seed samples of i.e. Thevetia neriifolia, Jatropha curcus, Abrus precatorius, Datura inoxia, and Ricinus communis, were collected during July- October 2018 from Rohtak district of Haryana. These plants were identified as based on their morphological features as well as molecular signature by using ITS marker in cases of Thevetia neriifolia (Accession No MH777018), Jatropha curcus (MH923185), Abrus precatorius (MH756599), Datura inoxia (MH762134) and by using rbcL marker Ricinus communis (Accession No-MK672874). All voucher specimens were deposited in the forensic chemical laboratory of the Department of Genetics, M.D. University Rohtak, Haryana (India).
Preparing of Extracts: All the seed samples of these toxic plants was washed individually with running water and left to dry at room temperature for about a week. Seeds were crushed to powder form and about 60 gram was extracted in 200 ml methanol in Soxhlet apparatus at a temperature of 60ºC. Extracts were evaporated to dryness in rotary evaporator and stored at 4ºC for further analysis.

**GC-MS of Extracts**

Phytochemical analysis of five toxic plant seed extracts was carried out using a GC-MS analyzer (BRUKER SCION 436-GC SQ). Extracts were dissolved in methanol (GC grade) and filtered through Whatman TM filter device, pore size 0.2 µm. Helium (99.99%) was used as a carrier gas, at a flow rate of 1 ml per minute in split mode. Restek Rtx®-5 capillary columns (Crossbond® 5% diphenyl/95% dimethyl polysiloxane) with 30 m length, 0.25 µm df and 0.25 mm ID column was used for separation of phytochemicals. Exactly 2 µL of the sample was injected in a column. The injector temperature was 280ºC. Oven temperature started at 70ºC and held for 2 min and then was raised at a rate of 70ºC per minute up to 320ºC; hold for 1 min. The temperature of ion sources was maintained at 250ºC. The mass spectrum obtained by electron ionization at 70eV and detector operates in scan mode 30 to 500 Da atomic units. Total running time was 30 min including 3 min solvent delay.

**Results and Discussion**

Results of many phytochemical compound in the seeds of Thevetia neriifolia, Datura inoxia, Abrus precatorius, Jatropha curcus, and Ricinus communis (Figure 1-5). The interpretation of mass spectra identified bioactive compounds by using the database of the National Institute of Standards and Technology (NIST) installed in GC-MS library.
Figure 2: Datura inoxia

Figure 3: Abrus precatorius

Figure 4: Jatropha curcus
GC-MS revealed several bioactive compounds in plant seeds materials some of which were used for therapeutic purposes. These bioactive compounds included 9,12-Octadecadienoic acid, ethyl ester (linoleic acid) having a properties of hypocholesterolemic, 5-alpha reductase inhibitor, antihistaminic, insectifuge, anti-eczemic, and anti-acne), antimicrobial properties has been reported of compound 4H-Pyran-4-one, 2,3-dihydro-3,5-dihydroxy, benzaldehyde, 4-Hydroxy-3-Methoxy, dodecanoic acid, octadecanoic acid. Some compounds like tetradeanoic acid hexadecanoic acid, methyl ester and n-Hexadecanoic acid having properties of antioxidant, cancer-preventing, nematicide, larvicidal and repellent activity, pesticide antiandrogenic, hemolytic and antifungal 8-11. Some of the compounds detected by GC-MS of plant extracts were, 3-Butanedione synonym diacetyl /di methylglyoxal potential toxic organic compound. It has been associated with several diseases includes Crohn’s disease, bronchiolitis obliterans, ulcerative colitis, nonalcoholic fatty liver disease, inborn metabolic disorders (celiac disease). All of this toxicity, this compound has been commonly used as a flavoring agent in artificial butter, and dairy fermented products at the current level in beverages (5 ppm) and food (50 ppm). 12. Literature reported various health issues with 2, 3-butanedione monoxime compound when it enters especially a concern when entering the central nervous system then increase blood pressure with increased heart rate as a result of cardiac arrest 13. Another important compound has detected 2(3H)-Furanone, 5-methyl which is a lactone (Butenolides) category commonly used in antimicrobial, antiproliferative, anti-inflammatory activities 14. Besides these therapeutic activities, a toxicological profile had been found in the case of Sesquiterpene lactones which induce toxic syndrome when it directs contact of the dermis in human and non-human 15. Dodecene compound shows toxicity at a high concentration that irritates eyes, nose, throats, and CNS depression when ingested or inhale had reported 16. A toxicity relevancy data of 2-Pentanone, 4-hydroxy-4-methyl with direct contact may cause sensation of pain, slight dizziness, burning, and itching irritation, by inhalation irritation, by inhalation neurological effects, and strong odor sensation reported 17-21. Literature had mentioned another saturated fatty acid such as myristic acid/1-tetradecanoic acid components of phospholipids of the plasma membrane, so even a small quantity of fatty acid is lost as a cell sloughing 22. The acute toxicity of myristic acid has been found in rats with the lethal dose > 5g/kg b.w. 11-12. Literature observed when it administered in a higher dose, the sign of toxicity had been observed such as depression, excessive salivation and serosanguineous discharge from the muzzle and eyes 22. In 1998, JEFCA released a current safety intake value of 1.2 µg/kg b.w./ day in the USA and 2.6 µg/kg b.w./day in Europe.

Misidentification of the nature of compounds that produce some toxicity reported in earlier investigation, most of the secondary metabolites synthesize in plants yielded toxicity in various ways including pyrrolizidine alkaloids, some unusual amino acids (canavanine...
and azetidine-2 carboxylic acid) and some analogs of these amino acid such as arginine and proline which is non-protein amino-acids that included into proteins but are present as free forms or act as protective defensive substance\(^5\). Phorbol esters are a tetracyclic diterpenoid that generally role to promote the action of diacylglycerol, tumor activities and also play a role of protein kinase activator which regulates different signal transduction pathways and other cellular metabolic activities discussed in\(^23\). Octadecanoic acid synonym stearic acid is a long-chain fatty acid with 18 carbon backbones. At high concentration of stearic acid gave a direct correlation to plasma cholesterol and fibrinogen that more promote thrombogenesis than oleic acid. Hence mortality caused due to cardiomyocyte which is a concentration dependence manner\(^24-27\). Besides the toxicity of the steric acid, it is used as a flavoring agent safety issues at the current level intake of 31 \(\mu\)g/kg/day in U.S.A. and 0.97 \(\mu\)g/kg per day in Europe\(^28\). According to HSDB online lauric or dodecanoic acid, a short-chain saturated fatty acid at dose 4.64 and 10.0 \(\mu\)g/kg in mice observed depression, mucoid diarrhea, excessive salivation, oily, unkempt fur and serosanguineous discharge from the muzzle and eyes\(^17\). Beside toxicity, lauric acid is in detergent and flavor purpose but it is quite safe to use 21 \(\mu\)g/kg b.w. per day in the USA and 9.9 \(\mu\)g/kg body weights per day in Europe\(^28\). Oleic acid is a C18 cis-monounsaturated fatty acid. It is highly absorbed and stored into adipose tissues or undergoes \(\beta\)-oxidation. For oleic acid catabolism, an additional isomerization pathway is required. It is mainly transported via the lymphatic system and it is reported that oleic acid can also penetrate the skin of rats. Since oleic acid is highly absorbed, it is poorly excreted\(^2\), \(\text{LD}_50\) in a rat of 74 \(\text{g/kg}\)\(^{21}\). Administration of oleic acid to rats up to 21.5 \(\text{mL/kg}\) caused neither deaths nor gross lesions at necropsy. However, signs of toxicity, including depression, excessive salivation, diarrhea and serosanguineous discharge from the muzzle and eyes, could be observed\(^29\). Rats that received a cream formulation containing 5 % oleic acid at the dose of 5 \(\text{mL/kg}\), showed weakness and colored urines and feces\(^30\). Another important fatty acid, 2-octanone produced from castor oil through a cracking process. During the process of cracking the ricinoleic acid is cut in two molecules: sebacic acid and 2-octanol Soluble in a most organic solvent or as a raw material as flavoring and fragrance purposes, paint coating, inks adhesives, lubricant, and fuels. Volatile compound combustible, by inhaling cause cough and sour throat, dry skin, red eyes, by ingestion feeling in burning sensation\(^31\). Literature mentioned castor oil contains 90% ricinoleic acid and their acute toxicity 0.3-3 \(\text{mg/animal}\) in guinea pigs which showed pro-inflammatory effects\(^32\). A case of allergy due to the presence of propylene glycol ricinoleate in lipstick has reported in the literature. In this case, the main constituents of allergy were confirmed by the positive reaction with a patch test to ester gum and ricinoleic acid presence in the lipstick sample. On the other hand, ricinoleic acid and 12-hydroxystearic acid are being to be considered the main constituents of allergens in hydrogenated castor oil and castor oil, some impurities might be risky and reason for definite allergens\(^33\). Methyl Hexyl Ketone form of colorless transparent liquid derived from castor oil by oxidation of nitric acid 2octanol to 2-octanone followed by further oxidation to a carboxylic acid\(^34\). This compound showed low toxicity when it directs contact with skin may cause defatting and irritation of the skin, by inhalation, may produce mild symptoms of eye, nose, and throat. Besides this toxicity, literature reported various application of esters in cosmetics, lubricants, food flavoring, fragrance and detergents, etc\(^35-36\). 

### Conclusion

Present work generated a data of bioactive constituents detected by GC-MS in of five toxic plant seeds. The study reports presence of some important components could be useful for the researcher working in the fields of pharmaceutical industries, environment science, and toxicology sciences including forensic toxicology.

**Acknowledgment:** Acknowledgment: We are thankful to the faculty of Aryabhata Central Instrumental Laboratory, M.D.University, Rohtak for analyzing the samples by using GC-MS.

**Author Contributions:** Equal contribution of all the authors in analysis and interpretations.

**Funding Information:** No Funding was received for this study.

**Conflicts of Interest:** No conflict of interest.

**Ethical Clearance:** No ethical issues involved as the study was analytical and did not violent any ethical principles.
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Psycho Social Factors in Adolescent Suicides- A Psychological Autopsy based Study

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Abstract

BACKGROUND: Suicides among adolescents in India have become an alarming problem, especially among students. This study is to find out the recent and remote psychosocial and disease related stress and adverse life events that could have led these young people to commit suicide.MATERIAL AND METHODS: It is a Cross sectional study on adolescent suicides with history and postmortem findings being consistent with suicideconducted at Department of Forensic Medicine, Government Medical College, Kozhikode, Kerala state .FINDINGS: Informants of 55 cases were interviewed with the help of questionnaire. Most of the suicide victims belonged to upper middle class category. Maximum number of suicidal deaths are seen in victims having 1 sibling, living in a nuclear family. History of suicidal deaths among the family members of the suicide victim is seen in 7 out of 55 cases. Mood of maximum number of cases before the suicide attempt in the recent past, say 2 weeks, was depressed. Maximum number of suicide attempts were seen in the evening, mostly after the school and college working hours. Academic performance of 40.0% cases was average. 10.9% were socially isolated. 14.5% had a history of previous suicide attempt. 14.5% had shown anger, aggression and impulsivity in the recent past, say 2 weeks. CONCLUSION: The main purpose of this study is to find out the stressors that could have led these adolescents to commit suicide and to suggest a few strategies to prevent the suicides in the future.

Keywords: Adolescents, suicide, depression, psychosocial stressors, psychological autopsy.

Background

Adolescence is the transitional phase of growth and development between childhood and adulthood. Adolescent suicides in India have become an alarming problem, especially among students. Severe competition and fierce expectation from the parents, teachers, family and friends have created an enormous stress on them. Psychological autopsy studies have been used to construct an overall view of suicide by collecting all available relevant information on the victim’s life preceding his or her death.

The present study is about suicidal deaths among adolescents (aged 10 to 19 years) and pattern of life events preceding their deaths. This study is to find out the recent and remote psychosocial and disease related stress and adverse life events that could have led these young people to commit suicide and to suggest a few suicide prevention strategies.

Material and Method

It is a Cross sectional study on dead bodies in the age group between 10 to 19 years of both sexes with history and postmortem findings being consistent with suicideconducted at Department of Forensic Medicine, Government Medical College, Kozhikode, Kerala state during one year (1st June 2017 to 31st May 2018). To find out the life events and stressors preceding the suicide, the person(s) and the policemen/ the Investigating Officer, who accompany the dead body are interviewed first. If they are not aware of the circumstances, then the contact number and residential address of the any of the victim’s parents, spouse, close friends, close relatives or colleagues are collected and interviewed later with the help of questionnaire.

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Findings

Informants of 55 cases were interviewed. Data were analysed using SPSS-18 software and the results are as follows.

Table 1: Socioeconomic status:

<table>
<thead>
<tr>
<th>Socioeconomic class</th>
<th>Number of suicides</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper class</td>
<td>4</td>
<td>7.3</td>
</tr>
<tr>
<td>Upper middle class</td>
<td>19</td>
<td>34.5</td>
</tr>
<tr>
<td>Lower middle class</td>
<td>15</td>
<td>27.3</td>
</tr>
<tr>
<td>Lower class</td>
<td>17</td>
<td>30.9</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Most of the suicide victims belonged to upper middle class category, accounting for 34.5% (19 out of 45 cases), followed by lower class category accounting for 30.9% (17 out of 55 cases) and lower middle class category accounting for 27.3% (15 out of 55 cases). Least number of suicidal deaths belonged to upper socioeconomic status, accounting for 7.3% (4 out of 55 cases).

Table 2: Number of siblings:

<table>
<thead>
<tr>
<th>Number of siblings</th>
<th>Number of suicides</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3</td>
<td>5.5</td>
</tr>
<tr>
<td>1</td>
<td>27</td>
<td>49.1</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
<td>36.4</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>7.3</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>1.8</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Maximum number of suicidal deaths are seen in victims having 1 sibling, accounting for 49.1% (27 out of 55 cases) and all those who had 1 sibling was living in a nuclear family, followed by victims having 2 siblings, accounting for 36.4% (20 out of 55 cases). Least number of suicides were seen in victims who have 3 or more siblings and those who live in joint family.

Table 3: Mood before suicide:

<table>
<thead>
<tr>
<th>Mood</th>
<th>Number of suicides</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>No significant change</td>
<td>24</td>
<td>43.6</td>
</tr>
<tr>
<td>Elevated</td>
<td>3</td>
<td>5.5</td>
</tr>
<tr>
<td>Depressed</td>
<td>28</td>
<td>50.9</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Mood of maximum number of cases before the suicide attempt in the recent past, say 2 weeks, were depressed. 28 out of 55 suicide victims had depressed mood, accounting for 50.96%. Elevated mood in the recent past was seen in 3 out of 55 cases, accounting for 5.5%. 24 out of 55 cases did not show any significant mood changes, accounting for 43.6%.

Table 4: Time of suicide attempt:

<table>
<thead>
<tr>
<th>Time</th>
<th>Number of suicides</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.00am-06.00am</td>
<td>2</td>
<td>3.6</td>
</tr>
<tr>
<td>06.01am-12.00noon</td>
<td>13</td>
<td>23.6</td>
</tr>
<tr>
<td>12.01noon-06.00pm</td>
<td>18</td>
<td>32.7</td>
</tr>
<tr>
<td>06.01pm-12.00am</td>
<td>19</td>
<td>34.5</td>
</tr>
<tr>
<td>Unknown</td>
<td>3</td>
<td>5.5</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Maximum number of suicide attempts were seen in the evening (from 06.01 pm to 12.00 am), mostly

Suicides in relatives who were living with the deceased (family members):

History of suicidal deaths among the family members of the suicide victim is seen in 7 out of 55 cases, accounting for 12.7%. Out of which, elder sibling (brother) of 6 adolescents had committed suicide within the past 1 year. Father of 1 adolescent female committed suicide by hanging 1 year back.
after the school and college working hours (19 out of 55 suicide attempts, accounting for 34.5%), followed by afternoon from 12.01 pm to 06.00 pm (18 out of 55 cases, accounting for 32.7%). 13 out of 55 cases accounting for 23.6% attempted suicide in the morning from 06.01 am to 12.00 am, accounting for 23.6%. 2 out 55 cases, accounting for 3.6% had attempted suicide in the early morning from 12.01 am to 06.00 am. The time of suicide attempt was unknown in 3 out of 55 cases, accounting for 5.5%.

**Table 5: Academic performance:**

<table>
<thead>
<tr>
<th>Academic performance</th>
<th>Number of suicides</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>13</td>
<td>23.6</td>
</tr>
<tr>
<td>Average</td>
<td>22</td>
<td>40.0</td>
</tr>
<tr>
<td>Poor</td>
<td>20</td>
<td>36.4</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Academic performance of 22 out of 55 cases was average, accounting for 40.0%, followed by poor academic performance in 20 out of 55 cases, accounting for 36.4% and good academic performance was seen in 13 out of 55 cases, accounting for 23.6%.

**Mental illness:**

4 out of 55 cases were been diagnosed to have depression and were on treatment, accounting for 7.3% of suicides. One of them was under irregular treatment.

**Table 6: Social isolation:**

<table>
<thead>
<tr>
<th>Present</th>
<th>Number of suicides</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>6</td>
<td>10.9</td>
</tr>
<tr>
<td>No</td>
<td>49</td>
<td>89.1</td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>100.0</td>
</tr>
</tbody>
</table>

6 out of 55 cases, accounting for 10.9% were socially isolated. Among these, one of the victims’ parents got divorced and were living separately; another one of the victims’ parents were working in different districts of Kerala and was under the care of grandfather. Other 4 victim’s fathers were working in Gulf Countries and were under their mother’s care. All 6 of them were school students with history of reduced rapport with their friends.

Death of family member, friend or relative during the past 1 year:

History of death of family member, friend or relative, during the past 1 year was seen in 10 out of 55 cases, accounting for 18.2% of suicides. 1 Close friend of 6 victims died during the past 1 year, out of which 4 of them committed suicide and 2 died in a road traffic accident. 1 Elder brother of 2 suicide victims committed suicide within the past 1 year. 54 Elder sister of one suicide victim died due to septic abortion within the past 1 year. Father of 1 of the suicide victims died following acute myocardial infarction within the past 1 year.

Expressing suicidal ideation verbally:

12 out of 55 suicide victims had expressed their suicidal ideation to any one of their family members or friends, within the past 1 month, accounting for 21.8% of suicides.

Previous suicide attempt:

8 out of 55 cases, accounting for 14.5% had a history of previous suicide attempt.

Subjects showing Anger, aggression, and impulsivity in the recent past:

8 out of 55 cases, accounting for 14.5% had shown anger, aggression and impulsivity in the recent past, say 2 weeks.

Discussion:

In this study, contrary to previous studies most of the adolescents who committed suicide, belonged to upper middle class category, accounting for 34.5% (19 out of 45 cases). In a previous Indian study, Low socioeconomic status was reported in 50 to 66% of suicide victims. A study at a tertiary care hospital in India among children and adolescents revealed that most of the suicide attempters were females (60.4%), from nuclear family, middle socioeconomic status and Hindu by religion. Maximum number of suicidal deaths are seen in adolescents having 1 sibling, accounting for 49.1% (27 out of 55 cases) and all those who had 1 sibling were living in a nuclear family.

In this study, relatives of 2 out of 55 suicide victims had significant psychiatric illness, accounting for 3.6%. The mother of both of these suicide victims had depression and they were on treatment. Suicidal
behaviour is highly familial. Relatives of persons who committed suicide are more likely to commit suicide. But results of adoption studies suggest that genetic factors are the determinants of familial concordance for suicidal behaviour. History of suicidal deaths among the family members of the suicide victim is seen in 7 out of 55 cases, accounting for 12.7%.

Mood of maximum number of adolescents before committing suicide was depressed in the recent past, say 2 weeks. 28 out of 55 suicide victims had depressed mood, accounting for 50.96%. There are studies which state that most of the suicide victims would have got depression in the recent past and they would have felt hopeless and many have a comorbid substance abuse or personality disorder. Maximum number of suicide attempts were seen in the evening (from 06.01 pm to 12.00 am), mostly after the school and college working hours (19 out of 55 suicide attempts, accounting for 34.5%). This is similar to a previous study, which states, majority of the young people who attempt suicide were females (81.6%), who attempted suicide between evening and midnight. Academic performance of 22 out of 55 cases was average, accounting for 40.0%. Only a few studies on Indian adolescents are available regarding the association of academic difficulty with suicidal ideation. They show that adolescents face multiple stressors such as criticism from the parents, teachers, peers, interpersonal problems, high parental expectations and academic worries. These stressors are not only faced by adolescents with academic difficulty but also by academically achieving adolescents.

4 out of 55 cases had history of depression and were on treatment, accounting for 7.3% of suicides. One of them was under irregular treatment. Depression is one of the most important predictors of suicide attempt. In a study conducted among 6 primary care settings including public and private in Kerala revealed an overall prevalence of 27.2% of depression and was higher in women. Past suicide attempt was identified in 6.9% of all out patients; higher in women than in men. Among the patients diagnosed to have depression, 21.3% had previously attempted suicide. 6 out of 55 cases, accounting for 10.9% were socially isolated. Previous studies state, two factors, namely social capital and social cohesion are very important in the development of adolescents. Studies have found that when adolescents have lower levels of social cohesion, they report poor mental status, higher crimes including suicides, homicides and even sex offences. In this study, history of death of family member, friend or relative, during the past 1 year, was seen in 10 out of 55 cases, accounting for 18.2% of suicides. In a previous American study, the logistic regression analyses indicated that family history of suicidality increased the risk of suicidal ideation and suicide attempts in children by 1.4 to 2.7%. Also, the offspring of parents who died by suicide, accidents and natural deaths showed higher rates of major depression and the children of suicide victims showed a higher rate of alcohol or substance abuse disorders. The level of complicated grief was higher in youth whose parents died through accidents than in those whose parents died by sudden natural death.

In this study, 12 out of 55 suicide victims had expressed their suicidal ideation to any one of their family members or friends, accounting for 21.8% of suicides. Previous studies state, Communication of suicidal intent is an event that often precedes suicidal behaviour (Robins et al. 1959, Barraclough et al. 1974, Kovacs et al., 1976, Wolk - Wasserman 1986, Isometsa et al. 1994, Handwerk et al., 1998, Zhou & Jia, 2012). It was evident that approximately half of the suicidal victims (48.8%) had verbally expressed their suicidal feelings to at least one of their family members. 8 out of 55 cases, accounting for 14.5% had a history of previous suicide attempt. A study found out that 5.1% of suicidal victims had actually attempted suicide, more in females than in males. Another study at Bangalore revealed that 7.69% of children had a history of previous suicide attempt. Suicide attempts in adolescents are at least twice as common in females than males. In this study, 8 out of 55 cases, accounting for 14.5% had shown anger, aggression and impulsivity in the recent past, say 2 weeks. The impulsive-aggressive behaviour is a high risk factor for suicide among adolescents. Adolescents with aggression and conduct disorders may be suicidal even in the absence of depression (Brent et al., 1993). Impulsivity increased the risk of suicide in the presence of negative life events. Higher impulsivity is more dangerous in young people.

**Conclusion**

The main purpose of this study is to find out the stressors that could have led these adolescents to commit suicide and to suggest a few strategies to prevent the suicides in the future. Family discord, poor communication, disagreements, lack of cohesive values and goals, and irregular routines and activities are common in suicidal children and adolescents who often
feel isolated within the family. Family intervention aims to decrease such problems, improve family problem-solving and conflict resolution, and thereby reducing the suicide among adolescents. Psychoeducational approaches can help parents clarify their understanding of childhood and adolescent suicidal behaviour, identify changes in mental state that may herald a repetition, and reduce the extent of expressed emotion or anger.

Conflict of Interest – Nil.

Source of Funding - Self

Ethical Clearance- Taken from Medical College Calicut, Institutional Ethics committee.

References


6. Maris et al, Comprehensive textbook of Suicidology, Gilford, 200), p.80, Table 3.6


Awareness of Most Commonly Used Drugs in Dentistry Inducing Teratogenic Effects among Dental Practitioners


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Abstract

Aim: The aim of the study was to assess the awareness of most commonly used drugs in dentistry inducing teratogenic effects, among dental practitioners. Birth defects may be caused by many factors such as physical conditions, teratogens, environmental exposures, genetic defects, etc., Although prescription drug use is common during pregnancy, the human teratogenic risks are undetermined for more than 90% drug treatments approved in the USA during the past decades. A particular birth defect may have its origins through multiple mechanisms and possible exposures including medications. A specific chemical process may result in different outcomes depending upon factors such as embryonic age at which a drug is administered, duration and dose of exposure and genetic susceptibility. Estimating the risk of fetal malformations attribute to the use of medications is difficult and perception of risk by health professionals will impact their counseling and treatment of patients. Pregnancy is a unique physiologic condition and importantly specific drugs like folic acid use may have several benefits for pregnant mother. The patient should maintain a good gynecologist-patient-Dentist communication. For example a woman with two spontaneous abortions would be expected to be skeptical of any drug therapy in her next pregnancy and by communicating this to physicians and respective clinician. She may influence the physician and dentist perception. The clinician should be aware of all the newer drugs and its teratogenic effects. For health professionals this includes awareness of specific drug information and sources that provide realistic descriptions of risk beyond product monographs. A greater focus on this aspect may act to balance Risk perceptions. Physicians and dentists need to weigh risks and benefits of drug prescribing to pregnant patients based on the available knowledge.

Keywords: Pregnancy, trimesters, medications, teratogenic effects, Dental practitioners.

Introduction

Pregnancy is a most important and special physiologic condition. The drug treatment and prescription of the drugs is a special concern in pregnancy because the physiology of the pregnancy affects the pharmacokinetics of the medications used[1]. Certain medications can reach the fetus and cause harm to the fetus[1]. Pain is a main symptom of the upcoming complexity. Relieving a pain of the patient is the main duty of the doctor. We shouldn’t ignore the patient just because the patient is pregnant. The complete ignorance of pharmacological treatment in pregnancy is not possible because some women enter pregnancy with certain medical conditions that requires episodic treatment[1]. Management of pregnant women in dental office is challenging. The clinician should know the proper prescription and should give proper treatment according to their medical history and trimester[1]. In pregnancy, drug treatment presents a special concern due to the threat of potential teratogenic effects of the drug that causes damage to the fetus[1,2]. History dates back, pregnant woman who ingested thalidomide gave birth to children with phocomelia, but the same drug is now being used for several oro-erosive lesions. After all these dangerous events happened in 1979[1,2]. Food And Drug Administration developed a system that determined the teratogenic risk of drugs by considering quality of data from clinical and human studies, the pregnancy categories are A,B,C,D, X[1]. The dentist should be aware of prescribing the drugs to the pregnant woman is a prime concern[1,2,3,]. The patient should maintain good gynecologist-patient-Dentist communication. The communication helps to avoid more problems and that could enhance effective treatment.
Materials and Methods

A questionnaire based study was conducted in about 60 dental practitioners who had clinical experience of over 10 years. The study was conducted with their complete concern knowledge. The questions were got approved from the department of oral medicine and radiology- Thai moogambigai dental college and hospital. All practitioners in this study completed a paper based questionnaire consisting of 10 questions with 4 options. The questionnaire was printed and distributed to Thai moogambigai dental college practitioners and Maduravoyal dental practitioners. In this study 35 female practitioners and 25 male practitioners were participated. Particularly 47 specialized practitioners and 13 general practitioners. This study was conducted in practitioners who had clinical experience over 10 years of general and specialized. It excludes fresh practitioners and practitioners who had less than 10 years of clinical experience. The subjects were briefed about the study and informed consent obtained from them. Ethical committee approval was obtained from the university. First part of the questionnaire consists of demographic details of subject’s age, gender, clinical experience, and qualification. The questions in the questionnaire were designed to assess their knowledge. The data were analyzed using the excel 2013 software.

Results

![Figure 1](image1)

![Figure 2](image2)

![Figure 3](image3)
To question number 1, among 60 dental practitioners, 83.3% of the responders give their answer as don’t know whereas 16.6% responders are aware that Mepivacaine induced fetal bradycardia. To question number 2, among 60 dental practitioners, 78.3% practitioners prescribed Acetaminophen to pregnant women. To question number 3, among 60 dental practitioners, 20% of the practitioners are not prescribing Thalidomide to their pregnant patients. To question number 4, among 60 dental practitioners, 91.6% of practitioners do not prescribe opioids to their patients since it can cause severe teratogenicity and neonatal abstinence syndrome. To question number 5, among 60 dental practitioners, 78.3% of the practitioners didn’t prescribe Prilocaine to their patients, because it can induce methemoglobinemia. To question number 6, among 60 dental practitioners, 91.6% of the practitioners prescribed Amoxicillin to their patients. In human studies amoxicillin didn’t show any teratogenic effects. To question number 7, among 60 practitioners, 93.3% are not prescribing Aspirin to their patients, because it can cause serious teratogenic effect which is premature closure of ductus arteriosus. To question number 8, among 60 practitioners, 86.6% practitioners are not prescribing Ciprofloxacin to their patients, because it can induce fetal hepatotoxicity. To question number 9, among 60 practitioners, 61.6% of the practitioners are not prescribing Fluconazole to their patients because it can cause teratogenic effects. To question number 10 among 60 practitioners, 90% of the practitioners do not prescribe nitrous oxide sedation to their patients as it can cause serious birth defects and spontaneous abortions.

### Discussion

Pregnancy and child birth is one of the most beautiful phases a women goes through. Although being a wonderful phase, a woman has to go through a lot of discomfort and pain. As it is a physiologic journey, other concerns of pain also affects the individual like tooth ache etc., Hence when a pregnant women comes for a treatment not only the discomfort should be eliminated, it should be eliminated without causing any harm to the fetus. Mepivacaine and Bupivacaine are considered in category C and should not be used during pregnancy. Both have shown to cause fetal bradycardia and embryocidal effects at early stages in the gestational period. According to the recent study 83.3% of the practitioners given their answer as don’t know to the question “does mepivacaine induce fetal bradycardia?”. Drugs like Thalidomide has caused a huge disaster past causing phocomelia and hence its usage with pregnant women has stopped by 20% practitioners. Opioids can cause neonatal abstinence syndrome, hence 91.6% of the practitioners do not prescribe opioids to their patients. Prilocaine is not used frequently due to its association with methemoglobinemia-induced fetal hypoxia and hence 78.33% of the practitioners didn’t use prilocaine to their patients. Amoxicillin is considered as the safest antibiotic and hence 91.6% of the practitioners prescribe amoxicillin to their patients. Aspirin and other salicylate group cause delay in sort of labor, premature closure of ductus arteriosus, jaundice etc., According to the recent study 93.3% of the practitioners do not prescribe Aspirin to their patients. In albino rat study, Ciprofloxacin showed spontaneous abortion. In human study, Ciprofloxacin crosses the placenta and concentrates in amniotic fluid which leads to fetal hepatotoxicity. Hence 86.6% practitioners do not prescribe Ciprofloxacin to their patients. Antifungal drugs like Fluconazole and Ketoconazole cause birth defects. According to the gynecological study, 2% of the fetus presents with neural tube defects, so 61.6% of the practitioners do not prescribe Fluconazole to their patients. Use of Nitrous oxide sedation is very dangerous to pregnant women and it also causes abortions, hence 90% of the practitioners are not recommending nitrous oxide sedation to their pregnant patients.
Conclusion

The results of this survey showed an acceptable level of awareness about drugs that inducing teratogenic effects among dental practitioners. It also showed that clinician should know about all the newer drugs and its significance. The outstanding nature of physiology of pregnancy presents challenges for pharmaceutical treatment for acute and chronic as well as oral problems and the pain management of many complains associated with pregnancy. From the clinician to till the pharmacist should have responsibility to prescribe drugs to pregnant woman because fetal safety is most important one. The drugs termed as over the counter (OTC) should be avoided during pregnancy and the clinicians also not recommend that drugs to pregnant woman. As Dentist part, relieving tooth pain and any other oral pain is mandatory one. The clinician should know the newer drugs and its teratogenic effects. This all can improve clinical practice among dental practitioners.

Conflict of Interest: There are no conflicts of interest.

Source of Funding: Self–sourcing.

Ethical Clearance: Ethical committee approval is obtained from the university (DR.MGR EDUCATIONAL AND RESEARCH INSTITUTE, MADURAVOYAL CHENNAI. )

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Awareness of Oral Hygiene Aids among General Population

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Abstract

Background: The objective of this study was to assess the knowledge of oral hygiene aids among general population.

Method: The study was conducted on general population in and around Chennai. A total of 100 members were selected and self-assessed questionnaire was formulated to assess the awareness on oral hygiene aids.

Result: About 72% of the population are aware of the commonly available oral hygiene aids; 42% population used tooth paste and brush as a method of cleaning their teeth; 50% brushed once daily; 51% used soft brushes to brush; 54% of the population change their brushes only after 6 months; 44% followed circular motion to brush their teeth; 43% don’t use mouthwash; 49% of population media is the source of information; about 83% of population know the importance of oral hygiene.

Conclusion: The present study shows better knowledge and awareness of oral hygiene aids but the oral hygiene practice seemed to be non-satisfactory. The awareness regarding the usage of oral hygiene aids, indicates that a mass educative programme should be conducted among the general population.

Keywords: Prevention, Health care, Medical care, Interdental aids, Oral hygiene.

Introduction

Oral diseases including dental caries, and periodontal diseases which can be prevented through a professional self-care activity which plays an important role in prevention of oral diseases(1). Oral health care practices have been proved to be an effective preventive measure for maintaining good oral health as part of general health. The use of oral hygiene aids may improve tooth cleaning effectiveness provided that cleaning is sufficiently through and performed at appropriate intervals.(2) Patients comply better with oral health care regimens when informed and positively reinforced. Lack of information is among the reasons for non-adherence to oral hygiene practices.(3)

Prevention of oral disease can be achieved by optimizing the oral health practices in the form of proper tooth brushing, use of dental floss, dental visits at regular intervals, & proper dietary practices.(4) The understanding of actual practices in keeping the oral health at standard based on patients’ perceptions of oral health care is vital.(5)

Although many studies have been carried out from time to time to assess the knowledge and behaviour of people about oral health, there is still a death of education regarding the same especially for rural people, who make up for more than 70% of the population in India. Furthermore, even the people living in cities, in spite of having easy access to dental care, fall prey to dental diseases due to their negligence in dietary habits and unhealthy life-style.(6)

Hence this survey was aimed at assess knowledge, awareness on oral hygiene aids among general population.

Materials and Method

The study was conducted on general population in and around Chennai. A total of 100 members were
selected and self-assessed questionnaire was formulated to assess the awareness on oral hygiene aids. The structured questionnaire consisting of 10 question (Table 1), each having four option were administered to the participants. The data collected was analysed by statistical package for social science (spss inc., )

Simple descriptive statistics was used to describe the distribution of data. Chi square test were used to analyse the statistical significance.

**Result**

The results are summarizing responses to each 10 questions in the survey. Table 1 shows the questionnaire prepared for the study.

<table>
<thead>
<tr>
<th>Table 1 : Questionnaire</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What are the Oral Hygiene Aids You were aware of?</td>
</tr>
<tr>
<td>2. What do you commonly use for oral hygiene practise?</td>
</tr>
<tr>
<td>3. How many times do you brush your teeth?</td>
</tr>
<tr>
<td>4. What type of brush do you use?</td>
</tr>
<tr>
<td>5. How much do you spend on brushing your teeth?</td>
</tr>
<tr>
<td>6. How often do you replace your tooth brush?</td>
</tr>
<tr>
<td>7. What technique do you use for brushing?</td>
</tr>
<tr>
<td>8. How frequently do you use mouthwash?</td>
</tr>
<tr>
<td>9. What are the important means of information about the available oral hygiene aids?</td>
</tr>
<tr>
<td>10. Are you aware about the importance of maintaining oral hygiene?</td>
</tr>
</tbody>
</table>

On evaluating the dental awareness, it revealed that

1. **What are the most common oral hygiene aids you are aware of?**

Among 100 participants, Majority of the participants (72%) have knowledge about commonly used oral hygiene aids like mouth wash, dental floss, and interdental brushes. 18% of participants are aware of mouth wash, 7% of participants are aware of interdental brushes, 3% of participants on dental floss..

2. **What do you commonly use for oral hygiene practice?**

Among 100 participants, most of them (42%) of participants use Tooth Brush and tooth paste, 32% of participants use Tooth brush tooth paste and mouthwash, 23% of participants use Tooth brush, Tooth paste, Mouthwash, Dental floss & 1% of participants use Tooth paste, Tooth brush, Mouth wash, Dental floss.

3. **How many times you brush your teeth?**

Among 100 participants, 50% of participants brush their teeth once daily, 49% of participants brush their teeth twice daily, 1% of participants brush their teeth randomly.

4. **What type of brushes do you use?**

Among 100 participants, a higher proportion 51% of participants preferred to use soft brush, 38% of participant’s preferred medium brush, 9% of participants never noticed, 2% of participants used hard brush.
5. **How much time do you spend on brushing your teeth?**

Among 100 participants, 59% of participants brush their teeth more than 1 min, 19% of participants brush their teeth less than 5 mins, 18% of participants brush their teeth less than 1 min, 4% of participants brush more than 5 mins.

6. **How often do you replace your tooth brush?**

Among 100 participants, 54% of participants replace their tooth brush once in 6 months, 39% of participants replace their tooth brush once when the bristles begin to fray, 5% of participants replace their tooth brush once when the color of bristles changes, 2% of participants replace their tooth brush once in a year.

7. **What technique do you use for brushing?**

Regarding brushing technique among 100 participants, 44% of participants use circular motion for brushing, 24% of participants use random motion for brushing, 19% of participants use vertical motion for brushing, and 13% of participants use horizontal brushing.

8. **How frequently do you use mouthwash?**

Among 100 participants, 43% of participants never used mouthwash in their lifetime, 38% used mouthwash once daily, 14% of participants used mouthwash twice daily, 5% of participants use after every meal.

9. **What are the important means of information about the available oral hygiene aids?**

Among 100 participants, 49% of participants get information through media, 30% of participants get information through dental camps, 19% of participants through family members, 2% of participants through newspapers.

10. **Are you aware about the importance of oral hygiene?**

Among 100 participants, 83% of participants answered yes, regarding the awareness on oral hygiene, & 17 % answered may be, regarding they might know about the importance of oral hygiene.

**Discussion**

Oral Diseases are a major public health concern owing to their higher prevalence and their effects on the individual’s quality of life. According to the World Health Organization (WHO), “Promotion of oral health is a cost-effective strategy to reduce the burden of oral disease and maintain oral health and quality of life.”

For general awareness of Oral Hygiene Aids among general population, The survey was conducted among 100 participants in a general population. On comparison with previous survey articles, People who brush their teeth twice daily, 50% reported positive, which is higher than study conducted by Al-Johani. In the frequency of changing tooth brush, 54% of participants reported...
of changing brush every 6 months, where American Dental Association ADA recommends changing of tooth brush every 3-4 months. In our study, for source of information, the common information means is through media, which is most consistent with the study of Sharda et al. Participants relatively about 56% use improper brushing technique which is noted as a risky factor of developing gingival inflammation, but the result is identically lesser than previous study conducted by Zhu et al. The participants use oral mouthwash daily at a rate of 57% which is comparatively high related to the study of which is about 44%. Most of the people have a improper brushing pattern, where circular motion is commonly done at a rate of 44%, The most recommended among brushing technique.

Conclusion
Within the general categories of toothbrush, interdental aids and mouthwash, the choices can be over-whelming, because of the vast number of products available, it is important for the dentist to advice patients about what type of products to purchase, based on individual needs. There is need to educate people about the importance and usage of oral hygiene aids.

Our present study shows better knowledge and awareness of oral hygiene aids but the oral hygiene practice seemed to be non-satisfactory. The awareness regarding the usage of oral hygiene aids indicates that a mass educative programme should be conducted among the general population.

Conflict of Interest: There is no conflict of interest.

Source of Funding: Self financing source of funding is utilized in our article.

Ethical Clearance: Ethical committee approval was obtained from Dr. MGR Education and Research Institute (Deemed to be University), Maduravoyl, Tamilnadu, India.

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An Experimental Study to Assess the Effect of Disinfectants on the Shade Tab

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Abstract

Dentistry leaning towards esthetic restorations have made shade matching a crucial step in fabrication of restorations. It is important to ensure the restorations have the accurate shade, this warrants for a successful treatment. This study aims to evaluate the effect on the color of the shade tabs after disinfection. Shade tab guides from two different shade tabs were used and exposed to three different disinfectants. A Spectrophotometer analysis was done to check for the absorbance value after exposure to the disinfectants. The results showed maximum changes occurred after exposure to sodium hypochlorite. The changes observed increased with increase in the exposure time of the shade guides to the disinfectants. Thus, a standard protocol should be followed in clinics regarding disinfection of shade tabs and ensure a change in the shade guides after three to five years span.

Key words : Disinfection, Shade tab, Spectrophotometer, Absorbance value, Color

Introduction

Shade matching, a fundamental requirement in the fabrication of esthetic restorations depends on the observer completely which results in a successful treatment outcome. Most commonly used method of shade matching is still by comparing the shade tabs of commercially provided shade guides. Shade guides are non-invasive instruments, however, they may become contaminated with saliva during the process and appropriate decontamination procedures are recommended after each use. Disinfection of the shade guide holder or individual tabs is obligatory and any incorrect application will affect the physical and/or mechanical properties of materials undergoing disinfection.

Materials and Method

The Vitapan Classical Shade Guide used for shade matching of the Ceramic restorations and Esthete.x Shade Guide used for composite restorations were selected for use in the study because they are among the most widely used shade guides in Dentistry.

A total of 72 random samples, i.e, 36 shade tabs from Vitapan Classical Shade Guide and 36 shade tabs from Esthetex shade guide were selected. It was ensured to include all basic hues and a wide range of saturations and values.

The shade guide tabs were immersed in three commonly used disinfectants present in the Department such as Spirit (70% Isopropyl alcohol) (Advita lifesciences, India), 5.2 % Sodium hypochlorite (Vishal DentoCare Private Limited, India) and Novacide (3% w/v PHMB [poly(hexamethylenebiguanide) hydrochloride], 10% w/v DDAC (Didecyl dimethyl ammonium chloride) (Bioshields, India).

Shade tab guides, three each, were immersed in these disinfectants for various intervals such as Seven days, Ten days, 24 hours, Four hours. The duration of exposure to the disinfectant was calculated by an average level of exposure. In the department, as each shade tab is disinfected for 30 seconds three times a day. Using this frequency, it was estimated a four hour exposure was
equivalent to five months ten days exposure, 24 hours is approximately two years and eight months exposure likewise the estimate was calculated for exposure. In this study the maximum limit of exposure was approximately five years.

The solutions were replaced with fresh solutions everyday, as they get depleted with time.

Each solution along with the shade tab was placed in a plastic beaker with similar dimensions. Each beaker was marked so that it mentions the type of disinfectant present and duration of the exposure.

The spectrophotometric analysis was performed of the exposed shade tabs. Unexposed shade tab was used as a control for analysis. Before analysis each exposed shade tab was cleaned for 30 seconds under running water and 5mins in the ultrasonic cleaner to remove any residue of the disinfectant.

**Results and Discussion**

Currently, there has been an increase in knowledge and awareness among patients leading to rise in demand for esthetic restorations. Shade matching has now become a critical step and it should be followed with utmost care. According to American Dental Association (ADA), hospital level disinfectants which are tuberculocidal in nature should be used for decontamination protocol of the shade guide holder and individual tabs. Water based agents should be used as the organic agents have the tendency to dissolve the plastic.\(^1\)

The aim of this study is to investigate the effect of different disinfectants on the shade tabs exposed for different time periods.

The changes observed were expressed in terms of Absorbance value. Absorbance value is the measure of the quantity of light absorbed by a sample. Spectrophotometer passes a whole series of wavelengths of light and the difference in the light transmitted or absorbed is then evaluated. The change in absorbance value is a measure of change in the value of the shade tab guides.\(^2\)

Data between the groups were analysed using unpaired t tests. Within the groups were analysed using repeated measures ANOVA. If ANOVA was significant LSD multiple pairwise comparison tests were used. SPSS software was used to analyse the data. \(P<0.05\) was considered to be significant.

<table>
<thead>
<tr>
<th>Table 1 : Comparison within Composite Shade tabs exposed to Sodium hypochlorite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>4hrs</td>
</tr>
<tr>
<td>24hrs</td>
</tr>
<tr>
<td>7 days</td>
</tr>
<tr>
<td>15days</td>
</tr>
</tbody>
</table>

\(F= 51.849 \quad P=0.018\) sig

<table>
<thead>
<tr>
<th>Table 2 : Comparison within Composite Shade tab exposed to Novacide</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>4hrs</td>
</tr>
<tr>
<td>24hrs</td>
</tr>
<tr>
<td>7 days</td>
</tr>
<tr>
<td>15days</td>
</tr>
</tbody>
</table>

\(F=1.667 \quad P=0.326\)ns

<table>
<thead>
<tr>
<th>Table 3 : Comparison within Composite Shade tab exposed to Spirit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
</tr>
<tr>
<td>---------</td>
</tr>
<tr>
<td>4hrs</td>
</tr>
<tr>
<td>24hrs</td>
</tr>
<tr>
<td>7 days</td>
</tr>
<tr>
<td>15days</td>
</tr>
</tbody>
</table>

\(F=14.229 \quad P=0.058\) ns
Table 4: Comparison within Ceramic Shade tab exposed to Sodium hypochlorite

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>4hrs</td>
<td>.39067</td>
<td>.059248</td>
<td>3</td>
</tr>
<tr>
<td>24hrs</td>
<td>.10133</td>
<td>.041741</td>
<td>3</td>
</tr>
<tr>
<td>7 days</td>
<td>.73767</td>
<td>.138868</td>
<td>3</td>
</tr>
<tr>
<td>15days</td>
<td>.11667</td>
<td>.073569</td>
<td>3</td>
</tr>
</tbody>
</table>

F=28.73  P=0.031 sig

LSD multiple Pairwise Comparisons

<table>
<thead>
<tr>
<th>(I) factor1</th>
<th>(J) factor1</th>
<th>Mean Difference (I-J)</th>
<th>P</th>
<th>95% Confidence Interval for Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lower Bound</td>
<td>Upper Bound</td>
</tr>
<tr>
<td>4hr</td>
<td>24hrs</td>
<td>.289†</td>
<td>.038</td>
<td>.038 - .540</td>
</tr>
<tr>
<td>4hr</td>
<td>7 days</td>
<td>-.347†</td>
<td>.018</td>
<td>-.550 - .144</td>
</tr>
<tr>
<td>4hr</td>
<td>15 days</td>
<td>.274</td>
<td>.070</td>
<td>-.055 - .603</td>
</tr>
<tr>
<td>24hrs</td>
<td>7 days</td>
<td>-.636†</td>
<td>.026</td>
<td>-1.084 - .189</td>
</tr>
<tr>
<td>24hrs</td>
<td>15 days</td>
<td>-.015</td>
<td>.513</td>
<td>-.099 - .068</td>
</tr>
<tr>
<td>7 days</td>
<td>15 days</td>
<td>.621†</td>
<td>.036</td>
<td>.101 - 1.141</td>
</tr>
</tbody>
</table>

* The mean difference is significant at the .05 level.

Table 5: Comparison Within Ceramic Shade tab exposed to Novacide

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>4hrs</td>
<td>.38067</td>
<td>.034948</td>
<td>3</td>
</tr>
<tr>
<td>24hrs</td>
<td>1.04100</td>
<td>.882143</td>
<td>3</td>
</tr>
<tr>
<td>7 days</td>
<td>.28533</td>
<td>.141931</td>
<td>3</td>
</tr>
<tr>
<td>15days</td>
<td>.37833</td>
<td>.090224</td>
<td>3</td>
</tr>
</tbody>
</table>

F=2.208  P=0.275 ns
Table 6: Comparison within Ceramic Shade tab exposed to Spirit

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>4hrs</td>
<td>.99567</td>
<td>.793555</td>
<td>3</td>
</tr>
<tr>
<td>24hrs</td>
<td>.20433</td>
<td>.167527</td>
<td>3</td>
</tr>
<tr>
<td>7 days</td>
<td>.46000</td>
<td>.265684</td>
<td>3</td>
</tr>
<tr>
<td>15days</td>
<td>.06733</td>
<td>.042618</td>
<td>3</td>
</tr>
</tbody>
</table>

The results showed that on exposure to sodium hypochlorite, maximum change was seen in the absorbance value of the shade tab after 15 days exposure.

The changes observed with exposure to Novacide were also significant, although the effects were lower in comparison to Sodium hypochlorite.

Spirit (70% Ethyl Alcohol) did not cause any significant changes in the absorbance values. This is in contrast to the study done by Alshethri, who reported a greater color change in denture teeth treated with 70% alcohol. This difference can be attributed to the use of mixture of ethanol and isopropanol in the study.[3]

It was also observed that with an increase in the duration of exposure there was increase in the changes seen in the absorbance values, regardless to the disinfectant solution used.

Huang et al. (2014) conducted a study to evaluate the effect of different disinfectants on shade guides and concluded that there was significant difference in the color of the shade tabs. The difference observed was dependent on the type of disinfectant used. These findings were consistent with the findings of this study.[4]

According to Table 1-6, it was observed that more early and definite changes were seen in the composite shade tab in comparison to the ceramic shade tab. Similar changes were observed in the study conducted by Nijhawan et al. where they evaluated the effect of four disinfectants on the color of two different shade guides.[5]

Pohjola et al., evaluated standard shade guide for color change after disinfection in which they observed a statistically significant increase in the value and chroma of the shade tabs subjected to disinfection with Cavicide after 2 and 3 years of simulated treatment. Similar results in the measure of absorbance value were seen in the current study on exposure to Novacide.[6]

With respect to most of the studies performed prior the results were in approximation to the current study.

**Conclusion**

In this study following conclusions can be drawn:

- Regular disinfection after a period of three to five years of the shade tab guides has shown to cause change in the value leading to inaccuracies in the shade matching process.

In the current study, the exposure time and the type of disinfectant used are the factors attributing to the changes observed. With increased exposure to the disinfectant, amount of change in the absorbance value was more. The maximum changes observed was with exposure to 5.2% Sodium Hypochlorite. These changes will begin as early as two years of time span and will gradually reach to a higher level within a span of five years or more. Thus, it is recommended for the older shade tabs to be changed after a particular time so as to avoid inaccuracy in the shade matching procedure.

The material of the shade tab guides can affect the amount of change in the value. The observed changes in the absorbance value of the shade tabs were higher and detected earlier in the Composite shade tab in comparison to the Ceramic shade tab.

**Ethical Clearance** - Taken from ethical committee

**Conflict of Interest** – Nil

**Source of Funding** - Self

**References**


Radiological Study of Fusion of Tri-radiate Cartilage in hip bone in Bikaner Region in 14-22 Years Age Group

Mathur Indubala¹, Sajjad Hussain², Agrawal Anjali³, Sharma Yogesh⁴

¹Associate Professor & HOD, Department of Forensic medicine and Toxicology, PCMS & RC, Bhopal (MP), ²Assistant Professor, Department of Forensic medicine and Toxicology, PCMS & RC, Bhopal (MP), ³PG final year, Department of Forensic medicine and Toxicology, PCMS & RC, Bhopal (MP), ⁴Professor & HOD, Department of Forensic medicine and Toxicology, RNT Medical College and Hospital, Udaipur (Rajasthan)

Abstract

Correct age determination has of great importance in legal prosecution. The principle means, which enable one to form fairly accurate opinion about age of an individual, are general physical development, dentition, secondary sex characters and ossification of bones. Among them Radiological examination of ossification process is most accurate than any other method up to 25 years of age.

This study involves radiological examination of Pelvis (AP view) of 169 individuals for the study of age related appearance and fusion of ossification center of Tri-radiate cartilage in hip in the individuals of age group of 14-22 years of both male and female in S P Medical college, Bikaner, Rajasthan.

Keywords: Age Estimation, Tri-radiate cartilage, X- Rays.

Introduction

Estimation of reasonably accurate age, plays an important role in civil/criminal cases like personal identification, fixing of criminal responsibility, judicial punishment i.e. in cases of rape, kidnapping, criminal abortion, attempted or evident murder, theft, burglary, dacoity and in various schemes of Social Welfare department i.e. Employment, attainment of majority, marriage contract etc.

Various workers suggest that there is a variation in age estimation, not only in country to country but also in different states of India, so Survey Committee¹⁵ (1964) while reporting on medico legal practice in India has recommended to the government to encourage Zone wise study for the problem of determination of age.

Material and Method

This study is carried out in the Department of Forensic-Medicine and Toxicology in association with the department of radio-diagnosis S.P. Medical College and the group of Hospitals, Bikaner. The subjects are selected randomly from various schools, from neighborhood of various faculty members and staff as well as cases attending the OPD of the Forensic-Medicine Department of P.B.M. Hospital, Bikaner. The persons selected for study were grouped as per their stated age, viz:- 14-15 years, 15-16 years, 16-17 years, 17-18 years, 18-19 years, 19-20 years, 20-21 years and 21-22 years. Here age 14-15 years means person of 13 years or more but below 14 years. Age, as stated by them is further confirmed by secondary school certificate, any document reflecting their exact age or entry in their school record.

Selection Criteria for inclusion of person in present study:

1. They should be living in Bikaner region for more than 5 years.
2. They should be free from any physical disability or endocrinal anomaly.

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email id: ksid786hussain@gmail.com,
dr.ibmathur@gmail.com
3. Person should have accurate record of their date of birth.

4. Informed expressed verbal consent of the subjects was taken before proceeding to their physical, dental and radiological examination.

Radiological Criteria for epiphyseal fusion –

The union is taken as complete when the:

a) Diaphyseo-epiphyseal space is completely obliterated and become bony in architecture and density.

b) There is continuity of the periosteum between epiphysis and diaphysis with no notching at the periphery of epiphyseal line.

c) Presence or absence of epiphyseal scar (a white, transverse line) has been disregarded in this connection and considered as recent complete union.

For generalization, fusion in more than 75% cases is relied upon as complete fusion. Radiological data of appearance and fusion of ossification center of triradiate cartilage in hip were reduced to table, of various age groups. Data thus obtained finally, were analyzed and compared with published work of various Indian and foreign workers.

Observation

Table No. 1: Appearance and Fusion of the Centre of Triradiate Cartilage in Boys

<table>
<thead>
<tr>
<th>S. No</th>
<th>Age (yrs)</th>
<th>No. of Cases</th>
<th>Appearance</th>
<th>Partial Fusion</th>
<th>Fusion</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>1</td>
<td>12-13</td>
<td>12</td>
<td>11</td>
<td>91.67</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>13-14</td>
<td>9</td>
<td>7</td>
<td>77.78</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>14-15</td>
<td>7</td>
<td>7</td>
<td>100</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>15-16</td>
<td>10</td>
<td>10</td>
<td>100</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>16-17</td>
<td>17</td>
<td>17</td>
<td>100</td>
<td>2</td>
</tr>
<tr>
<td>6</td>
<td>17-18</td>
<td>25</td>
<td>25</td>
<td>100</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>18-19</td>
<td>19</td>
<td>19</td>
<td>100</td>
<td>1</td>
</tr>
<tr>
<td>8</td>
<td>19-20</td>
<td>10</td>
<td>10</td>
<td>100</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>20-21</td>
<td>11</td>
<td>11</td>
<td>100</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>21-22</td>
<td>12</td>
<td>12</td>
<td>100</td>
<td>-</td>
</tr>
</tbody>
</table>

In Boys - Table No. 1 shows appearance and fusion of ossification centre of tri-radiate cartilage in boys. The appearance of ossification centre of tri-radiate cartilage found in 91.67% of cases in 12-13 years, in 77.78% of cases in 13-14 years and in 100% of cases in 14-15 years age group and above. The complete fusion of the tri-radiate cartilage was observed earliest at the age of 15 year and 10 day in our study and found in 90% of case in 15-16 years of age group and in 100% cases in 19-20 years of age group and above. Average age of fusion of tri-radiate cartilage was observed at 15-16 years of age in our study. Age of oldest subject not showing complete fusion of tri-radiate cartilage was 18 years and 7 months in our study.
In Girls - Table No. 2 shows appearance and fusion of ossification centre of tri-radiate cartilage in girls. The appearance of ossification centre of tri-radiate cartilage was observed in 100% cases of 12-13 years age group and above. The complete fusion of the tri-radiate cartilage was observed earliest at the age of 15 year, 1 month and 1 day in our study. The complete fusion of the tri-radiate cartilage was observed in 100% of cases in age group 15-16 years and above. Average age of fusion of tri-radiate cartilage was observed 15-16 years of age in this study. Age of oldest subject not showing complete fusion of tri-radiate cartilage was 14 years, 8 months and 1 day in our study.

Discussion

In present study average age of fusion of tri-radiate cartilage was observed at 15-16 years of age in both male as well as female, which is consistent with the observation of the Nagi Abdul Wahab Abdulla et al (Yemen) as they observe that it is 15-16 years of age. The findings in our study are also consistent with the observation of the Alok Kumar et al (Kanpur) as they observe that it is 15 years of age. The findings in our study are consistent with the PC Dikshit, who stated that it is 15 years of age.

The finding in our study is slightly higher than the observation of study of Apurba Nandy that it is 14-15 years of age, finding of study by Pillai in Madrasian showed that age of fusion of Tri-radiate cartilage is 11-14 years of age which is far less than our present study’s finding and it is also higher than the age as stated by different authors of standard textbooks as VV Pillay and G Nagesh kumar Rao stated in their textbooks that it is 13-15 years of age, Krishan Vij stated that it is 11-14 years of age. and N.Reddy stated in his textbook that it is 14 years of age.

The finding in our study is slightly below than the age 16-17 years, as stated by authors of standard textbooks of anatomy as BD Chourasia.

But some of the studies also show variation in male and female as describes below:
In females - The findings in females, in our study is slightly higher than the observation of Galstaun \(^6\) (Bengal) as he observed that it is 14 years of age, Dharmesh Shilajiya \(^{14}\) et al in Gujarat that it is 14-15 years of age in female and also higher than the observation of Flecker \(^5\) (Australia), as he observed that it is 13 years of age in their studies. The finding in our study is slightly below than the age 16-17 years, as stated by authors of standard textbook of anatomy, Gray’s Anatomy \(^7\).

In Male: In present study we found the average age of fusion of tri-radiate cartilage was 15-16 years of age in male, which is consistent with the observation of Galstaun \(^6\) (Bengal) as he observe that it is 15-16 years of age in male and also consistent with the observation of Flecker \(^5\) (Australia), as he observe that it is 15 years of age and also it is consistent with the observation of the Davies & Parsons \(^3\) (England), as he observe that it is 16 years of age.

Dharmesh Shilajiya \(^{14}\) et al in Gujarat and Yatiraj Singi \(^{17}\) et al in their studies found the age of fusion of Tri-radiate cartilage is 16-17 years of age in male, which is slightly higher than the findings of our present study.

The finding in our study is slightly below than the age as stated by authors of standard textbook of anatomy, Gray’s Anatomy \(^7\) that it is 16-18 years of age.

**Conclusion**

Following conclusions are drawn from the present study that average age of fusion of tri-radiate cartilage in both boys as well as girls are 15-16 years of age in Bikaner region of Rajasthan.

Findings of our study are again giving the strength to the workers and Survey Committee \(^{15}\) report, as they suggest to the government to encourage Zone wise study for the problem of determination of age. This study is an attempt which may be a valuable aid to a forensic practitioner to give the approximate age certificate in medicolegal cases.

**Ethical Clearance**- Taken from Ethical committee of S.P. Medical College and Group of Hospitals, Bikaner Rajasthan.

**Source of Funding**- Self

**Conflict of Interest** – Nil

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**References**


Effects of Circuit Training Program on Quality of Life of Children with Hemophilia

Mandar Malawade¹, Amrutkuvar Rayjade¹, G. Varadharajulu²

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Abstract

Introduction: Circuit training addresses both the components of exercise i.e. strength and aerobic which can be administered to participants in a playful manner. As the large number of children will have to gather at one place for the intervention, so it will be beneficial for the therapist also to conduct the session by incorporating them into small groups. Very few have shown the effects of circuit training in hemophilia Therefore it becomes necessary to provide an exercise regimen to children which will be interesting to perform in order to improve their general fitness level.

Methodology: Forty nine participants were selected and screened and were allocated into 7 groups. The intervention was given for 4 weeks period, once a day for 7 min with 50 sec for exercise and 10 sec to move from one station to the next. Pre and Post parameters were assessed for VAS for fatigue and Subjective Exercise Experience Scale.

Results: Data was analyzed using Graph-Pad InStat software version-trial version 3.03. The statistical measures utilized were mean, standard deviation and test of significance such as Paired ‘t’ test to analyze the data. The results were concluded to be statistically significant with p <0.05 and highly significant with p < 0.01.

Conclusion: The present study concludes that the circuit training is effective in hemophilic children as its multipronged approach improves various body systems.

Key words: Haemophilia, Circuit training, Fatigue, Group Exercises, Physiotherapy

Introduction

The existence of life-long bleeding disorders and their familial occurrence was noted early by Alsaḥaravius during tenth century.¹ Bleeding disorders are due to either defects in the coagulation mechanism, the blood platelets, vitamin K deficiency or deficiency of clotting factor. Haemophilia is one of the bleeding disorders, has been recognized as a clinical entity since Biblical times.² Haemophilia is also known as ‘the royal disease’ as one famous carrier was Queen Victoria, Queen of England and Ireland, India who transmitted the condition to three of her children.³

Haemophilia has been recognized all over the world, an available estimate range for incidence of haemophilia is from 1 in 20,000 to as high as 1 in 10,000 persons.⁴⁵ It is an X-linked inherited recessive bleeding disorder that is characterized by a deficiency of clotting factor.⁶ Clotting factors are proteins in the blood that controls bleeding.⁷ Haemophilia is traditionally classified as ‘mild’, ‘moderate’, or ‘severe’, depending on the level of clotting factor available in the body compared with that found in the general population.⁸ Patients with severe haemophilia have <1% clotting factor activity, moderately affected patients have 1-5% and mildly affected patients have 6-40%.⁹

Wound bleeding is the characteristic symptoms of all haemophiliacs. It is usually slow and persists for days to weeks. Bleeding into joint may be spontaneous or induced by minor trauma. The earliest joint hemorrhages appear most commonly in knee and ankle, because of the lack of stability of these joints as the toddler assumes an upright posture. Other joints that may be
involved are the elbows, hips, wrists, shoulder and small joints of hand and feet. Prophylactic treatment with the use of coagulation factor is efficient in reducing bleeding episodes in haemophilic children. Frequent musculoskeletal bleedings ongoing in persons with haemophilia result in limitations and deficiencies of the musculoskeletal system, affecting the performance of daily living activities. Clinical manifestations may include pain, muscle atrophy, abnormal gait, haemarthrosis, reduced joint range of motion or even the development of degenerative alterations in joint. The damage resulting from haemarthrosis may cause periods of joint immobilization, tendon weakness, stiffness and joint destruction with a higher risk of fractures and osteoporosis.

Besides pharmacological treatment physiotherapy plays an important role in rehabilitation of haemophiles. Physical fitness is generally defined as ‘the ability to perform daily tasks without fatigue’. It is an umbrella term incorporating the characteristics of cardiovascular fitness, body compositions, flexibility, muscular strength and endurance. It is important for the individuals with haemophilia because their disabling condition itself may interfere with their activities like their ability to move efficiently. Benefits of regular physical exercise for haemophilic patients are numerous and cover various physical and psychosocial aspects. Physical benefits include improvement in range of motion of the joints, muscular strength protecting joint from injury. The psychosocial benefits include higher self-esteem and socialization which leads to a better quality of life. However physical activity has been linked to improving psychological conditions, such as limiting emotional distress and enhancing self-esteem. Therefore selecting appropriate exercises and fitness activities that are safe for people with hemophilia is essential.

Circuit training (CT) is a type of exercise which involves exercises to perform in a sequence in a circular manner and designed to improve cardiovascular fitness, muscular strength and endurance. It comprises both forms of exercises i.e. aerobic and resistance or strength training.

Circuit Training is a fun, cost and time effective way and able to be administered to large groups of individuals at the same time, while still being effective. There is some evidence to suggest that Circuit Training leads to positive changes in body composition, which also improves motor control and fundamental movement abilities. Development of such abilities at a young age may be beneficial in the long term. However, few studies have assessed the effects of Circuit Training on both physical fitness and movement abilities. Thus, the aim of the present study will be to determine the effectiveness of CT program on Fatigue level and Psychological well-being in children with haemophilia.

Procedure:

Forty nine participants were selected for the study. They were randomly allocated into 7 groups. Details about the study and intervention were explained to the participants and written informed consent was obtained. Demographic details of each participant were noted including clotting factor level. Participants were assessed pre and post data for Visual Analogue Scale for fatigue and Subjective Exercise Experience Scale.

The intervention was given once a day for 4 weeks period, once a day, for 7min with 50 sec for exercise and 10 sec to move from one station to the next in the form of Circuit Training. A demonstration was given to the participants to make them understand how to perform the exercises and how to move in the Circuit. Exercises were done with music for having effective and enjoyable. At a time only one group was given Circuit Training followed by other in a circular sequence. Each participant in the circle performed respective exercise recommended to them at that particular station.
Exercises for respective joints were the followings:

**Exercise for Shoulder joint:** Keep both the hands on shoulders of the same side. Move the shoulders in outward direction in a circular way simultaneously.

**Exercise for Elbow joint:** Stand facing the wall. Place hands flat on wall with arms straight. Lean body towards wall allowing elbow to bend. Return to upright position by pushing with arms and straightening the elbow.

**Exercise for wrist joint:** Place palm of hands together with finger straight (in a prayer position) while keeping the hands pressed flat together move both the wrists in extension alternately.

**Exercise for Hip joint:** Stand by facing the wall. Place both the hands on the wall for support. Extend the hip by keeping the knee straight. Perform the same for both the hips alternately.

**Exercise for Knee joint:** Stand with the weight evenly distributed on both feet. Squat down partway keeping weight distributed evenly on both feet. Do not bend knees far enough to cause pain. Hold for several seconds. Return to upright position.

**Exercise for Ankle joint:** Stand with both legs adequately wide apart. Place both palms of hands on wall for support. Do the dorsi-flexion and plantar-flexion alternately.

**Exercise for Trunk:** Keep both the hands on low back for the support and gently extend as much as possible. Then come back to upright position.

**Data Analysis:**

Data was analyzed using Graph-PadInstat software trial version 3.03. It was entered into an excel spreadsheet, tabulated and subjected to statistical analysis. The statistical measures utilized were mean, standard deviation (SD) and test of significance such as Paired ‘t’ test to analyze the data. Paired ‘t’ test was used to compare the differences of scores on pre and post intervention within a single group. The results were concluded to be statistically significant with p < 0.05 and highly significant with p < 0.01.

**Fatigue Score:**

The rates of perceived fatigue were assessed byVAS. The rating of fatigue scores were recorded on the scale. Paired ‘t’ test was used to compare score within the group. The pre-intervention average score of fatigue score in participants was 1.40 and post-intervention was 1.87. There was highly significant increment in fatigue score for the group after intervention.

<table>
<thead>
<tr>
<th>Fatigue Score</th>
<th>Mean + SD</th>
<th>Mean difference</th>
<th>‘t’ value</th>
<th>P value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.40 + 1.17</td>
<td>1.87 + 1.50</td>
<td>0.673±0.74</td>
<td>3.683</td>
<td>0.006</td>
</tr>
</tbody>
</table>

**Subjective Exercise Experience Scale (SEES):** Paired ‘t’ test was used to compare score within the group. The pre-intervention average score of Positive wellbeing in participants was 14.32 and post-intervention was 16.97. There was highly significant increment in Positive wellbeing score for the group after intervention.

The pre-intervention average score of Psychological Distress in participants was 7.14 and post-intervention was 4.83. There was highly significant reduction in Psychological distress for the group after intervention.

The pre-intervention average score of fatigue was 5.51 and post-intervention was 5.10. There was highly increment in positive wellbeing component as well as significant reduction Psychological distress component of SEES after intervention, whereas Fatigue component found to be significant.
Table 2: Comparison of pre and post intervention scores of SEES components

<table>
<thead>
<tr>
<th>SEES Components</th>
<th>PRE Mean ± SD</th>
<th>POST Mean ± SD</th>
<th>Mean Difference</th>
<th>‘t’ value</th>
<th>‘p’ value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive well being</td>
<td>14.32 ± 2.42</td>
<td>16.97 ± 2.17</td>
<td>2.65 ± 0.96</td>
<td>19.15</td>
<td>0.001</td>
<td>Highly significant</td>
</tr>
<tr>
<td>Psychological Distress</td>
<td>7.14 ± 1.39</td>
<td>4.83 ± 1.28</td>
<td>2.30 ± 0.821</td>
<td>19.64</td>
<td>0.001</td>
<td>Highly significant</td>
</tr>
<tr>
<td>Fatigue</td>
<td>5.51 ± 1.17</td>
<td>5.10 ± 1.18</td>
<td>0.93 ± 0.59</td>
<td>2.74</td>
<td>0.08</td>
<td>Significant</td>
</tr>
</tbody>
</table>

**Discussion**

The study was done to evaluate the effects of circuit training in Haemophilic Children. In children with Haemophilia reduced muscle strength and cardiovascular endurance are main contributing factors to have poor fitness level and reduced psychological wellbeing compared to typically developing peer which results because of fear of getting bleed.

Circuit Training showed good improvement in Positive wellbeing, reduced psychological distress and fatigue to some extent. Circuit training being multipronged in its approach addresses the improvement in various systems of body and even psychological aspects. CT program was specifically designed to provide variation and stimulation in order to maximally engage children and to ensure adherence and enjoyment, whilst achieving positive changes in health and fitness outcome measures. The effects seen in this study were due to gradual effects of exercise which imposes demands on the different systems of the body such as enhancement of oxygen delivery systems, expanded plasma volume, maximum minute ventilation and increased cellular enzyme activity.23, 24

Most of the haemophilic children are sedentary and having reduced physical activity. Therefore fatigue had set in early. In the present study there was significant difference fatigue score.

A pilot study was done to determine the effect of an acute bout of exercise on the subjective exercise experience of Vietnam Veterans, and to determine which exercise intervention results in the most positive acute outcome. Specifically, this study included the use of a combination of traditional exercise modes and innovative exercise. Overall this pilot study has demonstrated that an acute bout of exercise elicits improved positive wellbeing and reduced psychological distress, and therefore warrants further research with a larger cohort to determine which exercise intervention results in the most beneficial subjective experience. The identification of specific exercise interventions that elicit acute positive exercise experiences has important implications for long-term exercise adherence in at-risk populations.

In the present study there were significant differences in the components of Subjective Exercise Experience Scale (SEES) with increase in positive wellbeing. Psychological distress showed reduction in score after intervention, whereas fatigue component also showed significant difference.

A study has proved that a school-based CT program had beneficial effects on a range of fitness measures. These movement skills are helpful in ensuring good general posture, and effective movement in a variety of physical activities, sports and game play. For these reasons, and given its low cost and suitability for large groups, CT maybe a useful exercise method to adopt in schools. This is in accordance with the research studies, CT program on the health, fitness, physical activity levels, and movement competency in young children.25, 26
An overview of literature review concluded that aerobic and resistant training intervention elicits some benefits for physical fitness and blood coagulation mechanisms, suggesting the application of physical training as a non-pharmacological treatment in association with conventional treatment. Adequate and periodized resistance training considering the disease severity, accompanied by physical education professionals could improve muscle strength, balance and proprioception. Aerobic training could reduce the risks of obesity and several metabolic and cardiovascular diseases. Another review article concluded important evidence on the recommendation of physical exercise and sport in haemophilia, the consensus on its suitability for the physical and social wellbeing of the patients and the need to increase scientific works in this respect.27

Researchers analyzed the current state of management of haemophilia and to suggest a comprehensive concept of rational and effective rehabilitation of children with haemophilia. The study concluded that current rehabilitation care is of good quality and necessary for effective lifelong therapy of haemophilia.28

Thus many researchers have proved that for achieving general fitness and maintaining psychological wellbeing in haemophilic children, exercise regimen and physical activities contribute major role which occurs due to physiological changes in various systems of body in order to prepare the body to control the new imposed demands while performing the exercise and physical activities.

Conclusion

The present study concludes that the circuit training is effective in haemophilic children as its multipronged approach improves various body systems.

Ethical Clearance- Taken from Krishna Institute of Medical Science Ethical committee

Source of Funding- Self

Conflict of Interest - nil.

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Study of Pedestrian Injuries and Fatalities in Maharashtra Population

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Abstract

Background- Pedestrians are the common road users India, with increasing traffic on road has lead to injuries and fatalities. The incidences of fatalities are higher than drivers of four wheelers or motor cyclist.

Method- Out of 734 Injuries and 213 fatalities were recorded in medico-legal records. The causes, types of injuries age group, causes of fatalities were also studied.

Results- The major age group was between 10-20 had 210(28.6%) followed by age group 61-70 had 142(19.3%). The major history of pedestrian were 210(28.6%) alcoholic, followed by 173(23.5%) were busy in mobile speaking. The major fractures were 69(9.40%) fractions of sternum, 176(23.9%) fracture of skull. 185(25.2%) intra-cranial hemorrhage. The major causes of fatalities were hemorrhage and shock 138(64.7%), followed by head injuries57(26.7%).

Conclusion-

Key words:- Injuries, Fatalities, Medico-legal, Hemorrhage, Fractures

Introduction

Pedestrians are the common road users in India, with increasing traffic on roads has lead to major injuries and fatalities of pedestrians.1,2. The incidence of injuries and fatalities is significantly higher than in car occupants or motor cyclists in road accidents, which are further increasing at an alarming rate. The cause of pedestrian’s injuries and fatalities are bilateral. It includes role of, drivers, pedestrians, roadway and environment 3. Apart from this hurry to cross the roads, by both drivers and pedestrians is one of the major cause of pedestrian injuries and fatalities. Hence attempt was made to analyze the various causes, types of injuries and fatalities in pedestrians.

Material and Methods

734 injured pedestrian were brought to IIMS & R Warudi, Jalna (district) Maharashtra were studied out of 734, fatality was 213 pedestrian

Inclusive criteria- The criteria pedestrian of different age group 10 to 70 years old were selected for study. Majority of them were alcoholic, visually, mentally auditory challenged.

Exclusion criteria – The patients had an intention to commit suicide and reported in MLC report was excluded from the study.

Method- Pedestrians with injuries and fatalities in road accidents were brought to IIMS & R Warudi: Jalna (Dist) Maharashtra was studied. Out of 734 injuries 213(2.9%) had fatalities. Injuries of the different parts of body, fractures of skull, intracranial hemorrhage, fracture of long bones multiple trauma were studied from x-ray, USG, CT scan/MRI in injured pedestrian, medico-legal case reports, additional information was collected from relatives and police department. The
duration of the study was April 2016 to Dec-2018,

**Statistical analysis-** The different age groups, cause of pedestrian injury to viscera. Head injuries were classified with percentage. The ratio of male and females were 2:1

**Observation and Results**

**Table-1** – Study of different age groups of pedestrian injuries and fatalities 210 (28.6%) victims between 10-20 years of age, 129 (17.5%) victims were aged between 21-30 years, 77 (10.4%) victims were aged between 31-40 years 66 (8.99%) victims were aged between 41-50 years, 110 (14.9%) victims were aged between 51-60 years, 142 (19.3%) were aged between 61-70 years.

**Table-2** – History of the pedestrian injured and fatalities 210 (28.6%) were alcoholic, 89 (12.1%) had visual problems, 20 (2.72%) had auditory challenged, 173 (23.5%) were mentality challenged, 147 (20%) were busy in mobile speaking, 95 (12.9%) were playing on roadside.

**Table-3**- Study of injuries to pedestrian 69 (9.40%) had fractures of sternum, 16 (2.17%) had injury to heart, 48 (6.53%) had injury to lungs 6 (0.81%) had injury to Aorta, 15 (2.04%) had injury to stomach, 59 (8.03%) had injury to liver 24 (3.26%) had injury to spleen 3 (0.40%) had injury to kidney, 176 (23.9%) had fracture of skull, 185 (25.2%) had intra-cranial hemorrhage 62 (8.44%) had fracture of long bone, 71 (9.67%) had multiple fractures.

**Table-4** - Cause of fatalities in pedestrians- 57 (26.7%) death was due to head injuries and intra-cranial hemorrhage 138 (64.7%) deaths due to hemorrhage and shock 13 (6.10%) had septicemia, 5 (2.34%) had Uremia.

**Table-1: Study of different age groups of pedestrian injuries and fatalities**

(No of patients 734)

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Age Group</th>
<th>No. of Patients</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10-20</td>
<td>210</td>
<td>26.6</td>
</tr>
<tr>
<td>2</td>
<td>21-30</td>
<td>129</td>
<td>17.5</td>
</tr>
<tr>
<td>3</td>
<td>31-40</td>
<td>77</td>
<td>10.4</td>
</tr>
<tr>
<td>4</td>
<td>41-50</td>
<td>66</td>
<td>8.99</td>
</tr>
<tr>
<td>5</td>
<td>51-60</td>
<td>110</td>
<td>14.9</td>
</tr>
<tr>
<td>6</td>
<td>61-70</td>
<td>142</td>
<td>19.3</td>
</tr>
</tbody>
</table>

**Study of different age groups of pedestrian injuries and fatalities**
### Table-2: History of the pedestrian injured and fatalities

(No of patients 734)

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Particular</th>
<th>No. of Patients</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Alcoholic</td>
<td>210</td>
<td>28.6</td>
</tr>
<tr>
<td>2</td>
<td>Visual problem</td>
<td>89</td>
<td>12.1</td>
</tr>
<tr>
<td>3</td>
<td>Auditory problems</td>
<td>20</td>
<td>2.72</td>
</tr>
<tr>
<td>4</td>
<td>Mentally challenged</td>
<td>147</td>
<td>20</td>
</tr>
<tr>
<td>5</td>
<td>Busy in mobile speaking</td>
<td>173</td>
<td>23.5</td>
</tr>
<tr>
<td>6</td>
<td>Playing the road side</td>
<td>95</td>
<td>12.9</td>
</tr>
</tbody>
</table>

### Table-3: Study of injuries to pedestrian

(No of patients 734)

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Structure or organs injured</th>
<th>No. of Patients</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Fractures of sternum</td>
<td>69</td>
<td>9.40</td>
</tr>
<tr>
<td>2</td>
<td>Heart</td>
<td>16</td>
<td>2.17</td>
</tr>
<tr>
<td>3</td>
<td>Lungs</td>
<td>48</td>
<td>6.53</td>
</tr>
<tr>
<td>4</td>
<td>Aorta</td>
<td>06</td>
<td>0.81</td>
</tr>
<tr>
<td>5</td>
<td>Stomach</td>
<td>15</td>
<td>2.04</td>
</tr>
<tr>
<td>6</td>
<td>Liver</td>
<td>59</td>
<td>8.03</td>
</tr>
<tr>
<td>7</td>
<td>Spleen</td>
<td>24</td>
<td>3.26</td>
</tr>
<tr>
<td>8</td>
<td>Kidney</td>
<td>03</td>
<td>0.40</td>
</tr>
<tr>
<td>9</td>
<td>Fracture of skull</td>
<td>176</td>
<td>23.9</td>
</tr>
<tr>
<td>10</td>
<td>Intra Cranial hemorrhage</td>
<td>185</td>
<td>25.2</td>
</tr>
<tr>
<td>11</td>
<td>Fractures of long bones</td>
<td>62</td>
<td>8.44</td>
</tr>
<tr>
<td>12</td>
<td>Multiple fracture</td>
<td>71</td>
<td>9.67</td>
</tr>
</tbody>
</table>
Table-4: Cause of fatalities in pedestrians (No of patients 213)

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Cause of death</th>
<th>No. of Patients</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Head injuries and intracranial hemorrhage</td>
<td>57</td>
<td>26.7</td>
</tr>
<tr>
<td>2</td>
<td>Hemorrhage and shock</td>
<td>138</td>
<td>64.7</td>
</tr>
<tr>
<td>3</td>
<td>Septicemia</td>
<td>13</td>
<td>6.10</td>
</tr>
<tr>
<td>4</td>
<td>Uremia</td>
<td>15</td>
<td>2.34</td>
</tr>
</tbody>
</table>

Discussion

In the present study of pedestrian injuries and fatalities, of Maharashtra population. The age group study was- 210(28.6%) were between 10-20 years of age, 129(17.5%) were aged between 21-30 years, 77(10.4%) were aged between 31-40 years 66(8.99%) were aged between 41-50 years, 110(14.9%) were aged between 51-60 years, 142(19.3%) were aged between 61-70 years (Table-1). History of the pedestrian was 210(28.6%) were alcoholic,
89(12.1%) had visual problems, 20(2.72%) had auditory problems, 147(20%) were mentality challenged, 173(23%) were busy in mobile speaking, 95(12.9%) were playing on roadside (Table-2). The injuries to pedestrian 69 (9.40%) had fractures of sternum, 16(2.17%) had injury to heart, 48(6.53%) had injury to lungs, 6(0.81%) had injury to Aorta, 15(2.04%) had injury to stomach, 59(8.03%) had injury to liver 24(3.26%) had injury to spleen liver, 3(0.40%) had injury to kidney, 176(23.9%) had fracture of skull 185(25.2%) had intra-cranial hemorrhage 62 (8.44%) had fracture of long bone, 71(9.67%) had multiple fractures (Table-3). The cause of fatalities in pedestrians- 57 (26.7%) death was due to head injuries and intra-cranial hemorrhage 138(64.7%) deaths due to hemorrhage and shock 13 (6.10%) had septicemia, 5(2.34%) had Uremia (Table-4) These findings were more or less in agreement with previous studies4,5,6.

Pedestrian can be defined as a person on foot, walking running jogging, and hiking, sitting or lying down. Walking transport modes, where relatively unprotected road users interact with traffic of high speed and mass. This makes pedestrians vulnerable. They suffer the most severe consequences in collisions with other road users interact with traffic of high speed and mass. of the vehicle against him/her7. Collisions between pedestrians and bicyclist or motor vehicle are the major problems in the countries that are becoming motorized and high rates of walking and bicycling8. Pedestrians are commonly referred to as vulnerable road users because in collisions with motor vehicles the lack of protective structure and differences in mass height and make their injury susceptibility, protecting them is a challenge, because road infrastructure typically have built for motor vehicles with little attention to those that moving on foot who may wish to travel on or along side roads or cross them or change direction at intersections9.

The injuries and fatalities of the pedestrian can be divided into three phases (stages), pre-crash, crash and post crash, pre-crash is the phase of prevention. The crash phase is the traumatic event, that involves the exchange of energy or the kinematics (mechanics of energy). Lastly, the post crash in the phase of patients care10.

The pedestrian’s road crossing behavior has been explained in the terms of minimum gap acceptance value by using a rolling gap. The driver’s yielding this minimum gap acceptance plays vital role for pedestrian to escape from collusion which may cause injury or fatalities11. The pedestrian crossing or passing the unidentified or prohibited area may cause injuries and fatalities. Most of the pedestrian were impatient and could not wait for passage of trains, vehicles, Lorries etc, were more vulnerable to get injured and fatalities.

Summary and Conclusion

The present study of pedestrian injuries and fatalities highlights Causes and types of injuries and deaths. Moreover it is advocated that, wide, safe roads, deployment of more traffic police force, stringent punishment can mitigate such accidents. In addition to this awareness programs of traffic rules to both pedestrian and drivers will be more effective to control road accidents.

This research paper was approved by Ethical Committee of IIMS & R warudi, Badnapur (Tq) Jalna (dist) Maharashtra

- No Conflict of Interest

- No Funding

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Stress, Anger and Coping among Dental Students

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Abstract

Background: Medical course and dentistry have always been considered to be stressful to the students because of its depth, diversity and competitiveness. These are very extensive course spread 4 to 5 years in India. Stress sometimes can lead to anger, which cause even more stress. Prolonged stress and anger can take a toll on the students, both physically and emotionally. It is important to eliminate them by attempting control management and implication of positive coping strategies.

Aim: This study aims to investigate level and source of stress, anger, anxiety, depression and associated coping mechanisms among dental students.

Material and method: A link to an online questionnaires conducted through Surveymonkey was distributed among all third-year, fourth-year and final-year students.

Result: The first major stressor for the dental students was clinical requirements (61.3%) followed by patient’s behavior, peer pressure/competitiveness, education program and language barrier. Taking some time off to rest (20.3%), talking to a friend (%23.9) and listening to music (19%) were the most commonly reported coping mechanisms (Table 3).

Conclusion: The primary sources of stress as perceived by the dental students were peer pressure/competitiveness, patient’s behavior and clinical requirements. In the present study, female dental students reported higher stress levels and a wider range of coping than male students, hence a stress management program should be implemented that focusing towards dental students. The preventive and intervention must be sought and directed as this need early in the student years.

Keywords: Anger, dentistry, depression, pressure and stress

Introduction

Stress has a vast meaning which depending on different people under different situations. Claude Bernard first scientifically explained stress, about how cells and tissues respond to stress. They are surrounded by buffer system, ion concentration, gaseous exchange and other biochemical modalities in order to coordinate physiological process and establish homeostasis. Other Ancients such as Aristotle and Hippocrates were aware of the stress and its adverse effect but the most generic definition of stress was given by Hans Selye. Selye was the ‘father of stress’ and he defined stress as “a non-specific response of the body to any demand".¹

Dental course undoubtedly is stressful, extensive and exhaustive. Students commonly encounter numerous of stressor in the beginning of dental school life. The stress can be multifactorial, which is arising from academic and socio-cultural environment and social support issues. In addition, students in the health care field are

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more vulnerable to stress due to the high demand of their education, demanding workload and intense theoretical education. Also, they are facing additional challenges such as providing care and treatment for patients, which can cause harm if performed inappropriately. As a result, dental students are repeatedly going through pressure and stress and put them under risk for depression, burnout and anxiety problems.

Many studies have been conducted to investigate level and causes of stress and findings have shown high stress levels among dentists and physicians. Two similar studies reported 38% of dentists and 44% of doctors having high stress. Significantly, the putative causes of stress for these two professions are to be differing. Dentists’ most common stressors are associated with difficulty to interact with patients, practice management pressure and ability to maintain high level of focus during procedure; doctors are constantly stressed with job and patient demands, constant interruptions and work conflict interfere with family life. As for students of dentistry and medicine, studies have shown that most these students are engaging in destructive coping mechanisms. Murphy et al also stated that dental students surprisingly perceive higher level of stress than medical students.

**Anger And Depression In Dentistry**

Anger is generally believed as a maladaptive attempt or effort to overcome a stressful condition, which causing inner conflict and personal discomfort physically and emotionally. On the other hand, anger is also said as an adaptive venture to achieve obstructed goals and perceived threats. An unhealthy anger happens when it is suppressed and collectively resulting to anxiety and depression. In addition, prolonged anger and temper can cause damage to relationships, lead to irrational thinking among the society followed by unpleasant consequences. Most studies have found that students under anger management training exhibit great self-control along with reduced aggressive behavior and attitude in classes and at home.

Depression is an illness that can occur at the average of mid-20s, which often related with anxiety disorders. A major depression generally involves the body, mood and thoughts. The first approach of managing depression can be done with a consultation and physical examination with physicians. The choice of treatment depends on the solid cause of depression after evaluations. Psychological counseling, antidepressant medication, stress management and self-help are some of the necessary components in overcoming depression. Self-help or self-guided improvement is the best help, which people have to exert a strong willing to manage the illness. This study was carried out to investigate level and source of stress, anger, and anxiety and to see associated coping mechanisms among dental students.

**Material and Method**

This study was conducted among all third-year, fourth-year and final-year students of Saveetha Dental College, Saveetha Institute of Medical and Technical Sciences. Total participants of forty-four male and seventy female were involved and all the responses of the questionnaires were kept anonymous. Age ranged from 21 to 24 years.

A link to an online questionnaires conducted through Surveymonkey was distributed. The questionnaire contained 19 questions about level of stress, anxiety, anger, depression and coping mechanisms. Participation was voluntary and no concession was offered. Verbal informed consent was obtained before participation in the study.

The data was collected and analyzed using the descriptive statistics and comparisons made using the Chi-square test and level of significance was set at \( P < 0.05 \).

**Questionnaire design**

The questionnaire was based on the dental environment stress and was modified accordingly to suit the curriculum and grading system of Saveetha Dental College. The questionnaire was sectioned into demographic details, course-associated stress, enjoyment, feelings of stress, anxiety, anger and related behaviour and coping mechanisms.
Table 1: Year and gender of the study population

<table>
<thead>
<tr>
<th>Year of study</th>
<th>n</th>
<th>Gender</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Male</td>
<td>Female</td>
<td></td>
</tr>
<tr>
<td>Third years</td>
<td>40</td>
<td>15</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Final year</td>
<td>40</td>
<td>20</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Intern</td>
<td>34</td>
<td>13</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>114</td>
<td>48</td>
<td>66</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Stressors among respondents

<table>
<thead>
<tr>
<th>Stressor</th>
<th>No stress</th>
<th>Moderate stress</th>
<th>High stress</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td></td>
<td>n %</td>
<td>n %</td>
<td>n %</td>
</tr>
<tr>
<td>Education program</td>
<td>6 5.2</td>
<td>10 8.8</td>
<td>33 28.9</td>
</tr>
<tr>
<td>Language barrier</td>
<td>21 23.4</td>
<td>26 17.8</td>
<td>12 12.3</td>
</tr>
<tr>
<td>Patient’s behavior</td>
<td>2 1.8</td>
<td>2 1.8</td>
<td>24 21</td>
</tr>
<tr>
<td>Clinical requirements</td>
<td>1 0.9</td>
<td>3 2.7</td>
<td>12 10.5</td>
</tr>
<tr>
<td>Peer pressure/Competitiveness</td>
<td>4 3.5</td>
<td>5 4.4</td>
<td>19 9.4</td>
</tr>
</tbody>
</table>

Table 3: Management of stress/depression/anger/related behavior

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th></th>
<th>Female</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td></td>
<td>Frequency</td>
</tr>
<tr>
<td>Indulge in hobbies</td>
<td>21</td>
<td>6.8</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>Take some time off</td>
<td>36</td>
<td>11.8</td>
<td>26</td>
<td>7.9</td>
</tr>
<tr>
<td>Practice mindfulness</td>
<td>20</td>
<td>6.5</td>
<td>20</td>
<td>6.6</td>
</tr>
<tr>
<td>Listen to music</td>
<td>32</td>
<td>10.5</td>
<td>26</td>
<td>8.5</td>
</tr>
<tr>
<td>Exercise regularly</td>
<td>19</td>
<td>6.2</td>
<td>4</td>
<td>1.3</td>
</tr>
<tr>
<td>Manage time properly</td>
<td>6</td>
<td>1.9</td>
<td>8</td>
<td>2.6</td>
</tr>
<tr>
<td>Talk to a friend</td>
<td>24</td>
<td>7.9</td>
<td>49</td>
<td>16</td>
</tr>
</tbody>
</table>
Results and Discussion

This study investigated, compared reported stress levels and related behavior with the associated coping managements in three batches of dental students in Saveetha Dental College. Out of the 114 participants, 80 (70.2 %) were equally third and final year dental students and 34 (29.8 %) were the interns. Age range of the dental students was between 21 years and 24 years, and the mean age for all three years was 23.3 years.

Stress scores for each parameter per gender were summarized in Table 2. A definite relationship between gender and perceived sources of stress was observed; majority of female students were reported higher levels of stress than male students in any conditions. In the present study reported that students were most stressed about the patient’s behavior (45.6%) and clinical requirements (61.3%). A significantly greater proportion of (48 female) dental students reported feeling stressed on completing clinical requirements while 32 male students were highly stressful on the same. Language barrier was quoted as the least stressor among the students that 41.2 % of the dental students were not in pressure due to communication with patients. Only 37 (32.4%) of the students were moderately stress and 30 (26.4%) of them were highly stress on language barrier. 48 female students and 19 male students were moderately stressful while 17 female students and 21 male students were highly stress about the peer pressure or competitiveness with their batchmates. Same result was reported in the previous studies that students tended to have more stressed and pressured on items related to academic performance such as competition with peers and examinations and grades. This is also consistent with other studies, which showed that most of dental students had feeling pressure to compete with other students, which two-thirds of those reported associated with anger, anxiety and sadness. Also, one-fifth of the students lied about their grades to peers and parents.

Most respondents reported moderately stressful on the education program (28.9% equally on both gender). Only fewer students reported having more stressed on the education program (28.2%).

Taking some time off to rest (20.3%), talking to a friend (%23.9) and listening to music (19%) were the most commonly reported coping mechanisms (Table 3). There were closely followed by hobbies (11.5%) and practice mindfulness (19%). Strikingly, more than half of female students tended to talk about their stress and problems with the peers or friends. Resting and listening to music were highly reported in male students compared to female students. There was a statistically significant difference between genders, that 19 male students and only 4 female students were reported managing stress with exercising. Fewer dental students
(4.5%) reported being able to manage time properly as a means of coping. Previous studies reported majority of dental students preferred to rest, talk to people who care and indulge in hobbies. A minor population chose to spend their money, eating and consume medication as an alternative therapies. 15.3% of dental students and 19.5% of medical students were reported having some form of counseling or prescribed psychotropic medication during their studies. Prinz et al describes most students often manage their stress, anxiety, anger and depression by ‘active-functional coping’, which have been described as resting, talking to someone and social interactions. The students’ coping mechanisms were very similar to the findings of Ayers et al.

In the present study, just under one-third (35 students) were having trouble to control their anger and may have bad temper on occasional basis. On the other hand, two-thirds of the students often have trouble to sleep. Prabhu et al reported in his study that 70% of students had inclination of bad temper, with 3% of students said that they would ‘never’ suppress their anger and 62% of the students on the other hand chose to ‘occasional’ when it comes to tolerate their emotions. Potegal et al has pointed that anger episodes vary in duration and is confined to some factors such as its intensity, continued presence/absent of the offending person/object and mind of the person.

Overall, female dental students reported higher stress levels and a wider range of coping than male students, which are the strong cause for concern. Soh reported same finding that female students expressed a higher level of stress in dental training. Although that dentistry is a stressful profession, the findings are alarming. Detrimental emotions and adverse mental states among the students may lead to more serious problems as they progress into work force in future. It is very important to maintain stable mental health and well being, not only for their own good, but for the best interests of patients as well. This significantly emphasizes the needs of help in these areas and importance of self-care.

Conclusion

The primary sources of stress as perceived by the dental students were peer pressure/competitiveness, patient’s behavior and clinical requirements. In the present study, female dental students reported higher stress levels and a wider range of coping than male students, hence a stress management program should be implemented that focusing towards dental students. The preventive and intervention must be sought and directed as this need early in the student years. Also, future research is recommended to achieve a greater understanding of stress through dental education program.

Ethical Clearance – All datas were taken from students of Saveetha Dental College

Source of Funding – Saveetha Dental College

Conflict of Interest - Nil

References


Assessment of Salivary Flow Rate in Edentulous Patient

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Abstract

Background: Complete denture help to re-establish the occlusion and aesthetic to such extent it mimic the previously missing teeth and other features which may be lose over the time. In a complete denture wearer, saliva is responsible for the retention of the prosthesis due to its lubricating function. It also aid in integrity, adhesion and stabilisation of dentures in position after the placement. It act as interposed salivary film which allowed the prosthesis to lie on the film rather than on the bare mucosa. This would help to protect the tissues from the hydration and forces of the denture base that acting on it. Therefore, maintaining normal pH and salivary flow rate is required, in order to achieve a better retention of denture as well as good oral health.

Aim: To investigate the relationship between the salivary flow rate before and after the placement of complete denture.

Materials and Method: There were 15 participants in the age group of 55 to 70 years old, which required complete denture prosthesis for the first time. The unstimulated or resting whole saliva and stimulated whole saliva was collected by using spitting method. Saliva production was stimulated by chewing paraffin wax. The time taken for saliva collection of 5 mL was recorded by using stopwatch. The data obtained was analysed by using paired t-test.

Results: There was significant difference between the unstimulated whole salivary flow rate and stimulated whole salivary flow rate before the placement of the denture, which was by 0.20 mL/min. Whereas, the difference between the unstimulated whole salivary flow rate and stimulated whole salivary flow rate after the placement also show significant changes which was about 0.14 mL/min. Chewing of paraffin wax as well as placement of denture act as stimulatory agents in production of saliva.

Conclusion: Stimulated salivary flow rate were higher than the unstimulated salivary flow rate which obtained before and immediately after the placement of complete denture. There was significant differences of the salivary flow rate before and after the placement of denture.

Keywords: Salivary flow rate, complete denture, edentulous patient

Introduction

All part of oral cavity play a vital role in maintaining the function, environment and also the harmony of the mouth and body. They are responsible for the mastication, phonetics, nutrients supply to the body and even for aesthetic purpose. Among these parts, teeth is considered as the most important in contributing to all of this action and function. Hence, most individuals and also dentist are focusing more on maintaining and restoring the status health of the dentition. However, saliva also help teeth as lubricating agents to protect soft tissues and also maintaining a good oral health and function [¹]

In a completely edentulous individuals, complete denture is one of the mode of treatment in replacing
the missing teeth. This type of denture is usually a removable prosthesis, where it can be easily placed and removed from the oral cavity. Complete denture help to re-establish the occlusion and aesthetic to such extent it mimic the previously missing teeth and other features which may be lose over the time. In a complete denture wearer, saliva is responsible for the retention of the prosthesis due to its lubricating function [2].

It also aid in integrity, adhesion and stabilisation of dentures in position after the placement [3]. It act as interposed salivary film which allowed the prosthesis to lie on the film rather than on the bare mucosa. This would help to protect the tissues from the hydration and forces of the denture base that acting on it [4,5]. Therefore, maintaining normal pH and salivary flow rate is required, in order to achieve a better retention of denture as well as good oral health.

In addition to this, retention of denture not only depend upon the physical factors like atmospheric pressure, vacuum, adhesion, cohesion, wettability, surface tension and viscosity, but it also related to flow rate of saliva [6,7]. Reduced in salivary secretion will result to discomfort to the wearer with oral functional impairment and also affecting the quality of life of the denture wearers [8]. In most of the situations, as complete denture is usually given to elderly individuals, age also give an effect on the flow rate of saliva as well as the overall status of the tissues in the mouth [9].

Hence, the optimum salivary flow rate should be recorded before and after complete denture placement, as complete denture may affect the salivary flow rate. In fact, increased or decreased of the salivary flow rate also may cause alteration in the pH as we’ll as the environment of the oral cavity. Therefore, this study was conduct to investigate relationship between the salivary flow rate in complete denture patient.

**Materials and Method**

1.1 Sample selection

The participants of this study were consisted of 15 edentulous patients in the average age group of 55 years to 70 years old. The participants were complete edentulous patient and received their treatment in department of prosthodontics of Saveetha Dental College and Hospital. The participants were given information about the study and their consents were obtained.

1.2 Criteria of the sample selection

**Inclusion Criteria**

- Completely edentulous
- First time wearer
- Healthy individuals
- No smoking or chewing habits

**Exclusion Criteria**

- Partially edentulous
- History of wearing denture or prosthesis
- Having systemic disease like diabetes mellitus, xerostamia or hypertension
- Smoking or chewing habits

1.3 Materials and armamentarium

- Distilled water
- Paraffin wax
- Disposable glass
- Graduated measuring jar
- Stopwatch

1.4 Saliva collection

For this study, two types of saliva were collected which were resting or unstimulated whole saliva and stimulated whole saliva. Saliva samples were collected from each participants on two different conditions which were before denture placement and immediately after placement of denture, by asking the patients to spit into the disposable glass. During both occasions, both unstimulated and stimulated saliva was taken for measuring the salivary flow rate of the participants.

Initially, the participants were asked to be seated in dental chair comfortably in upright positions where head were tilted downward in order to avoid postural changes [4], as well as to enhance the accumulation of saliva inside of the mouth. The participants were asked to rinse their mouth with 5mL of distilled water for 10 seconds followed by spitting of the watered initial swallow. This was done in order to remove any food debris and other non salivary elements which may influences the stimulation of salivary flow or interfered
with the measurements of salivary flow rate[10].

Then the unstimulated whole saliva was collected inside the disposable glass until 5mL of saliva is collected. The time taken for collection of the saliva was measured by using the stopwatch. After completion of the collection of unstimulated saliva, participants were asked to chew the paraffin wax, to stimulate the production of whole saliva inside the mouth. Then, the saliva was collected similar as the unstimulated saliva method over a period of time.

This steps were repeated immediately after the placement of complete denture, to measure the flow rate of saliva. Both unstimulated as well as stimulated saliva was collected. The salivary flow rate was calculated based upon the saliva collection, over the time taken to obtained 5 mL of saliva and was expressed in unit of mL/min. The data was tabulated and analysed by using paired t-test method by using SPSS software.

Results

Based on the experiments, the salivary flow rate of stimulated whole saliva was higher than unstimulated saliva in both occasions, which were before and immediately after the placement of denture. The mean of salivary flow rate was the highest immediately after the placement of complete denture.

Based on Graph 1, there was significant difference between the unstimulated whole salivary flow rate and stimulated whole salivary flow rate before the placement of the denture, which was by 0.20 mL/min. Whereas, the difference between the unstimulated whole salivary flow rate and stimulated whole salivary flow rate after the placement also show significant changes which was about 0.14 mL/min. Chewing of paraffin wax as well as placement of denture act as stimulatory agents in production of saliva.

Graph 1: Salivary flow rate before and immediately after insertion
**Table 1: Mean, SD, paired t test and P values whole salivary flow rate.**

<table>
<thead>
<tr>
<th></th>
<th>Before placement of Complete denture</th>
<th>After placement of Complete denture</th>
<th>Difference between before and after placement of Complete denture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Resting (unstimulated) whole salivary flow (ml/min)</td>
<td>0.45</td>
<td>0.65</td>
<td>0.20</td>
</tr>
<tr>
<td>Mean</td>
<td>11.18</td>
<td>6.05</td>
<td>1.80</td>
</tr>
<tr>
<td>Standard deviation (SD)</td>
<td>1.84</td>
<td>0.66</td>
<td>0.10</td>
</tr>
<tr>
<td>Paired t test</td>
<td>( t(14) = -12.98 ) ( p &lt; 0.00 )</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stimulated whole salivary flow (ml/min)</td>
<td>0.83</td>
<td>0.97</td>
<td>0.14</td>
</tr>
<tr>
<td>Mean</td>
<td>7.64</td>
<td>5.14</td>
<td>0.60</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>0.49</td>
<td>0.72</td>
<td>0.14</td>
</tr>
<tr>
<td>Paired t test</td>
<td>( t(14) = -18.61 ) ( p &lt; 0.00 )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

Whole saliva is the mixture of secretion that enter the mouth in the absence of exogenous stimuli like chewing or talking. In general, unstimulated salivary flow rate can be defined as the salivary flow in absence of exogenous stimuli or pharmacological stimulation, while stimulate salivary flow rate is produced by the pharmacological stimulation or gustatory stimuli \(^{11}\). Production of saliva in oral cavity was produced through secretions from the salivary glands, mainly parotid, submandibular and sublingual salivary gland \(^{12}\). Average daily secretion of saliva in oral cavity is in a ranges of 500 to 700 mL \(^{13}\).

Submandibular and sublingual salivary glands are mainly responsible to produce saliva at rest in ranges between 0.25 to 0.35 mL/min. Whereas, on stimulation the secretion rate is about 1.5 mL/min \(^{14,15}\). There is significant difference in secretion of saliva at rest and also stimulation. This is similar to the result obtained in this study, where the unstimulated salivary rate was at minimal and stimulate salivary rate was at the highest is both conditions.

In this study spitting method was used to collect the saliva, which able to be applied in a normal condition and even in condition of low rate of salivary flow. Therefore, this method can be accepted and the most reproducible for the collection of saliva. Next, paraffin wax was used as stimuli to trigger or stimulate the secretion of saliva. This was done in order to mimic the masticatory process and also phonetics.

The results obtained in this study was similar to the study done by Muddugannadhar et al \(^{11}\) and Yurdukoru et al \(^{16}\). They stated that there was increased in the unstimulated saliva after the placement of denture. In Sonthalia, A et al study \(^{4}\), they stated that unmedicated group (healthy), mean salivary flow rate was high at 24 hours after denture insertion when compared to before denture insertion. This show that the Placement of the complete denture inside of the oral cavity also act as the mechanical stimuli to enhance the production of saliva, along with chewing of paraffin wax.

However, increased in the secretion of saliva also may be due to psychological effect of the participants due to their anxiety during the denture insertion and...
also due to anxiousness about the success rate of the treatment in placing their missing teeth. Increased in the production of saliva will help to in retention of the dentures they provide a better adhesion, cohesion and wettability between the denture and tissues. Thus, it help to prolong the span of denture and provide a good integrity and stability for the denture. In addition to this, if the denture wearer is having systemic disease like diabetes mellitus or xerostomia, the medication taken to treat this diseases may influenced the flow rate of saliva. Therefore, healthy individual was included as the inclusion criteria in this study.

**Conclusion**

Stimulated salivary flow rate were higher than the unstimulated salivary flow rate which obtained before and immediately after the placement of complete denture. There was significant differences of the salivary flow rate before and after the placement of denture.

**Ethical Clearance** - Not required

**Source of Funding** - Self

**Conflict of Interest** - Nil

**References**


Assessment of Pattern of Suicidal, Accidental and Homicidal Cases Along with the Sort of Poisoning in North Indian Population

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Abstract

Introduction: This study aims at determining the mode of suicidal, accidental and homicidal cases along with the sort of poisoning in north Indian population in relation to age, gender, profession, marital status, upshot of diverse cases of poisons and prerequisite of ventilatory support in dissimilar kind of poisonings.

Materials and Methods: The study includes patients who had been earlier exposed to the to poison either by domestic or farming pesticide, snakebite, toxic plants, stings, manufacturing pollutant, drugs or varied stuffs. The status of patients undergone through poisoning regardless of age, gender, sort as well as method of poisoning, constituent of poisons were recorded in a proforma as prescribed by WHO guidelines. Results: Poisoning was more during summer season was found to be having the majority of cases which comprised 35.0% of the total recorded incidents. Household and agricultural agents comprising of the 55.2% of the total were followed by bites and stings comprising 26.2% were allied with a large amount of poisoning. Conclusion: The prototype of poisoning in the current study is no exception with the patterns observed in most of the other associated studies, preponderance of fatalities comprised male and toxins used for agriculture affairs.

Keywords: Poisoning, Suicidal, Accidental, Homicidal, Victims, Deaths

Introduction

Suicidal deaths are counted approx a million each year whereas approx 3,70,000 deaths are reported due to conscious ingestion of pesticides every year. According to WHO, in the year 2012 an estimated count of 1,93,460 people died globally due to inadvertent poisoning. A total of 84% of these deaths happened in low-and middle-income nations. In the same year, an unintentional poisoning was reported causing the demise of more than 10.7 million years of vigorous life. Unfortunately the incidence of poisoning in India is rated highest in the world. Toxic exposure is considered to be one of the major causes of deaths. The count of deaths is estimated to be 50,000 each year from such incidence. Household agents were considered to be the major causes for such unfortunate events by National Poisons Information Centre, New Delhi. The total percentage of accidents arising from such incidents is reported to be 44.1% which is followed by incidents emerging from drugs 18.8%. Occurrences from agricultural pesticides mounts up to 12.8% followed by industrial chemicals with 8.9% . Animal bites and stings have a total percentage 4.7%. Plants, unknown factors and miscellaneous groups have lower percentages ranging 1.7%, 2.9% and 5.6% respectively.

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In non-communicable diseases, poisoning is a major epidemic in the present era. The numbers of demises occurring from poisoning are so high that they are counted next only to the deaths arising from road traffic accident. Earlier , deaths from poisoning resulting from the consumption of pesticides were largely inadvertent
However, later on trouble-free accessibility, small price range, and unobstructed transactions led to an swell in suicidal and dangerous cases as well. Three million cases of poisoning worldwide every year has been estimated by World Health Organization (WHO). Developing nations are of great concern in this regard as 99% of such cases have been reported in these countries. Diverse geographical conditions, varied demography and differences in religious and cultural practices mark dissimilar cases in India and the frequency and mold of poisoning differ from one place to another. Therefore, it is enviable to carry out provincial studies sporadically to distinguish the level and fruition of the crisis. Aluminum Phosphate (ALP) and Organophosphate Poisonings (OP) are extensively used in western India to control vermin and insect and have turned out to be foremost providers of deaths resulting from poisoning. Snake bite in addition is a frequent medical crisis faced by rustic inhabitants. Early identification, cure and preclusion are vital in reducing the load of poisoning associated wound in any nation. Studies concerning to the epidemiology of poisoning have been done in very meager number in north India as compared to western part of the country. This study aims at determining the mode of suicidal, accidental and homicidal cases along with the sort of poisoning in north Indian population in relation to age, gender, profession, marital status, upshot of diverse cases of poisons and prerequisite of ventilatory support in dissimilar kind of poisonings.

As per the latest census in 2011, the entire populace of Pune, a city in state of Maharashtra in India, was 9.4 million establishing it the 4th most densely inhabited district in India. The city accommodates numerous industrial vicinity which offers effortless convenience to huge number of compounds and pesticides which in turn upshots into remarkable use of these agents for poisoning. The agricultural diversity of Pune has another aspect of happenings as it brings forth tremendous use of pesticides for determined self-harm and accidental revelation along with amplification in animal bites and stings.

Materials and Method

The total period devoted to the study was three years. The study includes patients who had been earlier exposed to the to poison either by domestic or farming pesticide, snakebite, toxic plants, stings, manufacturing pollutant, drugs or varied stuffs. The status of patients undergone through poisoning regardless of age, gender, sort as well as method of poisoning, constituent of poisons were recorded in a proforma as prescribed by WHO guidelines. The patients up to the 6 miles west of the middle town are served by the emergency department. Data collection was executed in accordance with the hospital guidelines after appropriate endorsement by the hospital establishment. The set for the study was the emergency department of an inner city level-one trauma center with just about 85,000 visits per year.

Cross sectional study was made and deployed utilization of exposition removal of data from evidence offered at the public and private teaching hospitals correspondingly. The entire poisoning cases obtainable in the medical record section were incorporated in the work. Data compilation was made in Predefined manners. Chi Square test was conducted to establish the connection between the variables. P<0.05 was deployed to settle on importance.

Results

In the entire period of the study, a total of 1050 cases were assessed over a length of 3 years. Exclusions made in the study were marital status and professional background. The reasons behind the exclusions were inappropriateness and unavailability of data in many cases. Else, the gender, reason of poisoning, age, poisoning route, seasonal deviations and agents implicated in poisoning is in accordance with the records presented. A total of thirteen cases were accounted dead on admission.

As compared to women, the preponderance of fatalities was of men comprising 66.1% of the total (table No.1). The majority of victims were married.
### Table 1. Age and gender wise allocation of poisoning cases

<table>
<thead>
<tr>
<th>Age Group (years)</th>
<th>Male (%)</th>
<th>Female (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;10</td>
<td>72(6.85)</td>
<td>42(4)</td>
<td>114(10.85)</td>
</tr>
<tr>
<td>11-20</td>
<td>110(10.47)</td>
<td>78(7.42)</td>
<td>188(17.90)</td>
</tr>
<tr>
<td>21-30</td>
<td>195(18.57)</td>
<td>65(6.19)</td>
<td>260(24.76)</td>
</tr>
<tr>
<td>31-40</td>
<td>148(14.9)</td>
<td>58(5.52)</td>
<td>206(19.61)</td>
</tr>
<tr>
<td>41-50</td>
<td>90(8.57)</td>
<td>51(4.85)</td>
<td>141(13.42)</td>
</tr>
<tr>
<td>51-60</td>
<td>50(4.76)</td>
<td>35(3.33)</td>
<td>85(8.09)</td>
</tr>
<tr>
<td>&gt;61</td>
<td>30(2.85)</td>
<td>26(2.47)</td>
<td>56(5.33)</td>
</tr>
<tr>
<td>Total</td>
<td>695(66.19)</td>
<td>355(33.80)</td>
<td>1050(100)</td>
</tr>
</tbody>
</table>

Poisoning was more during summer season was found to be having the majority of cases which comprised 35.0% of the total recorded incidents. Household and agricultural agents comprising of the 55.2% of the total were followed by bites and stings comprising 26.2% were allied with a large amount of poisoning. Table 2 need attention in this regard--

### Table 2: Characteristics of Poisoning Cases Reviewed

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>695</td>
<td>66.19</td>
</tr>
<tr>
<td>Female</td>
<td>355</td>
<td>33.80</td>
</tr>
<tr>
<td>Reason for poisoning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intentional</td>
<td>558</td>
<td>53.1</td>
</tr>
<tr>
<td>Accidental</td>
<td>456</td>
<td>43.4</td>
</tr>
<tr>
<td>Unknown</td>
<td>36</td>
<td>3.4</td>
</tr>
<tr>
<td>Route of Poisoning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ingestion</td>
<td>725</td>
<td>69.1</td>
</tr>
<tr>
<td>Injection</td>
<td>2</td>
<td>0.1</td>
</tr>
<tr>
<td>Inhalational</td>
<td>44</td>
<td>4.1</td>
</tr>
<tr>
<td>Bite/Sting</td>
<td>278</td>
<td>26.4</td>
</tr>
<tr>
<td>Eye</td>
<td>1</td>
<td>0.2</td>
</tr>
<tr>
<td>Season of Poisoning</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Summer</td>
<td>368</td>
<td>35.0</td>
</tr>
<tr>
<td>Monsoon</td>
<td>340</td>
<td>32.3</td>
</tr>
<tr>
<td>Winter</td>
<td>342</td>
<td>32.5</td>
</tr>
<tr>
<td>Agent Involved</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Household and Agricultural products</td>
<td>580</td>
<td>55.2</td>
</tr>
<tr>
<td>Animal Bites and Stings</td>
<td>276</td>
<td>26.2</td>
</tr>
<tr>
<td>Drugs</td>
<td>115</td>
<td>10.9</td>
</tr>
<tr>
<td>Plants and Miscellaneous</td>
<td>42</td>
<td>4</td>
</tr>
<tr>
<td>Unspecified</td>
<td>37</td>
<td>3.5</td>
</tr>
</tbody>
</table>
Discussion

The reason behind the elevated frequency of poisoning in the age group of 20-35 years might possibly be due to the familial, educational and service related strain. Moreover, the trouble-free accessibility of domestic agents in this manner clarifies the prevalence. Familial aggression, poignant standing of adolescent girls and their defenselessness to strain and anxiety for the duration of puberty is the cause for amplified feminine cases in age group of 13-19 yrs. Swift amplification in gratitude by farmers and collapse to repay due to the reason of ordinary catastrophe like draught could be the motive at the back of the augment in poisoning in times of summer period.\textsuperscript{6,7} Being an agriculture nation, handling of pesticides in country like India is a customary ritual by farmers and their family associates.

Unfortunately self poisoning is a very old method of attempting suicide. There are various incidents accessible from diverse sections of the globe bestowing prominence to a variety of stuff maltreated for heightened poisoning. Western nations have soporific and numbing as major and frequent material mistreated, with transience variable changeable between 0.4% and 2.0%\textsuperscript{8,9} crop sprays and drugs have been reported as the frequently maltreated toxic materials in central Asian countries like Sri Lanka and Pakistan. Uganda, in African countries illustrate crop sprays and drugs with known transience rates ranging between 2.0% to 2.1%\textsuperscript{10,11} The anguish in any case of heightened poisoning relies on an amount of reasons like character of poison used, dosage frenzied, stage of obtainable medical amenities and the period of hiatus amid consumption of poison along with period of time taken to come to the hospital, etc.

The outcome of the work exemplifies that a sum of 1050 patients were taken into the admission at hospital due to heightened poisoning. 186 patients comprising the ratio of 8.3% of the total admitted patients reported dead because of poisoning. The conclusion of the current work is in accord with a variety of reports from developed and emerging nations, which divulge a extensive hike in transience and morbidity happening because of poisoning.\textsuperscript{12-15} The outcomes of the work discovered an elevated prevalence of poisoning in male victims in comparison to the female patients in all age groups, substantiating added studies.\textsuperscript{12-14} There are conclusions drawn from some other nations where the female ration has a predominance.\textsuperscript{15,16} The greater part of such occurrences in male victims was from the age group of 21–30 years. The male prevalence seems to be the reason for major revelation to job-related vulnerability and strain as measured up with females in this part of the globe. Mortality resulting from organophosphates was maximum as per the present study which was very much alike to the study performed in South India. Aluminiumphosphide is experienced as the foremost reason of poisoning in South India. An amplified trending use of alcohol along with a toxic material for self harm was found, escalating the danger of aspiration, coma and respiratory breakdown leading to death. The possible reason for the maximum exposure during 6pm– 12 am might be the constant pondering over the problems in evening and in the night when victims had enough time after the routine tasks which ultimately resulted in harming themselves.

Conclusion

The prototype of poisoning in the current study is no exception with the patterns observed in most of the other associated studies, Preponderance of fatalities comprised male and toxins used for agriculture affairs. Some effectual steps to decrease the rate of poisoning and improvise the results may be as follows:

1) Poison information centers could of great use in this regard. However, there are certain such centers, which are operative in some places. This practice should be brought to a great level by making them prepared in every public hospital and government teaching hospitals.

2) Anti-dotes must be readily accessible in the primary health center.

3) Storages should be kept in good control in the houses of the farmers to prevent any unwanted situation arising from poison intake.

4) Lay persons should be made skilled by proper training on how to deal with poisonous substances.

The study was performed with hindsight by gathering the data from medical records. However, some crucial information was missed out of the records. These information were of social and economic stature of the patients, referred cases from other hospitals, intake timings of drugs and time of admission to the admission. Meager management and safeguarding of records was recurrently experienced in the public setting.

Ethical Clearance- Taken from the institutional ethical committee (Teerthanker Mahaveer Medical
References


Importance of Forensic Odontology

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Abstract

Forensic dentistry is the connection between the dental professions and forensic professions. In fact, the teeth and jaws are highly resistant to degradation and decomposition by postmortem. For a number of different reasons and situations such as mass disasters, in criminal investigations and in the case of disfigured bodies due to fire and vehicle accidents, dental identification of humans happens. The different methods include x-rays, antemortem & post-mortem photographs, tooth prints, palatal rugae, lip printing, bite marking and molecular methods such as polymerase chain reaction for pulp DNA analysis.

Keywords: forensic, bite mark, lip print, tongue print, polymerase chain reaction

Introduction

Forensic Odontology is the branch of forensic sciences that aims to establish identity of dead bodies: as offenders or innocent, based on available dental records and is also called Forensic Dentistry.1, 2 Teeth, lips, tongue, facial bones and associated dental items like fillings, dentures etc. can be source for identification of dead human bodies, it helps in identification of destroyed body age, sex accordingly.3-5 Even in major accidents, violence, burial, or other serious exposure to the elements, they still avoid decomposition. For every individual the dental patterns are unique. This peculiarity is also due to the dentist’s variety of treatments. A person’s dentition is therefore useful for individual identification and comparison, if there are records for that purpose.5 Teeth can survived after mortem so it is the most reliable to use for identification.6

Forensic odontology in the recent scenario has following applications.

- Maxillo - mandibular investigation of hard and soft tissues.
- Situations of major casualties where criminal investigation is crucial.
- Situations where there are incidences of bite marks. Example - Physical maltreatment with child, inflicting sexual trauma, in situations of unarmed personal safety measures.7

Classification according to type of examination8:

- Examination of living individuals - Bite Injury, determination of sex and age.
- Examination of dead individuals - occlusal pattern variations of human dentition, dental restorative materials, prosthetic rehabilitations.
- Examination of physical materials: Identification of isolated human teeth
- Examination at the scene of crime or disaster-human skeletal remains with teeth intact tooth imprints
- Examination of dental records: By specific research team and dental experts

Recovery team:

The team members are supposed to collect the dead bodies and protect their identities by means of a numbering system, store the dental evidence safely in a proper transport media without interfering with them.9
Forensic odontologist should be part of this team and should search for onsite dental evidence to prevent contamination of the dental substances during transport to the mortuary.10

**Ante Mortem Team:**

The task of deciphering data of the missing person is assigned to the team. Family members of the missing person and health care providers play a crucial role in the purpose. Dental records including computed tomography scans, x-rays, dental models and facial photographs are collected and stored in the appropriate tabular format. It serves as proof.11

**Post Mortem Team**

This is a team that tracks their cumulative research from dead bodies. In natural and manmade disaster situations the teeth material is a tough organic material that remains intact. Dental pulp tissue is important for DNA sampling. Vital teeth are extracted and sent for proper matching to forensic DNA laboratories.6

**Dental Record Maintenance.**

Maintaining dental records is a dentist’s responsibility and an essential component that acts as a source of information for dentists and patients, both for medical, administrative and forensic purposes.12 The dental graph should be accurately registered. This provides information on descriptions of all the teeth found in the mouth, such as teeth present or missing, restorations, pathologies such as caries, involvement in furcations, root sections and periodontal health.13

**Sex determination**

Forensic odontologist can determined age from dental and skeletal remains.14 Woman has less cusp than male (distobuccal or distal cusp) in the mandibular first molar.15 The scale of the crown and the tuber of Carabelli to be bigger in males.16 Using Polymerase Chain Reaction (PCR) DNA from pulp tissue is used for sex determination.17 Sivagami et al. achieved 100% success in determining the individual’s sex. 18

**Age estimation**

Dentition is used to estimate the age of children and adolescents and adults in three categories, namely prenatal, natal and postnatal time.19 For children and young adults, age assessments are made using clinical methods such as the sequence of eruptions, radiographic methods such as the Schour and Masslers process, the Moorer, Fanning and Hunt method, the Demirijian, Goldstein and Taners method and the Nolla technique.20 The eruption of third molars is important in separating juveniles and adults.21 For adults, regressive alteration of the teeth, periodontal status such as loss of attachment, dentin translucency histologic changes such as gradual cement lines, radiographic assessment such as root resorption, cement apposition at the apex helps for age estimation.22 Gustafson developed a single tooth age estimation method that uses different stages of regressive teeth changes.23 Several studies show pulp of tooth ratio with volumes calculates the age.24

**Race determination**

Carabelli cusp variation, fissure system, morphological incisor patterns are measures to distinguish between Caucasian, Asian and black races.25
Socio economic status

Socioeconomic person can easily identify by seeing their teeth. Those who have number of caries and cheap material fillings, prosthetic, indicate low income status, protruded malocclusion in children indicate thumb sucking habit. Orthodontics appliance, expensive tooth fillings indicate high income.27

Palatal rugae.

The ridge present on either side of the midpalatine raphe in the anterior part of the palate is referred as palatal rugae. Palatal rugae is well covered by fat pad buccal teeth. This prevents decomposition. Palatal rugae pattern is special for every single person. Because of their anatomical position inside the mouth, the palatal rugae are well-preserved even after third degree burns. That keeps them well protected against trauma and isolated from high temperatures, more resistant to decomposition and thermal effect.282930 Thomas et al 31 has classified rugae pattern as Diverge, Converge, Curve, Wavy, straight, Circular. Palatal rugae can also aid in gender and race differentiation

Lip print

Tsuchitsashi et al have suggested 6 different types of groove pattern in the lip that might be useful in investigating crime. Every individual has a different lip print.32 Similar to the prints on the finger, thumb, foot and lip prints, these are also distinctive and do not alter during a person’s life.33 Recent studies have proven that lip prints are a superior method in gender determination compared to fingerprints and mandibular canine index.34

Tongue print

The tongue’s dorsal surface is special for each person. Even among identical twins, the characteristic features of the tongue display remarkable difference. For forensic odontology, lingual contact on the dorsal surface along with the lateral border has been proved useful. The tongue is a unique organ that exchanges many static and dynamic characteristics.35

Bite mark

In violent incidents such as sex-related crimes, cases of child abuse, and offenses involving physical altercations such as homicide, bite marks on human tissues can be observed. It can occur in situations where the attacker bites the victim or the victim bites the attacker as a defensive act, but it should be noted that in the cases, the bite victim may be the perpetrator. Male victims are most often bitten on their arms and shoulders, while female victims are most often bitten on their breasts, arms and legs.36 In bite mark analysis, dental findings should include all the teeth present and missing, interrelation between both jaws, both arches form, dimension of mesiodistals and any unusual features if any like fractured, supernumerary, rotated etc.37

DNA analysis

DNA can be extracted from dentin and pulp with success. DNA remains intact for a very long time in the teeth and bones, and is therefore a valuable source of information. The method of DNA extraction consists of the following stages.38 cell rupture or lysis, protein denaturation and inactivation by chelating agents and
proteinase final step involves DNA isolation

**SALIVA**

It has been shown that human saliva is an excellent source of high molecular weight DNA. Crime scene clothing, cigarette buds etc., can collect saliva samples. The isolated samples are analyzed and linked to suspicious reference sources.\(^{39}\)

**Figur 3 - Extraction of DNA samples from saliva\(^{40}\)**

**Conclusion**

Forensic dentistry plays a major role in identifying those individuals who can’t be visually or otherwise identified. Teeth and dental structures’ durability ensures there is a lot of information that can be used for human identification purposes. This branch of medical science is focused on the idea that physiological variations, anatomy and effects of dental hard and soft tissue therapy are special to each individual. That is also very useful in situations with medico-legal background. As the scope of forensic science is very wide and challenging, Forensic odontology-trained dental surgeons can make unique contributions in the administration.

**Ethical Clearance**- Not applicable

**Source of funding**- Nil

**Conflict of Interest**- Nil

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35. Musa OA, Elsheikh TE, Hassona ME. Tongues: Could they also be another fingerprint? Indian J Forensic Med Toxicol. 2014;8:171-5. [Google Scholar]


39. chemicell GmbH • geneMAG-DNA / Saliva • Version 1.0

Study of Otoacoustic Emissions and Brainstem Evoked Response Audiometry in Infants

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Abstract

Aim and objective: To evaluate the usefulness of otoacoustic emissions and brainstem evoked response audiometry for assessment of hearing loss in newborn.

Materials and Method: Total of 370 healthy newborns were subjected to ENT examination, otoacoustic emissions (OAE) within 3 days to 30 days of birth. All newborn with normal hearing at OAE were not studied further, and for refer cases OAE testing was carried out again at 3rd month of age. The infants who failed the second OAE were subjected to brainstem evoked response audiometry (BERA). All newborn with abnormal BERA were subjected to repeat BERA at 6th month of age.

Results: All 370 healthy enrolled babies underwent OAE testing. Of which 200 (54.05%) passed the test and 170 (45.95 %) were referred. All 170 referred babies underwent repeat OAE at age of 3 months. Of which 50 passed the test and 120 were referred again. All these 120 referred cases were subjected to further testing using BERA between the ages 3-4 months. 2 were found to be having profound hearing loss during BERA testing at 3-4 months as well as at 6 months.

Conclusion: Profound hearing loss was found in 2 out of 370 enrolled normal newborn. This also means that if only ‘at risk’ babies were screened there is likely chance of missing impaired hearing in newborn without any risk factor. Hence, during hearing assessment it is mandatory to include all newborns irrespective of their status normal or ‘at risk’.

Keywords: Hearing loss, Hearing tests, Newborn

Introduction

Hearing impairment is one of the most critical impairments with significant social and psychological consequences. Delay in detecting children with congenital or acquired hearing loss may result in lifelong deficits in speech and language acquisition, poor academic performance and personal-social and behavior problems 1,2. Significant hearing loss is the most common disorder, occurring in 1 to 2 newborns per 1000 in the general population 3,4. As compared to vocabulary of a 3-year-old child without any hearing impairment is 500-900 words. Similarly with hearing impairment if remediated at birth is 300-700 words; at 6 months is 150-300 words and at 2 years is 0-50 words. The hearing loss can be conductive or sensorineural and mixed. Sensorineural further can be either cochlear, retrocochlear or central. Many risk factors for congenital hearing loss are well known 5. Critical period for identification and remediation of hearing loss is before
the age of 6 months. It has been observed that practice of neonatal screening has dramatically lowered the age of diagnosis of deafness from 1½ - 3 years to less than 6 months of age. In view of the above, standard guidelines for early diagnosis of hearing loss are very much needed. We undertake this study about usefulness of otoacoustic emissions (OAE) and brainstem evoked response audiometry (BERA) as a part of two-stage screening protocol in early assessment of hearing in newborn. In this two tier screening program, the second tier BERA being relatively more expensive was used only for select a few, making the program more practical and viable. OAE are quicker methods unlike BERA for assessing hearing in newborns. OAE are sounds of cochlear origin recorded in the auditory meatus, produced by the action of healthy outer hair cells. In organ of Corti there are three rows of outer hair cells (OHCs) and one row of inner hair cells that sit on the basilar membrane and by the tectorial membrane on top. OAE test is performed by keeping a small probe in the child’s external acoustic meatus, click sound is delivered and response is detected by the probe and its graphical output in the form of display as well as print is obtained. In BERA test the clicking sound is presented in each ear separately by the earphone placed in external auditory canal, resultant action potential generated by the cochlea in auditory nerve is picked up by the skin electrodes placed strategically. This is further processed to generate graphical output. OAE and BERA are useful tools in determining the type and the site of lesion causing hearing loss. The timely intervention by stimulation of hearing is most important part in management of hearing loss in newborn. This study was made to evaluate the usefulness of OAE and BERA for early diagnosis of impaired hearing in newborn with no risk factor.

**Material and Method**

The study was carried out at Otorhinolaryngology department, in tertiary care teaching hospital. Total of 370 healthy newborn referred from the department of Obstetrics without any risk factors during period between October 2017 and April 2019 were included in the study. All newborn requiring active life support therapy, newborn with acute illness, congenital anomalies of ear such as atresia or stenosis of external auditory canal, any head and neck deformities and newborns whose parents did not consent for the procedure were excluded from the study. All enrolled cases were subjected to OAE using distortion product otoacoustic emission (DPOAE) screening after ENT examination. OAE testing was done as per referral at 3 days to 30 days of birth. All babies with normal hearing at OAE were eliminated from further study, and for refer cases OAE testing was repeated at 3-4 months of age. The infants who failed the OAE at 3-4 months of age were subjected to BERA for confirmation of hearing loss or without any deafness. All babies with abnormal BERA were considered as a probable candidate requiring stimulation of hearing either by way of hearing aid (HA) or cochlear implant (CI) after reconfirmation by BERA again at 6th month of age. All procedures performed on human participants were in agreement with ethical standards of the Institutional Ethics Committee.

**Informed Consent:** Informed consent was obtained from all the cases in the study.

**Statistical Method**

Using statistical analysis the frequency distribution of collected data was obtained with the help of IBM SPSS (Statistical Packaging for Social Sciences) IBM, INDIA, version 20.0 software.

**Observation and Results**

The present study was conducted on 370 newborn among whom 183 (49.5%) were males and 187 (50.5%) were females. 247 were in age group of 1-10 days, out of which 183 were male and 84 female. 93 were in age group of 11-20 days, out of which 48 were male and 45 female. 30 were in age group of 21-30 days out of which 17 were male and 13 female. Out of 370 neonates screened initially, 200 (54.1%) did not require further assessment as they passed first OAE between 3 days to 30th day. Remaining 170 (45.9%) referred cases were advised further testing by BERA (Refer Table 1). Out of 170 cases, 50 (29.4%) cases passed the second OAE at 3-4 months and did not require further assessment (Refer Table 1). Remaining 120 (70.6%) referred cases were referred cases requiring further testing (Refer Table 1). Out of 170 cases, 50 (29.4%) cases passed the second OAE at 3-4 months and did not require further assessment (Refer Table 1). Remaining 120 (70.6%) referred cases were advised further testing by BERA (Refer Table 2). At 3-4 months of age out of remaining 120 cases BERA was normal in 118 (98.33%) requiring no further testing and in 2 (1.67%) it was profound hearing loss, which was reconfirmed at 6 months. (Refer Table 2)

**Summary**

All 370 healthy enrolled newborn underwent OAE testing. Of which 200 (54.05%) passed the test and 170 (45.95 %) were referred. All 170 referred underwent
repeat OAE at age of 3 months. Of which 50 passed the test and 120 were referred again. All these 120 referred cases were subjected to further testing using BERA between the ages 3-4 months. 2 out of these 120 were found to be having profound hearing loss during BERA testing at 3-4 months as well as at 6 months. (Refer Table 3)

Table 1: 1st OAE and 2nd OAE Screening.

<table>
<thead>
<tr>
<th>Result</th>
<th>1st OAE Screening</th>
<th>2nd OAE Screening</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Frequency n=370</td>
<td>Percent</td>
</tr>
<tr>
<td>B/L Pass</td>
<td>200</td>
<td>54.1</td>
</tr>
<tr>
<td>B/L Refer</td>
<td>140</td>
<td>37.8</td>
</tr>
<tr>
<td>Right pass, left refer</td>
<td>17</td>
<td>4.6</td>
</tr>
<tr>
<td>(R-p, L-r)</td>
<td>13</td>
<td>3.5</td>
</tr>
<tr>
<td>Total</td>
<td>370</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2: BERA at 3rd and 6th months.

<table>
<thead>
<tr>
<th></th>
<th>BERA at 3rd months</th>
<th>BERA at 6th months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency n=120</td>
<td>Percent</td>
<td>Frequency n=2</td>
</tr>
<tr>
<td>Normal</td>
<td>118</td>
<td>98.33</td>
</tr>
<tr>
<td>Hearing Loss</td>
<td>2</td>
<td>1.67</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 3: Summary

<table>
<thead>
<tr>
<th>Screening</th>
<th>No. of Cases</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Number Screened</td>
<td>370</td>
<td>100</td>
</tr>
<tr>
<td>Pass in 1st OAE</td>
<td>200</td>
<td>44.05</td>
</tr>
<tr>
<td>Refer in 1st Screening</td>
<td>170</td>
<td>45.95</td>
</tr>
<tr>
<td>Pass in 2nd OAE</td>
<td>50</td>
<td>29.41</td>
</tr>
<tr>
<td>Refer in 2nd Screening</td>
<td>120</td>
<td>70.59</td>
</tr>
<tr>
<td>Hearing Impairment</td>
<td>2</td>
<td>0.54</td>
</tr>
</tbody>
</table>
Discussion

The hearing loss is often overlooked because of its silent nature preventing the detection through routine clinical evaluation. The definition of early identification and intervention has evolved over the years. Early identification is considered to be as early as 3 months for diagnosis and 6 months for intervention. There are few surveys about finding incidence of congenital hearing loss in India. In this study the incidence of impaired hearing was 5.4 per 1000. Whereas, P.Nagapoornima, et al in 2006 found it to be 5.6 per 1000, and similarly Bhatt in 2015 found 5% in high risk newborns and 0.5% in normal newborns. In this study there were 2 cases having impaired hearing amongst 370 newborn without any risk factor. Out of remaining 368 cases 200 were eliminated from the study as they passed OAE at first visit and 168 failed became normal during further study. Johnson et al reviewed the results of 1317 ears of patients who initially failed the OAE test and then passed the BERA test. Therefore even though OAE is useful initially for early screening about hearing loss, BERA is for diagnosis as well as confirmation as in this study. Hence universal screening remains the ideal strategy for diagnosis of hearing impaired in newborn. This study has shown that the strategy of two-stage OAE screening and subsequent confirmation by BERA helped in picking up 2 newborn from not ‘at risk’ group which otherwise would have gone unnoticed if only ‘at risk’ were screened. These 2 newborn having profound hearing loss would otherwise be refrained from the benefits of early stimulation of their hearing either by way of hearing aid (HA) or cochlear implant (CI) for speech rehabilitation. The incidence of hearing impairment and other findings of this study are in accordance with previous studies.

Conclusion

Amongst 370 enrolled newborn 170 were referred in first OAE, 120 were referred in second OAE. Profound hearing loss was found in 2 by BERA during 3-4 months of age which further was confirmed by BERA again at 6 month. If only ‘at risk’ babies were screened initially there was likely chance of missing above 2 cases of profound hearing loss amongst 370 enrolled newborn without any risk factor. Hence, it becomes mandatory to include all newborn irrespective of their status normal or ‘at risk’ during hearing assessment for the benefits of early stimulation by way of hearing aid (HA) or cochlear implant (CI) and speech rehabilitation.

Ethical approval: All procedures performed on human participants were in agreement with ethical standards of the Institutional and/or National Ethics Committee.

Source of Funding: In this project the cost of investigations of the study participants was born by the Institute research fundings.

Conflict of Interest: None.

Acknowledgement: We acknowledge the cooperation and assistance of the Departments of Obstetrics, Krishna Hospital and Medical Research Center, Karad, India.

References

Role of Hand and Foot Print Dimensions in Stature Identification among Indian Population

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Abstract

Introduction: The four essential factors in Forensic Anthropology, representing in determining personal identification are age, sex, stature and ethnicity. Among this ‘big fours’ of the biological profile, determination of stature is considered as one of the main parameter of personal identification in forensic examinations. Thus, this study will aim to correlate relation between hand and foot measurements with stature of individual.

Aim of the study: The study aimed to estimate the relationship between statures of an individual on the basis of hand and foot prints, in Indian populations.

Materials and Method: The study group comprised of 100 subjects (age group above 18 years) with normal growth and development.

Measurement of height: The measurements of height was made using standard anthropometer by making the subject stand erect on the horizontal plane. The distance of the subject from the ground to the highest point of the vertex in the median sagittal plane was recorded.

a) Hand length and Hand breadth: Hand length (HL) was measured from mid-point below radial and ulnar tuberosity to tip of middle finger. Hand breadth (HB) was measured from base of 5th to 2nd metacarpus by drawing the outline of hand on paper.

b) Foot length and breadth: The foot length was measured as a direct distance from the most posterior point of back to tip of the Hallux or to tip of the second toe. The foot breadth was measured as the direct distance between the most prominent point on medial side and the most prominent on lateral side.

d) Heel Ball Index Measurement

The breadth of the foot at ball and at heel (BBAL, BHEL) were measured. The HB Index of the foot was calculated as (BHEL+ BBAL) x 100.

Results: Correlation of the various hand and foot parameters showed a regression coefficient range of 0.331-0.377. Among all variables measured, hand length exhibited the highest correlation with stature (r value of 0.377 p-value < 0.003). Further forward stepwise linear regression analysis [Height = 115.426+2.615* Hand length (Left)] established hand length to be the single best predictor of height (r value of 0.377 and standard error of 7.35cms).

Conclusion: Thus, the foot length provides highest reliability and accuracy in estimating stature of unknown males and females. Also this study will help to generate population-specific equations using a simple linear regression statistical method.

Key words: Anthropology, Stature, Regression formulae, hand and foot length and breadth

Original article

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Introduction

Forensic Anthropology is described as the analysis of human remains for the medico legal purposes to establish identity, investigate suspicious deaths and identify victims of mass disasters. Identification of human remains is one of the prime factors addressing the victims in case of mass disasters such as fire accidents,
explosions and aircrafts and railway accidents.

The four essential factors usually represented in determining personal identification are age, sex, stature and ethnicity. Among this 'big fours'\(^1\) of the biological profile, determination of stature is considered as one of the main parameter of personal identification in forensic examinations. Stature is the height of a person in the upright posture and has a definite and proportional biological relationship with each and every part of the human body which helps the forensic experts to identify along with other evidences like dentition, foot prints and hand dimensions.\(^1\)

Thus, this study aim to correlate relation between hand and foot measurements with stature of individual.

Aim of the Study

The proposed study aim to estimate the stature of an individual (male and female) on the basis of hand and foot prints, in Indian populations.

Objectives of the study

· To determine the relationship between stature and hand dimensions (length and breadth) among males and females of Indian populations.
· To determine the relationship between stature and foot dimensions (length and breadth) and also to derive heel ball (HB) index among males and females of Indian population.

Materials and Method

The study group comprised about 100 subjects of age group above 18 years after their informed consent and after Institutional ethical committee approval.

Inclusion criteria:
· Subjects with normal growth and development.

Exclusion criteria:
· Physically and mentally challenged individual
· Malocclusion

Measurement protocol

**Measurement of Height\(^2\):**

The measurements of height was made using standard anthropometer by making the subject stand erect in the anatomical position that is on the horizontal plane, barefooted according to the Frankfort plane, aligning the posterior surface of heels, pelvic girdle, scapular girdle, and occipital region to the vertical plane. The distance of the subject from the ground to the highest point of the vertex in the median sagittal plane was recorded. \(^2\)

**Hand and Foot Measurements**

**a) Hand length and Hand breadth \(^3\):**

Hand of the subject (right and left hand) was kept straight and flat on table. Outline of hand was drawn on an A4 sheet of paper and the measurement were made respectively. Hand length (HL) was measured from midpoint below radial and ulnar tuberosity to tip of middle finger. Hand breadth (HB) was measured from base of 5th to 2nd metacarpus. \(^3\) [fig.1]

![Fig: 1 Hand measurements](image)

**b) Foot length and breadth \(^4\):**

Right and Left foot were taken for the measurement by placing on an A4 sheet of paper and drawing the outline of foot. The foot length was measured as a direct distance from the most posterior point of back [pternion] to tip of the Hallux or to tip of the second toe (acropodion) [fig:2]. The foot breadth was measured as the direct distance between the most prominent point on medial side (Metatarsal tibiale) and the most prominent on lateral side (Metatarsal fibulae). \(^4\)
Foot breadth at the ball (BBAL) was measured as the widest part of the foot at the ball while the foot breadth at heel (BHEL) was measured as the widest part of the heel. [Fig: 3]. The HB Index of the foot were calculated as (BHEL + BBAL) x 100.

**Method to make the outline of hand and feet**

The subject were asked to place his/her hand on an A4 sheet of paper. Outline of hand and foot were drawn using a pencil. Before lifting it from the paper, anatomical landmarks of the hand and feet were marked on the papers close to the hand and footprints which are mid-rear heel point and most anterior point of all toes in case of feet and mid-point below radial and ulnar tuberosity to tip of middle finger in case of hand.

**Statistical Analysis**

The data were then analyzed using linear Regression Analysis using the SPSS software to estimate the height of the individual based on and hand /foot indices. The regression equation with the R and $R^2$ values with standard errors of estimate were calculated to identify the most suitable predictor of stature of the individual.

**Results**

Correlation of the height of the individual with various hand and foot indices was done using Pearsons correlation coefficient (Table 1). The best parameters which correlated were the hand and foot lengths, with $r$ value ranging from 0.331-0.377 (Figure 1). Among all variables measured, hand length exhibited the highest correlation with stature ($r$ value of 0.377, $p$-value < 0.003). Forward stepwise linear regression analysis [Height = 115.426+2.615* Hand length (Left)] further established hand length (left side) to be the single best predictor of height ($r$ value of 0.377 and standard error of 7.35cms) [Table 2].
TABLE 1: PEARSONS CORRELATION OF HEIGHT OF THE INDIVIDUAL WITH VARIOUS HAND AND FOOT MEASUREMENTS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>R</th>
<th>R Square</th>
<th>P value</th>
<th>equation</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand L(R)</td>
<td>.346</td>
<td>0.12</td>
<td>0.007</td>
<td>( \text{HEIGHT} = 122.033 + 2.238 \times (\text{Hand L(R)}) )</td>
<td>7.1246</td>
</tr>
<tr>
<td>Hand L (L)</td>
<td>.377</td>
<td>0.142</td>
<td>0.003</td>
<td>( \text{HEIGHT} = 115.426 + 2.615 \times (\text{Hand L (L)}) )</td>
<td>7.0346</td>
</tr>
<tr>
<td>Hand B(R)</td>
<td>.177</td>
<td>0.031</td>
<td>0.175</td>
<td>( \text{HEIGHT} = 141.104 + 2.863 \times (\text{Hand B(R)}) )</td>
<td>7.4735</td>
</tr>
<tr>
<td>Hand B(L)</td>
<td>.197</td>
<td>0.039</td>
<td>0.131</td>
<td>( \text{HEIGHT} = 136.062 + 3.539 \times (\text{Hand B(L)}) )</td>
<td>7.4443</td>
</tr>
<tr>
<td>FL R</td>
<td>.331</td>
<td>0.11</td>
<td>0.01</td>
<td>( \text{HEIGHT} = 110.904 + 2.13 \times (\text{FL R}) )</td>
<td>7.1653</td>
</tr>
<tr>
<td>FL (L)</td>
<td>.362</td>
<td>0.131</td>
<td>0.004</td>
<td>( \text{HEIGHT} = 104.697 + 2.378 \times (\text{FL (L)}) )</td>
<td>7.0775</td>
</tr>
<tr>
<td>FB R</td>
<td>.181</td>
<td>0.033</td>
<td>0.167</td>
<td>( \text{HEIGHT} = 144.602 + 2.049 \times (\text{FB R}) )</td>
<td>7.4687</td>
</tr>
<tr>
<td>FB(L)</td>
<td>.131</td>
<td>0.017</td>
<td>0.318</td>
<td>( \text{HEIGHT} = 148.164 + 1.649 \times (\text{FB(L)}) )</td>
<td>7.5283</td>
</tr>
<tr>
<td>BBAL R</td>
<td>.163</td>
<td>0.026</td>
<td>0.214</td>
<td>( \text{HEIGHT} = 146.693 + 1.82 \times (\text{BBAL R}) )</td>
<td>7.4927</td>
</tr>
<tr>
<td>BBAL(L)</td>
<td>.115</td>
<td>0.013</td>
<td>0.383</td>
<td>( \text{HEIGHT} = 150.128 + 1.435 \times (\text{BBAL(L)}) )</td>
<td>7.5436</td>
</tr>
<tr>
<td>BHEL R</td>
<td>.160</td>
<td>0.026</td>
<td>0.223</td>
<td>( \text{HEIGHT} = 153.066 + 1.842 \times (\text{BHEL R}) )</td>
<td>7.4961</td>
</tr>
<tr>
<td>BHEL L</td>
<td>.289</td>
<td>0.084</td>
<td>0.025</td>
<td>( \text{HEIGHT} = 145.162 + 3.294 \times (\text{BHEL L}) )</td>
<td>7.2694</td>
</tr>
<tr>
<td>HB R</td>
<td>.184</td>
<td>0.034</td>
<td>0.159</td>
<td>( \text{HEIGHT} = 145.854 + 0.012 \times (\text{HB R}) )</td>
<td>7.4641</td>
</tr>
<tr>
<td>HB L</td>
<td>.240</td>
<td>0.058</td>
<td>0.065</td>
<td>( \text{HEIGHT} = 138.911 + 0.017 \times (\text{HB L}) )</td>
<td>7.3715</td>
</tr>
</tbody>
</table>

AVERHEIGHT STANDARD ERROR 7.353871
SD OF ERROR 0.18137

Table 2: Forward stepwise linear regression for Hand length measurements

<table>
<thead>
<tr>
<th>Parameter</th>
<th>R</th>
<th>R Square</th>
<th>P value</th>
<th>equation</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand L (L)</td>
<td>.377</td>
<td>0.142</td>
<td>0.003</td>
<td>( \text{HEIGHT} = 115.426 + 2.615 \times (\text{Hand L (L)}) )</td>
<td>7.0346</td>
</tr>
</tbody>
</table>

Figure 1: Scatter plot showing the correlation of height and hand and foot measurements
Discussion

Stature is considered as one of the important characteristic for identification of an unknown person and is usually evaluated based on the lengths of the limb bones based predominantly on the femur. Stature depends on gender, genetic make-up, racial and geographical origin, social stratum as well as physical activity. The primary objective of the present research was to study the ethnic peculiarities of the relationship between the stature and hand and foot measurements in Indian population and to estimate stature using the measurements of handprints in this population.

The results of the present study show that the dimensions of the hands and feet were statistically significant with positive correlation with stature of an individual. It also facilitates formulation of regression equations which can be successfully utilized for stature estimation among Indian population. In this study among hand dimensions, HL had the best correlation with stature were r value = 0.377 and p value =0.003 and a weak correlation was stated between HB and stature.

Present study has found that both Hand length as well as Foot length are showing positive and statistically significant correlation with stature, but Hand length is showing more correlation with stature as compared to Hand breadth. Such finding were also observed in Australian and Thai population in the study done by Ishak NI et al and Laulathapho P et al.

In the present study, the age of the subjects were between 18-30 years to avoid the process of bone loss after this age. In this regards, Firooznia et al. (1984) pointed out that bone loss with age is a natural phenomenon and bone mass peaks around ages 25–30 years and declines gradually thereafter in both men and women. The FL and FB were found to be increasing significantly on weight bearing between 3 and 19 years of age and in both genders (Hasegawa et al. 2009).

In the present study, values of mean hand length were found to be higher on the left side compared to right side which is in agreement with the studies of Kulaksiz and Gozil. Results of the discriminant analysis by Troy case etal clearly indicate that the left hand should be preferred over the right, and that the hands should be preferred over the feet, for determining sex based upon length measures. It is also clear in both the hands and feet, that the phalanges are better at discriminating sex than the metacarpals or metatarsals.

The human hand that is considered the most used and versatile part of the body and is of great importance to investigators in the field of anthropometry according to Rastogi et al’s study were HL was used for estimation of stature. In both, males and females, HL showed high positive value of correlation coefficient, which suggests a strong positive correlation between stature, HL, In the present study Regression equations for estimation of stature was derived as Height = 115.426+2.61 *(Hand Length of left side).

Length measurements of hand and feet differ substantively from the other measurements could be explained by the fact that they are less influenced by lifetime activity. The main impact on length measures will be genetic and nutritional. Evidence from stature and growth studies of living humans suggest that bone length is influenced.

Conclusion

The stature can be accurately and satisfactorily estimated for medico-legal and forensic purposes since bilateral and bisexual differences have been taken into account while devising the linear regression equation. However, if the age of the person is known, then better result can be obtained using the different linear regression equation as per age.

Source of Funding: No

Conflict of Interest : Nil

References


A Profile Study of Sudden Natural Death Cases in Vadodara Region of Central Gujarat

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1Assistant Professor, Dept. of Forensic Medicine & Toxicology, Government Medical College, Bhavnagar

Abstract

Sudden death is said to be sudden or unexpected when the victim not known to have been suffering from any dangerous disease, injury or poisoning is found dead or dies within 24 hours after the onset of terminal illness (WHO). Incidences of sudden natural deaths are increasing now a days and specifically in healthy young individuals can arise suspicion of foul play. Our study may help to provide epidemiological data regarding the sudden death that can be used to control disease outbreaks, identifying emerging causes or changes in disease pattern so that appropriate action can be taken to reduce the morbidity and mortality. The present study undertaken to find the socio-demographic profile (age, sex and religion etc.) of the deceased of sudden death. This prospective study had been conducted on autopsy cases brought to tertiary health center of Vadodara, Central Gujarat for the period of one year. During study period total 2240 autopsies were conducted, of which 224 cases (10%) were sudden deaths. Most of the cases were from the 41 - 50 years age group. Of the 224 cases, 149 were due to diseases of cardiovascular system and 63 due to diseases of respiratory system. We observed that sudden death cases were higher in young age group and cardiovascular system was most commonly involved.

Key words:- Autopsy, Sudden Natural Death, Cardiovascular system

Introduction

All forensic pathologists deal not only with criminal, suspicious, accidental and suicidal deaths, but with a wide range of deaths from natural causes. Many of these are sudden, unexpected, clinically unexplained or otherwise obscure even though there need be no unnatural element in their causation.(1) Death is said to be sudden in a person if death occurring in less than 24 hours from onset of symptoms, not otherwise explained, death known not to be violent or instantaneous for which no cause can be discovered.(2) Some authors limit sudden deaths as those occurring instantaneously or within one hour of onset of symptoms.(3) An apparently healthy individual of any age when dies suddenly and unexpectedly , without any pre indication or even in case of natural death under suspicious state, with no medical attention and possibility of any disease being responsible for it being considered remote, a suspicion of foul play, injury, poisoning may arise in the mind of officials responsible for the certification of death.(4) Determination of cause of death in natural deaths, particularly when the death occurred suddenly, unexpectedly, or in the young, is an important part of forensic autopsy practice, for reasons including the following:(5)

- Performance of a complete and through autopsy on apparent natural deaths can provide valuable information in the interest of public health by identifying public health risks and monitoring disease trends.
- Identification of disease processes and patterns provides epidemiological data that can be used to control disease outbreaks, identify changes in disease patterns, or to identify reportable diseases.
- The timely and accurate diagnosis of medically important diseases can have a significant impact on the relatives of the deceased by allowing them the opportunity to seek treatment for certain hereditary
diseases in which the presenting symptom may in fact be sudden death.

Earlier studies have shown that cardiovascular disease was the most important cause of the sudden death. It was followed by respiratory disease, central nervous system disease and others. Several factors such as age, sex, occupation and marital status may also influence the sudden death which will be evaluated during this research.

**Material and Method**

This observational prospective study had been conducted in Department of Forensic Medicine and Toxicology, Medical College and S.S.G. Hospital, Vadodara during the period of 1 year from 1st March 2013 to 28th February 2014 which is tertiary health center of Central Gujarat. During this one year period 2240 autopsies were conducted and out of them 224 cases (10%) of sudden death were selected for present study in which relatives were ready to give informed written consent. Before starting the post mortem examination, a detailed history was taken from the relatives, investigating officer, inquest papers and from clinical papers. The information regarding the circumstances of death with special reference to any sign and symptoms suggestive of sudden death, family history, previous medical history, histopathology report and chemical analysis report in all cases were taken and data were filled in performa. All cases included in this study were examined meticulously during autopsy. Findings of this study were compared with the similar type of studies done by the Indian and foreign authors.

**Inclusion criteria:** All sudden natural death cases

**Exclusion criteria:** All cases where death occurred due to injury, poisoning.

- All cases where the victim dies after 24 hours from the onset of symptoms
- Decomposed and unidentified cases.

**Results**

**Table: 1: Distribution of Sudden Death cases according to the Age and Sex**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Male (%)</th>
<th>Female (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10</td>
<td>2(0.89)</td>
<td>1(0.45)</td>
<td>3(1.34)</td>
</tr>
<tr>
<td>11-20</td>
<td>2(0.89)</td>
<td>3(1.34)</td>
<td>5(2.23)</td>
</tr>
<tr>
<td>21-30</td>
<td>14(6.24)</td>
<td>7(3.13)</td>
<td>21(9.37)</td>
</tr>
<tr>
<td>31-40</td>
<td>52(23.22)</td>
<td>4(1.79)</td>
<td>56(25.01)</td>
</tr>
<tr>
<td>41-50</td>
<td>56(24.99)</td>
<td>5(2.24)</td>
<td>61(27.23)</td>
</tr>
<tr>
<td>51-60</td>
<td>42(18.74)</td>
<td>4(1.79)</td>
<td>46(20.53)</td>
</tr>
<tr>
<td>Above 60</td>
<td>22(9.82)</td>
<td>10(4.47)</td>
<td>32(14.29)</td>
</tr>
<tr>
<td>Total</td>
<td>190(84.79)</td>
<td>34(15.21)</td>
<td>224(100)</td>
</tr>
</tbody>
</table>

Table 1 showing distribution of sudden death cases according to the Age and Sex in which majority of cases were seen in the age group 41-50 years (27.23%) and 31-40 years (25.01%). Males were affected more (84.79%) as compared to females (15.21%) making an M/F ratio of 5.57:1.
Table 2: Distribution of Sudden Death cases according to their Marital status

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unmarried</td>
<td>33</td>
<td>14.73</td>
</tr>
<tr>
<td>Married</td>
<td>173</td>
<td>77.23</td>
</tr>
<tr>
<td>Divorced</td>
<td>4</td>
<td>1.79</td>
</tr>
<tr>
<td>Widow / Widower</td>
<td>14</td>
<td>6.25</td>
</tr>
<tr>
<td>Total</td>
<td>224</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2 showing distribution of Sudden Death cases according to their Marital status in which majority of victims were married (77.23%) and 14.73% were unmarried.

Table 3: Distribution of Sudden Death cases according to their Occupation

<table>
<thead>
<tr>
<th>Occupation</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not applicable (&lt;18 years and student)</td>
<td>10</td>
<td>4.46</td>
</tr>
<tr>
<td>Office / Private Employee</td>
<td>39</td>
<td>17.41</td>
</tr>
<tr>
<td>Businessperson</td>
<td>20</td>
<td>8.93</td>
</tr>
<tr>
<td>Labourer</td>
<td>20</td>
<td>8.93</td>
</tr>
<tr>
<td>Worker in industries, mills, shops, farm and other sectors</td>
<td>45</td>
<td>20.09</td>
</tr>
<tr>
<td>Housewife</td>
<td>19</td>
<td>8.48</td>
</tr>
<tr>
<td>Unemployed</td>
<td>7</td>
<td>3.13</td>
</tr>
<tr>
<td>Government Employee</td>
<td>37</td>
<td>16.52</td>
</tr>
<tr>
<td>Retired person</td>
<td>27</td>
<td>12.05</td>
</tr>
<tr>
<td>Total</td>
<td>224</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 3 showing distribution of Sudden Death cases according to their Occupation in which workers in industries, mills, shops, farms and other sectors constituted 20.09% and Office/Private Employee constituted 17.41% followed by Government Employee 16.52%.

Table 4: Distribution of Sudden Death cases according to their Life Style

<table>
<thead>
<tr>
<th>Life Style</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sedentary</td>
<td>96</td>
<td>42.85</td>
</tr>
<tr>
<td>Moderate work</td>
<td>104</td>
<td>46.43</td>
</tr>
<tr>
<td>Heavy work</td>
<td>24</td>
<td>10.72</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>224</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Table 4 showing distribution of Sudden Death cases according to their Life Style in which cases with sedentary and moderate work life style cases completely outnumbered cases with heavy work life style.

Table 5: Distribution of Sudden Death cases according to involvement of body system

<table>
<thead>
<tr>
<th>System</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiovascular</td>
<td>149</td>
<td>54.38</td>
</tr>
<tr>
<td>Respiratory</td>
<td>63</td>
<td>23</td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>25</td>
<td>9.12</td>
</tr>
<tr>
<td>Central nervous</td>
<td>17</td>
<td>6.20</td>
</tr>
<tr>
<td>Genitourinary</td>
<td>4</td>
<td>1.46</td>
</tr>
<tr>
<td>Not Known</td>
<td>16</td>
<td>5.84</td>
</tr>
</tbody>
</table>

Table 5 showing Distribution of Sudden Death cases according to involvement of body system in which majority of the sudden deaths were due to the diseases of Cardiovascular system (54.38%) followed by diseases of Respiratory system (23%).

Table 6: Distribution of Sudden Death cases according to activity of deceased at the time of onset of symptoms

<table>
<thead>
<tr>
<th>Activity</th>
<th>No. of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not known</td>
<td>10</td>
<td>4.47</td>
</tr>
<tr>
<td>Rest</td>
<td>84</td>
<td>37.5</td>
</tr>
<tr>
<td>Routine Activity</td>
<td>94</td>
<td>41.96</td>
</tr>
<tr>
<td>Strenuous Activity</td>
<td>8</td>
<td>3.57</td>
</tr>
<tr>
<td>Sleeping</td>
<td>17</td>
<td>7.59</td>
</tr>
<tr>
<td>Travelling</td>
<td>11</td>
<td>4.91</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>224</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Table 6 showing Distribution of Sudden Death cases according to activity of deceased at the time of onset of symptoms.
Table 6 showing distribution of Sudden Death cases according to activity of deceased at the time of onset of symptoms in which 41.96% victims while doing routine day work and 37.50% were at rest.

**Discussion**

During the one year period of our study total 2240 medico-legal autopsy conducted and out of them incidence of sudden death was 224 (10%) cases. Almost similar incidence were noticed by Reddy(3), Nandy(6), Rao(8.67%) et al(7), Zanjad(8.92%) et al(8), Ambade(15.48%) et al(9). In contrast higher incidence of sudden death was reported by most of the studies done by foreign author’s e.g. Obiorah (55.6%) et al(10), in Escoffery and Shirley(51.3%) et al(11), Kuller(31.4%) et al(12), Avmak(28.9%) et al(13), and Nordrum(27.8%) et al(14). Higher incidence of sudden death outside India may be due to different type of case load, different geographical areas and different life styles of people.

Table no. 1 shows the distribution of cases according to their age and sex which shows that maximum number of the victims(27.2%) of the sudden death belonged to 41-50 years age group which was also observed by Kumar et al(15), Sarkioja et al(16) while Zanjad(26.78%) et al(8) and Ambade (20.75%) et al(9) found maximum cases in the age group 31-40 years.

Most of the studies done in India are showing that the maximum numbers of sudden death are happening in the middle aged people (31-50 years). It may be due to urbanization, westernization of Indian society, sedentary life style, increased smoking habit, stress and strain in life, lack of regular exercise and lack of regular medical check-up.

In our study majority of victims (84.79%) were male and 15.21% were female making male to female ratio of 5.57:1 which was also observed similarly by Zanjad et al(8), Kumar et al(15) and Rao et al(7) while study by Meina Singh et al(17) shows male to female ratio of 26.5:1. Thus from above studies, it was observed that males far predominate the females which is consistent with present study. During reproductive life women remarkably spared whose reason still unknown unless they have an underlying predisposition to atherosclerosis such as diabetes mellitus and hypertension. Also the habits of smoking and alcoholism are common in males and males are more prone for stressful conditions as compared to female.

It was observed that most of the victims (77.23%) were married as the occurrence of sudden deaths increase with aging. This coincides with study of and Gupta(63.49%) et al(18) and Kumar(59.8%) et al(15) where majority of sudden deaths were seen in married. The reason may be married people are more cautious and worried about their financial and other social issues.

We found that most cases were from middle and lower socio-economic class constituting 90.18% which comprises labourers, workers in industries, mills, shops, farms and other sectors, drivers and so on. These groups basically have lower income compared to higher class. They might not get regular medical checkups for early detection or even treatment for their diseases. Risk factors for coronary artery disease such as lack of physical activity, smoking, hyperlipidemia, hypertension, obesity, and diabetes are more common among individuals with middle socio-economic status. Higher socio-economic class contributed least to the sudden deaths (9.82%) which comprises businessmen, managers and executives. They had better knowledge and were more aware of the health importance. Their economic status also allowed them to have a better nutrition and healthier lifestyle.

Table no. 3 shows that workers in industries, mills, shops, farms and other sectors constituted highest cases (20.09%) and labourers (8.9%). It coincides with study of Kumar (30.6%) et al(15) where majority of the patients were from the semiskilled–unskilled group. The preponderance in this group is possibly due to low socio-economic status, lower education, neglect of alarming symptoms of illness, unaffordable treatment and physical stress etc.

We observed that maximum deaths were related to diseases of cardiovascular system constituting 54.38% which was very well supported by other similar studies e.g. Di Maio and Di Maio (60.9%) et al(19), Puranik(56.4%) et al(20), Avmak(55%) et al(13), Anderson(53.4%) et al(21), 45-50% by Reddy(19) and 45% by Nandy(22). Preponderance to cardiovascular system could be explained by changing social concepts and way of living, food habits- high concentration of fatty foods, physical and mental stress, lack of exercise with sedentary lifestyle, high salt intake, ice-cream, bakery items, urbanization, industrialization and progressive excessive indulgence of younger age groups in predisposing factors like smoking and alcoholism. In contrast to this study, very high cardiovascular disease...
rates were reported by Lorin (72.7%) et al(23) and Sarkioja(83%) et al(16). However, much lower rates of cardiovascular diseases were reported by Obiorah (23%) et al(10). There was involvement of more than one system in some cases.

The second most common cause of sudden death was related to respiratory system diseases 23% which very well supported by Yadhukul(27.45%) et al(7) and Escoffery and Shirley(23%) et al(11). Lung disease may be difficult to accept as a cause of sudden death in people who are not disabled by respiratory disease, but intermittent hypoxia may lead to ventricular arrhythmias in these patients. Pneumonia constituted 50.79% of all respiratory deaths in our study which was similar to in Nordrum (52.8%) et al(14) and in Obiorah (62.6%) et al(10). The high rate of death due to pneumonia is attributable to a lack of education, lack of health care, exposure to the cold and inadequate nutrition. Sudden deaths due to pulmonary tuberculosis was 5.11% which were more when compared to Azmak (0.7%) et al(13) and Kumar(3.1%) et al(15). Lower socioeconomic status, social stigma and treatment default may be the reason for higher incidence of pulmonary tuberculosis in our study.

The third commonest cause of sudden death was related to GI system(9.12%) which is consistent with Chaudhari(11.3%) et al(24). Fatty liver (40%) was the commonest cause followed by Cirrhosis (36%). The fourth commonest cause of sudden death was related to central nervous system diseases (6.20%) which was almost similar to Chaudhari et al(24). Intracerebral haemorrhage (52.94%) was the commonest cause followed by Subarachnoid haemorrhage (29.41%).

**Conclusion**

The present study illustrates a clear influence of age, sex, religion, occupation, marital status, socio-economic status and life style on the incidence of sudden death.

From this study we can conclude that diseases of the cardiovascular system are the major contributing factor for sudden deaths. The age distribution curve points out the fact that younger age group involvement appears to be slightly higher. Respiratory system diseases contributed the next major share of diseases. This can be attributed to poor hygiene, malnutrition and low socio-economic status.

This type of autopsy based information is vital in the planning of the health services, teaching and research programmes, particularly in a developing nation with a limited resources.

**Conflict of Interest**- None

**Source of Funding** – Self

**Ethical Clearance** - Approved by Institutional Ethical Committee

**References**

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Effectiveness of Progressive Resistance Drills and Dynamic Balance Training on Functional Performance among the Patients with Osteoarthritis of Knee

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Abstract

Osteoarthritis, degenerative joint disease in which the wearing down of the protective tissue at the ends of bones (cartilage) occurs gradually and worsens over time. The majority of people aged 40 years have radiographic evidence of knee osteoarthritis, is more common in women than in men.(1) Exercise has a wide range of health benefits in every individual. Mostly for middle aged population there is a clear evidence to support exercise in improving health and functional performance with well evidenced exercise programs.(2, 3) These programs have shown to improve the mobility of joints and strength of muscles around the joints by performing specific exercises for the specific muscles. This population people are often unable to undertake high intensity exercise programs. Therefore progressive resistance exercises are been used as an alternative. Many research studies have reported the benefits of resistance exercises as a physical activity for middle aged adults and individuals with limited movement.

Method: The subjects in the KIMSDU campus were screened and 41 subjects fulfilling the criteria were involved. Prior consent was taken. Treatment protocol consists of progressive resistance exercises for 4 days per week for 6 weeks The interpretation of the study was done on the basis of comparing pre-test and post-test assessment of Western Ontario and McMaster Universities Osteoarthritis Index(WOMAC) and BERG BALANCE TEST.

Result: Intra group comparison results showed that progressive resistance exercises are effective and WOMAC and Berg Balance Test were statistically extremely significant (p<0.0001) and (p<0.0001) respectively.

Conclusion: Progressive resistance exercises were significantly effective in improving the mobility and function and reducing the pain among the patients with osteoarthritis of knee.

Keywords: Osteoarthritis (OA), progressive resistance exercises, Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), Berg balance Test.

Abbreviations: Western Ontario and McMaster Universities osteoarthritis index (WOMAC), Osteoarthritis (OA).

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Contact no.: 9420107179

Introduction

Osteoarthritis is the most common type of arthritis which is usually found in elderly individual. It is degenerative, non-inflammatory disorder of synovial joint characterized by loss of hyaline cartilage, remodeling of surrounding bone and narrowing of joint space.(4) Osteoarthritis of knee is the most common type
of osteoarthritis and the prevalence is more in women than men. Due to the degenerative changes occurs in knee joint it mainly affect the cartilage of the knee joint and is one of the most common cause of functional limitation and dependency.

OA of knee is mainly diagnosed by symptoms such as:

1. Pain
2. Stiffness
3. Paresis
4. Tenderness
5. Effusion
6. Decrease in range of motion (ROM) secondary to pain
7. Muscle weakness.

In OA of knee, day to day physical activities like walking, squatting, stair climbing, cross leg sitting are mainly affected. OA of knee is a degenerative disorder so the line of treatment should be focus on reducing physical and psychological disability which includes patient education, physical activity, weight reduction and the use of assistive or orthotic devices. Muscle strength around the knee joint is significantly reduced in subject with OA of knee. Mostly the muscle which is get affected by OA of knee is quadriceps group of muscle. It acts as a shock absorber in the knee joint that is why the weakness in quadriceps muscle causes the reduction in functional performance at knee joint.

In OA of knee individual balance is also affected which may leads to injury to the knee joint. Muscle strengthening through resistance increases physical function, decrease pain and increase stability at the knee joint which is causes by OA and it also helps to reduce self-reported disability due to the OA.

The progressive resistance exercises are as follows:

1. Seated hip march
2. Heel raise
3. Step up
4. Walking
5. Squatting
6. Stair climbing

It is found in earlier studies that physical activities improve the metabolism and blood circulation. Resistance can be applied by various methods with progressively increasing manner like weight cuff, resistance band, body weight exercises, etc. Regular exercise including stretching and strengthening is an important component in managing OA irrespective of severity which is the standard care for individual with knee OA because it helps to reduce pain and improve function and stability at the knee joint. That is why it is important to evaluate the effect of progressive resistance drills and dynamic balance training on functional performance among the patients with OA of knee. However there is less number of articles available on effect of progressive resistance exercises on functional performance among the patients with osteoarthritis of knee.

Material and Methodology

Ethical clearance was obtained from the institutional ethical committee, KIMSDU, karad. This study included the 41 osteoarthritis of knee individuals according to inclusion and exclusion criteria. The study protocol was approved by the regional ethical committee. Individuals were selected according to inclusion criteria age between 40-70 years, men and female and exclusion criteria was individuals taking medication which influence the variable measured, any orthopedic condition that limit the exercise, unstable angina, uncontrolled hypertension – SBP ≥ 200 mmHg and DBP ≥110 mmHg. And they were perform progressive resistance exercises including warm up and cool down period of 10 min.

Progressive Resistance Exercise Protocol: (30 minutes)

1. WARM UP (6 minutes)
   - Seated hip march
   - Heel raise
   - Step up

   Each move will have 20 repetitions.

2. WORKOUT (18 minutes)
   - Walking
   - Slow walking
OUTCOME MEASURES

1. Western Ontario and McMaster Universities Osteoarthritis index (WOMAC). (11)

2. BERG BALANCE TEST.

STATISTICAL ANALYSIS

Statistical analysis of the recorded data was done by using the software INSTAT. 41 subjects were successfully completed assessment and were perform progressive resistance exercises for 12 weeks.

Result

Age Distribution

Table 1: Age distribution

<table>
<thead>
<tr>
<th>Age Group</th>
<th>No. of Individuals</th>
</tr>
</thead>
<tbody>
<tr>
<td>40-49 yrs.</td>
<td>12</td>
</tr>
<tr>
<td>50-59 yrs.</td>
<td>19</td>
</tr>
<tr>
<td>60-70 yrs.</td>
<td>10</td>
</tr>
</tbody>
</table>

Gender Distribution

Table 2: Gender distribution

<table>
<thead>
<tr>
<th>Gender</th>
<th>No. of Individuals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>17</td>
</tr>
<tr>
<td>Female</td>
<td>24</td>
</tr>
</tbody>
</table>

Outcome Measures

(WOMAC AND BERG BALANCE TEST)

Table 3: Comparison of pre and post WOMAC and BERG BALANCE TEST within the group

<table>
<thead>
<tr>
<th>Outcome Measures</th>
<th>Pre-test</th>
<th>Post-test</th>
<th>P value</th>
<th>t value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>WOMAC</td>
<td>75.682±12.084</td>
<td>62.170±10.370</td>
<td>0.0001</td>
<td>13.193</td>
<td>Extremely Significant</td>
</tr>
<tr>
<td>Berg Balance Test</td>
<td>61.365±10.495</td>
<td>77.682±14.138</td>
<td>0.0001</td>
<td>8.157</td>
<td>Extremely Significant</td>
</tr>
</tbody>
</table>
In present study the pre-test mean of WOMAC was 75.682±12.084, whereas post-test mean was 62.170±10.370. The pre-test mean of BERG BALANCE TEST was 61.365±10.495, whereas post-test mean was 77.682±14.138. Intra group analysis of WOMAC and BERG BALANCE TEST revealed statistically increase in post-test WOMAC and BERG BALANCE TEST scores. This was done by using paired t test. WOMAC (P<0.0001), BERG BALANCE TEST (P<0.0001).

In group statistical analysis for WOMAC and Berg balance test shows extremely significant in post intervention. There is improvement in strength in muscle around the knee which helps to reduce the pain due to osteoarthritis of knee in subjects. This patients performs the specified progressive resistance strength training show the significantly improvement in decreasing level of pain due to osteoarthritis of knee during activity daily living.

Discussion

Walking is the aerobic activity which can be used as the warm up which leads to pump up the body for the further training effect. The walking with progressive resistance use to train the lower extremities and it is largely used by the sports players as a part of exercise training. So, it is very effective to do exercise in middle aged individuals which helps in the weight reduction as well as improves the strength all over the body. This specified progressive resistance training are used to improve stamina, aerobic capacity and strength in the individual with osteoarthritic of knee. This exercise helps to improve strength muscles around the hip and knee which reduce the level of pain and increase the mobility of knee in the patient with osteoarthritic of knee. It also improves the balance of individual.(10)

Conclusion

From this study, we can conclude that there is significant effect of progressive resistance drills and dynamic balance training on functional performance among the patients with osteoarthritis of knee.

Conflict of Interest: There is no conflict of interest concerning the content of the study.

Source of Funding: This study was self-funded

Ethical Clearance: The study was undertaken after obtaining the approval of Protocol committee and Institutional Ethical committee of KIMSDU.

Acknowledgement

We acknowledge the guidance and constant support of Dr. G. Varadharajullu, Dean, Faculty of Physiotherapy, Karad, Dr. Shrinivasan Anandh, Professor, Department of Community Health Sciences and Dr. S.V. Kakade for helping in statistical analysis.

References

8. Akshara parmar, pradnya Nishad, Dr. Nupoor Kulkarni, Dr. Sarita Shevatekar(January 2018); Effectiveness of theraband® exercise on elderly individuals with osteoarthritis of knee; International Journal of Yoga, Physiotherapy and Physical Education; Volume 3; issues 1; January 2018; Page no. 129-33.

Evaluate the Effectiveness of Calisthenics on self-esteem among Elderly Residing in Selected Old Age Homes of Haryana, India

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Abstract

The aim of the study was to evaluate the effectiveness of Calisthenics on self-esteem among elderly. Quantitative research approach, quasi experimental nonequivalent control group pretest posttest design was used to collect the data from 70 elderlies (35 in experimental group and 35 in comparison group) by using convenience sampling technique. The tools used were Sample characteristics performa and Rosenberg’s Self Esteem Scale. For both the groups pre-test, post-test-1and2 were taken on day 1st, 30th and 45th respectively. Calisthenics was given to experimental group thrice a week for four weeks. A significant difference was found in terms of self-esteem between the experimental and comparison group after intervention (t= 17.47 and p=0.001) at 0.05 level of significance. Hence, Calisthenics was found effective in increasing self-esteem among elderly.

Key words: Self-esteem, Calisthenics, Elderly.

Introduction

Ageing is a continuous process beginning at the time of conception and ending with death. It is the process of becoming older, a process that is genetically determined and environmentally modified.1

Older people, often experience greater rates of loneliness and social isolation which occurs for many reasons, including death of social ties, relocation to different types of living and care communities, and limitations in physical and mental health. This can lead to poor quality of life, lower self-esteem and poor sleep quality, which may further lead to anxiety and depression among older people.2

Self-esteem is individual’s attitude toward himself/herself which measures one’s feelings of self-evaluation and self-acceptance, and reflects one’s value, worth and respect built by perceived views across the significant surroundings.3 There are several factors that influence the development of one’s self esteem. Among them is the respect, acceptance, and attention received from significant people in one’s life, including family members.4

One of the research study conducted with elderly members of a community in Montreal, Canada, found that there was decline in the self-esteem which may contribute to deregulate the hypothalamic-pituitary-adrenal axis functions that can cause adverse outcomes to the health of the elderly, such as social isolation.5
The maintenance of high physical function is one of the key factors for successful aging. Staying physically and mentally active can not only delay the development of some chronic illnesses and disabilities, but also improve mental and physical health in older adults as it helps in reducing depressive symptoms and promotes self-efficacy.

There is no particular age to perform exercises; even in the old age, exercises can be performed. Many studies proved that exercises diminish the age related problems. Among all exercises calisthenics are simple exercises that can be easily performed by elderly group. Calisthenics is a type of arranged exercises made up of many different movements performed using simple steps. This exercise is an ideal way to increase flexibility by strengthening the muscle tone. Calisthenics is a widely practiced form of exercise and is recognized as a fun and healthy way to keep fit.

Materials and Method

The study was conducted during the period from March 2018 to May 2019 in the state of Haryana, India. A total of 70 elderlies those who were aged 60 years and above, willing to participate in the study, residing in selected old age homes, who are alert, oriented and comprehend to respond, able to understand and speak Hindi and who are able to move without walking aids / physical assistance were selected by using Convenience Sampling technique. The tools used for data collection are Sample Characteristics Performa and Rosenberg’s Self Esteem Scale. Self-report (interview) technique was used to collect the data.

Description of Tool:

Sample Characteristics Performa: It consisted of 13 items i.e. age, gender, marital status, education, previous occupation, duration of stay in old age home, relatives visit, nature of the previous habitat, financial support, health problems, regular physical activity, sleep medicines and mode of admission in old age home.

Rosenberg’s Self Esteem Scale: It is a standardized tool which measures in a 4 point Likert scale (0-3) consisting of 10 items related to self-esteem which has 5 positive items and 5 negative items where it can be categorized as (0-14) low self-esteem, (15-22) moderate self-esteem and (23-30) high self-esteem. The calculated Cronbach Alpha Internal consistency was 0.91. Prior permission from the tool developer and Hindi translation was done by the researcher herself after obtaining permission from the tool developer.

Procedure:

After obtaining formal administrative approval from concerned authority of old age homes, 70 elderlies (35 in experimental group and 35 in comparison group) were selected using convenience sampling technique. The subjects were informed regarding the purpose of the study. Written consent was taken from the subjects to assure the confidentiality of their response. Pre-test was conducted on day 1st with sample characteristic and Rosenberg’s Self Esteem Scale among elderly in both the groups. The total intervention was given from day 2nd to day 29th (4weeks). On the 2nd day, Calisthenics was administered to the experimental group individually in order to make the elderly follow the correct steps (Arm rotation, Trunk twisting in chair, Ankle rotation, Leg kick in chair, Hip rotation, Side bends and Forward bends, Stepping and Walking). Then from the 3rd day onwards Calisthenics was given in groups among experimental group, thrice a week, morning 25-30 minutes on alternative days for four weeks. Post-test-1 and post-test-2 was conducted on 30th and 45th day with Rosenberg’s Self Esteem Scale in both the groups.

Kolmogorov-Smirnov test was applied to check the normality of data distribution. Data was normally distributed; hence parametric tests were applied.

Findings

Homogeneity between the experimental and comparison group was checked by Chi – square test in terms of sample characteristics and found that there was no significant difference between the groups in terms of sample characteristics at 0.05 level of significance. Which infer that both the groups were homogenous and comparable.

Percentage distribution of experimental and comparison group in terms of level of self-esteem shows that more than half of the elderly were having low self-esteem in both the experimental (60%) and comparison (68.57%) group. Chi – square was applied to compare both the groups in terms of level of self-esteem and it was found to be statistically non-significant ($\chi^2 = 0.56$, \(p= 0.45\)) at 0.05 level of significance. Hence, it infers that both the groups were homogenous and comparable in terms of level of self-esteem at baseline.
After administration of Calisthenics, percentage distribution of elderly in terms of level of self-esteem results that in experimental group, most of subjects were having high self-esteem in post-test-1 (74.28%) and post-test-2 (68.57%) then the comparison group in both post-test-1 (68.57%) and post-test-2 (62.58%) as depicted in figure 1.

![Figure 1: Bar diagram showing percentage distribution of elderly in terms of self-esteem in experimental and comparison](image-url)
Further, in both post-test-1 and post-test-2, experimental group had higher mean score then the comparison group in terms of self-esteem. The calculated ‘t’ value for post-test-1 was 17.47 and p= 0.001 which was statistically significant at 0.01 level of significance. Similarly, in post-test-2, the calculated ‘t’ value was 16.27 and p= 0.001 which was statistically significant at 0.01 level of significance as depicted in table 1. Hence, it infers that Calisthenics was effective in increasing the self-esteem among the experimental group.

Table 1: Mean, Mean Difference, Standard Deviation of Difference, Standard Error of Mean Difference and ‘t’ value of Self Esteem among Elderly after administration of Calisthenics in Experimental and Comparison group

<table>
<thead>
<tr>
<th>Observation</th>
<th>Group</th>
<th>Mean ± S.D.</th>
<th>MD</th>
<th>SEMD</th>
<th>t’ value</th>
<th>df</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Experimental group (n=35)</td>
<td>24.34±2.68</td>
<td>11.51</td>
<td>0.65</td>
<td>17.47</td>
<td>68</td>
<td>0.001**</td>
</tr>
<tr>
<td></td>
<td>Comparison group (n=35)</td>
<td>12.83±2.82</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experimental group (n=35)</td>
<td>23.34±2.71</td>
<td>10.60</td>
<td>0.65</td>
<td>16.27</td>
<td>68</td>
<td>0.001**</td>
</tr>
<tr>
<td></td>
<td>Comparison group (n=35)</td>
<td>12.74±2.73</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results of Repeated Measure ANOVA reveals that in experimental group, the mean score of self-esteem in pre-test, post-test-1 and post-test-2 was 13.77, 24.34 and 23.34 respectively. Where the F value is 300.60 with calculated p=0.001 which was statistically significant at 0.01 level of significance. Whereas in comparison group the mean score of self-esteem in pre-test, post-test-1 and post-test-2 scores was 12.89, 12.83 and 12.74 respectively. Where F value is 0.17 with calculated p= 0.84 which was statistically non-significant at 0.05 level of significance as depicted in table 2. Therefore, it can be stated that Calisthenics was effective in increasing the self-esteem among elderly.

Table 2: Repeated Measure ANOVA Showing the Mean Score from pre-test to post-test-2 in terms of Self Esteem in Experimental and Comparison group

<table>
<thead>
<tr>
<th>Groups</th>
<th>Test</th>
<th>Mean</th>
<th>F value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental group (n=35)</td>
<td>Pre-test</td>
<td>13.77</td>
<td>300.60</td>
<td>0.001**</td>
</tr>
<tr>
<td></td>
<td>Post-test-1</td>
<td>24.34</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post-test-2</td>
<td>23.34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comparison group (n=35)</td>
<td>Pre-test</td>
<td>12.89</td>
<td>0.17</td>
<td>0.84NS</td>
</tr>
<tr>
<td></td>
<td>Post-test-1</td>
<td>12.83</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post-test-2</td>
<td>12.74</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NS- Non significant(p≥0.05) **- significant (p < 0.01)
Additionally, post hoc test (LSD) shows that post-test-1 and post-test-2 score was better than pre-test score and post-test-1 score was better than post-test-2 in terms of self-esteem in experimental group.

Association of pre-test self-esteem score with selected sample characteristics among elderly was tested by using one-way ANOVA and ‘t’ test. The findings revealed that there was no significant association of self-esteem score with sample characteristics except in educational status i.e. (F= 2.82, p= 0.03) which was significantly associated with self-esteem among elderly.

Further, Post Hoc test was applied to reveal the mean difference of self-esteem in pre-test among elderly with selected sample characteristics (educational status) where it results that elderly who had primary education and secondary education were having higher self-esteem than those elderly who had higher secondary education and collegiate education.

Multiple regression analysis was used to explore the exact predictability of multiple independent variables on dependent variable. Based on basic assumption, step wise regression was applied. Data entered were raw/continuous variables, dichotomous variables and dichotomous dummy variables.

The stepwise regression results that Higher secondary education had prediction with variability of 7.90% ($R^2=0.079$) as calculated $F$ value=5.776 which was significant at 0.05 level of significance which further infers that changes of fluctuation or change in R value is less than 0.01. If Higher secondary education combines with duration of stay in old age less than 1 year, both variables together having prediction with variability of 14.50% ($R^2= 0.145$) as calculated $F$ value = 5.586 which was significant at 0.01 level of significance which infers that changes of fluctuations or change in R value is less than 0.006 as depicted in table 3. Hence, Higher secondary education alone as well as Higher secondary education with duration of stay in old age less than 1 year mostly had equal amount of predictability with self-esteem.

Table 3: Step Wise Regression Showing Predictability on Self Esteem by Multiple Independent Variables among Elderly (Multiple Correlational Coefficient) in Pre-test

<table>
<thead>
<tr>
<th>Model</th>
<th>R Value</th>
<th>R square</th>
<th>F value</th>
<th>df</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher secondary education</td>
<td>0.282</td>
<td>0.079</td>
<td>5.776</td>
<td>1/67</td>
<td>0.01*</td>
</tr>
<tr>
<td>Higher secondary education, Less than 1 year duration</td>
<td>0.380</td>
<td>0.145</td>
<td>5.586</td>
<td>2/66</td>
<td>0.006*</td>
</tr>
</tbody>
</table>

* - significant (p < 0.05)  ** - significant (p < 0.01)

As there was predictability of Higher secondary education in multiple correlation coefficients, the direction of predictability for variable is, if chance of Higher secondary education increases by 1 point, the self-esteem increases by 2.6 points and if chance of less than 1 year duration increases by 1 point, the self-esteem gets decreases by 2 points. This infers that higher secondary education had continuous prediction in positive direction throughout the models which is shown in table 4.
Table 4: Step Wise Multiple Regression Showing Predictability of Self Esteem by Multiple Independent Variables among Elderly in (Regression Coefficient) in Pre test N=70

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized coefficient B</th>
<th>Std. error</th>
<th>Standardized coefficients Beta</th>
<th>t value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher secondary education</td>
<td>13.017</td>
<td>0.382</td>
<td></td>
<td>34.116</td>
<td>0.001**</td>
</tr>
<tr>
<td>(Constant)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher secondary education</td>
<td>2.539</td>
<td>1.056</td>
<td>0.282</td>
<td>2.403</td>
<td>0.01*</td>
</tr>
<tr>
<td>Less than 1 year duration</td>
<td>-2.051</td>
<td>0.913</td>
<td>-0.256</td>
<td>-2.247</td>
<td>0.02*</td>
</tr>
</tbody>
</table>

* - significant (p < 0.05) ** - significant (p < 0.01)

Discussion

The present study population comprises with subjects who are age 60 years and above and among them, more than half of the subjects i.e. 57.1% were male and 42.9% of the study subjects were female in the experimental group. These findings were consistent to a study conducted by Deok-jo Kim, Sung-je Cho et al (2015) on Psychological State and Self-Esteem of Elderly in Relation to Socio-Demographic Characteristics where it was found that more than half of the study participants (53.8%) were male and the remaining 46.2% were female which is less than half of the subjects.9

In this present study it is found that 60% of elderly were having low self-esteem and 40% of elderly were having moderate self-esteem. The findings were consistent with the study conducted by Franak J, Malek M et al (2012) to assess the self-esteem among elderly in Kermanshah, Iran where they found one third of the elderly had a low self-esteem.10

Interestingly, the present study findings result a significant difference in the mean post-test self-esteem score among elderly between experimental and comparison group which infers that Calisthenics was effective in increasing the level of self-esteem among the elderly. These findings were consistent with the study conducted by Seong-Hi Park, Kuem Sun Han and Chang-Bum Kang et al (2014) on effects of exercise programs on quality of life and self-esteem in older people where it was found that exercise intervention was effective in increasing the level of self-esteem among older people.7

It has been previously argued that participation in the physical activity may have its greatest potential for enhancement of the levels of self-esteem. The present study findings certainly suggest the enhancement of the level of self-esteem among elderly after the administration of Calisthenics in the experimental group as there was a significant difference in terms of self-esteem from the pre-test score to post-test-1 and post-test-2 score. These findings were consistent with the study conducted by Edward McAuley, Jeffrey, Terry E, Shannon L el al (2001) on physical activity, self-esteem and self-efficacy relationship in older adults, where it was found that there was increased in the level of self-esteem upon completion of the intervention.11
Conclusion

Calisthenics was effective in increasing the self-esteem among elderly as there was a significant difference between the experimental and comparison group. There was a significant predictability for self-esteem by educational status and duration of stay in old age home.

Conflict of Interest: NIL

Source of Funding: NIL

Ethical Clearance: The ethical clearance was obtained from university research ethics committee of Maharishi Markandesshwar (Deemed to be University), Mullana, Ambala, India (MMU/IEC/1171) and the study was carried out in accordance with the guidelines laid by Indian Council of Medical Research (ICMR,2017). The permission was taken to conduct the study from concerned authority of old age homes of districts, Ambala (Jeevan Dhara Senior citizen home), Yamunanagar (Virdh Ashram park trust) and Kurukshetra (Baba Bansiwal Virdh Ashram) Haryana, India. Consent was prepared and filled from the study subjects regarding their willingness to participate in the research study. The purpose for carrying out research project was explained and assurance of confidentiality was given to the participants.

References

Observational Study on Sexual Dimorphism of Carrying Angle among Natives of Ajmer region

Nirjhar Mathur¹, Anupam Johry²

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Abstract

Introduction: - The carrying angle is the angle placed between the median axis of arm and median axis of forearm in full extension and supination position. This angle provides the forearms a clear movement with respect to the hips while walking and is important when carrying objects. Carrying angle is examined in various pre-placement medical examination. Carrying angle can be used to differentiate between male and female upper limb. This can be used in partial identification if rich regional data is systemically and statistically collected.

Objective:- To collect the statistical data values of carrying angle in both the sexes of Ajmer region. Observing any difference between the caring angle of dominant and non-dominant hand of same individual

Method: - A cross-sectional study was carried out with right handed 100 males and right handed 100 females and variations in carrying angle between males and females were calculated using Goniometer. The value is analyzed by mean, standard deviation

Results: - In males, mean carrying angle of both upper limbs is 10.72⁰ whereas in females mean carrying angle of both upper limbs is found 13.42⁰.

Conclusion: The present study showed that the carrying angle was greater in females than in males and it was greater in non-dominant arm than in dominant arm.

Key words: - Carrying angle, Goniometer, Extension, Variation

Introduction

The carrying angle is acute angle between median axis of the upper arm with fully extended and supinated forearm. This angle is associated with the lateral obliquity of arms¹. Secondary sexual characters in females² ³ ⁴ ⁵ ⁶ leads to greater carrying angle than males. In some cases it was also seen that females and males did not have variations in carrying angle on full extension⁷ ⁸ ⁹. As the skeletal configuration is affected by regional variation and no previous study had been conducted in the past on Ajmer region, therefore this study is planned to collect statistical data of carrying angle from Ajmer region. This study will also provide a sex specific data on variations in carrying angle on full extension, so that it can be used in identification purpose and sex determination in segmented/dismembered bodies. The carrying angle is examined in various medical examination for fitness of jobs especially meant for field services.

Materials and Method

This is a cross-sectional study among natives of Ajmer region. Carrying angle was measured in both arms of 100 males and 100 females aged between 18 to 24 years using goniometer¹.

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Data was manually collected on Microsoft Excel sheet and then analyzed statistically.

**Sample universe:** - MBBS Students studying JLN medical college, Ajmer

**Inclusive criteria:** - Cases with parents born in Ajmer were considered as natives of Ajmer. All the cases of age group 18 to 24 years are included in our study

**Exclusion criteria:** - Cases with history of previous fracture, congenital anomalies, contracture deformity of upper limb are excluded

-All cases with left handed dominance are excluded

**Study period:** - Sample was collected from 1st May 2019 to 31st 2019 at JLN medical College, Ajmer till sample size was achieved

### TABLE No. (1): Distribution of carrying angle among male and female

| SN | MALE | | | FEMALE | | |
|---|---|---|---|---|---|
| | No. of cases | Carrying angle (rt) | Carrying angle (lt) | No. of cases | Carrying angle (rt) | Carrying angle (lt) |
| 1 | 26 | 10.1 | 10.1 | 26 | 13.5 | 13.5 |
| 2 | 15 | 10.4 | 10.5 | 22 | 13.2 | 13.6 |
| 3 | 38 | 10.6 | 10.9 | 31 | 12.8 | 13.9 |
| 4 | 12 | 12.3 | 12.1 | 8 | 13.6 | 14.1 |
| 5 | 5 | 19.5 | 19.7 | 6 | 12.2 | 13.7 |
| 6 | 2 | 13.1 | 12.8 | 4 | 15.1 | 14.8 |
| 7 | 1 | 08.7 | 09.1 | 2 | 10.9 | 11.8 |
| 8 | 1 | 15.2 | 15.4 | 1 | 11.7 | 12.1 |

### Results

When carrying angle was measured out of 200 subjects, 26% did not have variations in carrying angles of their right and left arms. On an average, in males mean carrying angle of right arm was 10.66° with SD 0.919 and carrying angle of left arm was 10.78° with SD 0.779. The mean value of male of both arms is 10.72° where as in females, mean carrying arm of right arm was 13.14° with SD 0.644 and carrying angle of left arm was 13.71° with SD 0.369. The mean value of both arms in female is found 13.42° .Females had greater carrying angle than males.

### Discussion

We have studied variations in carrying angle between males and females. Females had greater carrying angle than males, i.e. arms are more laterally angulated and they have greater carrying angle°. Non dominant upper limb has more carrying angle then dominant upper limb in both sexes

### Conclusion

This data can be used in pre placement medical examination of various services especially required for natives of Ajmer region. There is difference in carrying angle of both side upper limbs so both sides carrying angle should be examined in borderline cases

### Suggestions

This data can be used cumulating and compounding with other studies for determination of average value of carrying angle in the population ,so that this can be used in determination of sex of an individual and also in various pre-placement medical examinations of armed forces. This data is useful in identification of segmented/ dismembered bodies

### Acknowledgement

We acknowledge the support of MBBS students, nursing and paramedical staff of JLN Medical College, Ajmer for their voluntary support for presenting themselves as case study.
References


Quasi Experimental Study to Evaluate the Impact of Psychoeducational Intervention on Level of Anxiety among Hospitalized Children

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Abstract

Background of the study: There are various ways to provide psycho-education (PI) to the patient admitted in the hospital. It is broadly steered by four main goals: transfer of information, medication and treatment support, training and support in self-help and self-care, and the provision of a safe place to vent emotional frustrations.

An excessive or persistent state of anxiety leads to devastating effects on children’s physical as well as mental health. Psych education is scientifically proved therapeutic intervention which helps the client along with family members to cope with illness and give the information as well as support to understand in a better way. Psych education helps the children and their family to minimize the emotional trauma during the hospital stay.

Objective:

1) To determine the impact of psycho-educational intervention on anxiety level among children with hospitalization.

2) To find out the association between socio-demographic variables with the pre-intervention anxiety level among hospitalized children.

Methodology: The study was executed by using quantitative research approach with quasi-experimental design. The study was conducted at three hospitals of Anand district, two hospitals of Vadodara district, and one Hospital of Ahmedabad District, Gujarat. 33 Hospitalized 6 – 12 year old children were selected for each experimental group and control group using convenient sampling technique. For both groups, Pre-intervention anxiety level assessment was done using Performa of demographic variables, Modified Hamilton Rating Scale. Psycho educational intervention included playbook and guided imagery administered to the 6-12 year old hospitalized children of experimental group for duration of 30 minutes for 3 consecutive days. On third day anxiety level have been done on third day after 5 hours from last intervention.

Result: Two sample t tests were used to determine the impact of psycho-educational intervention on anxiety level among hospitalized participants. As psycho-educational intervention has administered to interventional group there was statistically significant difference (p value <0.00010) found in post-assessment of anxiety level between experimental as well as control group. Comparison between interventional and control group calculated value of two sample test was 11.85.
**Conclusion:** Findings of the study came to the conclusion that psycho educational interventions consider a positive effect to reduce the anxiety level among children during hospitalization.

**Key words:** Psycho educational intervention, anxiety level, hospitalized children

**Introduction**

Hospitalization is a stressful and emotional event for parents and caretaker. It can be emotionally devastating to children. Hospital play interventions have been widely used to prepare children for invasive medical procedures and hospitalization. Hospitalization is a critical phase in the life of child. Hospitalization may leads to increase the stress and level of anxiety among children and their caretakers. An excessive or persistent state of anxiety leads devastating effect on children’s physical as well as mental health.[1]

Anxiety can be characterized by the feelings of tension and worry thoughts. It is a normal process in life. However, if the anxiety becomes severe or start to impair one’s life functioning, it can be categorized as a disorder or illness.

All parents would like to avoid their parents from hospital based anxiety and stress. Child also try to become less panic with health care industry environment. In all over child population numbers of children are admitted in hospital at least once in their early younger age which is about 30 per cent and all of them 5 per cent are frequently hospitalized.[2] Children’s psychological and physical needs should be vital, for the reason that continuation of the growth and evolution during the sickness will forestall the steady and irreversible physical and mental impacts of kids.[3]

Despite the specific illness, hospitalization of children in a new situation faces them with scary intervention, body pain and uneasiness. Causes creating stress and anxiety during hospitalization of children are: separation of children from their parents those who have loved, fear of the unknown, lack of control and autonomy, bodily injury leading to discomfort, pain and fear of the death. Kids’ reaction in crises situation is affected by different factors, included formative age, past experience, adaptable innate and adaptable abilities, severity and seriousness of the disease and the accessible emotionally supportive system.[3]

Kids having different kind of fear with regards to hospitalization, for example, fear of separation from the family, having blood tests and invasive procedure, long duration hospital stay, and being told “bad news” about their health. Among different kind of psychological treatments, there are sufficient research proof based on impact of behavioural intervention along with cognitive behavioural intervention for minimizing the fearfulness and anxiety. [3] Children commonly report feeling afraid or anxious as they anticipate and engage in healthcare settings with medical professionals.[4]

The American Academy of Paediatrics (Child Life Services for hospitalized children) recommended providing information, education, and formation of a trusting relationship between health care professionals and children and their parents by using various tools such as pictures, diagrams, orientation tours of surgical or treatment areas, therapeutic play, and puppet etc.[5]

Psychoeducation is an evidence-based therapeutic intervention for patients and their loved ones that provides information.

A research study found that about 10 to 15 per cent of children who are admitted to hospital after sustaining an injury develop post-traumatic stress disorder (PTSD), while for those admitted to areas such as the intensive care unit (ICU), the rate of psychological disorder in children is much higher – in the order of 20-25 per cent.

At the time of hospital admission, particular attention is paid to the improvement of the clinical symptoms of the disease and to a reduction in the psychological burden. As a result, play is often disregarded, or considered of minor importance. However, the role and value of play increases when the child is repeatedly hospitalized, mostly due to a chronic disease or disability, since it decisively contributes to emotional, mental well-being, self-confidence and self-esteem.

There are few techniques which can be utilized including guided imagery, play intervention, music therapy as a non-pharmacological treatment etc. One of intervention is psycho education intervention, which can be one of the viable treatments in decreasing the anxiety emerging from the hospitalization in kids.[3]

Psych education has been defined as “The evidence-
based therapeutic intervention for clients and their family members who help them to cope up with illness and give the information as well as support to understand in better way.” Psych education is helps to children and their family to minimize the emotional trauma during the hospital stay. [6] The central goal of therapeutic play is to facilitate the emotional and physical well-being of hospitalised children. [7]

Psychoeducational intervention seems very effective in various anxiety related disorders, personality disorders, psychotic illnesses, bipolar disorder, schizophrenia and clinical depression.

**Methodology**

The study was executed by using quantitative research approach with quasi experimental design. Quasi experimental research design: It involves the manipulation of independent variable to observe the effect on dependent variable, but it lacks at least one of the two characteristics of the true experimental design: randomization or a control group.

The target population for conducting research study were hospitalized children who are 6 – 12 year old. Using non probability convenience sampling technique 66 hospitalized children having anxiety were employed by calculating power analysis and then randomly allocated in two groups (33 each). Only experimental group had taken the intervention. Data collection was done using a researcher self-developed Performa of demographic variables and Modified Hamilton Anxiety Rating Scale. Before data collection, researcher introduced herself to participants with given explanation regarding the study and also obtained informed consent from the participants.

As per the part of psycho-educational intervention, one play book and one story for guided imagery has been prepared by researcher. Consecutively 3 days intervention had given to the experimental group for 30 minutes. Therapeutic play will be given for 20 minute and guided imagery will be given for 10 minutes, in that 7 minute for story and 3 min for take the review from the child about the story. Anxiety level should assessed by using Modified Hamilton anxiety rating (HARS) scale After 5 hours from last intervention.

The study was conducted at selected five hospitals of Anand district, Gujarat. Main study was done at selected three hospitals of Anand district, two hospital of Vadodara district and one Hospital of Ahmedabad District, Gujarat.

Moreover, the data was analysed and interpreted by using descriptive and inferential statistics.

**Operational Definition**

Anxiety: It refers to fear and worry among hospitalized children. It affects body and mind, leads to emotional stress. In Present study anxiety is assessed by Modified Hamilton Anxiety Rating scale.

Psycho educational Intervention: It is the cluster of the strategies which help to reduce the level of anxiety. In present study, play therapy and guided imagery used as a psycho educational intervention to reduce the level of anxiety among hospitalized children.

Hospitalized children: Refers to the children between the age group of 6-12 Years and who are admitted in the hospital with different diagnosis.

**Inclusion criteria:**

- Children those are 6 – 12 year old.
- Children those are admitted in selected hospitals for minimum 3 days.
- Children those are willing to participate in the study.
- Children whose parents are available at the period of study.
- Children whose parents are giving permission for intervention.
- Children who’s able to understand Gujarati Language.

**Exclusion Criteria:**

- Children those are admitted in intensive care unit.
Children those are not co-operative for intervention.

• Children those are physically and mentally challenged.

**Result**

Result shows that,

**Section 1: Findings related to socio-demographic variables in Experimental group and control group.**

In Analysis & interpretation of data, Frequency and percentage distribution of samples based on socio demographic variable

**In experimental group out of 33 samples,**

16 samples (48.5%) are 6-9 years old and 17 samples (51.5%) are 10 - 12 years.

Out of 33 samples, and 22 samples (66.7%) are male and 11 samples (33.3%) are female according to Gender.

In reason for area of hospitalization 21 sample (63.6%) are admitted in general ward, 12 samples (36.4%) are admitted in special ward.

In reason for hospitalization 19 samples (57.6%) having medical illness, 14 sample (42.4%) having surgical illness.

In family type, 18 samples (54.5%) belongs to joint families, 15 sample (45.5%) was living in nuclear families.

24 sample (72.7%) children experience of previous hospitalization and 9 sample (27.3%) children have no experience of previous hospitalization

In regards of duration of hospitalization, 18 sample(54.5%) children are admitted for 1-5 days, 7 sample (21.2%) children are admitted for 6 -10 days and 8 sample (24.2%) children are admitted for ≥ 11 days.

**In control group out of 33 samples,**

19 samples (57.6%) are in 10-12 years and 14 samples (42.4%) are 6-9 years old.

By 33 samples, 18 samples (54.5 %) are male and 15 samples (45.5%) are female according to Gender.

In reason for area of hospitalization 16 sample (48.5%) are admitted in general ward, 17 samples (51.5%) are admitted in special ward.

In reason for hospitalization 25 samples (75.8%) having medical illness, 8 sample (24.2%) having surgical illness.

In family type, 22 samples (63.6%) was living in nuclear families, 12 samples (36.4%) belongs to joint families.

24 sample (72.7%) children experience of previous hospitalization and 9 sample (27.3%) children have no experience of previous hospitalization

In regards of duration of hospitalization, 21 sample(63.6%) children are admitted for 1-5 days, 9 sample (27.3%) children are admitted for 6 -10 days and 3 sample (9.1%) children are admitted for ≥ 11 days.

**Section 2:**

**TABLE 1 Findings related to psycho educational intervention on anxiety level during hospitalization of experimental group.**

Assess pre and post-test level of anxiety in experimental group

<table>
<thead>
<tr>
<th></th>
<th>Mild (1-17 Score)</th>
<th>Mild to Moderate (18-24 Score)</th>
<th>Moderate to Severe (25-30 Score)</th>
<th>Very Severe (31-56 Score)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Pre test</td>
<td>00</td>
<td>00</td>
<td>05</td>
<td>15.15</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>07</td>
<td>21.21</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post Test</td>
<td>26</td>
<td>78.78</td>
<td>06</td>
<td>18.18</td>
<td>01</td>
</tr>
<tr>
<td></td>
<td>00</td>
<td>00</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Above mentioned table 2.1 interpreted that in experimental group, 5 sample have mild to moderate anxiety, 21 sample have moderate to severe anxiety and 7 sample have very severe anxiety in pre-test while in post-test 26 sample have mild anxiety, 6 sample have mild to moderate anxiety, 1 sample has moderate to severe anxiety.

**Table 2:** Mean pain value and SD of subjects according to psycho educational intervention on level of anxiety during hospitalization of experimental group.

<table>
<thead>
<tr>
<th>Experimental group</th>
<th>Mean</th>
<th>SD</th>
<th>T value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre test</td>
<td>28.00</td>
<td>4.04</td>
<td>11.99</td>
<td>0.000</td>
</tr>
<tr>
<td>Post Test</td>
<td>13.42</td>
<td>5.70</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Above table 2.2 consists description of mean [pre-test 28.00, post-test 13.42] and standard deviation [pre-test 4.04, post-test 5.70] of children according to psycho educational intervention in experimental group.

**TABLE 3: Findings related to psycho educational intervention on level of anxiety during hospitalization of control group.**

3) Pre and Post- test anxiety level of Control group

<table>
<thead>
<tr>
<th>Mild (1-17 Score)</th>
<th>Mild to Moderate (18-24 Score)</th>
<th>Moderate to Severe (25-30 Score)</th>
<th>Very Severe (31-56 Score)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Pre test</td>
<td>01 03.03</td>
<td>02 06.06</td>
<td>17 51.51</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>33</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post Test</td>
<td>01 03.03</td>
<td>05 15.15</td>
<td>17 51.51</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>33</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Above mentioned table interpreted that in control group, 1 sample have mild anxiety, 2 sample have mild to moderate anxiety, 17 sample have moderate to severe anxiety and 13 sample have very severe anxiety in pre-test while in post-test 1 sample have mild anxiety, 5 sample have mild to moderate anxiety, 17 sample has moderate to severe anxiety and 10 sample have very severe anxiety.

**Table 4:** Mean pain value and SD of subjects according to psycho educational intervention on level of anxiety during hospitalization of control group

<table>
<thead>
<tr>
<th>Mean</th>
<th>SD</th>
<th>T value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre test</td>
<td>28.97</td>
<td>3.95</td>
<td></td>
</tr>
<tr>
<td>Post Test</td>
<td>27.97</td>
<td>4.16</td>
<td>1.00</td>
</tr>
</tbody>
</table>

Above table 4 consists description of mean [pre-test 28.97, post-test 27.97] and standard deviation [pre-test 3.95, post-test 4.16] of children according to psycho educational intervention in control group.
Comparison between mean score of anxiety during hospitalization of interventional and non-interventional group.

Table 5: Comparison of post-test anxiety scores among interventional and non-interventional group

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>T value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exp Group</td>
<td>13.42</td>
<td>5.70</td>
<td>11.85</td>
<td>0.00010</td>
</tr>
<tr>
<td>Control Group</td>
<td>27.97</td>
<td>4.16</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Above table 5 consists description of comparison between interventional and non-interventional group post assessment score of mean [interventional group 13.42, non-interventional group 27.97] and standard deviation [interventional group 5.70, non-interventional group 4.16] of children according to impact of psycho educational intervention on level of anxiety.

P Value is 0.00010*p<0.05 is significant at 0.05% level. Hence null hypothesis $H_0$ was rejected. This indicates that Psycho educational intervention is highly effective in reducing level of anxiety among hospitalized children.

Findings related to association between level of anxiety and selected demographic variables of experimental group.

$\chi^2$ calculated value corresponding to the age in year, gender, Area of Hospitalization, Reason for Hospitalization; Types of family, History of previous Hospitalization, Duration of Hospitalization are found less than tabulated $\chi^2$ value. Hence, it is concluded that there is no significant association between levels of anxiety during Hospitalization with selected demographic variables in experimental group.

The above result can be compare with the result of a study that “Children who received the hospital play interventions exhibited fewer negative emotions and experienced lower levels of anxiety than those children who received usual care”.

Ethical Clearance- it is obtained from CHARUSAT ethical committee.

Conflict of Interest- Nil

Source of Funding-Nil

Acknowledgement—I am very thankful to all the nurses and staff who help in this study.

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storytelling on separation anxiety in hospitalized children with chronic diseases, Journal of Research in Medical and Dental Science, 2018, 6 (5):284-290


A Study on Sociodemographic Profile and Pattern of Injuries in Road Traffic Accidents amongst Pillion Riders in Chennai

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Abstract

One of the widespread preventable cause of unnatural death is Road Traffic Accidents. A Retrospective cross sectional study of the sociodemographic profile of pillion riders being victims of Road traffic accidents, the circumstances leading to road traffic accidents, the pattern and severity of injuries of occurring in Chennai was conducted in Saveetha Medical College and Hospital, Thandalam, Chennai, Tamilnadu. A total of 2438 cases of Road traffic accidents were recorded for a year (JAN2018-DEC2018). Out of which 62 cases (2.5%) of Road traffic accidents deals with the injuries of pillion riders. Among the pillion riders, Male outnumbered the Females (1.11 : 1). The most vulnerable age group was 21-30 years (50%). Most frequent of all is Head and Neck injuries and Injuries on the Upper limb. The information obtained can serve as a guide for better management of victims of Road traffic accidents and to establish Road safety measures.

Key Words: Road traffic accidents, Head injury, Pillion riders, Two Wheeler Accidents, Demography.

Introduction

Accident is an event, occurring suddenly, unexpectedly and inadvertently under unforeseen circumstances (1). A Road traffic accident occurs when a vehicle that is moving along a roadway crashes with another vehicle or object. RTAs is the most frequent cause of death under the age of 50yrs. Road traffic accidents, being life threatening if untreated at the earliest, remains to be one of the fatal ordeal, especially in case of accidents involving motorcyclist. According to the Global Status Report on road safety released by WHO in December 2018, the total mortality rate caused by Road traffic accidents (RTAs) has reached 1.35 million (2). In India, about 4,80,652 cases of Road traffic accidents (RTAs) occurs annually (3). About 181908 cases of RTAs has been recorded in South India by Ministry of Road transport and Highways as of 2016 (3). As per the National Crime Records Bureau annually about 7,328 cases (9.3%) has been recorded in Chennai as of the year 2015 (4). Throughout most Asian countries, the motorcycle has become an important mode of transport for most families. Pillion rider is a passenger on a motorcycle who is positioned directly behind the rider, facing forward on a registered seat for a pillion passenger (5). In vehicular collisions, the pillion riders are the most vulnerable to injuries because limited or no physical protection with the most common type of injuries sustained being head injuries. Mortality rate remains higher for both the drivers and the pillion riders.

Materials and Method

This study was conducted retrospectively for a time period of 1 year (JAN 2018- DEC 2018) at Saveetha
Medical College, Thandalam, Chennai, Tamil Nadu. Required approvals were obtained from the respective institutional ethics and research committee. In this study, all pillion riders victims of RTAs who presented themselves to Emergency department of Saveetha Medical College (JAN 2018- DEC 2018) were included. Death occurring in RTAs due to other vehicles apart from 2 wheelers were excluded.

The data was collected as per the preformed and approved format. The Sociodemographic profile and injury profile were collected from the case records of the victims. The collected data was analysed by using SPSS Software.

**Results**

A total of 2438 cases of RTAs were recorded for a year (JAN 2018-DEC 2018) at Saveetha Medical College and Hospital, Thandalam, Chennai, Tamil Nadu. Out of which 62 cases[2.5%] of RTAs deals with injuries of pillion riders. Among the pillion riders Males(55%) outnumbered the Females (45%)[1.11:1][Fig.1]. The most vulnerable age group was 21-30 years among pillion riders followed by that of 31-40 years(19%)[Table 1]. Month of December accounted for highest number of RTAs with 14 cases(22%) respectively[Fig.2].

Majority of the accidents occurred during evening (6.01pm to 12:00am) (36%) followed by that between 6AM to 12 PM(32%) .It was observed that nature of accidents in majority of cases were due to skid and fall(66%) followed by a head on collision with another 2 wheeler (14%). Majority of the accidents were front impact/collision (79%). Almost 2/3 rd of the RTAs involving pillion riders has occurred at National highways(68%). Majority of the pillion riders involved in this study were residing at Semiurban areas(47%)[Table-2].

Most of the cases, area of impact was found to be Head & Neck and Upper limb(50%). Injuries in the abdomen were least common among these cases(2%) [Fig.3]. Abrasion(72%) was the most common pattern of injuries in these cases. Only 21% were using helmet at the time of accident[Fig.4]. There were no fatal cases of pillion rider RTAs reported in this one year study.

![Fig 1: SEX DISTRIBUTION](image1)

![Fig 2: MONTH OF ACCIDENT OCCURED](image2)

![Fig 3: Area of Impact](image3)

![Fig 4: HELMET USE (n=62)](image4)
### TABLE-1: Age and Sex Distribution

<table>
<thead>
<tr>
<th>Age</th>
<th>Sex</th>
<th>Total(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>1-10yrs</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>11-20yrs</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>21-30yrs</td>
<td>21</td>
<td>10</td>
</tr>
<tr>
<td>31-40yrs</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>41-50yrs</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>51-60yrs</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>34</td>
<td>28</td>
</tr>
</tbody>
</table>

### TABLE-2: Profile of RTA Victims(n=62)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>No. of Cases</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIME</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12:01am to 6:00am</td>
<td>3</td>
<td>5%</td>
</tr>
<tr>
<td>6:01am to 12:00pm</td>
<td>20</td>
<td>32%</td>
</tr>
<tr>
<td>12:01pm to 6:00pm</td>
<td>17</td>
<td>27%</td>
</tr>
<tr>
<td>6:01pm to 12:00am</td>
<td>22</td>
<td>36%</td>
</tr>
<tr>
<td>RESIDENT OF RTAs VICTIMS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>URBAN</td>
<td>21</td>
<td>34%</td>
</tr>
<tr>
<td>SEMIURBAN</td>
<td>29</td>
<td>47%</td>
</tr>
<tr>
<td>RURAL</td>
<td>12</td>
<td>19%</td>
</tr>
<tr>
<td>PLACE OF ACCIDENT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NATIONALHIGHWAYS</td>
<td>42</td>
<td>68%</td>
</tr>
<tr>
<td>VILLAGE</td>
<td>20</td>
<td>32%</td>
</tr>
<tr>
<td>OFFENDING VEHICLE TYPE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2WHEELER</td>
<td>9</td>
<td>14%</td>
</tr>
<tr>
<td>4WHEELER</td>
<td>5</td>
<td>8%</td>
</tr>
<tr>
<td>AUTO</td>
<td>2</td>
<td>3%</td>
</tr>
<tr>
<td>LORRY</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>BUS</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>PEDESTRIAN HIT</td>
<td>3</td>
<td>5%</td>
</tr>
<tr>
<td>SKID and FALL</td>
<td>41</td>
<td>66%</td>
</tr>
<tr>
<td>SIDE OF IMPACT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FRONT</td>
<td>49</td>
<td>79%</td>
</tr>
<tr>
<td>REAR</td>
<td>5</td>
<td>8%</td>
</tr>
<tr>
<td>SIDE</td>
<td>8</td>
<td>13%</td>
</tr>
<tr>
<td>AREA OF IMPACT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HEAD and NECK and UPPERLIMB</td>
<td>31</td>
<td>50%</td>
</tr>
<tr>
<td>LOWER LIMB</td>
<td>27</td>
<td>43%</td>
</tr>
<tr>
<td>ABDOMEN</td>
<td>1</td>
<td>2%</td>
</tr>
<tr>
<td>THORAX</td>
<td>2</td>
<td>3%</td>
</tr>
<tr>
<td>PELVIS</td>
<td>1</td>
<td>2%</td>
</tr>
</tbody>
</table>
TABLE-3: PATTERN OF INJURIES AND AREA OF IMPACT (n=62)

<table>
<thead>
<tr>
<th>AREA OF IMPACT</th>
<th>PATTERN OF INJURIES</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ABRASION</td>
<td>CONTUSION</td>
</tr>
<tr>
<td>HEAD AND NECK AND UPPERLIMB</td>
<td>20</td>
<td>2</td>
</tr>
<tr>
<td>LOWER LIMB</td>
<td>20</td>
<td>3</td>
</tr>
<tr>
<td>ABDOMEN</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>THORAX</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>PELVIS</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>44(71%)</td>
<td>5(8%)</td>
</tr>
</tbody>
</table>

Discussion

The most vulnerable age group involved in pillion rider RTAs was found to be between 21-30 years which is similar to the findings of studies of R. Ravikumar et al shows that majority of pillion riders belong to age group between 20-29 yrs\(^{6}\). The reason probably being increased risk taking attitude of youth and reduced road safety measures. Male victims(55%) outnumbered the Females(45%). This finding was unlike a study by Urfi et al which showed that female victims(60%) outnumbered the male victims(40%)\(^{7}\). Males being the predominant working population and bread winner in the Indian families could be the reason for being the victims of RTAs.

In the present study, majority of the accidents occurred at December (22%). This season also has close similarity with winter season in India where number of RTAs are on the rise.

Most of the accidents took place at National highways(68%). Front on collision is the most common way of accident in pillion riders. Skid and fall(66%) was found to be the major cause for the RTAs among pillion riders. According to Nupur Pruthi et al most of the accidents had taken place due to skid and fall(45.5%)\(^{8}\). The drivers exceeding the speed limits, not following traffic rules and reduced road maintenances are some of the probable reason. In the present study, in 62 victims other than injuries to Head& neck and Upper limb together comprising of 50%, injuries to the lower limb was the common injury. It was present in 43% of cases, followed by Thorax(3%), Pelvis(2%) and Abdomen(2%). Abrasion(72%) was the most common pattern of injury followed by Contusion(8%), Fracture & dislocation(8%), Laceration (6%) and other injuries(6%).Unlike K. Prasannan et al and P.A. Sheeju et al study which showed that Chest injury(43.13%) was the major injury in RTA among pillion riders\(^{9}\). There were no fatal cases of pillion rider RTAs reported in this one year study. 79% of the pillion riders were not using helmet at the time of accident. Head Injury was more in pillion riders than the drivers. It may be due to the usage of helmet by the drivers.

Conclusion

Road traffic accidents continues to be a threat, causing heavy loss of valuable human assets, along with loss of future economic growth. Interventions in RTA should include integrated efforts from the society, governmental and non-governmental organizations. Political guidance, good governance and a unfailing technical team are the essential components. The information obtained can serve as a guide for better management of victims of road traffic accidents and to establish Road safety measures.
**Recommendation:**

- Strict rules should be implemented to ensure mandatory Helmet usage for both drivers and pillion riders.
- Road traffic rules and speed limits should strictly be followed.
- Educating the public on pillion rider safety by the government.
- An engineering intervention is needed that will address the injuries typically sustained by pillion riders. A device to be devised as safety backrest for pillion riders and also other measures that will protect the lower limbs, chest, abdomen, and neck.

**Funding:** Self

**Conflict of Interest:** None declared.

**References**

A Retrospective study on Non Fatal Motor Vehicle Accident cases in the Emergency Department, Saveetha Medical College, Chennai

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Abstract

Aim & Objectives: To retrospectively study non fatal RTAs in the emergency department of SMCH with help of AR registers while studying various factors involving like pattern, site and time of injuries and age of the person involved.

Materials and Methodology: Data was collected for complete one year and all the cases in the year were included in the study, which thus constitute sample for the study. The retrospective study group consisted of all the RTA victims reporting to Emergency Department of SMCH in the study period from 1st January 2018 to 31st December 2018. These collected data were compiled with help of Excel.

Results: In this study a total of 911 cases were included who were admitted in the emergency department of SMCH. Males were the most commonly involved. Around 95% of the cases involved 2 wheelers. 65% of the accidents took place in the 6pm to 9pm range. Commonly involved age group is 18-30. 20% showed head injuries but the majority had injured their limbs.

Conclusion: This suggests that there has to be more awareness created amongst the youth population encouraging them to wear helmets and seat belts. More advancement is required in the field of automotive safety. Road safety must be embedded in the children’s curriculum from lower grade itself. More involvement of Traffic police, NGOs and other public awareness groups are required to enforce this.

Keywords: Accidents, Awareness, Non-fatal injury, Trauma

Introduction

A road traffic accident (RTA) is any injury due to crashes originating from, terminating with or involving a vehicle partially or fully on a public road. It is predicted that road traffic injuries will move up to the 3rd place by the year 2020 among leading causes of the global disease burden. An accident is not just 1 bad event; it’s the combination of a series of mechanical failures and a very bad luck.

Road traffic injuries are the 8th leading cause of death globally and sadly is also more prevalent in the most important age group that is needed for the growth of a country which is 15–29 years. WHO report says more than a million people die each year on the world’s roads and the cost of dealing with these consequences of these incidents runs to crores of rupees. Current trends suggest that by 2030 road traffic deaths will become the fifth leading cause of death (from 8th position) unless urgent action is taken.

Accidents are just not because of incompetence, but are due to carelessness, thoughtlessness and over confidence. The morbidity is particularly high in India is mainly because of our rapidly motorizing economy with poor or under developed roads with lack of proper road infrastructures and other safety needs on roads. The rules also play an important role as they don’t strictly enforce the rider to wear a helmet. When this is viewed from a better angle, it causes an economic problem nation wise, especially in developing and underdeveloped countries.
Most of us know the facts that, you’re most likely to die on the way to the airport than while you’re flying in an airplane. This means that car accidents are more incidental than air crash. 2008 Traffic Safety Facts Data says there are 1.27 fatalities per 100 million vehicle miles traveled. While the same report works out to nearly zero accidents per million flying miles. According to the aviation report, most of the mid air emergencies have been safely handled and no one died\(^1\). In actuality, driving is more dangerous, with more than 5 million accidents. Whereas there has been only 15 accidents on average per year. 2017 was the safest year with only 10 accidents throughout and only 44 lives were lost. This fact is true because of the volume of cars in the world when compared to airliners. All these facts show us that air travel is much safer. The odds of death in a car accident are to be 1 in 98 for a lifetime.

In 2004, the World Health Organization (WHO) and the World Bank launched the World report on road traffic injury prevention. It also aims to monitor the whole decade and to give suggestions on how to improve road safety\(^2\). In spite of all these efforts there has been no overall reduction in the number of people killed on the world’s roads: about 1.24 million deaths occur annually. But since there’s been a corresponding 15% global increase in the sales of number of registered vehicles, suggesting that interventions to improve global road safety have failed to account for this fact. And therefore there is still rise in RTA deaths except in about 8 developed countries which has successfully decreased their RTA mortality rates.

This lack of attention to road safety issues further adds to the load of problems of road traffic injuries and need public health concerns. Thus reducing the epidemic of accidents. This study was planned to understand the major causes/risk factors as well as nature, type and mode of occurrence of road traffic accidents in and around the areas of our hospital Saveetha Medical College, Thandalam, Chennai.

**Materials and Methodology**

This is a retrospective study. The study was conducted using AR (Accident Registers) logs available at the department of medical records, Saveetha Medical College, Thandalam, Chennai. The study period was from January 1\(^{st}\), 2018 to December 31\(^{st}\), 2018. A total of 911 cases were reported during this period. All of these cases were taken into the study. I took six factors for the analysis of the study. These are as follows;

- Age (person admitted)
- Sex (person admitted)
- Mode of transport involved (both parties)
- Time of accident
- Site of Injury
- Pattern of Injury

All these data were collected from the AR log books manually. It was then compiled with the help of Microsoft Excel (2007). These compiled data was then analyzed using SPSS software. All the frequencies and percentages were also obtained from this.

One important factor that was not included in this study is the cause of the accident which includes drunken driving, sleeping while driving or of exhaustion.

The minimum that was recorded in my study was 8 years and maximum was 69 years. So the age groups were split into groups of 15 years each. For example, 0-14 years and 15-29 years and so on. This makes it easier to study which age group is more affected and which is less affected.

Mode of transport involved were 2 wheelers, 4 wheelers, HMVs like lorry, 3 wheelers like auto rickshaws and pedestrians. The whole 24 hours of the day were split into a 3 hour segment. So there are 8 segments. Segment I is from 0000 hours to 0300 hours, Segment II is from 0301 to 0600 hours so on and so forth.

For the study of site of injury, I had split upper limb injuries into two (proximal and distal) and lower limb injuries into two (proximal and distal). Proximal in upper limbs are above the level of the elbow and distal means elbow and below level. In lower limbs proximal is above the level knee and distal means knee and below level. Trunk includes abdomen, thorax and back.

**Results**

In this study, all cases of poly traumatic injuries as well as simple trauma injuries. Multiple trauma is 55% of cases and 45% of cases came with simple traumatic injuries. It implies the presence of two or more separate injuries, at least one or a combination of which endangers the patient’s life\(^3\).
There were a total of 911 cases noted. Out of these victims who came to the ER, 87% of them were males and 13% were females.

However this couldn’t be because of the population distribution of Tamil Nadu, as it is 955 females per 1000 males according to the 2011 census. The most commonly involved age group was 15-29 years. This category contains the bunch of teenagers and young adults. Main reasons behind these accidents are carelessness, thoughtless driving and experimental stunting. This accounts to about 62.8% of the total accidents recorded. It amounts to 572 cases. The next highest category is the 30-44 years which accounts to about 21% which is 187 cases. Only 19 accidents involved children less than 14 years of age and 29 accidents were involved by senior citizens.

Traffic is of peak during 6pm to 9pm around Thandalam region. Therefore the accidents are also more during this time. 250 accidents were recorded during these hours. Second most highest is recorded in 9pm-12am part with 150 cases. Although we might tend to think that early morning accidents should be more common, these trends were not seen in my study.

This peak hour accidents could also be because of social factors like the mindset of the person who are returning home from office after a stressful day. Distractions also play a role. People using phones whilst driving, their spatial processing is reduced by 37%.

The number of 2 wheelers in urban areas like this significantly high, and so they are the most involved. The sales of 2 wheelers in India reached 20 million mark in 2018, which was double the number sold in 2010 which was at 11.24 million. This boom is very much evident in this study too as the two wheelers involved were 93.4% of total cases i.e. nearly 850 cases of 911 accidents. Less than 1% involved pedestrians.

Most of the injuries were of abrasion type. Abrasion is defined by an injury of destruction of the skin, which involves only the superficial layers of the epidermis and also doesn’t involve the whole thickness of skin. Number of cases which had abrasion type injury is 516 cases. This is the most common type of injury, as the study takes in cases only about non-fatal road traffic accidents. Abrasion is just mild. Others like laceration or contusion or even fracture can be fatal. Next commonest is laceration type with 36.3% of total cases.
This amounts to about 331. Followed by contusion and fracture at 5.3% and 1% respectively.

Data analysis is conclusive that most commonly injured sites are the distal parts of the lower limbs. This accounts to about 24.8%. All of the injuries were within close reaches of this value, that is, all of the bodies were injured equally. Next closest is Distal upper limbs at 23.4% followed by proximal upper limbs at 22.6%. Proximal lower limbs were at 20%. Unlike other case studies, head injuries involved in my study were surprisingly less. But this can be explained by the fact that this being a non-fatality study, prevalence of head injuries was low at a staggering 9%.

This rapid urbanization side by side with motorization must be addressed. But this can’t be stopped until we control the population explosion. All we can do is to prevent these accidents from happening. Encouragement of use of public transport can reduce this significantly. Doing this has double benefits: First of all it reduces accidents and number of vehicles on the road, and secondly it reduces the carbon footprints of all of us. But many of Indian population look down upon or refuse the use of public transport due to various reasons like to avoid the crowd and for reasons of hygenicity. So, in order to counteract this, the transport department must increase the frequency and number of buses or rails and ensure proper hygiene techniques are used.

From the school level itself we must create awareness among the children and teach them about the consequences. If bikes are the preferred transport, then proper driving equipment should be used. From wearing helmets to wearing gloves. To protect injuries to spine we have spine guards too. But for at least an average protection wearing of seat belts and helmets is to be made mandatory. Road safety measures are very simple solutions to these complex problems. There should be good road lighting and segregation of slow moving vehicles from fast moving vehicles, pedestrians safety in highways by use of Zebra crossing and sub ways for pedestrians(10). They can add proper signs along the sides of the road to warn the drivers(11). Nowadays there’s AI mediated driving technology growing.

Peak hour traffic can be managed by better road laying techniques and maintaining proper conditions of signals. In this study we found that 6pm to 9pm the accidents were the highest. This because of the traffic in the Thandalam area during that time. Strict implementation of rules by the court of law is much needed.

Last of all and most important change we have to bring in is the medical support. In case of an accident, ambulances must reach the site within a very short time and extensive training for paramedical staff is also one of the cornerstones to provide the first aid needed in the field. Better equipped ER with advanced trauma care must be in use.
Conclusions

This study was conducted in Saveetha Medical College, Thandalam, Chennai. Total of 911 cases were studied retrospectively about the non-fatal road traffic accidents that came to the emergency department during January 1st, 2018 to December 31st, 2018. Road vehicles have no respect for the human anatomical boundaries. They occur to people irrespective of age, sex, caste or religion.

The most involved age group was from 15-29 years. 87% were male. 55% had multiple injuries. Knees, legs and feet were the most injured parts with 56% of them had abraded type of injury. What we need is beehive coordination between doctors, engineers and government to tackle this problem and not some pinnacle of technology to save us.

Conflict Of Interest: None

Source Of Funding: Self Funding.

Ethical Clearance: Obtained from institutional ethical clearance bar

References

6. Ganveer GB, Tiwari RR. Injury pattern among non-fatal road traffic accident cases: a cross-sectional study in Central India.
Comparative Evaluation of Cention with Glass Ionomer Cement, Composite Resins and Silver Amalgam with Respect to Mechanical Strength: An in-Vitro Study

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Abstract

Introduction: Numerous direct filling materials are available to the modern dental practice from amalgams, GIC to modern bulk fill composites. Cention is an “alkasite” restorative. Alkasite refers to a new category of filling material, which like compomer or ormocer materials is essentially a subgroup of the composite material class. This new category utilizes an alkaline filler, capable of releasing acid-neutralizing ions. It is a tooth-colored, basic filling material for direct restorations. It is self-curing with optional additional light-curing. It is radiopaque, and releases fluoride, calcium and hydroxide ions. As a dual-cured material it can be used as a full volume (bulk) replacement material. Hence the Aim of the study was to compare the Alkasite (Cention N) with Silver amalgam, GIC and Composite to evaluate the Compressive strength & diametral tensile strength.

Materials and Method: Split molds of dimension 6 [height] x4 [diameter] was used to fabricate 15 samples of each material for testing the compressive strength and for tensile strength. And subjected under Universal Instron testing machine connected to a load measuring cell, to recorded load applied to the samples at a crosshead speed of 0.75 ± 0.25 mm/min till the samples fracture.

Results: Composite and Cention N showed significantly higher strength than Silver Amalgam and Glass ionomer cement.

Conclusion: Within the limitation of this study, it can be concluded that Cention N can be used as a superior alternative when compared with Silver Amalgam and Glass ionomer cement.

Keywords: Compressive strength, Diametral tensile strength, Restorative materials.

Introduction

Numerous direct filling materials are available to the modern dental practice – from amalgams through to modern bulk fill composites. Amalgam materials were first introduced to western dentistry in the 19th century, glass ionomer cements (GICs) were introduced around the 1970s, composites became standard during the 1980s, resin modified glass ionomers and compomers were introduced in the 1990s and the current decade saw the launch of several bulk-fill composites.

Dental amalgam is sufficiently strong to support moderate biting forces within the first hour. The clinical success of an amalgam restoration depends on various factors including: appropriate cavity preparation involving undercuts due to the non-retentive nature of amalgam, condensation technique, anatomical characteristics and final finish. Although the use of amalgam became popular in the west in the 19th century, its long history and popularity however have not shielded it from controversy.

Glass ionomers were invented in the late 60s, first described by Alan Wilson and Brian Kent in the
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early 1970s and introduced to the market soon after\(^6\). Despite their reasonable clinical performance in terms of retention, glass ionomers are usually far less esthetic than composite restoratives\(^7\). Glass ionomer cements offer depot ion-release and undoubtedly improve on the esthetics of amalgams but they provide far less strength and longevity. Both products clearly have certain drawbacks and represent a clinical compromise in one respect or another.

The advent of new composite restorative materials, together with new adhesives has brought enormous benefits - notably in terms of esthetics and strides towards minimally invasive dentistry. They may however be perceived as expensive, time-consuming and technique-sensitive. Their existence has not eliminated the need for or appropriateness of traditional “basic” dental materials.

Cention N is an “alkasite” restorative. Alkasite refers to a new category of filling material, which like compomer or ormocer materials is essentially a subgroup of the composite material class. This new category utilizes an alkaline filler, capable of releasing acid-neutralizing ions\(^8\).

Cention N is a tooth-coloured, basic filling material for direct restorations. It is self-curing with optional additional light-curing. It is radiopaque, and releases fluoride, calcium and hydroxide ions. As a dual-cured material it can be used as a full volume (bulk) replacement material.

Cention N consists of a separately packaged powder and liquid that are mixed by hand directly before use\(^8\). As a new category of filling material, it is essential to understand its mechanical properties with respect to the common existing permanent restorative materials. Therefore, in this study, it was decided to compare the diametral tensile strength of alkasite (Cention N) with Glass ionomer cement, composite resin and silver amalgam.

**Aim and Objectives**

To evaluate and compare the diametral tensile strength of Cention, GIC, Composite and amalgam.

**Materials and Method**

Materials used were Cention N, Fuji Type IX Glass ionomer cement, 3M ESPE Z 350 XT Composite resin and Dentsply Dispersalloy Silver Amalgam.

Diametral Tensile Strength Test:

Six specimens of 6.0 mm in diameter and 3.0 mm in height were prepared for each material. All the samples were made according to ADA specification number 27. The environmental temperature was controlled and the materials were prepared as per the manufacturer’s instructions except Composites. After mixing, the materials were put into into brass moulds, which were slightly over-filled with the materials. A piece of film was placed onto the material in the mould and covered with a glass slide. Hand pressure was then applied for 20 seconds while excess material was extruded from the top of the mould. Two minutes after the placement into the moulds, the assembly was placed in an oven at 37 ± 1 °C and 95 ± 5% relative humidity, for 15 minutes. Then, the specimens were ejected from the mould and stored in 6 mL of deionized water at 37 ± 1 °C. The diametral tensile strength was measured by placing disc shaped specimens of 6mm diameter and 3mm thickness on the lower platform of universal testing machine [Model:3366, Instron] and were loaded at a rate of 0.5mm/min until fracture. The DTS was calculated by dividing the highest load recorded during the test divided by area of the specimen and is reported in MPa [n=6]. Data were subjected to one-way analysis of variance (ANOVA) and a Post Hoc Tukey test for multiple comparisons (<0.001).
Results

Table 1: DTS of Individual of material

<table>
<thead>
<tr>
<th>Material</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Statistics/Mean squares</th>
<th>df2(welch) F(Anova)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CENTION</td>
<td>6</td>
<td>51.83167</td>
<td>6.424657</td>
<td></td>
<td>66.669 10.069</td>
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<tr>
<td>GIC</td>
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<td>2.948625</td>
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<td></td>
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<tr>
<td>COMPOSITE</td>
<td>6</td>
<td>65.90667</td>
<td>12.39706</td>
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<tr>
<td>SILVER AMALGAM</td>
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<td>23.23167</td>
<td>2.025433</td>
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</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>39.22583</td>
<td>21.92236</td>
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</table>

Table 2: Inter group Comparison of material tested

<table>
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<tr>
<th>Dependent Variable</th>
<th>COMPARISON GROUP</th>
<th>COMPARED WITH</th>
<th>MEAN DIFFERENCE</th>
<th>Std. Error</th>
<th>P VALUE</th>
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<tbody>
<tr>
<td>maximum Compressive stress (MPa)</td>
<td>CENTION</td>
<td>GIC</td>
<td>35.8983333*</td>
<td>4.16093</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>CENTION</td>
<td>COMPOSITE</td>
<td>-14.0750000*</td>
<td>4.16093</td>
<td>0.014</td>
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<tr>
<td></td>
<td>CENTION</td>
<td>SILVER AMALGAM</td>
<td>28.6000000*</td>
<td>4.16093</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Maximum Compressive stress (MPa)</td>
<td>GIC</td>
<td>COMPOSITE</td>
<td>-49.9733333*</td>
<td>4.16093</td>
<td>&lt;0.001</td>
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<tr>
<td></td>
<td>SILVER AMALGAM</td>
<td>COMPOSITE</td>
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<td>0.324</td>
</tr>
<tr>
<td></td>
<td>SILVER AMALGAM</td>
<td>COMPOSITE</td>
<td>42.6750000*</td>
<td>4.16093</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Comparison of Maximum Compressive stress (MPa) using one way ANOVA test shows that the mean value of Composite (65.906667) is highest followed by Cention (51.831667), Silver Amalgam (23.231667) least in GIC (15.933333). This difference is statistically Significant with a test value of 10.069 and p value of <0.001. Post hoc Tukey test shows that the difference between Cention and GIC is Statistically significant with a mean difference of 35.8983333* and p value of <0.001. The difference between Cention and Composite is Statistically significant with a mean difference of -14.0750000* and p value of 0.014. The difference between Cention and Silver Amalgam is Statistically significant with a mean difference of 28.6000000* and p value of <0.001. The difference between GIC and Composite is Statistically significant with a mean difference of -49.9733333* and p value of <0.001. The difference between GIC and Silver Amalgam is not statistically significant with a mean difference of -7.2983333 and p value of 0.324. The difference between Composite and Silver Amalgam is Statistically significant with a mean difference of 42.6750000* and p value of <0.001.

Discussion

Among all the restorative materials available, composite resin (Z350XT 3M ESPE) has become the material of choice for restoration of all teeth. The recognition of resin-based composite restoration has increased because of its excellent aesthetic and other favourable characteristics.
In the present study, comparing the results obtained, the null hypothesis was rejected as there was a significant difference in mechanical properties (DTS) among the newer posterior restorative material tested. The restorative materials used in the oral environment are subjected to various occlusal forces. In this study, the mechanical properties of various dental restorative materials were compared and studied. The analysis of DTS is important for the comparison of mechanical properties of dental materials which reflect which material is better to perform clinically and is resistant to the masticatory forces. The result of the study indicated that the four materials tested in the study differed statistically in terms of DTS with a p value of 0.001, which suggests a significant difference in mechanical properties. The findings of this work have shown that the nanofilled composite (Z350XT 3M ESPE) has relatively high DTS (65.90 MPa). Basically, the diametral tensile strength (DTS) is a property described by ADA/ANSI Specification 27 for characterizing dental restoratives. Diametral tensile was also high in Cention N (51.83MPa) as compared with the other tested materials. Composite (Z350XT 3M ESPE) and Cention N showed a statistically significant difference DTS with GIC (Fuji IX) and Silver amalgam with the p value significant at 0.001. The value of diametral tensile strength in Silver amalgam and GIC was 23.23 MPa and 15.93 MPa, respectively. The weakest mechanical properties were obtained by GIC (Fuji IX) with the mean value of 15.93 MPa in DTS. There are various studies with regard to the comparative evaluation of mechanical properties of restorative materials showing contradiction of results. This was in accordance with Kumar et al.9 and Chalissery et al.10 who did a comparative study on mechanical properties of direct core build-up materials. They concluded that the composite had high mechanical properties followed by Cention N and GICs showed the weakest; this is in agreement with our study.

**Conclusion**

In the present study, it can be concluded that the mean compressive strength and DTS values of all the four restorative materials were significantly different because the composite materials available have a variation in composition and viscosity. The nanohybrid composite Z350-XT has the highest DTS and the properties of Cention N were almost similar. Silver Amalgam and GIC (Fuji IX) exhibited the least values when compared with that of the other materials.

**Conflict of Interest:** NIL

**Source of Funding:** SELF

**Ethical Clearance:** Institutional Ethics Committee at Manipal College of Dental Sciences, Mangalore Ref No18079

**References**

8. Scientific Documentation; Cention N, Ivoclar vivadent AG; research and development scientific service, issue; October 2016.
Correlation between Stature and Length of Clavicle in Female Population of Central India

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Abstract

Introduction: Anthropology plays an important role in various medicolegal aspects; apart from determination of Age, Sex and Race of individual, stature is also one of the important parameter of identification various civil and criminal cases. Therefore efforts have been made to determine association between stature and length of clavicle if any.

Materials and Method: The present research was carried out in department of Anatomy JNMC Sawangi (M) Wardha; was conducted on total 50 Female individual of age 17–24. The length was calculated with the help of osteometric callipers for clavicles from anatomical landmarks and stature was calculated in centimetres.

Conclusion. From present research it was concluded that the length of clavicle and stature reveals positive correlation and the linear relationship between the living stature and length of clavicle of each side was carried out in the form of regression equation.

Key: Anthropology, clavicle, stature, correlation.

Introduction

Anthropometry which deals with expressing human form in numbers has been widely used in forensic identification and Anatomy. Identification includes determining sex, age, race and stature of a person. Among these, the sex and stature are the most important. Along with Age, stature also plays key role in ante mortem and post-mortem cases in identification of in various medicolegal cases.

Determination of stature is one of the important factors amongst age, sex and race in various cases, which can be useful for identification in various medicolegal cases. Determination of stature plays significant role in various medicolegal cases. In the field of anatomical, forensic and anthropology measurement of individual body parts plays very a vital role and to assess the various parameters in determination includes height of an individual. Various authors have confirmed correlation between stature and measurements of several parts of the body which are often represented using linear regression equation derived from them. At present many inherent population differences present among the different population, thus giving rise to the need for different formulae to be derived from different populations. Many authors like Terry, Thieme and Oliver, tried to determine correlation between stature and different bony measurement including clavicle. There are very few literature available in India, Singh et al, Jit et al envisages effort to determine correlation between stature and clavicle length.

Materials and Method

The current study was carried out in the department of Anatomy JNMC Sawangi (M) Wardha; was conducted on total 50 Female individual of age 17–24.
The length of the both clavicle was measured by means of a centimeter scale from anatomical landmarks with skin marking pencil and re checked by vernier calliper. Stature was measured in centimeter.

Participant has been asked to stand barefoot on a plane surface on the ground in upright position and was measured from the vertex to the foot according to the anatomical position and Frankfurt plane. To avoid diurnal variation, Measurements were taken at a set time. Exclusion of participant with obvious deformity or defects.

**Result**

A sample of 50 Females were considered, and the measurements were taken randomly using standard tapes. The data obtained were analyzed statistically using Microsoft Excel software, and the average living stature for an adult female was determined. The linear association between the living stature of individual and length of clavicle of each side was carried out. It was clear that the clavicle length showed a positive correlation with the stature. The mean value of the stature of the individual was found to be 156.12 and the length of the clavicle was found to be 13.132 and 12.926 for right and left clavicle respectively. The correlation coefficient \( r \) was calculated, and it was found to be significant correlation. The data are shown in Table 1 and Figure 1.

**Table 1: Correlation of height with length of right and left clavicle**

**Pearson's Correlation Coefficient**

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
<th>Correlation r'</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>156.12</td>
<td>3.58</td>
<td>50</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Length of right clavicle</td>
<td>13.132</td>
<td>1.081</td>
<td>50</td>
<td>0.3088</td>
<td>( p &lt; 0.01 )</td>
</tr>
<tr>
<td>Length of left clavicle</td>
<td>12.926</td>
<td>1.11</td>
<td>50</td>
<td>0.2427</td>
<td>( p &lt; 0.01 )</td>
</tr>
</tbody>
</table>

**Graph 1 showing correlation between length of clavicle and height of individual**
Discussion

Determination of stature from decomposed skeletonised residue is crucial in establishing the individuality of unknown person. Study conducted by Jakhar et al suggests that there is positive association between the stature and anthropometric dimensions\textsuperscript{11}.

Study have been conducted by Krishan et al to estimate height from the human skeleton, they suggested that different methods can be used to estimate the stature from the bone. The simplest and trustworthy method is by regression analysis\textsuperscript{12-13}.

Along with Clinical, dental examinations; bone examination also plays an important role to arrive at the opinion in medicolegal cases.\textsuperscript{14 15} Similarly skeletal maturity also based on life style, dietary climatic behavioural factors there for study are recommended in every region of India for academic and judicial interest.\textsuperscript{16 -18}

By using multiplication factor or regression formulae approximate stature of the individual can be determined from different long bones\textsuperscript{19}. Nagrale N, Patond S, found that identification in case of unknown body by using various anthropometric measurements and regression formula was helpful for forensic experts in various medicolegal cases\textsuperscript{20}.

Similarly Patond S et al found that determination of the stature from decomposed or skeletonised body and from remains is very crucial in establishing the identity of unknown individuals in various Medicolegal cases if one parameter is known, then with the help of regression formula we can find out the remaining parameters\textsuperscript{21}.

Conclusion

From present research it was concluded that the length of clavicle and stature reveals positive correlation and the linear relationship between the living stature and length of clavicle of each side. If the dimension of clavicle is obtained, the stature can be determined, would be useful for forensic experts and anthropologists in various medicolegal cases.

Ethical Clearance: Taken from institutional ethical committee.

Funding: Article did not receive any specific grant from funding agency

Conflict of Interest: Author declares that there is no conflict of interest

Acknowledgment: our sincere thanks to all participant of medical and allied health profession

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Forensic Investigation and Comparison of Blood Sample Referring to Thalassemia

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Abstract

Identification of an individual is one of the significant features of forensic investigation. The present study was conducted to study the difference between normal and thalassemic blood. The study was conducted on 40 blood samples aim to compare control and disease wet blood samples by using different methods of microscopy. The comparison was done based on the morphology of the RBCs and red blood cell count. A (monolayer) thin blood film is prepared on a slide with a wet blood sample and observed under a compound microscope. Red blood cell count is performed with the help of Neubauer’s chamber. Observation shows the changes in the morphology of red blood cells in the thalassemic population as compared to the control population, moreover based on total RBCs count the number red blood cell count found higher in the thalassemic population as compared to the control. Both morphology and Count significantly differed from the control population. Thus, the present method can be used in the daily routine at forensic science casework.

Keywords: Thalassemia, Forensic, Investigation, Neubauer’s chamber, RBC morphology

Introduction

Blood Disorders

Blood disorders affect one or more than one part of the blood and thus prevent the blood from doing its regular job that is transportation, regulation, and protection. Blood disorders can be inherited or other causes include some other diseases, side effects of some medicines and also can happen due to a lack of important nutrients in your diet.

Blood disorders mainly affect the three main components of the blood which are erythrocytes, leukocytes, and thrombocytes. These disorders affect the oxygen-carrying capacity of the blood, immunity and also the clotting property to heal the wounds.

Thalassemia is one of these disorders which generally affect the shape and size of blood cells.

Thalassemia

Thalassemia is a red blood cell disorder which is a rare genetic disease caused by the markedly decreases in accumulation of one of the globin subunits of hemoglobin. Hemoglobin is an iron-rich protein in red blood cells that carries the oxygen to different parts of the body, it also carries the carbon dioxide which a waste gas from the body to the lungs. Thalassemia is an anemic disease and the person can have both mild and severe anemia. Thalassemia is of two types one is alpha thalassemia and another is beta-thalassemia. Hemoglobin contains four protein chains i.e. two alpha globins and two beta globins. The two major types of thalassemia are named after a defect in this protein chains1.

Alpha Thalassemia

Alpha thalassemia is the disease that is the most common hemoglobin genetic defect which is caused due to the reduction in the alpha globin’s chains or due to the absence of alpha-globin chains2. The disease

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is prevalent in tropical and subtropical regions. But recently this disease is spreading throughout the world because of massive population migration. This disease is occurred most frequently due to the deletion in both or one of alpha-globin and least commonly due to non-deletion abnormality\(^2\). Symptoms: The person suffering from alpha thalassemia will show abnormal hemoglobin, microcytic anemia, and abnormality in the immune system, gallstones, cognitive impairment.

**Types of alpha thalassemia:**

HbH disease is the mild form and results from a defect in one alpha-globin and the presence of only one functioning alpha-globin gene. Due to this, there is the presence of excess beta chains and they form beta 4 tetramers. HbH is unstable and they are prematurely breakdown in spleen hence consequently hemolysis formed.

Hb Bart hydrops fetalis syndrome: the second type of alpha thalassemia in this disease there is an absence of all four alpha globins alleles\(^2\). It is moderately insoluble and thus accumulates in the red blood cells. Its presence indicates that one or more of the four genes that produce alpha globin’s chains are dysfunctional, causing alpha thalassemia. Fetal hydrops fetalis is characterized by an accumulation of fluid in at least two fetal compartments and cardiac failure. This condition is so severe that the foetuses are either stillborn or die soon after death\(^3\).

**Beta Thalassemia:**

Beta thalassemia is a hereditary disease, which is characterized by abnormalities that occur in synthesis or accumulation of the beta chains of hemoglobin which results in severe anemia to clinically asymptomatic individuals. Anemia begins at the 3-6th month of age. It is caused by the reduction or absence of the synthesis of beta globins chains of the hemoglobin tetramer, as we know that hemoglobin tetramer contains two beta chains and two alpha chains, thus the mutation in beta chains cause beta thalassemia\(^4\). A large number of imperfect red cells destroyed in bone marrow, giving rise to ineffective erythropoiesis, a prominent feature of disease\(^1\). Beta thalassemia is further of three types that is thalassemia major, thalassemia intermedia and thalassemia minor also known as beta-thalassemia carrier state\(^4\). The person suffering from beta-thalassemia major shows the symptoms of severe anemia within two years of life and they require a regular blood transfusion. The person with this disorder shows various features such as diabetes mellitus, parathyroid, thyroid, liver fibrosis, etc.

**Fig 1. Showing Difference between control and thalassemia population**

In forensic science the blood act as very important evidence, blood residue acts as a weapon which helps the investigator in the identification purpose, reconstructs a criminal action and links the suspect to the crime. Various studies show that thalassemia is a disease in which there is changes occur in the morphology of the red blood cells. The shape, size, color of the cells show clear changes that can be identified with the help of microscopy. Thus in forensic science, it is easy to determine if blood is present in the crime scene then that blood is from a normal person or thalassemic patient.

Hence, this study was designed on thalassemia patients to identify their blood using a normal microscope and compare the shape of RBC with the control population to distinguish between thalassemic
and non-thalassemic patients. All these help to narrow down the search of the area by taking inclusion and exclusion, identification of the suspected person which ultimately provides a lead in the investigation and helps the investigator to link the person with the crime.

**Materials and Method**

**Chemicals**: Ethylene diamine tetraacetic acid (EDTA) used as an anticoagulant, Ethanol, 1% HCL, Leishman’s Stain, Buffer, Distilled water, Saline water.

**Glass Ware**: Glass slides, Coverslips, Dropper, Test tubes, Beakers

**Instruments**: Compound Microscope of Microcater instrumentation, Haemocytometer (Neubauer Chamber)

**Sample collection**

A total of 40 samples of blood were collected out of which 20 were collected from normal people and 20 were collected from the patients suffering from thalassemia. Samples were collected from the laboratories of hospitals (left after hematological test) and all the samples are stored in EDTA vials and labeled properly. Only waste blood samples were collected from the laboratories situated in hospitals in the Chandigarh region.

**Procedure for Microscopy.**

1. Blood films are prepared by placing the drop of blood on one end of the slide with the help of a micropipette.
2. The blood is dispersing over the slide’s surface to form a monolayer. The slide was left for a few minutes to air dry. The dried slide was fixed by immersing into methanol for 3-4 minutes. Afterward, the slide was stained with Leishman stain, 2-3 drops of dye were put on the slide and wait for left for 3-4 minutes.
3. The slide was diluted using the buffer for 7-8 minutes. Buffer is used to maintaining the pH so that cells do not get destructed. The slide was washed and observed under a microscope for morphology.

**Procedure for Neubauer Chamber**

1. A 1:200 dilution of blood was prepared.
   - A 20 microlitre of whole blood placed on the tube.
   - RBC diluting fluid was mixed and shaken with mechanical shaker for 2-3 minutes.
2. 10 microlitres of blood filled to each slide of the counting chamber. Once the counting chamber is filled with the sample allow the cells to settle for 2-3 minutes before counting.
3. Count of cells: Counting was done under a microscope

![Fig. 2 The shape of RBC in normal Blood at 100X](image)
Fig. 3. The shape of RBCs in Thalassemic blood 100X

Fig. 4. The shape of RBCs in Thalassemic Blood at 40 Red

**Blood Cell count**

**Table 1. Variation of red blood cell count between normal and thalassemic blood**

<table>
<thead>
<tr>
<th>Samples</th>
<th>Red Blood cell Count (cells per microliter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Blood</td>
<td>4.5 million</td>
</tr>
<tr>
<td>Thalassemic blood (S1)</td>
<td>7.2 million</td>
</tr>
<tr>
<td>Thalassemic blood (S2)</td>
<td>7 million</td>
</tr>
<tr>
<td>Thalassemic blood (S3)</td>
<td>7.2 million</td>
</tr>
<tr>
<td>Thalassemic blood (S4)</td>
<td>7.5 million</td>
</tr>
<tr>
<td>Thalassemic blood (S5)</td>
<td>6.8 million</td>
</tr>
<tr>
<td>Thalassemic blood (S6)</td>
<td>6.9 million</td>
</tr>
</tbody>
</table>
### Table No. 2: Showing Comparison in the Shape of Cells

<table>
<thead>
<tr>
<th>S. 1</th>
<th>The Shape of RBCs in Thalasemic Blood Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>N.1</th>
<th>The shape of RBCs in Normal Blood Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image2.png" alt="Image" /></td>
<td></td>
</tr>
</tbody>
</table>

#### Result

Blood samples were taken both thalasemia and normal population and observed under the microscope and the changes in the blood were observed which are explained further.

On observing the blood sample of thalasemia patients, different shapes of erythrocyte were found. Out of which the hypocromic, microsite shapes were observed in greater number, other shapes like targeted, acanthocyte, basophilic, schistocyte, barr cell were also observed in the average number and limon cell were observed in the least number during the study wherein the control sample no such shape change observed and normal or basic changes were observed.

On comparing the blood sample on basic of cell count different level of cell volume or cell count was observed both in thalasemic and control population. The level of RBCs was found to increase in the thalasemic population as compared to the control population. The volume of erythrocyte observed in the control population was 4-5 million/microliter of blood...
where 6.8-7.2 million/microliter was observed in the thalassemic population. Hence thalassemia patients are richer in the count of corpuscles than control.

At the end of the observations, it results that the hypothesis made during the research is an alternative hypothesis.

**Discussion**

A total number of 40 samples were taken, 20 samples of normal blood and 20 samples of thalassemic blood. The study was designed in such a way that each sample was studied by using different methods and comparison is done between the normal blood and thalassemic blood. Two methods are used to study the wet blood those are microscopy and red blood cell count.

According to various previous studies change in the morphological shape of erythrocytes were observed due to the formation of methemoglobin and precipitation of globin. Bunyaratvej et al. in 1985 performed a study on thalassemia patients an analyzed the shape of RBC especially in Beta-thalassemia and observed the change in the shape from normal (biconcave) RBCs to torocytes, acanthocytes. Galanello and Origa in 2009, performed a study in beta-thalassemia patients, they also observed the morphological changes in the shape (speculated teardrop, elongated and nucleated) RBCs from normal morphology of RBCs. Galanello and Cao in 2011, work on alpha thalassemia patient Alpha thalassemia is a very rare disease that affects the shape, size, color and total count of the RBCs. RBCs number was found to be increased. Akrimim Jameeka Ali et al. in 2013 performed a study in a different type of anemia and study the effect on RBCs. They found 93% shape in RBCs was abnormal form the basic shape. Founded abnormal shapes were hypocromic microsite, targeted, acanthocyte, basophilic, schistocyte, barr cell, limon cell. All these abnormal shapes of RBCs are already reported in above given previous studies, from the comparison and cell characterization were made (Bunyaratvej et al. in 1985) (Renzo Galanello and Rafaella origa in 2009) (Renzo Galanello and Antonio Cao in 2011) (Akrimim Jameeka Ali et al. in 2013) all previous study supports and validate the current study.

Studies show that total RBCs count is higher in thalassemic blood as compare to normal blood because due to the lack of hemoglobin body is not able to get enough amount of oxygen thus to overcome this situation body tends to make more and more red blood cells to carry more and more oxygen. Evan and Jehle in 1991, studied on anemic population and reported that anemia can be categorized based on mean corpuscular volume and red blood cell distribution. Galanello and Rafella in 2009, worked on beta-thalassemia and reported the increase in the number of RBCs after splenectomy. Again, Galanello and Cao, worked on alpha thalassemia and reported that same observation as in previous research, the increase in the count of RBCs.

In the current study, number or count and volume of RBCs were analyzed, the results observed were the same as observed in previous studies. The count and the volume of RBCs were found to increase in the thalassemic population form normal volume and comparison to the control population. The volume of RBCs was observed on an average of 4-5 million/microliter where in thalassemic population volume was 6.8-7.2 million/microliter, which is far greater than the control population. So, it will be easy for the comparison between normal and anemic patients.

All the results observed are found the same as in the previous study which indicates that the previous study supported the present study, moreover the presented method can be used as a tool for identification of individual as class characteristics. As the class characteristic help in narrow down the area of investigation, the presented method also helps to narrow down the area of investigation and research, rather than used sophisticated instruments/methods and tests to narrow down the investigation. According to J. Ford in 2013 RBCs morphology can be used for identification in hematology laboratory and microscopy can easily help in identification. So, abnormal shape RBCs using microscopy can be used as a tool for personal
identification. Ja hyun, Yang and lee in 2012 stated that body fluids will give important insight into crime scene reconstruction by supporting a link between the donor and criminal act. 

According to Colah, Italia, and Gorakshakan, a low rate of thalassemia was found in India, on an average 10000-12000 thalassemic children born in India where specifically in Maharashtra and Gujarat per 1000 birth 0.28 and 0.39 % was born with thalassemia. Data is also available based on communities that reveal a minimum of 4% to a maximum 17% population was affected with thalassemia. The less prevalence of thalassemia used as a tool for the identification of a suspect or narrow down area of investigation. Blood sample comparison sets criteria for inclusion and exclusion of individuals with different blood diseases and saves time and gear up the investigation. Such types of evidence play a crucial role in criminal trials and help to link the suspect with the crime by determining whether they having a common source or not. (Thompson Williams).

Presented research can be used in analyzing of regular cases encounter with the forensic science investigation for further research and investigation.

**Conclusion**

The study shows that the comparison between the normal and thalassemic blood is possible based on the morphology/shape of the RBCs and total red blood cell count by using a wet blood sample. This study is helpful to compare the blood evidence found at the crime scene, based on this comparison it is possible to link the suspect with the crime and helps to narrow down the investigation.

**Limitations:** RBC count can only be done with the wet blood sample., Dry blood can also be used for investigation purposes.

**Further Scope:**

The size of the RBCs is also a factor that can also be used for the comparison; the size of red blood cells gets smaller and smaller in thalassemic blood.

The Colour of the RBCs can also be included as a factor for comparison.

Use of dry blood for all investigations.

**Conflict of Interest:** Authors shows no conflict of interest.

**Source of Funding:** Self/ no funding was provided by any agency.

**Ethical Clearance:** NA (waste blood used for study).

**References**

Perspective of Maternal Deaths: A Retrospective Autopsy Study

Patekar M B., Jagtap N.S., Pawale D.A.

Abstract

Reducing maternal mortality has been a constant struggle globally. The major causes of maternal mortality remain to be ante and post-partum haemorrhage, anaemia, obstructed labour, hypertensive disorders and post-partum infections, liver disorders as observed in various studies. The present study was carried out with view to determine factors causing maternal deaths, and utility of autopsy with autopsy record as a useful and adjunct data source for ascertainment of maternal deaths. In this study we have retrospectively considered the autopsy of maternal cases during 2015 to 2019 referred to RCSM GMC Kolhapur, Kolhapur, Maharashtra. Of the total 66 cases of maternal deaths, maximum number of cases were seen in age group of 20 to 29 years comprising 42 out of 66 (63.63%), Maximum cases 53 (81.30%) were resident of rural areas. Maximum causes of death on autopsy were direct causes, of which hemorrhage was the predominant cause. Most of the cases (42 out of 66 ) died within 24 hours of admission to the hospital. The determinants of maternal mortality need to be studied through the lens of autopsy.

Key words- Maternal mortality, medicolegal autopsy, Direct Causes, Indirect Causes, Hemorrhage.

Introduction

In the past decade, India has been able to reduce maternal mortality from 206 to 181 maternal deaths per 100000 live births, but with 17 % (50000 maternal deaths) of all maternal deaths occurring in India, it still is the highest contributor of maternal deaths in the world followed by Nigeria (14%, 40000).

Maternal death is used as a proxy indicator to assess the country’s maternal and reproductive health status. World wide about 830 women die every day of preventable causes related to pregnancy and childbirth, 20 % are from India.

Maternal mortality is defined as “The death of a woman while pregnant or within 42 days of termination of pregnancy (delivery) irrespective of the duration and site of the pregnancy from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes. Delivery includes, abortions (spontaneous, legal and illegal), live or stillbirths, vaginal or cesarean deliveries. WHO classifies maternal deaths causes into four groups:- 1) Direct 2) Indirect 3) late due to unanticipated complications of management, and 4) incidental deaths.

The four groups into which the cause of maternal death can fall are:

1. Direct causes: Direct obstetric deaths are those resulting from obstetric complications of the pregnancy state (including pregnancy, childbirth and the puerperium to 42 days), such as deaths as a result of obstetric haemorrhage or eclampsia.

2. Indirect causes: Indirect obstetric deaths are those resulting from previous existing disease or disease that developed during the pregnancy which was not a result of direct obstetric causes, but which was aggravated by the physiologic effects of pregnancy, such as cardiac conditions aggravated by pregnancy.

3. Unanticipated complications of management: these are deaths resulting from interventions, omissions, incorrect treatment or from a chain of events resulting
from any of the above during pregnancy, childbirth or the puerperium (up to 42 days).

4. Incidental: Cause unknown and thus not attributable to either direct or indirect causes.

High-quality antenatal, intra-natal and postnatal care and emergency obstetric care are the most important ways to reduce the maternal morbidity and mortality. This study was aimed to analyze the causes of maternal death through autopsy records.

Objectives-

1. To know the causes of maternal death subjected to autopsy.

2. To categorize the causes according to various groups.

3. To identify various factors which influence maternal deaths.

4. To suggest measures to prevent maternal deaths.

Material & methods:-

A total of 66 cases of maternal death which underwent medico-legal autopsy during the period of January 2015 to June 2019 were studied at the Department of forensic medicine and toxicology, RCSM GMC, Kolhapur, Maharashtra. The current study includes maternal death cases referred from private hospitals, peripheral government hospitals, remote areas, and the cases which were brought dead. The cases of maternal deaths which were treated at the same institute, were also brought for medicolegal autopsy. All the autopsies in maternal death were performed by a team of forensic expert, pathologist and a gynecologist, after an inquest along with the clinical papers were received for the same. Cases from the year January 2015 to June 2019 were studied retrospectively after detail analysis of the postmortem reports, inquest papers and histopathology reports.

The study involved a detailed analysis of the postmortem findings including the history of each case, with the external examination and internal findings pertaining to the maternal death. The pregnancy related findings apart from the organs of generation like the fetus if present, placenta, upper vagina, broad ligament, internal iliac vessels, etc were also studied to conclude the given cause of death after postmortem examination.

Observations & Results

It is observed from this study [table no.1] that out of the 66 cases of maternal mortality brought for autopsy in the study period, maximum number of maternal deaths were seen in age group of 20 to 29 years comprising 42 (63.63%) and 14 (21.21%) cases were found in the age group 30 to 34 years of age. Only 4 cases belong to the age category below 20 years and 6 cases above the age 35 years.

Table no. 1 Distribution of maternal deaths as per mentioned variables and criteria.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Variables</th>
<th>No of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years.</td>
<td>&lt;20</td>
<td>4</td>
<td>6.06%</td>
</tr>
<tr>
<td></td>
<td>20-29</td>
<td>42</td>
<td>63.63%</td>
</tr>
<tr>
<td></td>
<td>30-34</td>
<td>14</td>
<td>21.21%</td>
</tr>
<tr>
<td></td>
<td>&gt;35</td>
<td>6</td>
<td>9.09%</td>
</tr>
<tr>
<td>Region wise distribution</td>
<td>Urban %</td>
<td>53</td>
<td>19.70%</td>
</tr>
<tr>
<td></td>
<td>Rural%</td>
<td>13</td>
<td>81.30%</td>
</tr>
<tr>
<td>Phase of gestational age</td>
<td>1st trimester</td>
<td>2</td>
<td>3.03%</td>
</tr>
<tr>
<td></td>
<td>2nd trimester</td>
<td>10</td>
<td>15.15%</td>
</tr>
<tr>
<td></td>
<td>3rd trimester</td>
<td>20</td>
<td>30.30%</td>
</tr>
<tr>
<td></td>
<td>Full Term</td>
<td>34</td>
<td>51.51%</td>
</tr>
<tr>
<td>Gravida</td>
<td>primigravida</td>
<td>26</td>
<td>39.39%</td>
</tr>
<tr>
<td></td>
<td>2nd gravida</td>
<td>21</td>
<td>31.81%</td>
</tr>
<tr>
<td></td>
<td>3rd gravida</td>
<td>13</td>
<td>1.96%</td>
</tr>
<tr>
<td></td>
<td>4th gravida</td>
<td>4</td>
<td>6.06%</td>
</tr>
<tr>
<td></td>
<td>&gt;4 grand-multipara</td>
<td>2</td>
<td>3.03%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>66</td>
<td>100%</td>
</tr>
</tbody>
</table>

Maximum cases 53 (81.30%) were resident of rural areas where as rest 13 cases (19.70%) belonged to urban area [table no. 1]. Most cases (33) of maternal mortality were referred for autopsy from the government hospitals including the present institute where the study was conducted, while 27 cases were referred from the private hospitals, and 6 cases were directly brought as dead to the casualty. Most of the cases (34) were with full term gestation while only 2 cases belonged to the first trimester [Table no. 1]. Death occurring in the 3rd trimester were the second most with 20 no. of cases. 26 cases of maternal mortality were primigravida, and least no. of cases belonged to the 4th gravida and above [Table no. 1].
Table no. 2 Fetal outcome in maternal deaths.

<table>
<thead>
<tr>
<th>Fetal outcome</th>
<th>Intra-uterine fetal death</th>
<th>Liveborn</th>
<th>Stillborn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intra-uterine fetal death</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liveborn</td>
<td>34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stillborn</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fetal outcome in 1st and 2nd trimester

<table>
<thead>
<tr>
<th>Fetal outcome</th>
<th>Aborted</th>
<th>Premature delivery</th>
<th>Death in utero</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aborted</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Premature delivery</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Death in utero</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Maximum no. of 34 cases were liveborn in maternal deaths followed by 20 cases with intra-uterine fetal death in the last trimester and full term. Total 10 maternal deaths occurred in the first and second trimester with fetal outcome as abortion in 2 cases, premature delivery in 2 cases and death in utero in 6 cases [table no. 2].

Maximum causes of death on autopsy were direct causes, of which hemorrhage was the predominant cause (24 no. of cases) [Table no. 3]. Sepsis and respiratory infections during pregnancy and after delivery were responsible for deaths in 17 cases. Indirect causes were responsible for 12 cases of maternal death and only one case had incidental cause of death.

Table no. 3 Distribution of cases according to the causes of maternal death.

<table>
<thead>
<tr>
<th>1) DIRECT CAUSES</th>
<th>No of deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemorrhagic causes</td>
<td></td>
</tr>
<tr>
<td>i) Uterine atony</td>
<td>postpartum hemorrhage</td>
</tr>
<tr>
<td>ii) Uterus/ Genital-tract trauma</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Uterine rupture</td>
</tr>
<tr>
<td></td>
<td>Cervical tear</td>
</tr>
<tr>
<td></td>
<td>Vaginal tears</td>
</tr>
<tr>
<td></td>
<td>Uterine inversion</td>
</tr>
<tr>
<td></td>
<td>Intraperitoneal bleeding following bicornuate uterus</td>
</tr>
<tr>
<td>iii) Placental causes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Placenta acreta</td>
</tr>
<tr>
<td></td>
<td>Placenta previa</td>
</tr>
<tr>
<td></td>
<td>Partial separation of lower end of placenta with vaginal tears</td>
</tr>
<tr>
<td></td>
<td>Abruptio placentae</td>
</tr>
<tr>
<td>iv) Postoperative</td>
<td>MTP-Dilatation and curettage post –LSCS</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Respiratory causes during pregnancy/delivery
Cont... Table no. 3 Distribution of cases according to the causes of maternal death.

<table>
<thead>
<tr>
<th>Causes</th>
<th>No of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Septicemia</td>
<td>3</td>
</tr>
<tr>
<td>Pneumonitis</td>
<td>9</td>
</tr>
<tr>
<td>Pleural effusion</td>
<td>4</td>
</tr>
<tr>
<td>Lung collapse</td>
<td>1</td>
</tr>
<tr>
<td>Pregnancy Induced Hypertension</td>
<td></td>
</tr>
<tr>
<td>DIC</td>
<td>9</td>
</tr>
<tr>
<td>Ecclampsia with hepatic disorders</td>
<td>3</td>
</tr>
</tbody>
</table>

INDIRECT CAUSES

<table>
<thead>
<tr>
<th>Causes</th>
<th>No of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chronic pyelonephritis</td>
<td>1</td>
</tr>
<tr>
<td>Aplastic anemia</td>
<td>1</td>
</tr>
<tr>
<td>Adenocarcinoma of gall bladder</td>
<td>1</td>
</tr>
<tr>
<td>Hepatic encephalopathy with hepatitis E</td>
<td>1</td>
</tr>
<tr>
<td>Subarachnoid hemorrhage</td>
<td>1</td>
</tr>
<tr>
<td>Bronchopneumonia</td>
<td>6</td>
</tr>
</tbody>
</table>

2) INCIDENTAL CAUSES

<table>
<thead>
<tr>
<th>Causes</th>
<th>No of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total no. of maternal deaths referred for autopsy</td>
<td>66</td>
</tr>
</tbody>
</table>

Table no. 4 No. of cases with referral to higher centers

<table>
<thead>
<tr>
<th>Referral of cases</th>
<th>No of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brought in dead</td>
<td>6</td>
</tr>
<tr>
<td>No referral (death in same hospital)</td>
<td>30</td>
</tr>
<tr>
<td>To private hospital</td>
<td>8</td>
</tr>
<tr>
<td>To government tertiary hospital</td>
<td></td>
</tr>
<tr>
<td>From private hospital</td>
<td>7</td>
</tr>
<tr>
<td>From primary health center</td>
<td>10</td>
</tr>
<tr>
<td>From rural hospital</td>
<td>2</td>
</tr>
<tr>
<td>From civil hospital</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
</tr>
</tbody>
</table>

A total of 8 cases were referred to private hospital, while 22 cases were referred to this tertiary government institute including 7 cases referred from private hospitals and 15 cases referred from peripheral government hospitals. Total 30 cases were treated at the same hospital without any referral to higher centres [table no. 4].

Table no.5 Distribution as per period of hospital stay

<table>
<thead>
<tr>
<th>Period of admission in hospital</th>
<th>No of cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;24hrs</td>
<td>42</td>
</tr>
<tr>
<td>&gt;24 hours to 1 week</td>
<td>12</td>
</tr>
<tr>
<td>&gt;1 Week</td>
<td>2</td>
</tr>
<tr>
<td>Brought in Dead</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
</tr>
</tbody>
</table>
Most of the cases (42 out of 66) died within 24 hours of admission to the hospital, while about 12 cases died within one week of admission. 6 cases were declared as brought in dead before treatment [Table no 5].

**Discussion**

Worldwide about 830 women die every day of avoidable causes associated with pregnancy and childbirth, 20% are from India.\(^7\) Deaths due to conditions related to pregnancy and childbirth is considered the 6\(^{th}\) biggest cause following infectious and parasitic diseases, injuries, conditions not elsewhere classified, cancer, and cardiovascular diseases.\(^8\)

The various causes of maternal death are being highlighted depending upon the classification of maternal deaths into direct and indirect deaths. Indian subcontinent has a considerably greater maternal mortality attributable to sepsis, infection and hemorrhage.\(^9\)

A broad summary of the extent and distribution of the causes of maternal deaths is critical to reform reproductive health policies. With this vision we conducted the study based on the medicolegal autopsy done in cases of maternal deaths during the period of January 2015 to June 2019 at RCSM GMC Kolhapur.

In the present study, higher incidence of maternal deaths 42 (63.63%) in the age group 20 to 30 years is in accordance with that observed by Thomas et al\(^{10}\), Kuralkar et al\(^{11}\), Mukherjee et al\(^{12}\), Soni et al\(^{13}\), Patil et al\(^{14}\). 20-30 years age is the most fertile age of a female, with obvious dominance in maternal deaths is this age group.

Considering the residence pattern, 19.70% females were residing in urban area and rest 81.30% were from rural areas. The high proportion of females from rural area in maternal death was in consistency with the observations of Soni et al\(^{13}\) and Bangal et al\(^{15}\). However, these results are in dissimilarity with that observed by Kuralkar et al\(^{11}\) and Patil et al\(^{14}\) who noted dominance maternal deaths in urban section. Women from rural section belong to lesser awareness about the maternal health, ignorance to nutrition necessary during pregnancy, poverty along with distant health facilities at the rural areas in the vicinity of this region.

34 cases of maternal death were in full term gestation, while 20 cases were in the 3\(^{rd}\) trimester and only 2 cases belong to the first trimester. The predominance of the maternal deaths in full term gestation points the sudden risk involved during prelabour, labour and post labour period. Predominance of death in the full term gestation and 3\(^{rd}\) trimester was consistent with the observations by Badrinath et al (42.20\%).\(^{16}\)

26 cases of maternal mortality were primigravida, while 21 cases were of second gravida and least no. of cases belonged to the 4\(^{th}\) gravida and above. The long stages of labour in primigravida increases the period of risk of maternal complications. However, our observations were not in consistency with observations by Kuralkar et al where multipara (47.4%) dominated the primigravida (46.3%) in maternal deaths and in Mukherjee et al\(^{12}\) deaths in multipara (75%) were more as compared to primigravida (25%).\(^{11}\)

In this current study we observed that most common cases of maternal deaths were due to direct causes i.e 83.3%, among them hemorrhagic shock (39.39%) was the most common. It was followed by septicemia and infective causes (25.75%) and pregnancy induced hypertension (18.8%). Maternal deaths due to indirect causes which was 16.66% which included death causes like kidney infections, pneumonia, anemia, subarachnoid hemorrhage, hepatitis. One incidental cause due to swine flu infection to which was unrelated to pregnancy was observed in this study. Dominance of direct causes over the indirect causes was consistent with the observations by Thomas et al\(^{10}\) which included 60% direct causes over 37% indirect causes and by Kuralkar et al\(^{11}\) (89.4% direct causes over 10.5% indirect causes). In the current study, 12 cases died due to uterine atony induced postpartum hemorrhage as evident by soft, flabby uterus on autopsy. 3 cases died due to uterine rupture, 3 cases due to vaginal and cervical tears. One death was related to hemorrhage following lower segment caesarean section and one maternal death was related to post abortion complications.

Of the total 66 cases, 30 cases died at the same treating hospital while 6 cases were directly brought in dead at the casualty. In the study 30 cases were referred to higher treating hospitals, which involved 8 private hospitals and 22 cases were referred to this government tertiary hospital. Patil et al observed high referral from private hospitals which was in contrast with our study.\(^{14}\)

Of the 12 cases which were referred from government hospitals, 10 were from the primary health centers, signifying importance of gynecologists and
lack of proper facilities including timely transportation. Badrinath et al observed that comparatively high MMR probably because of the many complicated referrals from rural areas and the referrals were brought in the last stage of maternal complications, which is consistent with our observations. \(^\text{16}\)

In this study we observed that 63.63% cases died within 24 hours of admission, while only 2 cases died following a prolonged hospital stay of more than a week which was consistent with Mukherjee et al\(^\text{12}\). Considering the factors like delay in referral, sudden deterioration of the health in the health due to pregnancy and labour complications, early death even on hospital admission might be the reason for death within 1 day of admission.

**Conclusion**

Maternal death is not just a health issue, but a social injustice which leads to breakdown of the vital pillar of the family. Lack of acceptable referral facilities to provide emergency obstetric care for complicated cases also subsidize to high maternal mortality rate. To lower maternal mortality following steps must be taken into consideration.

- Training the medical officers in maternal health services can achieve remarkable improvement in maternal and perinatal outcome.
- Early recognition of high risk cases through ANC, timely sonography, good healthy communication between the health staff accompanied with proper transport facilities.
- Guidance from the hospital administration to implement the national health programmes of the Ministry of health like Janani Suraksha Yojna to prevent home deliveries or deliveries by unqualified staff.
- To discuss local cases of death or severe morbidity and identify immediately remediable local solutions in relation to maternal morbidity.
- Maternal death audit which should include the forensic experts, pathologists in addition to gynecologists to discuss reasons, factors and lack of proper management leading to maternal death.

**Disclosure of Interests** - None

**Source of Funding** - None

**Acknowledgement** - None to declare

**Ethical Clearance** - Approved by the institutional ethical committee

**References**

12. Mukherjee S, Mukherjee S, Sarkar R. A six year retrospective study of maternal mortality at a tertiary teaching institute in Uttar Pradesh. International


Effect of Nordic and Normal walking on coronary risk factors among middle aged obese population: Comparative Study

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Abstract

Background: In recent years, obesity significantly increased in all the age groups due to sedentary lifestyle. It can result into chronic heart disease. So walking is very beneficial for every individual therefore this study is aimed to compare the effect of Nordic and Normal walking on coronary risk factor in middle aged obese population. 32 middle aged obese individuals were participated in this study they were divided into 2 group. One group performed Nordic walking and other Normal walking and evaluate the efficiency of Nordic and Normal walking for the coronary risk factor.

Objective: To assess the W-H Ratio BMI, HDL and LDL level

To find out the pre and post effect of Nordic and normal walking on the coronary risk factors.

Methodology: The study subjects were 32 middle aged obese individuals. They were divided into 2 groups. The primary intervention to Group A consist of a Nordic Walking and Normal walking for group B. Individuals were selected according to inclusion criteria age between 45-65 years, Body Mass Index ≥30 kg/m², Waist – Hip Ratio > 0.9 cm for men and 0.8 cm in female, HDL < 40mg/dL, LDL > 130 mg/dL and exclusion criteria was individuals taking medication which influence the variable measured, any orthopedic condition that limit the exercise, unstable angina, uncontrolled hypertension – SBP ≥ 200 mmHg and DBP ≥110 mmHg.

Result: Statistical analysis for BMI, Waist – Hip ratio, LDL and LDL level was significant (P value = 0.0001) in individuals performed Nordic walking. In normal walking P value is changes in BMI, W-H ratio, HDL and LDL level which was not significant.

Conclusion: From this study, it can be concluded that the Nordic walking reduces the coronary risk factor in middle aged obese population than the normal walking.

Keywords: Nordic walking, Coronary risk factors – BMI, HDL, LDL, WHR , middle Age . Obesity

Introduction

Obesity is a medical condition in which excess body fat has accumulated to the extent it may have a negative effect on health [¹]. In recent studies have reported globally, more than 1.9 billion adults are overweight and the 650 million people are obese and approximately 2.8 million deaths are reported due to obesity. Its due to the sedentary life style, consumption of high energy dense food, lack of physical activity. In India prevalence of obesity and central obesity varies from 11.8% to 31.3% and 16.9% to 36.3% respectively and in urban population prevalence of obesity was12.7% compared to 5.4%in rural area [¹] According to WHO obesity defined as BMI greater than 30kg/m² is significant and it is linked to health problems such as increased LDL

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level, total cholesterol level, reduce insulin sensitivity and diabetes, CVD, cancer and sleep apnea, joint pain such as OA. In previous studies they show that it affects the physical functioning, role limitations due to physical problems, bodily pain. They facing difficulty in walking, climbing upstairs, shortness of breath while walking\[^{12}\] and its negative impact on health-related quality of life in all the domains including physical, social and mental functioning.

Nowadays, walking is highly recommended in obese population for the physical reconditioning. It is an rhythmic, dynamic, aerobic activity, which can be provide a training effect. There are various health benefits of walking such as it increases the cardiovascular and pulmonary fitness, individual’s aerobic capacity, management of conditions like hypertension, high cholesterol, joint and muscular pain and stiffness and diabetes, Stronger bones and improved balance, Increased muscle strength and endurance and Reduced body fat.

The many previous researches proved that walking is beneficial in weight reduction which has positive impact on the coronary risk factors.\[^{1}\] But, in middle age i.e age group between 45-65 years there is change in musculoskeletal, cardiovascular system which reduces the exercise capacity. The middle age obesity has an important role in atherosclerosis and coronary artery disease And also obesity is main risk factor for the larger joint (Eg. Knee joint) osteoarthritis.\[^{3}\] Walking is a popular form of exercise but weight bearing is more during walking so it may be a critical source of biomechanical loads that link obesity and OA.

There are few studies have been conducted on how obesity affects the biomechanics in walking. In Spyropoulos et al. compared the stride length and joint angle difference between obese and normal weight men. They found that the obese males walked slower (1.09m/s) with wider steps and similar knee flexion. The peak knee flexion is during the loading response of the gait cycle increases as the walking speed increases. This will result in obese men might adopt a more flexed knee during stance phase.\[^{3}\] In Messier et al study they found that absolute peak vertical ground reactional force increased in almost directly proportional to the body weight. So as the weight increases the GRF increased over the larger joint this will increases pain on OA knee.

So, walking with the help of Nordic poles is more beneficial in obese population.\[^{3,4}\] Nordic walking has benefits on obese population. The walking distance and speed of walking increase which help in weight reduction. In , Kocur et al. reported significant effect on cardiovascular adaptation to effort, it mainly decreased heart rate compared to walking without poles.\[^{3}\] Walking with the help of poles uses the body’s various muscle group than the normal walking. The use of arm muscles mainly triceps and the shoulder girdle muscle due to arm swing while walking. Therefore, chest expansion is more in Nordic walking which help in reducing symptoms of dyspnea while walking in obese population. Also, walking with the poles reduces the joint load, maintain balance and co-ordination, improves the posture while walking than the normal walking.

**Material and Methodology**

Ethical clearance was obtained from the institutional ethical committee, KIMSDU, karad This study included the 32 obese individuals according to inclusion and exclusion criteria and the were divided into 2 groups. Group A (n= 16) and group B( n = 16). The study protocol was approved by the regional ethical committee. Individuals were selected according to inclusion criteria age between 45-65 years, Body Mass Index (BMI) ≥30 kg/m\(^2\), Waist – Hip Ratio (WHR) > 0.9 cm for men and 0.8 cm in female, HDL < 40mg/dL, LDL > 130 mg/dL and exclusion criteria was individuals taking medication which influence the variable measured, any orthopedic condition that limit the exercise, unstable angina, uncontrolled hypertension – SBP ≥ 200 mmHg and DBP ≥110 mmHg.

Group A was given Nordic poles for walking. And they were perform walking including warm up and cool down period 10 min. 30-45 min/ day walking for 3-4 time/ week for 12 weeks. Group B perform Normal walking and it also include warm up and cool down period 10 min, walking 30-45 min/ day for 3-4 times/ week for 12 weeks.

**Outcome Measures:**

The outcome measure was taken for this study were

BMI

Waist – Hip Ratio

HDL and LDL level
Statistical Analysis

Statistical analysis of the recorded data was done by using the software SPSS version 20.

16 subjects were successfully completed assessment and the 12-week Nordic walking program. 3-4 times / week. The result showed that mean BMI per 31.92 kg/m² and post intervention program 29.13 kg/m², WHR Previous 1.97cm and Post 0.8cm, HDL Previous 47 mg/dL and post 50.18mg/dL, LDL 126.44 mg/dL and post 103.94 mg/dL

### Table no 1 – Pre and Post BMI score within groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre treatment</th>
<th>Post treatment</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ±SD</td>
<td>Mean ±SD</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>32.79 ± 1.66</td>
<td>29.13 ± 1.57</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>B</td>
<td>32.8 ± 2.99</td>
<td>31.1 ± 1.36</td>
<td>0.0042</td>
</tr>
</tbody>
</table>

### Table no 2 – Pre and Post Waist – Hip ratio within groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre treatment</th>
<th>Post treatment</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ±SD</td>
<td>Mean ±SD</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>1.97 ± 30.47</td>
<td>0.8 ± 30.52</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>B</td>
<td>1.05 ± 2.99</td>
<td>1.00 ± 0.07</td>
<td>0.26</td>
</tr>
</tbody>
</table>

### Table no 3 – Pre and Post HDL level within groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre treatment</th>
<th>Post treatment</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ±SD</td>
<td>Mean ±SD</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>47.00 ± 20.66</td>
<td>52.18 ± 4.7</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>B</td>
<td>41.46 ± 4.74</td>
<td>46.41 ± 4.74</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

### Table no 4 – Pre and Post LDL level within groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre treatment</th>
<th>Post treatment</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ±SD</td>
<td>Mean ±SD</td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>126.44 ± 7</td>
<td>103.9 ± 6.76</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>B</td>
<td>121.93 ± 8.57</td>
<td>104.47 ± 6.98</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

**Result**

Thirty-two middle aged obese individuals participated in this study. Their basic BMI, W-H ratio and biochemical data are represented in Table no 1,2 and Table no 3,4 respectively. After 12 weeks of exercise performed according to Nordic and Normal walking. There is significantly reduction in BMI (on average 3.66 kg, 5.7%) and W-H ratio (on average by 1.17) were observed in Nordic walking. None of the participants showed a body weight increases. In biochemistry results statistically drops in LDL (-22.54mg/dL) and increases HDL (8.5mg/dL)

In Normal walking the statistics are BMI (on average 1.7 kg. 2.3%) and W-H ratio (on average 0.05) in biochemistry result LDL drops(-17.93mg/dL) and increases HDL (5.18mg/dL)
Discussion

Walking is the aerobic activity which can produce the necessary intensity to provide a training effect.[5] The walking with the specially designed poles, called Nordic walking and it is largely used by the sports players as a part of exercise training. So, it is very effect mean of exercise in middle aged obese individuals which helps in the weight reduction as well as improves the coronary risk factors.

The present study aimed to compare that the effect of Nordic and Normal walking on the coronary risk factor in the middle-aged obese population.

The objectives are to assess the BMI, Waist hip ratio, HDL and LDL level and To find out the pre and post effect of Nordic and normal walking on the coronary risk factors in middle aged obese population.

This study done was done in 12 weeks of duration with sample size 32 and age group 45-65 years. Later they were divided into 2 groups. One group performed walking with the help of poles and other without poles. Complete session required 60 min 10 min of warm up and cool down period 30-45 min of walking and other group same.[6] Consent from was taken from subjects and assessment were done pre and post treatment.

In this study, we observed a significant reduction in BMI, Waist – Hip ratio, increased in HDL level and reduced the LDL level in group A than group B in accordance to other study.[7,8] Moreover, the result demonstrate that there is no significant improvement in coronary risk factor in Normal walking. Weight reduction after 10-12 weeks of Nordic walking was also observed by other group of researchers.[9]

As mentioned above the comparative study of 12 weeks of Nordic walking program had positive effect on BMI (table 1) and WHR (Table 2) than normal walking. The Nordic walking program increases the HDL (table 3) and reduces the LDL (table 4).

Nevertheless, the complete clinical result of the Nordic walking program was associated with its hypolipidemic effect, and can be expressed as the reduce the risk of cardiovascular disease at least 20-25% (10% depend on LDL reduction and 10-15% dependent on HDL increase). [10]

Conclusion

From this study, we can conclude that the Nordic walking is an effective type of physical training which help to reduce the coronary risk factor in middle aged obese population.

Abbreviations:

BMI – Body mass index

WHR – Waist – Hip ratio

HDL - High density lipoprotein

LDL – Low density lipoprotein

Conflict of Interest: There is no conflict of interest concerning the content of the study.

Source of Funding: This study was self-funded

Ethical Clearance: The study was approved by the institutional ethics committee of KIMSDU.

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Awareness among Intern Doctors Regarding Privacy and Confidentiality in Medical Practice

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Abstract

Background: Privacy and confidentiality in medical care are deeply rooted in core professional ethical standards across a variety of health professions. Present project aimed to study perceptions of intern doctors regarding privacy and confidentiality in medical practice.

Materials and methods: Total 100 intern doctors of GMERS Medical College, Valsad, Gujarat were subjected to pre-tested and pre-validated Likert scale type questionnaire regarding knowledge and awareness of privacy and confidentiality in medical practice after obtaining their informed written consent. Data obtained were analyzed via median score and tabulated.

Results: Out of 100 respondents, 58 were male and 42 were female. Knowledge and awareness regarding many of the facts related to privacy and confidentiality of medical practice found to be satisfactorily with median score of more than 3. Professional secrecy is implied term of contract between doctor and patient, patient can sue the doctor for damages if disclosure is done without his consent and harm him and not in the interest of public, etc. showed median score of 3. Disclosure to parents without consent in case of major and breach of professional secrecy is professional misconduct of doctor showed median score less than 3.

Conclusion: Intern doctors had little knowledge regarding disclosure to parents without consent in case of major and breach of professional secrecy is professional misconduct of doctor. Intern doctors were not sure about Professional secrecy is implied term of contract between doctor and patient and patient can sue the doctor for damages if disclosure is done without his consent and harm him and not in the interest of public. Knowledge and awareness regarding rest of the facts related to privacy and confidentiality of medical practice found to be satisfactorily among intern doctors.

Key words: Privacy, Confidentiality, Professional secrecy, Medical practice, Awareness, Intern doctors.

Introduction

Privacy and confidentiality in medical care are deeply rooted in core professional ethical standards and values across a diversity of health professions since years. For example, the Hippocratic Oath amongst physicians includes a pledge to protect patient confidentiality and privacy [1]. In one version, participants of the oath state that “I will admire the privacy and confidentiality of my patients, for their problems are not disclosed to me that the world may know” [2].

One of the essential features of professionals is that they are guided by ethical codes [3, 4], and ethics only are not adequate pointer of professional grade [5]. Another primary feature of professions is the skill to control
information\textsuperscript{[5]}, so anything that might alter it may affect inter or intra professional relationship. For example, invention of new technologies usually associated with inter-professional conflict, as well as test prevailing intra-professional practices and organizational routines \textsuperscript{[6, 7]}. The prevalent diffusion of new information and communication technologies into health care forms a revolution in at least the method that information is achieved and dispersed \textsuperscript{[8]}. Moreover, as access to health information rest on relations across numerous professional groups among socio-technical organizations \textsuperscript{[9]}, information and communication technologies may test the information regulator of multiple professional groups, causing additional troubles and potentials for alteration.

Evetts \textsuperscript{[10]} defines professional discourse as “the customs in which health professional as well as occupational workers are accepting, including and accommodating the idea of ‘profession’ and particularly ‘professionalism’ in their work.” Control and safety of patient information is considered as important part of the ethic by health professionals, while for other fields it is not much relevant. Professionals’ discourse regarding secrecy and privacy also give idea about how new information technologies and laws test prevailing practices of information regulation among health professional groups \textsuperscript{[10]}

In this study, perceptions of intern doctors towards privacy and confidentiality of medical practice were studied.

**Materials and Method**

Present study was undertaken at GMERS Medical College, Valsad, Gujarat. Study was done after obtaining ethical approval from the Institutional Ethical Committee. Questionnaire was designed to study perceptions of intern doctors regarding privacy and confidentiality in medical practice. Total 10 questions were prepared on Likert scale (1 to 5, 1 – Strongly Disagree, 5 – Strongly Agree) and checked for face and content validity \textsuperscript{[11-23]}

**Inclusion criteria:** Intern doctors who were willing to participate were included in the study after obtaining their informed written consent with full confidentiality.

**Exclusion criteria:** Those who didn’t want to participate were excluded.

Total 100 intern doctors of GMERS Medical College, Valsad, Gujarat were subjected to pre-tested and pre-validated Likert scale type questionnaire regarding knowledge and awareness of privacy and confidentiality in medical practice after obtaining their informed written consent. Data obtained were analyzed via median score and tabulated.

**Results**

Total 100 intern doctors were participated in the present study and their responses to questionnaire related to privacy and confidentiality in medical practice were taken into consideration for data analysis. Out of 100 respondents, 58 were male and 42 were female. There was no statistical difference among perceptions of male and female.

**Table – 1: Knowledge and Awareness regarding privacy and confidentiality in medical practice among intern doctors (Likert scale: 1 to 5, 1 – Strongly Disagree, 5 – Strongly Agree).**

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Perceptions of students</th>
<th>Median score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Discussion of patient’s findings with spouse or friends without patient’s consent is breach of professional secrecy.</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Professional secrecy is implied term of contract between doctor and patient</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>I know that without confidentiality patient will not reveal everything.</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>Patient can sue the doctor for damages if disclosure is done without his consent and harm him and not in the interest of public</td>
<td>3</td>
</tr>
</tbody>
</table>
**Cont...** Table – 1: Knowledge and Awareness regarding privacy and confidentiality in medical practice among intern doctors (Likert scale: 1 to 5, 1 – Strongly Disagree, 5 – Strongly Agree).

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Questions</th>
<th>Responses of Intern Doctors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Discussion of patient’s findings with spouse or friends without patient’s consent is breach of professional secrecy.</td>
<td>SD 2  D 9  NS 5  A 70  SA 14</td>
</tr>
<tr>
<td>2</td>
<td>Professional secrecy is implied term of contract between doctor and patient.</td>
<td>SD 9  D 11  NS 45  A 30  SA 5</td>
</tr>
<tr>
<td>3</td>
<td>I know that without confidentiality patient will not reveal everything.</td>
<td>SD 4  D 8  NS 22  A 55  SA 11</td>
</tr>
<tr>
<td>4</td>
<td>Patient can sue the doctor for damages if disclosure is done without his consent and harm him and not in the interest of public.</td>
<td>SD 5  D 17  NS 55  A 21  SA 2</td>
</tr>
<tr>
<td>5</td>
<td>If patient is major, don’t disclose anything to his parents without his consent.</td>
<td>SD 1  D 56  NS 33  A 5  SA 5</td>
</tr>
<tr>
<td>6</td>
<td>Don’t answer any enquiry by third party without consent of patient.</td>
<td>SD 1  D 5  NS 20  A 31  SA 43</td>
</tr>
<tr>
<td>7</td>
<td>When servant is examined at the request of master, not disclose anything to master without consent of servant</td>
<td>SD 3  D 33  NS 25  A 37  SA 2</td>
</tr>
<tr>
<td>8</td>
<td>While reporting a case in medical journal, don’t disclose patient’s identity.</td>
<td>SD 1  D 2  NS 21  A 37  SA 39</td>
</tr>
<tr>
<td>9</td>
<td>Breach of professional secrecy is professional misconduct of doctor</td>
<td>SD 18  D 38  NS 12  A 21  SA 11</td>
</tr>
<tr>
<td>10</td>
<td>In case of minor patients, disclosure of findings to parents or guardians leads to breach of professional secrecy.</td>
<td>SD 21  D 49  NS 11  A 12  SA 7</td>
</tr>
</tbody>
</table>

(SD- Strongly Disagree, D- Disagree, NS- Not Sure, A- Agree, SA- Strongly Agree)

Total 70 intern doctors were agreed upon that discussion of patient’s findings with spouse or friends without patient’s consent is breach of professional secrecy with median score of 4. Total 45 intern doctors were not sure about professional secrecy is implied term of contract between doctor and patient with median score of 3. Total 55 intern doctors were agreed upon that without confidentiality patient will not reveal everything with median score of 4. Total 55 intern doctors were not sure about that patients can sue the doctor for damages if disclosure is done without his consent and harm him and...
not in the interest of public with median score of 3. Total 56 intern doctors were not agreed upon that if patient is major, don’t disclose anything to his parents without his consent with median score of 2. Total 43 intern doctors were strongly agreed upon that don’t answer any enquiry by third party without consent of patient with median score of 5. Total 37 intern doctors were agreed upon that don’t disclose anything to master without consent of servant with median score of 4. Total 39 intern doctors were strongly agreed upon that don’t disclose patient’s identity with median score of 5. Total 38 intern doctors were disagreed upon that breach of professional secrecy is professional misconduct of doctor with median score of 2. Total 49 intern doctors were disagreed upon that in case of minor patients, disclosure of findings to parents or guardians leads to breach of professional secrecy with median score of 2 (Table – 1, 2).

Discussion

Many literatures on ethics focus on the skill to understand, describe, and handle information within their jurisdictions [5]. Such confidentiality is not only a basis of medical profession, but also need of statutory authority and healthy doctor-patient relationships, and of the skill to describe, convert and guard professional and occupational boundaries [24]. Codes of ethics for how professionals use and protect patient information aid to legitimize the control power as well as professional status in society [25]. However, other opinion claims that professional secrecy of patient information is not only about authority, independence and prestige, but is also essential to the faith embedded in doctor-patient relationships [10].

Professional secrecy and confidentiality of patient information, is core part of the ethical values and principles [26]. Professional secrecy and confidentiality is also essential requisite of the success of good professional, through the learning of codes of ethics [27]. Inculcation of core principles of ethics will make health professional oblige to his duty towards his patients including professional secrecy with his occupational boundaries [28]. In certain instances, professional secrecy can be broken as part of privileged communication in favor of state or large community [29].

Many previous studies have focused and analyzed the privacy of patients [30, 31, 32], few studies have focused at how health care professionals think about effect of new technologies on professional secrecy and confidentiality. In this study, perceptions of intern doctors towards privacy and confidentiality in medical practice were obtained.

As the time advances with technology, principles of ethics are also evolving gradually. Too much use of technology may mechanize the organization with lack of humanity and professionalism. Early in the 20th century, shift from treatment casebooks to patient based case files as a source of information management was initiation of increasing complexity in medical care. Then after era of emergence of new professional groups e.g. record librarians or record room in hospital. New information technologies such as electronic health records are being extensively implemented across health care. Electronic health records are playing vital role in improving the quality of health care in the USA and in other countries by facility of easy to access and retrieve health information but they also impart challenges in health professionals in their handling and secrecy. Those who are not well versed with use of technology, for them access of electronic health records are difficult especially for aged health workers.

Conclusion

Intern doctors had little knowledge regarding if patient is major, don’t disclose anything to his parents without his consent and breach of professional secrecy is professional misconduct of doctor. Intern doctors were not sure about Professional secrecy is implied term of contract between doctor and patient and Patient can sue the doctor for damages if disclosure is done without his consent and harm him and not in the interest of public. Knowledge and awareness regarding rest of the facts related to privacy and confidentiality of medical practice found to be satisfactorily among intern doctors. Privacy and confidentiality among medical care is very essential element of ethics and intern doctors must be abreast in knowledge and awareness regarding various issues of it. This can be achieved by contact session at the beginning of internship regarding medical ethics and law.

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Conflict of Interest: None Declared
Source of Funding: None

Ethical Clearance: Obtained from Institutional Ethical Committee, GMERS Medical College, Valsad, Gujarat, India

References


Awareness among Intern Doctors about Medical Records and Duty of Doctors in Tertiary Care Hospital, Valsad

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Abstract

Background: Optimum knowledge of medical records and duty of doctor is must for every doctor to enhance safe health care delivery in an unbiased standardized way. Present study was undertaken with aim to assess awareness of intern doctors towards medical records and duty of doctors.

Materials and methods: Present study was undertaken at Gujarat Medical Education and Research Society (GMERS) Medical College, Valsad, Gujarat after obtaining ethical approval from the Institutional Ethical Committee of Valsad. Total 10 questions were prepared and validated on Likert scale (1 to 5, 1 – Strongly Disagree, 5 – Strongly Agree) regarding medical records and duty of doctors. Total 100 intern doctors of GMERS Medical College, Valsad, Gujarat were subjected to pre-tested and pre-validated Likert scale type questionnaire regarding medical records and duty of doctors after obtaining their informed written consent. Data obtained were analyzed via median score and tabulated.

Results: Students were well aware about following facts like Maintenance of patients’ record is legal duty of hospital, Every operation required informed written consent of patient, Fail to attend patient during emergency is punishable, Patient has right to refuse treatment, and Carelessly leaving object into patient body during operation is negligent act. Students were not sure of facts like Patients’ records are property of patients, Refusing patient on religious ground is punishable, Not to treat patient due to HIV is punishable, and doctor has right to choose patient. Students were not aware regarding either doctor can refuse to attend medico-legal case or not.

Conclusion: Intern doctors had no awareness regarding duration of preservation of hospital records. Students were not sure of various aspects of medical records and duty of doctors. Compulsory internship in Forensic Medicine subject as well as sensitization workshop regarding medical records and duty of doctors for interns at beginning of their internship may build confidence among them to be aware with various duties of doctors.

Key words: Medical records, Duty of doctors, Awareness, Intern Doctors, Valsad.

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Introduction

Legal aspects of medical practice were present in early civilizations such as Babylon and India [1]. Optimum knowledge of medical law, medical records, duty of doctor towards patient is must for every doctor to enhance safe health care delivery in an unbiased...
standardized way [2]. Forensic Medicine subject is usually dealing with teaching of medical law and ethics in Indian medical education set up. Present study was undertaken with aim to assess awareness of intern doctors towards medical records and duty of doctors.

Materials and Method

Present study was undertaken at Gujarat Medical Education and Research Society (GMERS) Medical College, Valsad, Gujarat after obtaining ethical approval from the Institutional Ethical Committee of Valsad. Questionnaire was designed to study perceptions of intern doctors regarding Medical records and duty of doctors. Total 10 questions were prepared on Likert scale (1 to 5, 1 – Strongly Disagree, 5 – Strongly Agree) and validated for face and content validity.

Inclusion criteria: Intern doctors who were willing to participate were included in the study after obtaining their informed written consent with full confidentiality.

Exclusion criteria: Those who didn’t want to participate were excluded.

Total 100 intern doctors of GMERS Medical College, Valsad, Gujarat were subjected to pre-tested and pre-validated Likert scale type questionnaire [3-15] regarding medical records and duty of doctors after obtaining their informed written consent. Data obtained were analyzed via median score and tabulated.

Results

Total 100 intern doctors were participated in the present study and their responses to questionnaire related to medical records and duty of doctors were taken into consideration for data analysis. Out of 100 respondents, 58 were male and 42 were female. There was no statistical difference among perceptions of male and female.

Students were well aware about following facts like Maintenance of patients’ record is legal duty of hospital, Every operation required informed written consent of patient, Fail to attend patient during emergency is punishable, Patient has right to refuse treatment, and Doctor has right to choose patient on certain ground.

Students were not sure of facts like Patients’ records are property of patients, Refusing patient on religious ground is punishable, Not to treat patient due to HIV is punishable, and either doctor can refuse to attend medico-legal cases or not.

Students were not aware of duration of preservation of hospital records.

Table – 1: Awareness regarding Medical law and negligence among intern doctors (Likert scale: 1 to 5, 1 – Strongly Disagree, 5 – Strongly Agree).

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Perceptions of students</th>
<th>Median score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Maintenance of patients’ record is legal duty of hospital</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Patients’ records are property of patients</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>I am aware of duration of preservation of hospital records</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Every operation required informed written consent of patient.</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>Fail to attend patient during emergency is punishable</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>Refusing patient on religious ground is punishable</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>Not to treat patient due to HIV is punishable</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>Patient has right to refuse treatment</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>Doctor has right to choose patient</td>
<td>4</td>
</tr>
<tr>
<td>10</td>
<td>Doctor can refuse to attend medico-legal cases</td>
<td>3</td>
</tr>
</tbody>
</table>

Discussion

Students usually not do direct dealing with medico-legal cases during their undergraduate study period but acquire only theoretical and exam oriented knowledge about it in subject of Forensic Medicine. Many students understood basic principles of medical records and duty of doctors which is in accordance with the study done by Dash S.K. in 2010 [16]. During internship, various exposure of medico-legal cases, medical law and negligence is started and gradually students acquired reasonable practical exposure before actual practicing in society.

Written records of patients, including history, radiographs, investigations and photographs must be particular, and it is compulsory for the documents to
be signed by appropriate authority and dated properly. Legally, physician written records carry more weight than patient’s recollections [17]. Under Article 51 A(h) of the Constitution of India, there is a ethical duty on the doctor, and a legal duty, to maintain and preserve medical, medico-legal, and legal documents in the finest benefits of social and professional justice [18].

General awareness regarding informed written consent was present among intern doctors with its requirements, needs and applicability. The authority of doctor is barely ever challenged, and advice of doctor is thought in greater honor hence role of doctor in decision making is still more but nowadays patient’s standard is becoming popular [19]. Heywood R. in 2007 found that 98% of medical students found informed consent to be significant and essential for a surgical intervention [20].

Doctor should not refuse treatment on religious ground neither denied treatment to HIV positive patients. Fail to attend patient in emergency in punishable for doctor as well as patient has right to refuse treatment. Negligence in medical practice in simpler term is doing something which a reasonably competent doctor is not supposed to do or not doing something which a reasonable competent doctor is supposed to do. Doctor has right to choose patient but doctor should not avoid treating patient when it comes as medico-legal case. Doctor is bound to give first aid and basic life-saving treatment to every patient particularly in emergency without any bias or prejudice.

Conclusion

Intern doctors had no awareness regarding duration of preservation of hospital records. Students were not sure of various aspects of medical records and duty of doctors. Compulsory internship in Forensic Medicine subject as well as sensitization workshop regarding medical records and duty of doctors for interns at beginning of their internship may build confidence among them to be aware with various cases.

Conflict of Interest: None Declared

Source of Funding: None

Ethical Clearance: Obtained from Institutional Ethical Committee, GMERS Medical College, Valsad, Gujarat, India

References

13. Parmar P, Rathod S, Parikh A. Perceptions of


Effect of Tactile Stimulation and Joint Integrity Exercises on Hemineglect in Stroke Survivors

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Abstract

Background: Unilateral spatial neglect is likely to be associated with poor functional outcome in sub-acute phase. During this period, intensive rehabilitation is needed to obtain higher ADL scores. If greater efficacy of rehabilitation can be brought about by early intervention for unilateral spatial neglect, patients with unilateral neglect might achieve higher ADL goals.

Material and Method: In this pre-post intervention study 25 neglect patients were included with less than six month of stroke. Tactile stimulations and joint integrity exercise protocol was set for four weeks. After pre-post assessment, data was analysed with help of appropriate statistical methods.

Results: According to this study, there is increase in tactile stimulation (p=0.0023), kinaesthetic stimulation (p<0.0001), stereognosis (p<0.0001) and motor outcome (p=0.0001). This indicates an overall increase in sensory and motor outcome.

Conclusion: Tactile stimulation and joint integrity exercises appears to be beneficial for improving motor outcome in hemineglect patients after stroke.

Keywords: Stroke, hemineglect, tactile stimulation, joint integrity exercises.

Introduction

In accordance with the definition used by the World Health Organisation (WHO), Stroke was defined as “Rapidly developing clinical symptoms and/or signs of focal, and at times global, loss of cerebral function, with symptoms lasting more than 24 hours or leading death, with no apparent cause other than that of vascular origin”. Stroke is one of the leading causes of death and disability in India. The estimated adjusted prevalence rate of stroke range, 84-262/100,000 in rural and 334-424/100,000 in urban areas. Approximately 12% of all strokes occurs in the population less than 40 years of age.

Hemineglect has been defined as “the failure to report, respond or orient to novel or meaningful stimuli presented to the side opposite to a brain lesion, when this failure cannot be attributed to either sensory and motor defects”. Anosognosia is lack of awareness of the effects of brain lesions, including hemiplegia and hemianopia. Neglect is considerably more frequent among patients with right hemisphere lesions being present in 40-50% of right hemisphere patients acutely after stroke. It is common disabling disorder occurring after stroke and is found in 30% of all acute stroke patients.

Women have lower age-adjusted stroke incidences than men. Women with early menopause have twice the risk of ischemic stroke as women with late menopause. Women over 85 years of age have an elevated risk compared to men. Several studies indicate that neglect implies a wrong prognosis after stroke in terms of functional outcomes, length of hospital stay, and discharge to home than for stroke patients lacking this symptoms. Furthermore, patient with the neglect seem

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susceptible to falls and wheelchair collisions. On the other hand, some studies shows that neglect has no influence on the functional outcomes.\textsuperscript{5}

Ischemic stroke is the most common type, affecting about 80% of individuals with stroke, and result when a clot blocks or impairs blood flow, depriving the brain of essential oxygen and nutrients. Haemorrhagic stroke occurs when blood vessels rupture, causing leakage of blood in or around the brain. Hemi spatial neglect is a common disabling condition following unilateral brain damage, particularly of the right hemisphere. It can be caused by various different pathological conditions; it is most often observed after cerebral infarction or haemorrhage and affects up to two third of right hemisphere stroke patients acutely.\textsuperscript{6} Patients with neglect often fail to be aware of or acknowledge items on their contralateral side (the left side for patients with right brain damage) and attained instead to items towards the same side as there brain damage.\textsuperscript{6} Neglect in its various forms and anosognosia are serious companions of primary right sided stroke with lesions in the parieto-temporal-occipital area.\textsuperscript{5}

Neglect is behaviourally defined as a deficit in processing or responding to sensory stimuli in the contralateral hemispace, a part of own body, the part of an imagined scene, or may include the failure to act with the contralateral limbs despite intact motor functions. Neglecting humans is frequently encountered after right parieto-temporal lesions and leads to multicomponent syndrome of sensory, motor and representation deficits.\textsuperscript{8}

Types of neglect:

1. Sensory Neglect: Sensory neglect is characterised by an unawareness of sensory information in the body and coming from the environment. This inability to recognize sensation usually occurs on the side of the body opposite to side to which the damage to the brain has occurred.

2. Motor neglect: motor neglect or output neglect is defined as the reduced ability to initiate movement in response to stimuli even though the patient is aware of the presence of the stimuli. This inability is not attributed to weakness of the muscles or to any primary motor deficit.

3. Representational neglect: Inattention to portions of internally generated images. Such images include visualizations including memories, dream and hallucinations. The patient will ignore half of the image on the opposite to where the brain damage has occurred.

4. Personal neglect: Lack of awareness to the side of the body opposite to the damage. E.g. A patient with personal neglect may deny ownership to a limb, ignoring its presence and claiming that it belongs to another person.

5. Spatial neglect: A patient who is unable to acknowledge stimuli originating in space opposite of damage is displaying spatial neglect. There are two types: Peri personal and extra personal neglect. Peri personal neglect is characterised by a patient’s inattention to items within reaching distance while extra personal neglect refers to the neglect of items that are farther away.\textsuperscript{6}

The best form of treatment for stroke that emerged over last several decades is stroke unit.\textsuperscript{9} Rehabilitation of a stroke patient begins as soon as any impairment is perceived and comprises traditional exercise programs and neuropsychological approaches with the primary aim of restoring mobility and function of patient.\textsuperscript{7} Though rehabilitation is proved to be the best treatment patients also prefer other mode of treatment approaches such as Medicine, Acupuncture, Ayurveda (Panchakarma), Chiropractic, Cupping, Dry needling, Brain stem stimulation, Stem cell therapy and Miscellaneous quack practice, etc.\textsuperscript{2,9-19}

Unilateral spatial neglect is likely to be associated with poor functional outcome in subacute phase. During this period, intensive rehabilitation is needed to obtain higher ADL scores. In rehabilitating unilateral spatial neglect patients’ deficits of spatial recognition and body image prevent them from learning efficient body movements and increase the risk of falls and collisions. Furthermore, they tend to be unduly limited to their activities because of fall risks. If greater efficacy of rehabilitation can be brought about by early intervention for unilateral spatial neglect, patients with unilateral neglect might achieve higher ADL goals.\textsuperscript{16}

**Materials and Methodology**

**Type of Study:** Experimental Study

**Study Design:** Pre and post

**Place of Study:** KIMSDU
Sample Size: 25 (Considering 10% dropout)

\[ n = \frac{4pq}{L^2} \]

Sampling Method: Simple random sampling method

Sampling Duration: Approximately 3 months

Inclusion Criteria:
- Subjects with right hemisphere stroke.
- Subjects with hemineglect following stroke.
- Acute phase (3 months) following stroke.
- Both sexes.

Exclusion Criteria:
- Subjects with neurological conditions other than stroke
- Subjects with left hemisphere involvement following stroke

Equipment's and Materials required:
- Sensory kit
- Assessment Charts
- Writing Material
- Computer for online access

Outcome Measures
- The Baking Tray Task

Time required to administer: anywhere from 1-5 minutes

Purpose of the study: The purpose of this assessment is to assess for unilateral neglect

Scoring:
- Normal: spreading the cubes out evenly across the tray
- Rightward bias: The cubes will be spread out across board, but cubes will be closer proximity to the right side of the tray. This score indicates unilateral neglect.

Nottingham Sensory Assessment

Patient position: Sitting and in suitable state of undress

Procedure: Apply the test sensation to the test area, to the left and right side in random order. Patient is asked to indicate, either verbally or by a body movement, whenever he or she feels the test sensation

1. Tactile sensation:

Procedure: If the patient has problems communicating being testing light touch, pressure and pinprick sections.

SCORING CRITERIA: 0 absent, 1 absent, 2 normal, 9 unable to test

2. Kinaesthetic Sensation:

Procedure: The limb on the affected side of the body is supported and moved by the examiner in various directions but movement is only at one joint at a time. The patient is asked to mirror the change of movement with the other limb.

Scoring: 0 absent, 1 Appreciation of movement taking place, 2 direction of movement sense, 3 joint position sense, 9 unable to test

3. Stereognosis

Procedure: Place the object in the patient’s hand for a maximum 30 seconds. Identification is by naming, description or by pair matching with an identical set. Affected side of the body is tested first. The object may be moved around the affected hand by the examiner.

Scoring: 2 normal, 1 Impaired, 0 absent, 9 Unable to test

Motor Assessment Scale

Findings

Out of the 25 subjects enrolled in this study, two were discharged early and did not came for follow up, while other one was not willing to participate in the treatment trails after two sessions.

Pre- and post-intervention data was analysed, tactile stimulation in sensory input considered very significant. (p=0.0023). The mean pre interventions for tactile stimulation of 1.5 (SD=0.51), changed to mean post-
intervention of tactile stimulation (SD=0.29), showing significant increase (p=0.0023).

Kinaesthetic stimulations were given to the patients to increase proprioception in neglected limb. Kinaesthetic stimulations shows extremely significant difference in pre- and post-assessments (p<0.0001). The mean pre-intervention of kinaesthetic stimulations 1.136 (SD=0.35), increased to mean 2.54 (SD=0.50). Stereognosis mean pre-intervention was 0.5(SD=0.51) and mean post interventions was increased to 1.72 (SD=0.45), shows extremely significant (p<0.0001). (Fig 1)

The motor assessment score are shown in Table 2 as the secondary outcome measure. The mean pre-intervention score was 9.818 (SD=3.11), which increased to mean of 24.04(SD=6.22). The changes in both pre- and post-interventions were extremely significant (p=0.0001). (Fig 2)
Conclusion

Tactile stimulation and joint integrity exercises were appear to be beneficial for improving motor outcome in hemi neglect patients after stroke.

Discussion

In this study we wanted to determine whether tactile stimulation and joint integrity exercises is effective in rehabilitation of neglect patient. Out of the 25 subjects enrolled in this study, two were discharged early and did not came for follow up, while other one was not willing to participate in the treatment trails after two sessions. Hemineglect subjects has a good potential to recover within first three weeks after stroke. Twenty five patients treated with sensory and motor stimulation for almost 4 weeks.

Pre and Post Assessments were taken with the two scales – Nottingham sensory assessment and motor assessment scale. According to roods, sensory input is required to produce a motor output. Purposeful movement, repetition of activity, or practice, play a part in learning motor skills. Tactile stimulation with the various textures applied to the patients with three strokes followed by 3 sec rest period. Pre- and post-intervention data was analysed, tactile stimulation in sensory input considered very significant. (p=0.0023). The mean pre interventions for tactile stimulation of 1.5 (SD=0.51), changed to mean post-intervention of tactile stimulation (SD=0.29), showing significant increase (p=0.0023).

Kinaesthetic stimulations were given to the patients to increase proprioception in neglected limb. Kinaesthetic stimulations shows extremely significant difference in pre- and post-assessments (p=0.0001). The mean Pre-intervention of kinaesthetic stimulations 1.136 (SD=0.35), increased to mean 2.54 (SD=0.50). Stereognosis mean pre-intervention was 0.5(SD=0.51) and mean post interventions was increased to 1.72 (SD=0.45), shows extremely significant (p<0.0001). (Fig 1)

Proprioceptors, exteroceptors and special sense organs were targeted for motor responses. The motor assessment score are shown in Table 2 as the secondary outcome measure. The mean pre-intervention score was 9.818 (SD=3.11), which increased to mean of 24.04(SD=6.22). The changes in both pre- and post-interventions were extremely significant (p=0.0001). (Fig 2) It would be beneficial to offer patients with hemineglect tactile stimulation and joint integrity exercises.

Offering variety of sensory stimulation (tactile / joint integrity) might have improved sensory functioning in patients that would have initiated the motor betterment. Variety of exercises & electrotherapy modalities must have played an important role in initiating neuronal plasticity to improve motor outcome. Conventional exercises, task oriented training must have improved interneuronal integration to improve sensory awareness. Structured program must have improved residual impairments to improve sensory mechanism. Electrical stimulation, hot fomentations have mechanisms to initiate sensory integration to improve motor as well as sensory response.

Conflict of Interest: There were no conflicts of interest in my study.

Source of Funding: Krishna Institute Of Medical Sciences Deemed to be University, Karad

Ethical Clearance: The Institutional Ethics committee has hereby given permission to initiate the research project titled, “Effect of tactile stimulation and joint integrity exercises on hemineglect in stroke survivors”

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Clinical Evaluation of Ocular Foreign Bodies

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Abstract

Background: Ocular foreign body can affect at any age as well as in both genders. Foreign body introduction in eye leads to various disturbances which can create significant health related problem. The study of the ocular foreign body gives unparalleled opportunities in reducing morbidity as well as for realizing significant savings for both financial as well as human terms.

Material and Method: This prospective study was conducted in ophthalmology department at of Krishna hospital, Karad, Hundred patients with ocular foreign bodies were included in study with consideration of inclusion and exclusion criteria.

Results: A study of 100 subjects showed that incidence of extraocular foreign bodies is very common compared to intraocular foreign bodies. Amongst that, corneal foreign bodies found to be have highest incidence. Commonest foreign body observed - iron particle (43%) and thorn/vegetative material (38%). Average age-40 years. Males are having higher incidence than females. Average interval between incident and intervention – 2.6 days (day 0 to day 10). Amongst the affected population, farmers and welders are maximum in number.

Conclusion: Though incidence of intraocular foreign body is very less, it has bad prognosis in relation with vision as well as progresses to endophthalmitis. Early visit to ophthalmologist showed better prognosis and thus visual outcome specially in cases of vegetative foreign body in which delayed treatment lead to further complications.

Key words: ocular trauma, ocular foreign bodies, incidence, visual outcome.

Introduction

An ocular foreign body can be any abnormal object or substance or material that doesn’t belong to the eye.¹ The highest incidence of ocular foreign body found in the industrial towns. Ocular foreign body can affect at any age as well as in both genders. Effects caused to the eye by foreign bodies are either mechanical effects or by introduction of secondary infection or by reactions due to specific materials.¹ Foreign body introduction in eye leads to various disturbances which can create significant health related problem. The study of the ocular foreign body gives unparalleled opportunities in reducing morbidity as well as for realizing significant savings for both financial as well as human terms.²⁻⁴

Superficial corneal foreign bodies can reduce the quality of vision either by causing scars / opacities in the visual axis or by causing secondary infections which may range from keratitis to endophthalmitis.⁵ Though Classification of Ocular Trauma states that injuries due to superficial foreign bodies are graded as mild one, based on severity of trauma, these foreign bodies tend to be very much uncomfortable leading to redness, watering, gritty sensation with pain in eye which increases every time with eye opening or closing.⁶ These injuries are responsible for various health care issues and thus they create an economic burden. Prevention of these FB accidents and potential serious consequences
caused by them is certainly possible. The investment in prevention of these problems can be easily justifiable. Use of appropriate protective goggles can prevent these accidents in large number. In addition to this use of glasses, personal protective measures can be added. It is very important to improve standards of workplace as well as to provide proper training for the supervisors.

**Inclusion Criteria:**

- All cases of ocular foreign bodies attending OPHTHALMOLOGY OPD

**Exclusion Criteria**

- H/o previous ocular foreign body with or without surgical intervention
- Blast injuries
- Age less than 5 years

**Materials and Method**

- The study was conducted in department of ophthalmology at of Krishna institute of medical sciences, Karad between October 2017 to May 2019 after obtaining clearance from ethical committee. Hundred patients with ocular foreign bodies were included in study with consideration of inclusion and exclusion criteria.
  - Informed consent was taken from the patients
  - A detailed history regarding nature of injury, nature of foreign body, time lapse between incidence and presentation, history of any prior intervention and previous ocular disease etc was taken
  - Visual acuity was checked by using Snellen's chart, with pinhole improvement
  - Thorough examination of adnexa and anterior segment was done using slit-lamp biomicroscopic and fluorescein staining was done wherever necessary
  - Posterior segment examination by Indirect and Direct ophthalmoscopy after dilatation with 0.8% tropicamide and 5% phenylephrine eye drops (if not contraindicated)
  - Radiological investigations were done in selective cases

- Necessary treatment was given.
- In our study most of the patients were having superficial surface foreign bodies (cornea or conjunctiva) which were managed on OPD basis only.
- These foreign bodies removed by using forceps, foreign body spud, 26 no. needle on slit lamp.
- In some cases of large epithelial defect in above mentioned cases, eye pad was given with plenty of eye ointment.
- All cases of OPD basis were called to OPD on immediate next day for follow up.
- Rest cases were admitted to ward and managed either by medical or surgical means depending on their need.
- Visual acuity on first follow up in OPD patients and at time of discharge in IPD patients were noted.
- It is taken as final visual acuity for statistics purpose.
- In cases of posterior segment complications, visual acuity also repeated after 1 month.

**Results**

**Age and sex**

It was observed that majority of patients were in age group 31-40 (44%) followed by 41-50 years (18%) and 21-30(17%) respectively. The mean age of the patients was 40 years. Majority of patients were male (80%) and females were 20%

**Laterality of eye**

It was observed that in 60% of cases left eye is involved while right eye involvement seen in 40% of subjects

**Occupation**

It was observed that commonest population affected by ocular foreign body belongs to welder (33%) followed farmers (27%) by their occupation.
It was observed that the most common foreign body observed in this study was metal (43%) followed by vegetative material (38%). Both together form a major portion.

Site of lodgement

It was observed that the most common site for lodgement of foreign body is cornea (67%) followed by conjunctiva (22%).
Number of foreign bodies

It was observed that 90% of the patients have single ocular foreign body, while only in 10% patients multiple foreign bodies found

Comparison Between Initial Visual Acuity and Final BCVA

In table no.1, there is comparison between initial visual acuity and final best corrected visual acuity. It was observed that this comparison is statistically significant with p<0.05.

Table no. 1 : Comparison Between Initial Visual Acuity and Final BCVA

<table>
<thead>
<tr>
<th>visual acuity</th>
<th>Initial</th>
<th>Final</th>
<th>Chi-square</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>6/6 to 6/9</td>
<td>19</td>
<td>19.0</td>
<td>58</td>
<td>58.0</td>
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<tr>
<td>6/12 to 6/18</td>
<td>44</td>
<td>44.0</td>
<td>22</td>
<td>22.0</td>
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<tr>
<td>6/24 to 6/60</td>
<td>23</td>
<td>23.0</td>
<td>13</td>
<td>13.0</td>
</tr>
<tr>
<td>FC at 3mt</td>
<td>10</td>
<td>10.0</td>
<td>5</td>
<td>5.0</td>
</tr>
<tr>
<td>FC &lt; 3mt</td>
<td>4</td>
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</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
<td>100</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Comparison between Time Period from Onset to presentation to OPD and Final BCVA

In table no.2, there is comparison between time period from onset to presentation to OPD and final BCVA. It was observed that this comparison is statistically significant with p<0.05.
Table no. 2: Comparison between Time Period from Onset to presentation to OPD and Final BCVA

<table>
<thead>
<tr>
<th>Final BCVA</th>
<th>Time period from Onset to presentation to OPD</th>
<th>Chi-square</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt; 2 days</td>
<td>≥2 days</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
<td>Frequency</td>
</tr>
<tr>
<td>6/6 to 6/9</td>
<td>47</td>
<td>70.14</td>
<td>11</td>
</tr>
<tr>
<td>6/12 to 6/18</td>
<td>10</td>
<td>14.92</td>
<td>12</td>
</tr>
<tr>
<td>6/24 to 6/60</td>
<td>7</td>
<td>10.44</td>
<td>6</td>
</tr>
<tr>
<td>FC at 3mt</td>
<td>2</td>
<td>2.98</td>
<td>3</td>
</tr>
<tr>
<td>FC &lt; 3mt</td>
<td>1</td>
<td>1.49</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>67</td>
<td>100.00</td>
<td>33</td>
</tr>
</tbody>
</table>

Comparison between site of lodgement of FB and Final BCVA

In table no. 3, there is comparison between site of lodgement of FB and Final BCVA. It was observed that this comparison is statistically significant with p<0.05.

Table no. 3 : Comparison between site of lodgement of FB and Final BCVA

<table>
<thead>
<tr>
<th>Final BCVA</th>
<th>Cornea</th>
<th>Conjunctiva</th>
<th>Iris</th>
<th>Sclera</th>
<th>Posterior Segment</th>
<th>Others</th>
<th>Chi-square</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/6 to 6/9</td>
<td>40</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6/12 to 6/18</td>
<td>20</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>101.03</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>6/24 to 6/60</td>
<td>5</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FC at 3mt</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FC &lt; 3mt</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

Nowadays, Ocular trauma is one of the leading cause of vision impairment worldwide. Most of the ocular traumas are associated with ocular foreign bodies. Annual incidence of trauma cases of eye exceed 2 million cases. In which more than 40000 people had permanent vision impairment to a significant level. The place of injury can be anywhere from work place to recreational area /agricultural area /rural settings.

Younger individuals are commonly affected. The male to female ratio being around 9:1. Financial penalty to person and family is aspect of IOFB. Because of recent micro surgical technique and instrumentation prognosis of IOFB has improved for the past decades. Safety glasses use in work places and health education are the two important factors which helps to reduce
The incidence and thus ophthalmologists can play an important role in giving education to the population.

The present prospective study was conducted for calculating incidence of various types of ocular foreign bodies and their various sites of lodgements with their relation to final best corrected visual acuity. The study was conducted in the Ophthalmology Department of Krishna Institute of Medical Sciences, Karad between October 2017 to May 2019. A total sample size of 100 patients with ocular foreign bodies taken into consideration.

In present study, it was found that majority of our patients were in age group 31-40 (44%) followed by 41-50 years (18%) and 21-30 (17%) respectively. The mean age of the patients was 40 years. Also, it was observed that majority of patients were male (80%) and females were 20%. Similar observation was observed by Napora et al in his study which shows majority of the patients were male with a mean age of 38.1 years. In another study, at Moorfields Eye Hospital done by Wickham et al. which was large retrospective cohort study a mean age observed was 34.6+/-12.4 years. Similarly, Maneschg et al. reported that all patients in their study were male with mean age of 28 ± 12.3 years. Koo et al. said that this occurrence of ocular FBs might be due to higher occupational exposure, higher involvement in dangerous sports and hobbies, alcohol use and risk taking behaviour in young men.

In present study it was found that commonest population affected by ocular foreign body belongs to welder (33%) followed by farmers (27%) by their occupation. This result is justified by fact that our locality constitutes both industrial as well as agricultural field. Most of the populations source of income depends on this only. That is why farmers and welders together constitute 60% of affected population.

In present study it was found that commonest foreign body observed in this study is metal (43%) followed by vegetative material (38%). Both together forms major portion. Evidences from many former studies are unanimous in proving metal object as the most frequent. Values of 91%, 85.3%, and 85.5% were reported previously by Woodcock et al., Feghhi et al. and Napora et al respectively. This difference of 43% metal FB in our study with 80-90% in other studies is because of increased incidence of vegetative FB in our study. This quite high incidence of vegetative FB as compared with previous documentation is because of more population working in agricultural fields in our area.

In present study it was found that in 60% of cases left eye is involved while right eye involvement seen in 40% of subjects. Dominance of left eye involvement explained by reason that most of people are right handed. So while working force of impact goes in direction towards left eye causing it as commonly involved in ocular FB.

In present study it was found that commonest site for lodgement of foreign body is cornea (67%) followed by conjunctiva (22%). A study done by A.R. Nalgirkar7 reported that Maximum number of foreign bodies were found in the cornea (41.6%) followed by conjunctiva (13.8%) whereas only 1 patient had an intra-ocular foreign body. Studies done by C Chiquet et al8 showed that corneal FB to be (58%), followed by the sclera (32%) and Zsuzsanna Suzijarto et al9 68% corneal and 32% sclera.

In present study, when comparison between initial visual acuity and final best corrected visual acuity done. It was observed that this comparison is statistically significant with p<0.05 with chi-square value of 32.198. Similar results observed in studies done by C Chiquet et al8 and Intiaz A. Chaudhry et al10 which shows that initial presenting visual acuity is significantly associated with final BCVA.

In present study, when comparison between time period from onset to presentation to OPD and final BCVA done. In our study, 67% patients presented to OPD before 24 hours. Out of them, 70% patients have Final BCVA better than 6/9. Amongst remaining 33% Patients who presented late to OPD, only 33% reached to visual acuity of 6/9. It was observed that this comparison is statistically significant with p<0.05 with chi-square value of 12.713. The study done by Tansu Erakguns, MD11 and Zsuzsanna Szijarto, et al9 states that if patient arrives late to the hospital, then it was significant association with poor vision outcome irrespective of age.

In present study, when comparison between site of lodgement of FB and Final BCVA is done, It was found that this comparison is statistically significant with p<0.05. this proves that corneal and conjunctival FB have better visual prognosis in comparison with other FBs. Iris FBs are not having good vision as there are posterior segment complications like vitreous haemorrhage and choroidal detachment due perforating nature of injury. Posterior segment FBs itself has bad prognostic value.
in comparison with anterior segment FBs which is proven otherwise. In our study, scleral FBs also didn’t show good Final BCVA. For one patient reason being late presentation to OPD i.e. after 10 days of incident with vegetative nature of FB (wood particle) and patient was non-compliant one. These multiple factors lead to deuteriation of patient’s visual acuity from 6/24 to Fc at 3 meter when he developed scleral abscess. Later on due to continuation on negligence on patients part, he land up into endophthalmitis. In other case of scleral FBs, multiple FBs and posterior localisation of FB required multiple surgeries. This could be the reason for less final BCVA in this patient.

**Conclusion**

1. Incidence of ocular FB is maximum in 4th decade with male preponderance.

2. Incidence of FB is common in welders and farmers i.e. 33% and 27% respectively.

3. Commonest FB found are metal followed by vegetative material i.e. 43% and 38% respectively.

4. Anterior segment ocular FB are far common than posterior segment. Amongst that cornea (67%) is most common site of lodgement of FB followed by conjunctiva (22%)

5. Extraocular FB have better visual prognosis in comparison with intraocular FB.

6. Time period between onset of incident and initiation of treatment is major prognostic factor in degenerating final visual outcome. Early visit to OPD have better visual prognosis than delayed visit and thus the treatment

**Ethical Approval** : All procedures performed on human participants were in agreement with ethical standards of the Institutional and/or National Ethics Committee.

**Source of Funding** : In this project, the cost of investigations of the study participants was born by the institute research fundings.

**Conflict of Interest** : None

**Acknowledgement**: We acknowledge the cooperation and assistance of the Department of Ophthalmology, Krishna Institute Of Medical Sciences, Karad, Maharashtra, India.

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Correlation of Perkins Hand-Held Applanation Tonometer with Non-Contact Tonometer

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Abstract

Aim: To correlate the IOP by the use of Perkins hand-held applanation tonometer (PAT) with Non-contact tonometer (NCT). Materials & Methods: Prospective cross-sectional study done on 148 eyes & 3 readings were taken for each method & mean calculated. Statistical analysis: Unpaired-T test & Correlation-coefficient, Sensitivity & Specificity were calculated for the NCT. Results: Mean age of subjects was 56.01±9.73 yrs. Mean IOP with PAT & NCT 15.43 mmHg (95% CI 15.14–15.76) & 15.13 mmHg (95% CI 14.81–15.46) respectively. NCT shows excellent agreement with PAT. Correlation coefficient(r) of IOP measured by NCT & PAT is 0.97 & 0.91 for RE & LE respectively with p value <0.05, showed strong positive correlation between the IOP measured by NCT & PAT. The NCT showed high sensitivity 86% & high specificity 97.9 % respectively, coming across an excellent agreement with PAT. Interpretation: NCT is easy to operate (non medical & Paramedical staff), minimum risk of infection & without any observer bias. Only drawback is the cost. Conclusion: The current study shows that the NCT compares well with the PAT. The NCT can be used as a reliable screening tool.

Keywords: Intraocular Pressure (IOP) ,Non-contact tonometer (NCT), Perkins applanation tonometer (PAT), Goldmann applanation tonometer (GAT), Right Eye (RE), Left Eye (LE).

Introduction

Glaucoma is a chronic progressive optic neuropathy caused by a group of ocular conditions which lead to damage of the optic nerve with loss of visual function invariably associated with increased IOP. Diagnostic criteria of glaucoma Raised IOP, Classical Field Changes, Classical Optic disc changes Any 2 of the above present are sufficient to diagnose glaucoma. Epidemiology Glaucoma is a major cause of irreversible blindness in the world [1] Globally, it is estimated that approximately 60 million people have glaucomatous damage & 8.4 million people who are blind as a result of glaucoma [2, 3] The prevalence of glaucoma is projected to increase with population growth & the ageing of the population, & by 2020 it is expected that the number of affected people will have risen to 80 million. Even in developed countries, only half of the people with glaucomatous damage are aware of the diagnosis [3] Early detection of glaucoma is crucial as effective & life long treatment for glaucoma prevents significant visual function loss.

Material & Method

A hospital based prospective clinical trial was conducted with 74 patients to correlate the IOP by the use of PAT with NCT.

Inclusion criteria

• Patient between the age of 40-70 years.
• Corneal astigmatism < 3D & Refractive error < ±2D spherical.

Exclusion criteria

• Age < 40 years
• Corneal astigmatism > 3D.
• Diagnosed case of glaucoma, patients with scarred or hazy cornea.
• History of corneal surgery including refractive surgery.
• History of corneal disease like keratoconus, microphthalmos.
• History of ocular infection like uveitis, conjunctivitis, corneal infections.
• History of hypersensitivity to topical fluorescein.
• Pregnant or Breast feeding women.
• Patient not willing to participate in study

Study Design: Cross- Sectional Study

Source of Data: This study was conducted on patients attending outpatient department of ophthalmology in a tertiary care centre. It was conducted from NOV 2017 to MAY 2019. This study was approved from institutional ethics committee.

Methodology

Data was collected using a proforma, with the informed consent of the participants. A detailed history was obtained from each participant followed by routine ophthalmological examination including visual acuity testing, anterior segment & fundus examination. Both the procedures will be explained to the subjects & participants were subjected to two methods of tonometry & NCT readings were recorded first, then PAT. 3 readings were taken two by residents & one by paramedical personnel & mean was calculated. PAT was calibrated at weekly. Measurements of IOP will be taken from 9 AM to 5 PM to avoid the effect of diurnal fluctuations on IOP. No specific attempts was made to separate the population on basis of gender. Disinfection was done according to the American Academy of Ophthalmology recommended guidelines.

Sample size: 74 cases

Statistical Analysis:

Statistical analyses were performed using SPSS (statistical packages for social sciences) 20.0 for Windows, IBM, India. IOP measurements were compared to those obtained by the PAT which was assumed to be the gold standard (Sensitivity, specificity, positive & negative predictive values). Regression Analysis was also performed to determine any causal relationship (Dependant variable- PAT IOP; Independent variables- NCT , IOP, age & gender). A Bland– Altman plot was constructed by using excel new version to investigate the resistance of any systematic difference between the different tonometry methods. Data was analyzed using Diagrammatic presentation, Mean ± SD, Un-Paired t-test & correlation coefficient was calculated.

Results

Both the eyes of all included patients have been studied. Therefore, for this analysis background characteristics including various study groups were calculated based on standard sample size of 74 patients as per the sampling technique used, while the remaining analysis was based on 148 eyes. The analysis of data obtained showed that, from a total of 74 patients, 39(52.70%) were males & remaining 35(47.30%) were females. The average age of patients was 56.01±9.73 yrs. The mean of IOP measured by PAT & NCT was 15.43 mmHg (95% CI 15.14–15.76) & 15.13 mmHg (95% CI 14.81–15.46) respectively. In this study the total participants were divided into 4 groups based on age for analysis purpose, as participants aged 41-50 yrs had 29(39%), 51-60 yrs had 21(28%), 61-70 yrs had 13(18%) & >or equals to 71 yrs had 11(15%) of participants.

Table No. 1 shows that mean IOP in RE for both male & females in age groups of 41-50 yrs, 51-60yrs, 61-70yrs, >or equals to 71yrs with PAT & NCT were 15.66mmHg, 15.42mmHg, 15.69mmHg, 14.73mmHg & 15.58mmHg, 14.63mmHg, 15.41mmHg, 14.13mmHg respectively for both tonometer with standard deviation of 1.6, 2.01,1.11,2.41 & 1.91,2.03,1.01,2.5 with p values of 0.86,0.71,0.73,0.83 respectively, & it showed that there was no significant difference between two tonometer.

Table No. 1 shows that mean IOP in LE for both male & females in age groups of 41-50yrs, 51-60yrs, 61-70yrs, >or equals to 71yrs with PAT & NCT were 15.52mmHg, 15.43mmHg, 15.85mmHg, 14.55mmHg & 15.3mmHg, 14.63mmHg, 15.41mmHg, 14.13mmHg respectively for both tonometer with standard deviation of 1.57,2.11,1.52,2.38 & 1.91,2.48,1.54,2.7 with p values of 0.65,0.27,0.47,0.7 respectively, showed there was no
significant difference between two tonometer.

**Table No. 2** shows that, age wise correlation of PAT compared well with the NCT for both eyes as evidenced by a r values of 0.97, 0.99, 0.86, 0.99 with a p value <0.05 for RE & 0.91, 0.90, 0.95, 0.96 with a P value <0.05 for correlation, for both male & females in age groups of 41-50 yrs, 51-60 yrs, 61-70 yrs, >70 yrs respectively, showed extremely significant correlation between tonometer.

**Table No. 3** shows, the correlation coefficient of IOP measured by PAT & NCT were 0.98 & 0.95 for RE & LE respectively with p value of <0.05 & were 0.97 & 0.88 for RE & LE respectively with p value <0.05, showed strong positive correlation between the IOP among males & females & also it was shows, the correlation coefficient of IOP measured by PAT & NCT were 0.95 & 0.84 for RE & LE respectively with p value of <0.05 in our study participants showed strong positive correlation between tonometer.
### Table 1: Mean IOP between PAT & NCT (in mmHg) among Total Participants by Age for both eyes.

<table>
<thead>
<tr>
<th>Age (In Years)</th>
<th>Right eye</th>
<th></th>
<th>Left eye</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PAT</td>
<td></td>
<td>NCT</td>
<td>Unpaired t- Value</td>
<td>p value</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>Unpaired t- Value</td>
</tr>
<tr>
<td>41-50</td>
<td>15.66</td>
<td>1.6</td>
<td>15.58</td>
<td>1.75</td>
<td>0.18</td>
</tr>
<tr>
<td>51-60</td>
<td>15.42</td>
<td>2.01</td>
<td>15.2</td>
<td>2.03</td>
<td>0.37</td>
</tr>
<tr>
<td>61-70</td>
<td>15.69</td>
<td>1.11</td>
<td>15.55</td>
<td>1.01</td>
<td>0.35</td>
</tr>
<tr>
<td>≥71</td>
<td>14.73</td>
<td>2.41</td>
<td>14.5</td>
<td>2.5</td>
<td>0.22</td>
</tr>
</tbody>
</table>

**Graph 3: Scatter Plot of LE IOP between PAT & NCT**
Table 2: Age-wise Correlation Coefficient of IOP between PAT & NCT among total participants.

<table>
<thead>
<tr>
<th>Eye</th>
<th>Age (In Yrs)</th>
<th>r value</th>
<th>r Squared</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RE</td>
<td>41-50</td>
<td>0.97</td>
<td>0.94</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>51-60</td>
<td>0.99</td>
<td>0.98</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>61-70</td>
<td>0.86</td>
<td>0.74</td>
<td>0.0002</td>
</tr>
<tr>
<td></td>
<td>≥71</td>
<td>0.99</td>
<td>0.99</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>LE</td>
<td>41-50</td>
<td>0.91</td>
<td>0.82</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>51-60</td>
<td>0.90</td>
<td>0.80</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>61-70</td>
<td>0.95</td>
<td>0.9</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>≥71</td>
<td>0.96</td>
<td>0.92</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Table 3: Gender wise Correlation Coefficient of IOP between PAT & NCT among total participants.

<table>
<thead>
<tr>
<th>IOP</th>
<th>Method</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>r value</td>
<td>r2</td>
<td>p value</td>
</tr>
<tr>
<td>RE</td>
<td>NCT</td>
<td>0.98</td>
<td>0.96</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>PAT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LE</td>
<td>NCT</td>
<td>0.95</td>
<td>0.9</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>PAT</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

A hospital based prospective cross-sectional clinical trial was conducted with 74 patients to correlate the IOP by the use of PAT with NCT. In our study total participants were divided into 4 groups based on age for analysis purpose, as participants aged 41-51yrs had 29(39%), 51-60yrs had 21(28%), 61-70yrs had 13(18%) & ≥ or equals to 71 yrs had 11(15%) of participants. This study was done with the principle aim to correlate the measurement of IOP by the NCT with the gold – standard PAT. According to a study by George R et al. [4] approximately 11.2 million Indians above 40 yrs suffer from glaucoma, supports our study to include all participants above the age of 40 yrs. [6-8]

The analysis of data obtained showed that, from a total of 74 participants, 39(52.70%) were males & remaining 35(47.30%) were females. The average age of participants was 56.01±9.73 yrs. Participants aged 41-50 yrs had maximum number 29(39%) of participants. In our study according to the Bland & Altman plot, the Mean (±S.D.) measurement for PAT was 15.44 mmHg (±1.83) compared with 15.13 mmHg (±1.87) for the NCT. The bias of the method was 0.30 (95% CI 0.14, 0.74) & precession was 3.78 (95% CI = 2.9, 4.67). Our study showed a good correlation between NCT & PAT when similar set of samples are used. In our study scatter plot for RE & LE showed positive correlation between NCT & PAT. In our study Mean IOP for RE was compared...
between PAT & NCT which was 15.46 mmHg & 15.30 mmHg respectively with p value of 0.60, & for LE was compared between PAT & NCT was 15.41 mmHg & 14.96 mmHg respectively with p value of 0.18, showed that there was no significant difference between the IOP measured by the NCT & PAT & suggest very good agreement between PAT & NCT. These findings are comparable with a study done by Prabhakar SK et al.[5]

In our study Mean IOP for both male & females for RE in age groups of 41-50 yrs, 51-60 yrs, 61-70 yrs, > or equals to 71 yrs was compared between PAT & NCT & mean IOP was 15.66 mmHg, 15.42 mmHg, 15.69 mmHg, 14.73 mmHg & 15.58 mmHg, 15.2 mmHg, 15.55 mmHg,14.5 mmHg respectively for both tonometer with standard deviation of 1.6, 2.01, 1.11, 2.41 & 1.75, 2.03, 1.01, 2.5 with p values of 0.86, 0.71, 0.73, 0.83 respectively, & it was found that there is no significant difference between two tonometer which means there is very good agreement between two tonometer. These findings are comparable with a study done by Prabhakar SK et al.[5]

Mean IOP for both male & females for LE in age groups of 41-50 yrs, 51-60 yrs, 61-70 yrs, > or equals to 71 yrs was compared between PAT & NCT & mean IOP was 15.52 mmHg, 15.43 mmHg, 15.85 mmHg,14.55 mmHg & 15.3 mmHg,14.63 mmHg,15.41 mmHg,14.13 mmHg respectively for both tonometer with standard deviation of 1.57, 2.11,1.52, 2.38 & 1.91, 2.48, 1.54, 2.7 with p values of 0.65,0.27, 0.47,0.7 respectively, it was found that there is no significant difference between two tonometer which means there is very good agreement between two tonometer. These findings are comparable with a study done by Prabhakar SK et al.[5]

It was observed in our study the gender wise correlation coefficient of IOP measured between PAT & NCT were 0.98 & 0.95 for RE & LE respectively with p value of <0.05 in males, showed strong positive correlation between the IOP measured by PAT & NCT among males & the gender wise correlation coefficient of IOP measured between PAT & NCT were 0.97 & 0.88 for RE & LE respectively with p value of <0.05 in females, showed strong positive correlation between the IOP measured by NCT & PAT amongst participants. These findings are comparable with a study done by Prabhakar SK et al.[5]

An essential criterion for a good screening tool is high specificity & high sensitivity. The NCT has been shown to be a reliable screening tool by Shields & Moseley et al. In our study Non-contact tonometer showed high sensitivity 82 (95%CL: 56.8-90.5) i.e. very few false negative results as well as high specificity 95.9 (95%CL: 92.7-99.1) i.e. few false positive results; thus coming across an excellent agreement with PAT. Our results are comparable with study done by Moseley M. J et al. & reported that NCT has sensitivity of 85% & specificity of 95%. In our study Inter-observer variability more occurs with PAT while NCT records IOP automatically leading to less chance of observer bias which proves that the scope of change reading with NCT was very rare as compared to PAT. In our study 2 out 74 participants had conjunctivitis & 8 had epitheliopathy with PAT & no participants had conjunctivitis & epitheliopathy with NCT. Thus the NCT was found to compare well with the PAT & confirmed the finding of previous researchers Hsu et al. & Ogbuehi & Almubrad.

**Conclusion**

Advantages of PAT are Portability & is a choice of tonometer in bedridden patients. Disadvantages of PAT are Cooperation of patient is needed, Squeezing of lids can lead to falsly high readings, On successive reading can lead to applanation epitheliopathy, May spread infections like keratoconjuntivitis, Need for topical anaesthesia & fluorescein dye required for staining, Slow learning curve, scope of Inter observer bias is present. Advantages of NCT are faster & reproducible results. Topical anaesthesia & fluorescein dye for staining not required. Non-contact technique (avoids infections like kerato conjuntivitis). No Inter-observer
Bias. Participant’s acceptance for NCT is favorable and, with High Sensitivity & Specificity, makes it a reliable tool for screening at tertiary eye care centre. Faster Learning curve can be used by paramedical personnel. Disadvantages are Expensive, Fixation is essential. The current study showed that, the NCT compares favorably with the PAT. NCT can be used as a reliable screening tool.

Ethical approval: All procedures performed on human participants were in agreement with ethical standards of the Institutional and/or National Ethics Committee.

Source of Funding: Self

Conflict of Interest: None.

References
Theatrical Prosthesis – Widening Horizons of Prosthetic Dentistry – A Case Report

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Abstract

A movie or a play is said to be great if it can imprint an image in our mind forever. To accomplish this, even the unnatural looking characters should look real. This case report describes a temporary prosthesis which alters the look of a theatre artist suited as a Dracula. Mock wax-up was done on the stone cast and an index of same was made using putty material. After dewaxing of the cast, tooth colored self-cure acrylic resin was mixed and poured into the index and stone cast with separating medium applied over it was pressed into the index. Prosthesis was retrieved, trimmed, polished and then delivered to patient.

Key Words: Theatrical Dentistry, Dracula teeth, canine prosthesis, vampire look

Introduction

The appearance of teeth plays an important role in depicting ones’ personality. Characterization of individual appearance using dentition includes various factors explained in dentogenic concept.¹

Theatre is collaborative form of fine art that uses live performers to present the experience of a real or imagined event. To provide the perception of the character, cosmetic alteration of the actor is done. This alteration also includes temporary modification in appearance of teeth. These have led to emergence of a new discipline called as theatrical prosthetic dentistry in which the alteration in appearance and functioning is done temporarily. It includes fabrication of prostheses that imparts characterized smiles. Theatrical dentistry deals mainly with two aspects of dentistry, namely aesthetics and phonetics. Alteration in both or either of them makes the basis of this new dimension.

Case Report

A patient reported to the department of Prosthodontics with demand of artificial teeth to attain a Dracula look for an act that he had to perform in one of the local theatres. Patient was explained about different types of removable and fixed prosthesis options. As the look was for a play, for a short time, fabrication of a removable prosthesis was done. For this -

1. Impression for Upper and lower arches were made with irreversible hydrocolloid material and casts were poured using dental stone [Fig 1].

2. Mock Wax-up was done and patient’s approval was taken for length and shape of extended canine [Fig 2].

3. A Poly Vinyl siloxane putty impression of diagnostic cast with mock wax up [fig 3] was made
which acted as an index for fabrication of the prosthesis.

4. Cast was dewaxed in a hot water bath and fit of Poly Vinyl Siloxane putty impression was checked on the cast.

5. Separating media was applied on the cast.

6. After matching the shade, appropriate shade of tooth coloured acrylic resin was mixed and poured into the putty impression.

7. Cast was pressed over the poured index till its fit.

8. Assembly was put in the pressure pot for about 15 minutes under 2 lbs pressure and acrylic was allowed to set.

9. Prosthesis was trimmed and checked intraorally for any occlusal interference [fig 4A, 4B].

10. Then it was polished and delivered to patient. [Fig 5A, 5B]
Discussion

Using tooth coloured self-cure acrylic resin provides the advantage of faster and cheaper fabrication of the prosthesis. Strength is sufficient for a short term use in theatre. Alternatively heat cure acrylic resin can also be used if more strength is needed. Self-cure acrylic prosthesis can be best indicated for theatrical use and heat cure acrylic resin can be used in situation when patient demand it for longer period as in for Halloween. These prostheses will be contraindicated if patient is allergic to acrylic resins, or in case where prosthesis cannot bear the occlusal load like in deepbite cases of heavy occlusal forces. Although, advent of newer materials and methods has led to increase in scope of theatrical dentistry, the designing of prosthesis will still play an important role in its longevity.

Conclusion

Prosthetic field has been explored for restoration of what is lost since ages. But now, exploring it to create newer dimensions has provided for us, a vast opportunity to use our prosthetic as well as artistic skills to fabricate something that is not only just conventional but something that were once just a imaginable character too.

Ethical Clearance - Consent taken from the subject.

Conflict of Intrest - None

Source of Funding - Self

References


Study of Unnatural Deaths of Women Brought to Raichur Institute of Medical Sciences for Medico-Legal Autopsy

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1Tutor, Dept. of Forensic Medicine & Toxicology, Raichur Institute of Medical Sciences, Raichur

Abstract
Discrimination against women in our society is deeply embedded within family context of the women. Women are subjected to violence from husbands and from their relatives in their natal as well as marital homes. This study was designed to determine unnatural deaths of females in Raichur during the year 2017. total 362 cases were autopsied where as 77 women of unnatural deaths were autopsied. Third and fourth decade were common age group. Most of the unnatural deaths were suicidal and road traffic accidents. This study reflects the susceptibility of women to unnatural deaths, thus needs to enhance the multipronged protective system, to curb these potentially preventable unnatural deaths of females

Key Words: unnatural deaths, females, suicidal, RTA, hanging.

Introduction
An unnatural death is an intentional or unintentional death due to external causes. this can often be violent, mutilating or destructive. when natural death involves women, it shatters the lives of the survivors and famil.

Suicidal death is one type of violent deaths which is caused by a deliberate act of decedent with the intent to kill himself.1,2data on such suicidal deaths in a geographic can give reflection of social and mental status of females. Suicidal deaths of married women have exponentially risen in Indian society in recent past. The women are often subjected to violence by husband and relatives in their natal as well as marital period. Violence against women includes not physical aggression but sexual abuse, psychological abuse and emotional abuse. Present study was conducted in Raichur to evaluate factors to unnatural deaths in females.

Materials and Method
This study is retrospective study undertaken at RIMS mortuary, Raichur during the year 2017.all cases of unnatural deaths of women were subjected to medico-legal autopsy during study period. The unnatural deaths were broadly classified as accidental, suicidal and homicidal depending on manner of death. Next as per the various pattern of modes of death encountered during the study, the unnatural deaths were classified as RTA’s, burns, fall from height, poisoning, assault, asphyxia deaths etc.,

Results
Table.1-Age Wise Distribution

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>04</td>
</tr>
<tr>
<td>11-20</td>
<td>14</td>
</tr>
<tr>
<td>21-30</td>
<td>17</td>
</tr>
<tr>
<td>31-40</td>
<td>17</td>
</tr>
<tr>
<td>41-50</td>
<td>08</td>
</tr>
<tr>
<td>51-60</td>
<td>09</td>
</tr>
<tr>
<td>&gt;60</td>
<td>08</td>
</tr>
</tbody>
</table>

Out of 77 female unnatural deaths, most of the females belong to 21 to 30 years of age and second most common age being 11-20 years of age.

Table.2-Marital Status:

<table>
<thead>
<tr>
<th>Status</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>MARRIED</td>
<td>57</td>
</tr>
<tr>
<td>UNMARRIED</td>
<td>20</td>
</tr>
</tbody>
</table>

Among unnatural female deaths majority of them were married.
### TABLE.3-MANNER OF DEATH:

<table>
<thead>
<tr>
<th>Manner of Death</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTA</td>
<td>22</td>
</tr>
<tr>
<td>POISONING</td>
<td>22</td>
</tr>
<tr>
<td>BURNS</td>
<td>10</td>
</tr>
<tr>
<td>SNAKE BITE</td>
<td>05</td>
</tr>
<tr>
<td>HYPERSENSITIVITY TO DRUGS</td>
<td>02</td>
</tr>
<tr>
<td>HANGING</td>
<td>07</td>
</tr>
<tr>
<td>RAILWAY ACCIDENT</td>
<td>01</td>
</tr>
<tr>
<td>DROWNING</td>
<td>03</td>
</tr>
<tr>
<td>HOMICIDE</td>
<td>01</td>
</tr>
<tr>
<td>UNKNOWN INSECT BITE</td>
<td>02</td>
</tr>
<tr>
<td>SCORPION STING</td>
<td>02</td>
</tr>
</tbody>
</table>

Among manner of death RTA and Poisoning are the commonest manner where as burns is second most common cause.

### TABLE.4-MOTIVE FOR DEATH:

<table>
<thead>
<tr>
<th>Motive for Death</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUCATION FAILURE</td>
<td>03</td>
</tr>
<tr>
<td>MENSTRUAL PAIN</td>
<td>06</td>
</tr>
<tr>
<td>DOWRY</td>
<td>02</td>
</tr>
<tr>
<td>DEPRESSION</td>
<td>02</td>
</tr>
<tr>
<td>LOAN DEPT</td>
<td>02</td>
</tr>
<tr>
<td>CHRONIC HEALTH ISSUES</td>
<td>02</td>
</tr>
<tr>
<td>PSYCHIATRIC ISSUES</td>
<td>04</td>
</tr>
<tr>
<td>PARENTAL PRESSURE</td>
<td>01</td>
</tr>
<tr>
<td>HOMICIDE</td>
<td>01</td>
</tr>
<tr>
<td>HARRRASMENT BY HUSBAND</td>
<td>01</td>
</tr>
<tr>
<td>ACCIDENTAL</td>
<td>53</td>
</tr>
</tbody>
</table>

Among motive of death menstrual pain is the commonest propelling factor for suicide followed by psychiatric issues due to various reasons stands second in the race.
Discussion

Incidence of unnatural deaths was 25%. Similar finding of Sharma et al\(^3\) where incidence was observed to be 28%.

In our study majority were in 2\(^{nd}\) to 4\(^{th}\) decades year age group which is consistent with other authors\(^4, 5\). Suicide and accidents were common modes of death in my study. This also observed by Sharma et al\(^3\). However accidental manner of death was more commonly reported by Sharma et al\(^3\).

In this study marital status showed that most cases of unnatural deaths were from married group which is consistent with other author. Accidents and hanging were most common cause of death followed by burns in my study. However these studies are not consistent with other studies\(^4, 5, 9, 10, 12\). Poisoning was commonest cause consistent with Prajapati P et al\(^7\).

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: obtained from rims ethical clearance committee

Recommendations

1. Early marriage of woman should be discouraged to prevent them from innate stressful exposure at an early age.
2. Anti-dowry cell and women protection cell should be established.
3. NGO’s and law protection should be established to prevent crime against women.
4. Counseling should be established at every district centre to counsel risk factors in women.

References

Profile of Brought in Dead Cases in a Tertiary Care Centre of South India

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Abstract

Most of the times it is noticed that incidence of Brought in dead (BID) cases in a tertiary care hospital is very high. But there are limited data of the statistics of such cases due to lack of records or audit. These cases can be due to natural cause or unnatural. The doctor attending such cases should be aware of all procedures and formalities associated with BID cases. Diagnosis of death should be ascertained clinically and hospitals should be aware of the legal responsibilities of these cases.

This study was conducted in a tertiary care institution where BID cases were profiled with the available data and records. The study throws light in to not only the demographic profile like age, sex, month wise distribution but also to time of reporting to Emergency department (ED) as well as the probable cause based on history of the informant. Males dominated in the total number of 307 cases compiled in 4 years, i.e, 2015 to 2018. Age of above 60 years cases made the major share with sudden death as well as road traffic accident (RTA) being the major culprits. Maximum number of BID were reported during early morning hours (12am to 6 am) followed by late evening hours (6pm to 12am).

Key words: Brought in dead cases, Emergency department, demographic profile

Introduction

The incidence of brought in dead (BID) is high in tertiary hospitals, but there is a lack of proper audit and relevant data of these cases. Brought in dead cases are those cases, where the patient on arrival to the emergency department (ED) was found to be clinically dead, hence also named as ‘Dead on arrival’. Persons ‘brought in dead’ (BID) often contribute to hospital ED mortality statistics (1,2,3,4).

Even though not an emergency, ED of a hospital has to provide necessary documentation and has to undergo all the legal issues regarding a BID case. Most of the times, it is important for the emergency clinician to confirm the death and to distinguish it from ‘apparent death’. There are many factors associated with brought in dead cases which could be neglect from the patient attenders, concealing crime by offenders, lack of infrastructure or lack of awareness. Almost always, all brought in dead cases are considered medicolegal and it is the duty of doctor to intimate the police according to the law of land. It is also important to know about the premorbid conditions of patients and to collect the previous treatment records of the deceased. This study is an attempt to collect material data about such cases and to compile the demographic profile with associated parameters which is a unique one in this region.

Materials and Method

The demographic profile of all BID from year 2015 to 2018 were analysed, which were presented to ED of a tertiary care medical college hospital in South India by

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a cross sectional study. The age wise, gender wise and month wise distribution were tabulated and graphically represented. The pattern of cases based on history and time of reporting to ED were also recorded.

**Results**

This retrospective study was conducted in an 800 bedded tertiary care private teaching institution from 2015 to 2018. In all the four years, males dominated in number of BID. The total number of cases in 4 years came up to 307. In the year 2015, 61% were males whereas the year 2016 there were 82.7% males. The year 2017 had 70.3% male cases and 2018 recorded 69.3% male dominance (Fig.1).

The age wise classification was done by grouping into <20 years, 20 to 40 years, 40 to 60 years and above 40 years. 43.6% cases belonged to above 60 years category from total number of cases in 4 years. There was clear majority of this age group BID in all the 4 years (Table.1).

Time of reporting to ED on given day were analysed for all the 4 years by classifying into four groups. Maximum number of BID was reported during 12 am to 6 am (39%) followed by duration of 6pm to 12am (35%) (Table.2).

The pattern of cases based on history available were recorded. Of which sudden deaths and RTA formed the major share (Fig.3). Most of the cases which belonged to elderly age group, i.e., above 60 years had various comorbidities in the past like COPD, CAD, renal failure, diabetes mellitus and systemic hypertension. BID following RTA belonged to younger age groups. Sudden death cases were also reported rampantly without any known comorbidities and chronic illnesses in past.

**TABLE.1 AGE WISE DISTRIBUTION OF BID FROM 2015 TO 2018**

<table>
<thead>
<tr>
<th>YEAR</th>
<th>&lt;20 YRS</th>
<th>20-40</th>
<th>40-60</th>
<th>&gt;60</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>3</td>
<td>14</td>
<td>21</td>
<td>37</td>
<td>75</td>
</tr>
<tr>
<td>2016</td>
<td>2</td>
<td>14</td>
<td>35</td>
<td>42</td>
<td>93</td>
</tr>
<tr>
<td>2017</td>
<td>3</td>
<td>21</td>
<td>16</td>
<td>24</td>
<td>64</td>
</tr>
<tr>
<td>2018</td>
<td>5</td>
<td>13</td>
<td>26</td>
<td>31</td>
<td>75</td>
</tr>
</tbody>
</table>

**TABLE.2 TIME OF REPORTING OF BID TO ED FROM 2015 TO 2018**

<table>
<thead>
<tr>
<th>YEAR</th>
<th>12 am -6am</th>
<th>6am -12pm</th>
<th>12pm-6pm</th>
<th>6pm-12am</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>27</td>
<td>10</td>
<td>14</td>
<td>24</td>
<td>75</td>
</tr>
<tr>
<td>2016</td>
<td>39</td>
<td>17</td>
<td>5</td>
<td>32</td>
<td>93</td>
</tr>
<tr>
<td>2017</td>
<td>25</td>
<td>12</td>
<td>3</td>
<td>24</td>
<td>64</td>
</tr>
<tr>
<td>2018</td>
<td>29</td>
<td>17</td>
<td>11</td>
<td>28</td>
<td>75</td>
</tr>
</tbody>
</table>
FIG. 1 GENDER WISE DISTRIBUTION OF BID FROM 2015 TO 2018

FIG. 2 MONTH WISE DISTRIBUTION OF BID FROM 2015 TO 2018

FIG. 3 BID PATTERN FROM 2015 TO 2018
Discussion

Death is permanent and irreversible stoppage of the all three vital systems of the body, including the circulatory, respiratory and neurological systems. The moment of death points to the exact moment when the person dies. Khan et al. has mentioned that about 10-50% of such deaths occur before reaching the hospital and hence recorded as brought in dead cases.[5]

In the present study, almost 43.6 % involved were above 60 years. The age group of 61-75 years constituted the largest group in a study done by Wang JS et al which is similar to our study [6]. The main reasons for the involvement of this age group may be the undiagnosed fatal illness or neglect of alarming symptoms of diseases in the community.

In our study, it was noted that there was clear cut male dominance in all the 4 years. This finding was consistent with other studies as well [7,8]. Month wise distribution of all the 4 years were also tabulated but no statistical significance or varied differences were noted.

It is interesting to find that most of the BID cases reported to the ED during 12 am to 6 am (39%) followed by duration of 6pm to12am (35%). This indicates that the late evening hours and early morning hours brings more BID cases to a hospital which may be due to delay in transport, inaccessibility and neglect.

Conclusion

The profile of BID cases presented to a tertiary care hospital in South India was similar to previous studies conducted. It is important for all hospitals to be aware of the legal formalities in handling BID cases. It is mandatory for all hospitals to maintain a proper BID register with all details. A doctor should be aware of his legal and ethical duties of such cases apart from confirmation of death.

Conflicts of Interest: There are no conflicts of interest.

Source of Funding: Nil.

Ethical Clearance: Obtained from institutional research board and ethical committee

Abbreviations

BID – brought in dead

ED – Emergency department

RTA – road traffic accident

References

Analysis of Medicolegal Cases in a Tertiary Care Hospital of South Kerala

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Abstract

Medicolegal cases (MLC) are presented to Emergency department (ED) of almost all hospitals in our nation after the Supreme Court guidelines stating that ‘the paramount duty of a doctor is to save the life of a person’. Hospitals should be equipped with infrastructure as well as treating doctors in combating such cases where documentation and treatment should be meticulously done.

This study is conducted in a tertiary care hospital in South Kerala where profile of MLC was analysed during the years 2016 -17. A total of 10,001 cases were studied which is unique compared to previous studies. Males dominated in the MLC with road traffic accident (RTA), fall from height and work place injuries formed the major share in the pattern of cases. Most of these cases were presented to ED between first and sixth hour of occurrence.

Key words: Medicolegal cases, Emergency department, demographic profile

Introduction

Any case of injury or ailment where some criminality is involved is called a Medicolegal Case (MLC)¹. MLC are identified by the treating doctor based on history and clinical examination. In the Emergency department (ED) of a tertiary care hospital, MLC forms the major share of cases and it is important for the hospital to handle the legal implications of such cases. With the emergence of specialization in Emergency medicine, identifying and handling of MLC meticulously has significance in reducing the burden of a clinician. As per the guidelines of Supreme Court of India, it is the paramount duty of a doctor to save a patient in emergency. It is important for the hospital to tackle MLC and give lifesaving treatment as well as to do all necessary medicolegal certifications and formalities to the patients. Profiling of MLC is an integral aspect for the prevention of preventable causalities in future and to study the crime rate in that area². The present study was conducted in an 800 bedded postgraduate teaching institution in South Kerala.

Material and Method

The present study was conducted on 10,001 MLC patients admitted to the casualty department of Pushpagiri Institute of Medical Sciences, Tiruvalla from January 2016 to December 2017. The demographic profile based on age, sex, month wise distribution was done for various patterns of MLC presented to the ED. All the data were analysed and demonstrated using tables and graphs. Ethical approval was taken from ethical review board of the institution and the administration of concerned hospital ensuring data confidentiality.

Inclusion criteria

All the MLC registered during January 2016 to December 2017 in the medicolegal case record book were included.

Exclusion criteria

Cases found non-medicolegal were excluded.

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Aims and Objectives

1. Profiling of MLC coming to the ED of Pushpagiri Institute of Medical Sciences, Tiruvalla

2. Suggestions for improving medico-legal work in Casualty.

3. To make recommendations to administrative authorities according to outcome of study.

Observations and Results

A cross sectional study on medicolegal cases presenting to the ED of a tertiary care medical college hospital was performed and the demographic profile and pattern of cases were analysed and tabulated. MLC of the years 2016 and 2017 were included.

In the year 2016, the total number of MLC was 4972. Of which, 3381(68%) were males and 1591(32%) were females. The age group classification was done and tabulated as < 20 years, 20 to 40 years, 40 to 60 years, 60 to 80 years and more than 80 years. Among all the age groups 20 to 40 years (40%) and 40 to 60 years (28%) constituted the major share with male gender preponderance (Table 1).

The patterns MLC studied were categorised in to road traffic accident (RTA), assault, fall from height, poisoning, burns, hanging, drowning, various bites and work pace and domestic injuries. Age wise and gender wise distribution was done. In the year 2016, 2163 RTA (43.5%) and 1686 fall from height (33.9%) were recorded and formed the major share. In both the categories there was male dominance (Fig.1). Among all the patterns of MLC, majority of cases belonged to the age group 20 to 40 years (59%) and 40 to 60 years (25%) (Table 1). Month wise distribution of cases were studied and September month (477) case recording the highest and November month (336) showing the least (Fig.2). The time of reporting to ED from time of incidence were also calculated for all cases. 30% cases reported within the first hour. 42% cases reported within 1 to 6 hours, whereas 26% presented between 6 to 12 hours. Only 2% cases presented to ED as late as more than 12 hours (Table 2).

In the year 2017 there were 5029 MLC cases recorded. There were 3623 males (72%) and 1406 females (28%). The age groups 20 to 40 years (54.1%) and 40 to 60 years (21.8%) formed the major share and age groups < 20 years (3.5%) and > 80 years (3.7%) contributing the least (Table 1). Among all the patterns RTA 2225(44%) and fall from height 1885 (37%) formed the major share. Males dominated in both the categories with age groups 20 to 40 years (46.5%) and 40 to 60 years (27.3%) were maximum affected compared to other age groups (Fig.3). August recorded with maximum number of cases (481) and February recorded the lowest (359) (Fig.4). 32% cases presented to ED within 1 hour from incidence whereas majority (43%) presented between 1 to 6 hours (Table 2).

<table>
<thead>
<tr>
<th>Age Groups</th>
<th>Male 2016</th>
<th>Female 2016</th>
<th>Male 2017</th>
<th>Female 2017</th>
<th>Total 2016</th>
<th>Total 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20 YRS</td>
<td>406</td>
<td>137</td>
<td>112</td>
<td>52</td>
<td>518 (10.1%)</td>
<td>189 (3.7%)</td>
</tr>
<tr>
<td>20-40</td>
<td>1422</td>
<td>1635</td>
<td>569</td>
<td>1087</td>
<td>1991 (40%)</td>
<td>2722 (54.1%)</td>
</tr>
<tr>
<td>40-60</td>
<td>910</td>
<td>908</td>
<td>487</td>
<td>189</td>
<td>1397 (28%)</td>
<td>1097 (21.8%)</td>
</tr>
<tr>
<td>60-80</td>
<td>474</td>
<td>817</td>
<td>347</td>
<td>37</td>
<td>821 (16.5%)</td>
<td>854 (16.9%)</td>
</tr>
<tr>
<td>&gt;80 YRS</td>
<td>169</td>
<td>126</td>
<td>76</td>
<td>41</td>
<td>245 (4.9%)</td>
<td>167 (3.5%)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>3381(68%)</td>
<td>3623(32%)</td>
<td>1591(72%)</td>
<td>1406(28%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TABLE 2.- TIME REPORTING OF MLC TO EMERGENCY DEPARTMENT IN 2016 AND 2017

<table>
<thead>
<tr>
<th>Time period</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1 HR</td>
<td>1492 (30%)</td>
<td>1612 (32%)</td>
</tr>
<tr>
<td>1-6 HRS</td>
<td>2089 (42%)</td>
<td>2172 (43%)</td>
</tr>
<tr>
<td>6-12 HRS</td>
<td>1293 (26%)</td>
<td>1128 (22%)</td>
</tr>
<tr>
<td>&gt;12 HRS</td>
<td>98 (2%)</td>
<td>117 (3%)</td>
</tr>
</tbody>
</table>

FIG.1 MLC PATTERN IN 2016 WITH GENDER DISTRIBUTION

FIG.2. PATTERN OF MLC IN 2016 WITH MONTH WISE DISTRIBUTION
Discussion

In the present study, 10,001 MLC were studied for a period of 2 years (2016 – 17) which is a unique study for this geographical region. The study was conducted in an 800 bedded tertiary care private teaching institution situated in a municipal area serving nearly 25 km radius population. This institution was equipped with round the clock emergency facilities and services from speciality and super speciality departments.

The study indicated male dominance in number as well as most of the pattern of cases involved. This could be because of males who are mostly involved in outdoor
activities, travelling and heavy manual jobs. The similar findings were found in study conducted by A. Yadav et al. in 2013 where males were dominant (67.6%). Other studies in 2010 and 2011 also have similar results\cite{3-6}.

The age group of 20 years to 40 years, followed by 40 years to 60 years were involved in majority of cases. This also suggests the healthy adults in working class were mostly subjected to injury due to their involvement in trade, agriculture and other fields of work. The RTA were the majority in both the years which could be due to multiple factors including over speeding, bad roads and the influence of alcohol in these age groups. Fall from height and work place injuries also showed a good number which could be due to heavy work and lack of safety awareness and measures among the working class.

It is important to note that in both the years, poisoning and hanging cases were dominated by females. The manner of these cases is mostly suicidal points towards the atrocities and cruelty with gender discrimination which is still prevalent in the study population.

Time of reporting to ED after the incidence were studied. Most of the cases were reported within first hour and 6 hours. This indicates the awareness, cooperation of public along with good connectivity to this centre.

**Conclusion**

1. Males were predominant in most of the MLC in both years.

2. Young age group with working class were involved in most of the patterns of MLC. So, measures should be taken to prevent injuries by providing safety awareness, security checks, and by maintaining strict laws by the Government authorities.

3. The bulk of cases up to 10,001 in two years shows the importance of a tertiary care in a densely populated area. This should be an eye opener for the government as well as Planning Commission to know about the need of establishment of such tertiary care centres in our country.

**Conflicts of Interest:** There are no conflicts of interest.

**Source of Funding:** Nil.

**Ethical Clearance:** Obtained from institutional research board and ethical committee

**Abbreviations**

MLC - medicolegal case

ED – Emergency department

RTA – road traffic accident

**References**


Comparison of Stress Patterns in Edentulous Mandibular Bone around Two Implant Retained, Four Implant Retained Overdenture and All-On-Four Concept. - A 3 Dimensional Finite Element Analysis

Puneeth Hegde¹, Shobha Rodrigues², Satish Shenoy³, Tilak Shetty⁴, Umesh Pai⁵, Sharon Saldhana⁵, Mahesh. M⁵.

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Abstract

Recently the use of tilted implants has been considered as a preferable option in case of atrophic edentulous arches. The tilted longer implants can be of use to ward off the important anatomical structures while also permitting cantilever reduction.

Since the load transfer mechanism of an implant can be altered significantly by the number of implants and its location in the edentulous ridge, the present study evaluates and compares the stress patterns in the edentulous mandibular bone around two implant retained, four implant retained over denture and all on four concepts under different loading conditions using finite element analysis.

Purpose: The biomechanical behaviour of the ‘All-On-Four’ system was compared with that of the two-implant-supported and four-implant supported mandibular overdenture using the three dimensional finite element method (FEM). Thereby evaluating the von Misses stresses induced on the implants under different loading simulations.

Materials & Method: Three dimensional models representing mandible restored with ‘All-On-Four’, two-implant-supported and four-implant-supported prosthesis were developed in the three dimensional design software and then transferred into FEM software. The models were then subjected to four different loading simulations (full mouth biting, canine disclusion, load on cantilever, load in the absence of cantilever). The maximum von Mises stresses were localized and quantified for comparison.¹

Results: Among the three models, under all loading simulations, the maximum stress concentrations were along the neck of the implant. The stress levels for full mouth loading simulation was highest for two implant supported overdenture design and the least for All-On-Four overdenture design. In all three designs, the least stress was when the implants were loaded in a lateral direction. The stress levels for cantilever and non-cantilevered designs were nearly the same for all the simulated designs.

Conclusion: When tested under different loading simulations, the three models showed similar location and distribution of stress patterns. Thus from the study it can be concluded that the All-On-Four Concept is a
clinically applicable treatment option for the atrophic edentulous ridges and induces least amount of stresses on the edentulous ridges. Therefore the overall longevity of the prosthesis is greatly enhanced.

**Key words:** atrophic mandible, biomechanics, finite element analysis, implants supported prosthesis, tilted implants.

**Introduction**

Dental implant treatment is considered as the most favorable treatment option for the partially or the completely edentulous patients.\(^1\) Although implant treatment is well documented and reliable, implant placement may be limited by the anatomy of the patient like in regions of posterior maxilla or the posterior regions of mandible, the use of implants is usually limited by extensive bone resorption and poor bone quality. In addition to this, there are various anatomical limitations like presence of maxillary sinuses in the maxilla and superior position of the inferior alveolar nerve in the mandible.\(^2\)\(^-\)\(^5\) Hence in such situations prosthetic rehabilitation of implants in the posterior region may necessitate the use of long cantilevered prostheses, thereby increasing the risk of implant failure.\(^6\)\(^-\)\(^8\).

Recently the use of tilted implants has been considered as a preferable option in case of atrophic edentulous arches as confirmed from the study by Watanabe et al. The tilted longer implants can be of use to ward off the important anatomical structures while also permitting cantilever reduction. Hence to simplify the treatment of atrophic maxilla or mandible using tilted distal implants, a technique named, ‘All-On-Four’ was developed.\(^1\)

The use of tilted implant concept offers good support by reducing cantilever length, enhancing primary stability by using areas of high density bone and also allows a favorable inter-implant distance. But poorly designed implants can create regions of increased stress in peri-implant bone and induce severe resorption, leading to gradual loosening and finally complete loss of implant \(^1\)\(^,\)\(^2\)\(^,\)\(^6\).

The stress and strain generated have been evaluated by methods like the photo elasticity, strain gauge analysis and finite element analysis. The photo-elasticity provides good qualitative information on the overall location and concentration of stresses but provides limited quantitative information. The strain gauge movements provide accurate data regarding strains only at the location of the gauge; the finite element method is capable of providing detailed quantitative data at any location within a mathematical model. Two and three dimensional finite element analysis has been used to evaluate the stresses around various dental implant systems.\(^2\)\(^,\)\(^5\)\(^,\)\(^10\)

An in-depth understanding of stress profiles encountered by the implant and more importantly in the surrounding jawbone can be gained through the use of FEM. It is of great importance that the clinician gains an understanding of the methodology, applications, and limitations of FEA in implant dentistry, and become more confident to interpret results of FEA studies and interpret these results to clinical situations.\(^1\)\(^,\)\(^4\)\(^,\)\(^9\)

Since the load transfer mechanism of an implant can be altered significantly by the number of implants and its location in the edentulous ridge, the present study is evaluating and comparing the stress patterns in the edentulous mandibular bone around two implant retained, four implant retained over denture and all on four concepts under different loading conditions using finite element analysis.

**Aim**

To compare the stress patterns in the edentulous mandibular bone around two implant retained, four implant retained overdenture and the prosthesis restored with All-On-Four Concept using finite element analysis.

**Objectives**

To compare the biomechanical behaviour of the prosthesis restored with All-On-Four Concept with that of two implant supported and four implant supported mandibular overdenture using three dimensional finite element analysis.

To localize and quantify the Von Mises stresses induced on the implants under different loading simulations.
Material & Method

Poorly planned implant placement can create regions of increased stress in peri-implant bone and induce severe resorption, leading to gradual loosening and finally complete loss of implant. Hence a detailed analysis needs to be done to evaluate the stress distribution with various implant designs.

The present study was carried out at the

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► Department of Aeronautical Engineering, Manipal Institute of Technology, Manipal.

Armamentarium used for the study

● CT Scan of edentulous mandible
● Replace Select Tapered TiU NP 3.5 x 13mm (Nobel Biocare)
● The Profile Projector (METZ- 801)
● Cylindrical Retainer of 4mm diameter.
● ANSYS - 11 Workbench Software.

Preparation of FEM model of the Edentulous Mandible. 1-4

A Computerized tomography image of the human edentulous mandible was obtained and introduced into the Computer Aided Design Software. Using the ANSYS software, the CT image of the mandible was later simplified into an arc shaped bone block with dimensions of 7.5 mm thick and 15mm high. A 1mm cortical bone layer was established overlying the entire mandible whereas trabecular bone was used in the internal structure, simulating the type III bone. Once the computerized 3-Dimensional model was obtained, incorporation of the implant design into the model was planned.

Preparation of the FEM implant model

The study was done to compare the stress patterns in the edentulous mandible under various implant supported overdenture designs, so the accuracy and contour of the threaded implant was a major concern. But the contour, shape and depth of the threads in the implant could not be evaluated and reproduced in the 3-dimensional model with the help of the computerized tomography, hence an instrument called ‘Profile Projector Optical System’ was used in this study. The values that were obtained from the profile projector were then used to prepare an accurate 3-D model of the threaded implant along with the retainer.

Profile Projector (METZ -801) Optical System

All profile projectors display magnified images on an appropriate viewing screen, as an aid to more precise determination of dimension, form and occasionally physical characteristics of sample parts. These optical projectors are able to display a two dimensional projection of a part rather than a simple linear dimension as with most other gauging devices.

This instrument creates work piece image on the projection screen at desired magnifications (10x, 20x, 50x) to provide accurate dimensional measurement as well as inspection of the contour and surface condition of the work piece.

The METZ- 801 features a large Projection Screen 300mm diameter and the combination of high performance projection lens and an optical system minimizing the magnification error, which may occur due to insufficient or improper focusing and ensures accurate measurements over the entire projection screen. The accuracy of this instrument is known to be 0.001mm.

Preparation of the working model

Three dimensional working models were constructed using 3D computer aided design software (ANSYS). The models represented the mandible restored with 2 - implant supported prosthetic design, 4 implant supported prosthetic design, and the design restored with the All On Four Concept. A rigid type III gold prosthetic bar, 6mm thick and 4mm high and in the shape of an arc was then designed and joined to the abutments.1

For the 3-Dimensional two implant supported prosthesis model, the threaded implants were strategically placed vertically in the region of lateral incisors bilaterally.

For the 3- Dimensional four implant supported prosthesis model, in addition to the mesial implants placed bilaterally, distal implants were vertically placed bilaterally in the premolar region.

For the 3- dimensional ‘All-On-Four’ model, Two anterior implants were placed vertically in the
position of the lateral incisors and two implants were placed bilaterally in the position of second premolars and tilted distally to 30º angle.

- Loading 1: Full mouth biting – bilateral and simultaneous vertical static loads of
  - 200 N was applied on the occlusal surface of the first molars (Cantilevers)
  - 150 N on the occlusal surface of second premolars
  - 150 N on the occlusal surface of first premolars
  - 100 N on the distal of canines
- Loading 2: Lateral Load – Unilateral static load of 50 N applied in the region of left canine.
- Loading 3: Cantilever Load – Unilateral vertical static load of 200 N was applied on the left cantilever.
- Loading 4: Load without the cantilever - Unilateral vertical static load of 200 N was applied in the region adjacent to the left second premolar, simulating absence of cantilever.

The results of the mathematical solutions were later converted into visual results and expressed in colour gradients, ranging from shades of red, orange, yellow, green and blue, with red representing highest stress values. The stress values in the three models were collected and compared, with the points of greatest magnitude identified by the Von Mises equivalent stress levels.

Loading Situation

This study was carried out on FEM models simulating two implant retained prosthesis, four implant retained prosthesis and the prosthesis restored with the All-On-Four Concept under a) Full mouth load, b) Lateral load, c) Cantilever load, d) Load without cantilever.

Results

The results of the numerical analysis are shown in Table 2 for Von Mises stresses occurring for the FEM models simulating

Graph 1 represents the biomechanical behavior of the two implant supported overdenture FEM modes when subjected to different loading simulations. The graph depicts maximum stress levels during full mouth loading simulation which was 2226.7 Mpa followed by cantilever loading simulation which was 813.09 Mpa and load without cantilever shown as 531.39 Mpa. The least stress for this model was found during the lateral loading simulation which was 64.76 Mpa.

Graph 2 represents the biomechanical behavior of the four implant supported overdenture FEM models under different loading simulations. The maximum stress level in this model was found during the full mouth loading simulation which was 303.51 Mpa followed by load simulating cantilever loading which was 187.34 Mpa and load simulating load without cantilever which was 125.09 Mpa. The least stress was found during lateral loading shown as 57.35 Mpa. The stress levels in the four implant simulation were comparatively much less than the two implant supported overdenture model.

Graph 3 illustrates the graphical representation of the biomechanical behavior of the FEM model simulating the prosthesis restored with the All-On-Four Concept. The maximum stress in this simulation was found during full mouth loading which was 253.37 Mpa followed by load simulating lateral load which was 88.01 Mpa and load simulating the cantilever load which was 85.22 Mpa. The least stress was found when load without cantilever was simulated which was 60.21 Mpa.

From the graphs it can be inferred that among the three models, the stress levels for full mouth loading simulation was highest for two implant supported overdenture design and the least for All-on-four overdenture design. For all three designs, the least stress was when the implants were loaded in a lateral direction. The stress levels for cantilever and non-cantilevered designs were nearly the same for all the simulated designs.
### Table 1 – Young’s Modulus & Poisson’s Ratio used in the study

<table>
<thead>
<tr>
<th>MATERIAL</th>
<th>YOUNG’S MODULUS (Mpa)</th>
<th>POISSON’S RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cortical Bone</td>
<td>13.7</td>
<td>0.30</td>
</tr>
<tr>
<td>Trabecular Bone</td>
<td>1.37</td>
<td>0.30</td>
</tr>
<tr>
<td>Titanium</td>
<td>115</td>
<td>0.35</td>
</tr>
<tr>
<td>Type III Gold</td>
<td>100</td>
<td>0.30</td>
</tr>
</tbody>
</table>

### Table 2 – Maximum Stress values recorded during different simulations.

<table>
<thead>
<tr>
<th>IMPLANT</th>
<th>TWO IMPLANT (Mpa)</th>
<th>FOUR IMPLANT (Mpa)</th>
<th>ALL-ON-FOUR(Mpa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full mouth biting</td>
<td>2226.7</td>
<td>303.51</td>
<td>253.37</td>
</tr>
<tr>
<td>Lateral Load</td>
<td>64.76</td>
<td>57.35</td>
<td>88.01</td>
</tr>
<tr>
<td>Cantilever Load</td>
<td>813.09</td>
<td>187.34</td>
<td>85.22</td>
</tr>
<tr>
<td>Load without Cantilever</td>
<td>531.39</td>
<td>125.09</td>
<td>60.21</td>
</tr>
</tbody>
</table>

Graph 1- Peak stresses in Two implant supported overdenture
Discussion

Various studies revealed that the occlusal load was one of the main contributing factors. The load transfer from implant to the surrounding bone depends on type of loading, bone-implant interface, length and diameter of implants, shape & characteristics of the implant surface, prosthesis type and quantity & quality of the surrounding bone. So the dentist has specific responsibilities to minimize overload to the bone implant interface. These include a proper diagnosis leading to a treatment plan providing adequate support. Among the various methods for the stress-strain analysis, the finite element method is capable of providing detailed quantitative data at any location within a mathematical model. Two and three dimensional finite element analyses have been used to evaluate the stresses around various dental implant systems.

Keeping in mind the consequences of unwanted stresses, this study was an attempt to compare the Von Mises Stresses around the implant by different loading conditions, on three different finite element models. The models were simulated on the basis of implant number, position, angulation and the type of prosthesis which is a Type III gold bar.
References


6. Dorothy E Eger et al, Comparison of angled and standard abutments and their effect on clinical outcome.


Exploring Thoughts of Victims of School Bullying Through Drawings

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Shyama Prasad Mukherji College for Women, University of Delhi

Abstract
This study explored the underlying thoughts of victims of school bullying through analysis of their drawings. Eighty senior secondary students (studying in classes 9 to 11) identified as victims based on the Illinois Victimization Scale participated in the study. Participants drew their victimization experiences and provided elaborations of their drawings. Analysis of participants’ responses involved the framework method. Results showed that thoughts of bullied participants were related to the (1) outcomes of being victimized (2) dealing with the bullies, and (3) the reason for bullying. The participants evinced various thoughts related to direct or indirect coping, victim-related reasons, and bully related reasons as gauged by their drawings. The findings of this study were interpreted in the light of developmental-ecological framework and research. The article indicates implications for future research and professionals to help the victims of school bullying.

Keywords Drawing · Coping · School bullying · Qualitative method

School authorities and practitioners working in the area of child and adolescent mental health across the world are realizing the importance of tackling the issue of school bullying. This has motivated vast research on school bullying. Extant research on bullying and cognitions relates bullying and victimization to the theory of mind[1], conduct disorder and theory of mind[2], executive functions[3], social-cognitive factors [4], and Cognitive Behavior Therapy intervention[5]. The above-referred studies focused on cognition and its relation to bullying but did not investigate the actual content of thoughts, an aspect which is uniquely considered in the present study. In the context of school bullying, a victim is defined as “a student who is exposed, repeatedly and over time, to negative actions on the part of one or more students” [6]. Due to repeated victimization in schools, bullied children report symptoms of depression, headaches, anxiety, stomachaches, and academic difficulties. In response to school bullying, school-based intervention programs have produced a dramatic decline in the rate of school bullying [7] and have led to the upsurge of research in cognitive and non-cognitive aspects of bullying.

Neisser[8] defined cognition as “the activity of knowing: the acquisition, organization, and use of knowledge.” Cognition involves a variety of functions such as thinking, learning, perception, attention, memory, retention, decision making, reasoning, and problem-solving. This study aimed at examining children’s thoughts about their bullying experiences. The study chose thoughts because of their ability to predict children’s current and future behavioral and emotional reactions to negative situations.

Questionnaires provide limited information about bullying. Victims’ drawings of school bullying allow researchers to understand actual lived experiences from their perspective, and to realize the underlying emotions and motivations in bullying[9]. Bosacki et al. [9] argued that a conventional method to assess bullying does not allow the participants to report their complete bullying experiences. The use of drawings in interventions like art therapy is very useful for adolescents with anxiety issues [10]. Drawings enable the investigators to understand the bullying experience of the victimized child, the power dynamics between the bully and the bullied [11], and the context of bullying. This study set the following objectives: (1) to identify the victims of school bullying and (2) to understand victims’ experiences by analyzing their thoughts.

Method

Research Design
This research employed the qualitative participatory
visual method and semi-structured interviews. Past research has shown the relevance of participatory visual methods or art-based methods with children\[12\]. Semi-structured interviews investigated children’s depictions. Steps involved in data analysis are described in the analysis section.

**Participants**

Participants were selected from among the students of 9th-11th grades studying in different schools located in Delhi, India. Only students who volunteered to participate with the approval of parents and school principals were involved in the study. The study used purposive sampling, and 300 participants were selected according to two criteria which include classes of 9, 10, and 11 and gender (male and female). Illinois victimization scale\[13\] was administered to identify the victims. The final sample comprised 80 participants (60 male and 20 female) in the age range of 16-18 years.

**Measures**

The study used the Illinois victimization scale to identify the victims. The material used for the drawing task comprised A-4 size paper, pencil, pen, eraser, and sharpener.

**The Illinois Victimization Scale.** It is a subscale of the Illinois Bully Scale\[13\] which includes 18 items on bullying phenomenon and fighting. The present study adopted and administered only the “victimization” subscale to identify victims of school bullying. The Victimization subscale comprises four items (that measure frequency of being picked on, made fun of, called names, and hit or pushed). It is a five-point Likert-type scale. Espelage and Holt\[13\] found a Cronbach alpha coefficient of .87 for their scale. Espelage et al.\[14\] found significant correlations with peer nominations of bullying, which showed acceptable concurrent validity of the scale.

**The drawing task.** The drawing task involved the depictions of participants’ victimization experiences in school. The drawing task was followed by semi-structured interviews based on the elaboration of participants’ drawings.

**Procedure**

The Victimization subscale of Illinois Bully Questionnaire\[13\] was administered to three hundred participants for identifying the victims of school bullying. It was followed by the drawing task. After checking the familiarity with the word “victim” and “school bullying” the task was administered in 40 mins in groups on separate days in different schools. The instruction for the drawing task was, “Draw a scene of your victimization taking place in school and also show in drawing what you were thinking by a thought bubble”. The researcher followed the drawing task with individual semi-structured interviews with the prior permission of participants. During the interview, the researcher asked each participant to describe and provide details of the drawing. Each interview lasted for about 15 min. Towards the end of the semi-structured interview with all the participants, the researcher debriefed the participants and thanked them.

**Analysis of Drawings**

The drawings were shown to two judges: the researcher and a freelance counselor well trained in art therapy and qualitative research. The judges initially independently surveyed the drawings and developed themes. The judges sorted out any discrepancies in the emerging themes through discussion and mutual agreement. The inter-judge reliability was satisfactory (95 percent agreement on emerging themes). Further analysis used only those themes on which the judges agreed with each other.

The researcher transcribed the interview data and used the “Framework method” to analyze the data. The Framework method is a five-stage qualitative analytic process espoused by Ritchie and Spencer\[15\] and comprises familiarization, identifying a thematic framework, indexing, charting, mapping, and interpretation. A brief explanation of these five stages according to Ritchie and Spencer is presented: Familiarization involves reading and re-reading the transcript, and listening back to the audio-recoded content of interviews, to gain the basic information about the collected data. Identifying a thematic framework or indexing involves the emergence, sorting, and sifting of the coded themes and categories obtained after the familiarization stage. Indexing refers to the process whereby the thematic framework or index is systematically applied to the data in its textual form. Themes corresponding to the selected parts of data are identified and annotated for further analysis. Charting is the next step which involves the presentation of the coded data in a matrix for each theme. The chart shows for each participant a clustered theme embedded within various codes, supporting annotated data, and reference
Mapping and interpretation involve analyzing the data as a whole comprising the various obtained themes, categories, and descriptions for all participants. The present study dealt with the contextual question, i.e., identifying the thoughts of bullied students and therefore framework method was considered as an appropriate method for addressing contextual questions[15].

**Results**

For the present sample of the study, a Cronbach alpha coefficient of .82 was obtained for the Illinois Victimization scale. All the participants produced complete drawings. The steps involved in the ‘Framework’ method and as used in the present study are described above in the analysis of the drawings section. Figs. 1-6 present drawings drawn by six participants to discuss the results. Table 1 shows the three themes that finally emerged from the analytical framework, along with the codes and their descriptions. Table 2 presents the thoughts related to the outcomes of victimization. Table 3 summarizes the thoughts related to dealing with the bullies, and Table 4 provides thoughts related to the reason for victimization. The italicized statements in the tables show the participant’s written responses used for analysis.

### Table 1 Code and description from the final thematic framework for thoughts of school victims.

<table>
<thead>
<tr>
<th>CODE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outcomes of victimization</td>
<td></td>
</tr>
<tr>
<td>Thoughts about consequences</td>
<td>Defensive reactivity, low will</td>
</tr>
<tr>
<td>Cognitive response of victim</td>
<td>Thoughts about hiding the bullying experience, thoughts of revenge</td>
</tr>
<tr>
<td>Dealing with the bullies</td>
<td></td>
</tr>
<tr>
<td>Coping thoughts</td>
<td>Active coping, passive coping</td>
</tr>
<tr>
<td>Metacognition</td>
<td>Reporting bullying, tackling bullies</td>
</tr>
<tr>
<td>Reasons for bullying</td>
<td></td>
</tr>
<tr>
<td>Bully related</td>
<td>Fun, strong</td>
</tr>
<tr>
<td>Victim related</td>
<td>Appearance, poor social skills, loneliness</td>
</tr>
</tbody>
</table>

### Table 2 Thoughts related to outcomes of victimization

<table>
<thead>
<tr>
<th>Participant</th>
<th>Consequences</th>
<th>Cognitive response of victim</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant 5</td>
<td>“If a student is being bullied in the school he/she would not feel good and there can be bad consequences”</td>
<td>“I should not tell to anybody; I should fight with him”</td>
</tr>
<tr>
<td>Participant 17</td>
<td></td>
<td>“Why everyone makes fun of me? I can’t tell anyone. They all make fun and laugh at me”</td>
</tr>
</tbody>
</table>
Table 3 Thoughts related to dealing with the bullies

<table>
<thead>
<tr>
<th>Participant</th>
<th>Coping thoughts</th>
<th>Metacognition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant 36</td>
<td>“He troubles me a lot, I thought to tell my mother, I sometimes slap him”</td>
<td></td>
</tr>
<tr>
<td>Participant 80</td>
<td>“Should I tell my parents or friends? Should I tell my parents?”</td>
<td></td>
</tr>
<tr>
<td>Participant 3</td>
<td>“No one helps me when I was pushed down, I will also not help anyone”</td>
<td></td>
</tr>
</tbody>
</table>

Table 4 Thoughts related to the reason for being victimized

<table>
<thead>
<tr>
<th>Participant</th>
<th>Bully related</th>
<th>Victim related</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant 43</td>
<td>“Bully’s preference for hitting me just to have fun”</td>
<td></td>
</tr>
<tr>
<td>Participant 23</td>
<td>“Bullied because of my looks;”</td>
<td></td>
</tr>
<tr>
<td>Participant 2</td>
<td>“Bullied due to my poor social skills,”</td>
<td></td>
</tr>
<tr>
<td>Participant 7</td>
<td>“Verbally bullied by others for being a twit and for my loneliness”</td>
<td></td>
</tr>
</tbody>
</table>

Fig.1 Participant 5’s drawing depicting thoughts related to outcomes of victimization
Fig. 2 Participant 17’s portrayal of thoughts related to outcomes of victimization
3 Participant 36’s drawing conveying thoughts related to dealing with the bullies

Fig. 3 Participant 36’s drawing conveying thoughts related to dealing with the bullies

Fig. 4 Participant 80’s drawing of thoughts related to dealing with the bullies

Fig. 4 Participant 80’s drawing of thoughts related to dealing with the bullies
Fig. 5 Participant 7’s depiction of thoughts related to the reason for being bullied
Discussion

The present study could achieve the objectives to identify the bullied in selected schools and to understand victims’ thoughts related to bullying. The overall thoughts of the victims regarding the consequences of bullying centered on their apprehensions of reporting for help from teachers, friends, parents and preferred hiding their bullying experiences. The findings of this study find support from the developmental-ecological framework [16]. Mohr [16] argued that the contexts of a child in crisis range from their microsystem (immediate
Participants’ depictions also made these contexts clear. A majority of the victims also reported thoughts about defensive reactivity, which refers to the “proneness to negative emotional reactivity in the face of threat” [17]. Thoughts of taking revenge from the bully and reduced motivation were also evident in depictions of the participants identified as bullied.

In the responses illustrative of thoughts related to dealing with the bullying situation, participants expressed various thoughts about active and passive coping. The current findings are in congruence with the previous research finding that victimized children generally think to speak about their bullying more often to their parents than to their teachers [18] and recommend passive strategies such as avoiding the bullies with a greater likelihood as they have a fear of retaliation by the bullies [19]. These results are consistent with Sittichai and Smith’s [20] findings that victims tell a teacher or parent about their bullying and the finding has implications for the pertinent role of duly held parent-teacher meetings in preventing bullying.

Telling others and seeking help when bullied has often been found to be an effective response to bullying [21]. The metacognition that is “thinking about thinking” of bullying the perpetrator, was also clear in the responses of some participants. Metacognition, along with attributional complexity, has a significant effect on resilience [22] and thus facilitates effective adaptation in negative situations, including bullying.

While portraying thoughts related to the reason for bullying, the victims attribute the causes of victimization more to their stable, internal, and global factors which are the most maladaptive ones [23], than to the bullies for just having fun [24] and being strong. The present findings also show that the victims revealed more information when asked to draw and elaborate on their bullying experiences. A scholarly debate regarding the best method for assessing bullying and victimization [25] exists in the bullying literature, and the present findings with the use of drawings along with a semi-structured interview seem to offer a good alternative to the existing conventional methods to assess bullying.

Some limitations of the present study could offer future research scope. First, the study focused on the thoughts of the victims of school bullying only. To further explore this topic, future studies could design the attribution retraining program. Second, future studies can design and implement the interventional program for victims of school bullying and test their efficacy.

Acknowledgment: I am thankful to Sujata, the freelance counselor, and all the children who participated in the study. I am also thankful to Narendra K. Sharma for his comments on the draft of this manuscript.

Conflict of Interest: None

Source of Funding: Self

Compliance with Ethical Standards

Ethics approval was obtained from the school ethical committee. Informed consent was obtained from both the parents and students and the information about anonymity, confidentiality, and the right to withdraw from the study at any stage were provided to all the participants.

References


Analysis of Factors Affecting the Implementation of “Remaja Sehat” Application

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¹Faculty of Public Health Universitas Airlangga Surabaya, Indonesia,

Abstract

This study aims to determine the effect of relative profitability, compatibility, complexity, trialability, and observability about knowledge regarding adolescent reproductive health in the use of the “Remaja Sehat” application. Implementation of the use of the media “Aplikasi Remaja Sehat” was carried out by 302 students of SMAN 19 Surabaya and SMA Muhammadiyah 7 Surabaya. Effectiveness measurement used pre-experiment methods with post-only design. The results of this study showed that there are relative advantages (0.013) and trialability (0.000) have an effect while compatibility (0.666), complexity (0.464) and observability (0.281) have no effect on the implementation of the use of “Remaja Sehat” application.

Keywords: Relative advantage, compatibility, complexity, trialability, observability, implementation, adolescent reproductive health.

Introduction

Indonesia so far has implemented various education regarding adolescent reproductive health. Adolescents have been given education with not a short period of time¹. Starting from education in schools, counseling in health facilities, and most importantly, environmental support and parents. Indonesia itself is a country that has a variety of cultures and religions. It is well known that different eras will cause cultural change with the increase of technological sophistication which makes it easy to share information. In Indonesia, the lecture method is still used in providing information and discussion about adolescent reproductive health. However, with social, cultural, and even religious changes in every era, the lecture method is less capable in the process of adolescent education².

One of the applications “Remaha Sehat” is a media as a channel of information regarding adolescent reproductive health apart from the education provided from schools, and from parents or health workers. This application explains various information related to HIV/AIDS, Sexuality, and Narcotics. In addition to the information, there is also a game in the form of a quiz about reproductive health with scores and discussions so that the adolescents will be encouraged to get the best score. After the adolescents use the application and implement it in the form continuously using the application, choose to not uninstalling the application and implementing it in daily life, whether the application will be more effective or not in terms of relative benefits, stability, complexity, trialability, and observability according to adolescents.

Material and Method

Research Design

This research used pre-experiment. Researchers will present an application “Remaja Sehat” to the students then the researchers will provide a questionnaire related to the relative advantages, stability, complexity, trialability, and observability of the application. This research design used a post-only design.

Research Location

This research was conducted in SMAN 19 Surabaya and SMA Muhammadiyah 7 Surabaya.

Population and Sample

The population in this study were SMAN 19
Surabaya and SMA Muhammadiyah 7 Surabaya’s students whose age around 15-19 years old. The sample in this study amounted to 302 students conducted by simple random sampling.

**Data Collection**

Data collection techniques and instruments in this study after being given an explanation regarding the study and filling in informed consent for 5 minutes, the researcher will present an application “Remaja Sehat” and a questionnaire will be given afterward. The instrument used for data collection in this study was a 30-minute questionnaire, a post-test has been prepared to find out about five variables of the application of “Remaja Sehat” and “Remaja Sehat” applications.

**Data Analysis**

Analysis of the data in this study used a computer that is first to provide code and grouping to facilitate data entry, the second will be scoring which is to give a score in each result, the data will be analyzed afterward. Univariate analysis is used to see the depiction and description of each variable and bivariate analysis used Logistic Regression.

**Research Result**

**Characteristic of Responden**

Table 1: Characteristics based on age, residence and gender

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age of Respondents</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 Years Old</td>
<td>124</td>
<td>41.1</td>
</tr>
<tr>
<td>17 Years Old</td>
<td>161</td>
<td>53.3</td>
</tr>
<tr>
<td>18 Years Old</td>
<td>17</td>
<td>5.6</td>
</tr>
<tr>
<td><strong>Residence of Respondents</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>House</td>
<td>293</td>
<td>97</td>
</tr>
<tr>
<td>Boarding House</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>121</td>
<td>40.1</td>
</tr>
<tr>
<td>Female</td>
<td>181</td>
<td>59.9</td>
</tr>
</tbody>
</table>

The frequency distribution of respondents by age can be seen that most respondents at the age of 17 years with the number of students 161 students or 53.3%. Students aged 16 years were as much as 124 students or 41.1% and students aged 18 years were 17 students or 5.6%.

The frequency distribution of respondents by residence is known that most of the student resides in a house with a total of 293 students or 97% while the students who live in a boarding house as much as 9 students or 3%.

The frequency distribution of respondents based on gender showed that most of the respondents are female with the number of student 121 students or 40.1% while the male respondents are as much as 181 students or 59.9%.
Discussion

Table 2: The effect of relative advantage, compatibility, complexity, trialability, and observability on implementation

<table>
<thead>
<tr>
<th>Dependent Variable (x)</th>
<th>Independent Variable (y)</th>
<th>Significant</th>
<th>α</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relative Advantage</td>
<td>Implementation</td>
<td>0.013</td>
<td>0.05</td>
<td>There is influence</td>
</tr>
<tr>
<td>Compatibility</td>
<td>Implementation</td>
<td>0.666</td>
<td>0.05</td>
<td>There is no influence</td>
</tr>
<tr>
<td>Complexity</td>
<td>Implementation</td>
<td>0.464</td>
<td>0.05</td>
<td>There is no influence</td>
</tr>
<tr>
<td>Trialability</td>
<td>Implementation</td>
<td>0.000</td>
<td>0.05</td>
<td>There is influence</td>
</tr>
<tr>
<td>Observability</td>
<td>Implementation</td>
<td>0.281</td>
<td>0.05</td>
<td>There is no influence</td>
</tr>
</tbody>
</table>

The result of the relative advantage with implementation showed that \( p = 0.013 \) which means more than \( \alpha = 0.05 \). The result of compatibility with implementation showed that \( p = 0.666 \) which means more than \( \alpha = 0.05 \). As for complexity with implementation showed that \( p = 0.464 \) which means more than \( \alpha = 0.05 \). The result of trialability with implementation showed that \( p = 0.000 \) which means less than \( \alpha = 0.05 \). While the result of observability with implementation showed that \( p = 0.281 \) which means less than \( \alpha = 0.05 \).

This “Remaja Sehat” application is used as a medium of learning or education regarding adolescent reproductive health. Not only lecture learning method, but this application also follows the adolescents’ nowadays that can’t stay far away from their smartphones. According to Wahidin 2018, the media in education apart from only giving messages but has to attract students’ attention by means of creative, innovative and varied methods(3).

An innovation of “Remaja Sehat” application can be measured how effective it is based on the decision and implementation to use and install the “Remaja Sehat” application. Decisions and implementation in the use of “Remaja Sehat” applications can be showed from the relative advantages, compatibility or the level of conformity with the needs or experiences of the students regarding adolescent reproductive health, complexity or the level of complexity of using “Remaja Sehat” applications both in terms of understanding information or games, trialability or can be tested and observability.

This research proved that there is an influence of relative advantages and trialability or can be tested but there is no influence of complexity, compatibility, and observability. This happens because students feel the “Remaja Sehat” application has the advantage of getting information easily by downloading it on a smartphone and can be used every day. In addition, students can use at any time not only in the learning process at school but also in any condition at home, or in other places students can still use this application. Based on the results of the questionnaire, students answered that this application was considered important in discussing adolescent reproductive health. A lot of benefits felt by students in using the “Remaja Sehat” application has made the students can implement to use this “Remaja Sehat” application.

According to Roger theory, trialability or can be tested is an innovation that can be tried or not by the recipient(4). The more innovation can be tested, the faster it will be accepted by the users or students. This “Remaja Sehat” application has been tested beforehand so that students can entrust this application as a medium of education or education regarding adolescent reproductive health. Student’s trust in the trial of this application can affect the implementation of the use of “Remaja Sehat” applications.

Compatibility, complexity, and observability do not affect the implementation of the use of “Remaja Sehat” applications on the students. This is alleged because of the students who have been accustomed to using a cellphone in their daily lives. According to
Roger Theory, compatibility is a consistent level of existing values, past experience\(^{(4)}\). In this “Remaja Sehat” application students assess in the process of using this application and showed the consistent with the existing value of adolescent reproductive health and past experience. In accordance with the research showed that there is a suitability of the material to the goals to be achieved by users so that in the case of this study if there is conformity and can cause curiosity then it does not affect students in implementing the use of “Remaja Sehat” applications\(^{(5)}\).

After taking the decision to adopt and use the “Remaja Sehat” application and it is felt there is no difficulty and easy to understand then the students will be easier to implement to use this “Remaja Sehat” application. This is because the students find it way simpler or easier compared to today’s games that require more challenges to win it. According to Apriyani, the characteristics in the easiness of usage are the existence of trust in technology that is flexible, easily understood by users and easy to be used\(^{(6)}\). While the game in the “Remaja Sehat” application, if compared to other games, is way easier, since it in the form of a quiz. Individuals will not be determined by curiosity and interest, but there is a sense of obligation to use the information system in financial management. Students do not feel the difficulty of using this “Remaja Sehat” application. Although there are games that support adolescent reproductive health information so that students willing to continue to play while learning, students do not feel the difficulty in operating this application. The complexity or complexity does not affect the implementation of the use of “Remaja Sehat” applications. Students will continue to use this application because they thought that adolescent reproductive health is important to be learned. Adolescents are supposed to be the pioneer of adolescent health program (from, by and for the adolescents) thus they need to say to the stakeholders (decision maker and provider) that there are: adolescents’ problems, experience by themselves or others; need for adolescent health program; availability of adolescents to be actively involved in the implementation of ACHS program. The adolescents hope that there will be an adolescent health program which is in tune with the characteristics, needs and capacities of them\(^{(7)}\).

This study showed the results that there is no significant effect between observability on the implementation of the use of “Remaja Sehat” applications. This happens because the observability of the innovation or application of “Remaja Sehat” has succeeded in influencing users. It is through friends and the surrounding that recommend to use and spread the benefits of using “Remaja Sehat” applications. This is supported by the research showed the results that there is a relationship of peer support to healthy behavior among students\(^{(8)}\).

**Conclusion**

Based on the results of this study the more the students feel the suitability in their needs, the ease of applying, and observability of “Remaja Sehat” then it will not affect the implementation of the use of “Remaja Sehat” applications. On the other hand, the relative benefits that will lead to user gain in its implementation and have been tested that brought up students’ trust in using “Remaja Sehat” applications affect implementation. The more students feel the benefit the application brings and can be tested it will improve the implementation of the use of “Remaja Sehat” applications.

The students feel the relative advantages and trialability can be seen more in the use of “Remaja Sehat” applications rather than the complexity, compatibility, and observability. The more students feel the benefit the application brings and have been tested, the more they decide and implement or vice versa if the students feel unprofitable in use of the application or not tested and reduce the students’ trust then the students will rethink of implementing the use of “Remaja Sehat” applications.

**Recommendation**

The next researcher is suggested to intervene using enough time to intervene so that the purpose of monitoring and can see the implementation well also the decisions in the use of “Remaja Sehat” application.

**Conflicts of Interest:** The authors declare that there is no conflict of interests.

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**Ethical Clearance:** Ethics approval was received from the Health Research Ethics Committee, Faculty of Nursing, Universitas Airlangga.

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1. Fitriana H, Siswantara P. Pendidikan kesehatan
Clinical Study of Optic Neuropathies

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Abstract

Introduction: Optic neuropathy is a frequent cause of vision loss encountered by ophthalmologist. The diagnosis is made on clinical grounds. The history often points to the possible etiology of the optic neuropathy. A rapid onset is typical of demyelinating, inflammatory, ischemic and traumatic causes. A gradual course points to compressive, toxic/nutritional and hereditary causes. The classic clinical signs of optic neuropathy are visual field defect, dyschromatopsia, and abnormal papillary response. Study objectives were to study etiological factors causing optic neuropathies.

Materials and Method: This analytical study was performed in Krishna Medical College Hospital, Karad for a period of months. The initial examination was started with anterior segment examination on slit lamp and fundus examination with direct ophthalmoscope. The material for the present study consists of 65 optic neuropathy patients during the 18 months period from November 2017 to May 2019.

Results: During this study, in Krishna Hospital karad we noticed that glaucomatous optic neuropathy is the most common type of optic neuropathy and traumatic optic neuropathy is the second most type.

Conclusion: Glaucoma being frequent cause of vision loss , is unfortunately not diagnosed at early stage and as age advances the risk of glaucoma increases also hypertension is one of the risk factors, so routinely every patient >40 years of age is to be assessed for glaucoma by noting optic disc changes and intra ocular pressure. If necessary Dynamic Perimetry is to be done for further evaluation.

Keyword: Optic neuropathy, Dyschromatopsia, Glaucoma, Glaucotuotous optic neuropathy, Traumatic optic neuropathy, Dynamic perimetry.

Introduction

Optic neuropathy is one of the common causes vision loss encountered by the ophthalmologist. The diagnosis is mainly on clinical grounds. The history often points to the possible etiology of the optic neuropathy. Optic nerve damage from any cause is called as Optic neuropathy. Damage or death of the nerve fibres, Leads to the characteristic features of optic neuropathy. Posterior or Retrobulbar optic neuropathies are associated acutely with a normal optic disc appearance. Anterior optic neuropathies are those with the swelling of optic nerve head. In almost all cases, at the end of 4 to 6 weeks after the onset of damage or visual loss, optic disc becomes pale, even when vision recovers and is referred as ‘Optic atrophy’.

A rapid onset is typical seen in demyelinating, inflammatory, ischemic and traumatic causes. A gradual course of disease is suggestive of compressive, toxic/nutritional and hereditary causes. The classic clinical signs of optic neuropathy are decreased vision , dyschromatopsia, abnormal pupillary Response and visual field defect.

There are ancillary investigations that can support the of optic neuropathy diagnosis. Visual field testing by either manual kinetic or automated static perimetry is very important in the diagnosis. In optic neuropathies like demyelinating and compressive type, it is essential
to do neuro-imaging of the brain and orbit.

**Materials and Method**

A cross sectional case study on the optic neuropathies and a study on the recent classification of Optic neuropathies depending on the etiological factors was conducted in the department of Ophthalmology, Krishna hospital, Karad.

**Source of data**- All eligible optic neuropathies patients according to inclusion criteria, presented to the OPD at Krishna Hospital during November 2017 to May 2019 were included in the study.

Sample size : 65 cases

**Inclusion criteria:**

All cases of optic neuropathies

**Exclusion criteria:**

- Paediatric cases
- Unconscious patients
- Optic neuropathies in mentally retarded patients

**Ocular examination included**

- Anterior segment examination: Slit lamp biomicroscopy.
- Pupillary reaction : RAPD.
- Posterior segment examination: Direct ophthalmoscope.
  - Indirect ophthalmoscope.
- Perimetry.

**Results**

There were 46 males (70.77%) and 19 females (29.23%) out of 65 participants in our study. The most common age group in our study was 61-70 years with 19 patients (29.23%), followed by 51-60 years with 13 patients (20.00%), 71-80 years with 12 patients (18.46%), 41-50 years with 10 patients (15.38%), 31-40 years with 6 patients (9.23%), 21-30 years with 3 patients (4.62%) and 81-90 years with 2 patients (3.08%).

Majority of the patients, 44 out of total 65 (67.69%) did not have any systemic disease. 11 patients (16.92%) had hypertension, 6 patients (9.23%) had both diabetes and hypertension while rest 4 patients (6.15%) had only diabetes.

**Table 1 : Etiological classification of Optic neuropathies**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Number</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glaucoma optic neuropathy</td>
<td>36</td>
<td>55.38%</td>
</tr>
<tr>
<td>Traumatic optic neuropathy</td>
<td>10</td>
<td>15.38%</td>
</tr>
<tr>
<td>Toxic / Nutritional optic neuropathy</td>
<td>5</td>
<td>7.69%</td>
</tr>
<tr>
<td>Retinitis Pigmentosa</td>
<td>4</td>
<td>6.15%</td>
</tr>
<tr>
<td>Compressive optic neuropathy</td>
<td>3</td>
<td>4.62%</td>
</tr>
<tr>
<td>Non-arteritic ischemic optic neuropathy (NAION)</td>
<td>2</td>
<td>3.08%</td>
</tr>
<tr>
<td>Optic neuritis</td>
<td>2</td>
<td>3.08%</td>
</tr>
<tr>
<td>Post papilloedema optic Atrophy</td>
<td>2</td>
<td>3.08%</td>
</tr>
<tr>
<td>Diabetic papillopathy</td>
<td>1</td>
<td>1.54%</td>
</tr>
<tr>
<td>Hereditary optic neuropathy</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Anomalous optic nerve</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
<td>100%</td>
</tr>
</tbody>
</table>

Majority of the patients, 36 out of 65 (55.38%) were having glaucomatous optic neuropathy.

**Co-Relation of Optic Neuropathy and Visual Field Defects**

1) **Glaucoma**

**Table 2: Visual field defect types in glaucoma**

<table>
<thead>
<tr>
<th>Type of visual field defect</th>
<th>Number of eyes (out of 39 eyes)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arcuate/Double Arcuate</td>
<td>14</td>
<td>35.90%</td>
</tr>
<tr>
<td>Various Scotomas</td>
<td>12</td>
<td>30.77%</td>
</tr>
<tr>
<td>Tubular vision</td>
<td>10</td>
<td>25.64%</td>
</tr>
<tr>
<td>Peripheral constriction</td>
<td>2</td>
<td>5.13%</td>
</tr>
<tr>
<td>Altitudinal</td>
<td>1</td>
<td>2.56%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>39</td>
<td>100%</td>
</tr>
</tbody>
</table>
The most common visual field defect was arcuate/ double arcuate vision seen in 14 patients (35.90%), followed by various scotomas seen in 12 patients (30.77%), tubular vision in 10 patients (25.64%).

2) TOXIC/ NUTRITIONAL OPTIC NEUROPATHY

Out of total 7 eyes with visual field defects in Toxic/ nutritional optic neuropathy, 5 were Centrocecal (71.43%), one eye each had Arcuate/Double Arcuate defect and various scotoma.

3) RETINITIS PIGMENTOSA

Out of 8 patients having Retinitis pigmentosa, 6 had peripheral constriction

4) POST PAPILLOEDEMA OPTIC ATROPHY

All 3 eyes out of 4 (75%) of post papilloedema optic atrophy have visual field defect of type ‘Enlargement of Blind spot’.

5) OPTIC NEURITIS

3 out of 4 eyes (75%) with optic neuritis had field defects. Each eye showed visual field defect Arcuate/ double arcuate scotoma, centro cecal and various scotoma.

6) DIABETIC PAPILLOPATHY

Both eyes of diabetic papillopathy had field defects of type ‘Peripheral constriction’

7) COMPRESSIVE OPTIC NEUROPATHY

Two eyes each had bi-temporal visual field defect and pie on floor defect in compressive optic neuropathy

8) NON ARTERITIC ISCHEMIC OPTIC NEUROPATHY (NAION)

Two eyes with Non-arteritic ischemic optic neuropathy (NAION) have field defect of type ‘Altitudinal defect’.

Table 3: Different types field defects seen in optic neuropathies

<table>
<thead>
<tr>
<th>Type of optic neuropathy</th>
<th>Tubular vision</th>
<th>Altitudinal</th>
<th>Arcuate/Double arcuate</th>
<th>Centrocecal</th>
<th>Enlarged blind spot</th>
<th>Tunnel vision</th>
<th>Peripheral constriction</th>
<th>Various Scotoma</th>
<th>Pie on floor</th>
<th>Bi-temparal</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glaucoma</td>
<td>10</td>
<td>1</td>
<td>14</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>12</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>39</td>
</tr>
<tr>
<td>Traumatic</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Toxic / Nutritional</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>7</td>
</tr>
<tr>
<td>Retinitis pigmentosa</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>6</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>NAION</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Compressive</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Post Papilloedema</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Optic Neuritis</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Diabetic Papillopathy</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL</td>
<td>10</td>
<td>3</td>
<td>16</td>
<td>6</td>
<td>3</td>
<td>2</td>
<td>10</td>
<td>14</td>
<td>2</td>
<td>2</td>
<td>68</td>
</tr>
</tbody>
</table>
Total 68 eyes in our study had visual field defects. 39 of them had glaucoma & rest 29 eyes were other neuropathies.

**Table 4: Association between the various field defects seen in glaucoma and other optic neuropathies**

<table>
<thead>
<tr>
<th></th>
<th>Tubular vision / Arcuate/ Double arcuate / Various Scotoma</th>
<th>Other field defects</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glaucoma</td>
<td>36</td>
<td>3</td>
<td>39</td>
</tr>
<tr>
<td>Others</td>
<td>6</td>
<td>23</td>
<td>29</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>42</strong></td>
<td><strong>26</strong></td>
<td><strong>68</strong></td>
</tr>
</tbody>
</table>

$X^2 = 36.13, \ p < 0.0001$ – highly significant

Highly significant association was seen between the type of field defects in glaucoma and other diseases ($p < 0.0001$), where 36 out of total 42 field defects (85.71%) seen in glaucoma were either Tubular vision / Arcuate/ Double arcuate / various scotomas as compared to the majority of the other optic neuropathies contributing to 23 out of total 26 (88.46%) field defects in other categories. This shows that the field defects in glaucoma were either Tubular vision / Arcuate/ Double arcuate / various scotomas which were significantly higher than other field defects seen in other optic neuropathies.

**Discussion**

The present cross-sectional study was conducted on total 65 patients with optic neuropathies. The data was collected from patients regarding demographic profile, detailed history, detailed ophthalmologic examination and relevant investigations like G1 Dynamic Octopus perimetry in all the patients with good fixation.

The analysis of study data obtained showed that out of 65, 46 were males (70.77%) and 19 were females (29.23%). Most common age group in our study was 61-70 years with 19 patients with a range of 26-82 years.

When we considered systemic diseases like Hypertension, Diabetes and optic neuropathies, it was noted that individual Hypertension is associated in 11 cases(16.9%), Diabetes in 4 cases(6.2%) and combined hypertension and diabetes in 6 cases (9.2%). Both the patients of Non Arteritic AION had history of Hypertension and in studies like Tsai et al(1998)$^1$; McCulley et al(2005)$^2$ have shown that hypertension is one of the risk factors for developing NAION in patients with the age above 50 years.

Majority of the patients, 59 out of total 65 (90.77%) had RAPD in any of the eyes which is suggestive of unilateral or asymmetrical optic neuropathy. Rest 6 cases were of almost symmetrical optic neuropathy or bilateral optic atrophy cases. Majority of the patients, 36 out of 65 (55.38%) were having glaucomatous optic neuropathy which is found to be the most common type.

In our study all cases of toxic optic neuropathy had addiction history of tobacco and alcohol of more that 15 to 20 years of duration. In studies like Behbehani R et al(2007)$^3$ and Foulds WS et al(1974)$^4$ it has been discussed that addiction of tobacco and alcohol is major risk factor for developing Optic neuropathies especially Toxic/ Nutritional optic neuropathies.

In our study, 8 patients with glaucoma had hypertension (22.22%), 5 had both diabetes & hypertension (13.90%) and 3 had only diabetes (8.3%) \.While some studies like P. Mitchell et al(1996)$^5$, L. Bonomi et al(2000)$^6$, N. Orzalesi et al(2007)$^7$ reported that systemic hypertension is a risk factor for glaucoma.

In Glaucoma patients ,when the comparision of vision and cup disc ratio was done separately in right eye and left eye , it was found significant association between the vision & CDR of RE ($p < 0.001$) in glaucoma patients as well as there was significant association between the vision & CDR of LE ($p < 0.001$) in glaucoma patients.

Out of 130 eyes of 65 cases , in 93 eyes perimetry was done and in rest 37 eyes perimetry was not done because of low vision and loss of fixation. Total 81 eyes showed visual field defect out of 93 eyes.

Visual field defect types in glaucoma: The most common visual field defect was arcuate / double arcuate vision seen in 13 patients (33.33%), followed by various scotomas seen in 12 patients (30.77%), tubular vision in 10 patients (25.64%). Similar things has been showed in Kedar et al(2011)$^8$, that Arcuate scotoma is caused by lesions to the retinal nerve fibres or to the ganglion cells in superior or inferior arcuate nerve fibre bundles. Glaucoma is the most frequent cause of an arcuate scotoma.
Out of total 7 field defects in Toxic/ nutritional optic neuropathy, 5 were Centroccecal (71.43%), one eye each had Arcuate/Double Arcuate defect and various scotoma. Central, cecocentral visual field defects in Toxic/nutritional optic neuropathy were also seen by Behbehani R et al(2007)³ in their study. In Forsek I et al(2016)⁴ showed that Cecocentral scotomas are frequently associated with nutritional/toxic optic neuropathies and commonly present bilaterally.

3 out of 4 eyes (75%) with optic neuritis had field defects. Each eye showed visual field defect Arcuate/ double arcuate scotoma, centro cecal and various scotoma.

In study Behbehani R et al(2007)³ it has been discussed that usually a central scotoma is brought on by a lesion in the papillomacular bundle or fovea and lesions responsible for this type of defect are Leber’s hereditary mitochondrial optic neuropathy (LHON), toxic-nutritional optic neuropathies, vascular lesions, multiple sclerosis, glaucoma, and optic neuritis.

In compressive optic neuropathy, we found 2 eyes of pituitary macroadenoma had bi temporal visual field defect and in case of craniopharyngeoma (two eyes) there was Pie on the floor type of field defect. In study T J Walsh et al(1985), it has been discussed that hemianopic defects can arise from a variety of causes, some of which are: lesions to the optic tract, tumors, trauma and lesions at the visual cortex in the occipital lobe. T J Walsh et al(1985) and Behbehani R et al(2007)³ observed arcuate and hemianoptic type of field...
defects in patients of compressive optic neuropathy.

Out of 8 patients having retinitis pigmentosa, 6 had peripheral constriction (75%) and 2 patients had tunnel vision (25%). All 3 eyes out of 4 (75%) of post papilloedema optic atrophy have field defect of type 'Enlargement of Blind spot'.

Behbehani R et al (2007) also explained that the hemianopic field defect which respect the vertical midline indicate the lesion at or posterior to chiasma and a junctional scotoma, known as the ipsilateral nasal half field defect and the contralateral temporal half field defect is suggestive of lesion compressing at the junction of optic nerve and chiasm.

In our study, highly significant association was seen between the type of field defects in glaucoma and other diseases (p < 0.0001), where 35 out of total 41 field defects (85.37%) seen in glaucoma were either Tubular vision / Arcuate/ Double arcuate / various scotomas as compared to the majority of the other optic neuropathies contributing to the 23 out of total 27 (85.19%) field defects in other categories.

This shows that the field defects in glaucoma were either Tubular vision / Arcuate/ Double arcuate / various scotomas which were significantly higher than other field defects seen in other optic neuropathies.

Conclusion

In a clinical practice setting, it is not easy to find out the cause of optic neuropathy. In a variety of clinical conditions have visual loss which is accompanied by the color desaturation and RAPD is often present. In the last decade the spectrum of the optic neuropathies has expanded enormously. As we now know that optic neuropathies could be the initial presentation of a number of closely related diseases which require the early and accurate diagnosis for the treatment to be successful. A good detailed clinical history and examination supported by a judicial choice of investigations and knowledge of the different clinical conditions that result in the optic neuropathy allow us for a quick diagnosis as well as early intervention.

Among Optic neuropathies ,Glaucoma being most common and preventable cause of blindness the Glaucoma screening and awareness programmes to be conducted along with cataract evaluation.

Our hospital being situated near National highway, all most all Traumatic optic neuropathies were because of Road traffic accidents.

Glaucma being frequent cause of vision loss, is unfortunately not diagnosed at early stage and as age advances the risk of glaucoma increases also hypertension is one of the risk factors, so routinely every patient >40 years of age is to be assessed for glaucoma by noting optic disc changes and intra ocular pressure. If necessary Perimetry is to be done for further evaluation.

Ethical Approval: All procedures performed on human participants were in agreement with ethical standards of the Institutional and/or National Ethics Committee.

Source of Funding: In this project , the cost of investigations of the study participants was born by the institute research fundings.

Conflict of Interest: None

Acknowledgement: We acknowledge the cooperation and assistance of the Department of Ophthalmology, Krishna Institute Of Medical Sciences, Karad, Maharashtra, India.

References


Effect of Gross Motor and Fine Motor Exercises on Trunk Control in Subjects with Spastic Cerebral Palsy

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Abstract

Background: Gross motor and fine motor activities are important to achieve as it is important aspect for ADL activities. It is widely known that when trunk control is affected, gross and fine motor activity is also affected. For efficient distal movements, proximal stability should be sufficient i.e for hand usage, development of trunk stability and central axis control is one of the important prerequisites. Recent studies have showed that there is positive correlation between trunk control and upper extremity functions. There is paucity of literature available showing effect of gross motor and fine motor activities on trunk control in cerebral palsy children, hence this study would be helpful to analyse the same.

Objectives: Objective of this study was to find out the effect of gross motor and fine motor activities on trunk control, on hand function and also to find out the correlation between trunk control and hand function.

Methodology: There were total 35 subjects, out of which 21 subjects were participants of this study. This is a study of effect of gross motor and fine motor activities on trunk control in cerebral palsy children. Demographic data, assent and consent was taken from the child and his/her parents, respectively. Pre and post assessment was taken on the basis of Gross Motor Function Classification System for Cerebral Palsy, Manual Ability Classification System and Trunk Control Assessment before and after 6 weeks (total 16 sessions) of the treatment respectively. Each session was of 45 mins. Later evaluation and interpretation of data was done.

Result: The 9.1% improvement is seen in pre and post treatment GMFCS, 18% improvement is seen in pre and post treatment MACS and 16.2% improvement is seen in pre and post treatment TCMS.

Conclusion: There is significant effect of gross motor and fine motor exercises on trunk control in subjects with spastic cerebral palsy.

Keywords: spastic cerebral palsy, gross motor and fine motor, hand function, trunk control, physiotherapy.

Introduction

Cerebral palsy is defined as non progressive disorders which restricts activities in developing foetus or infant brain. The most prevalent form of physical disability is cerebral palsy in children¹. Cerebral palsy can result from brain injury occurring during the prenatal, perinatal or postnatal periods, because brain development continues during the first two years of life². Sensory, cognitive, communication, behavioural and perceptional problems, with epilepsy and other seconday musculoskeletal system problems are seen along with the motor disorders in cerebral palsy. Inability to use movement control for balance and also inability to use the hands for reaching and manipulation in day to day activities is one of the

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major problem in cerebral palsy children\textsuperscript{3}. The ability to maintain centre of gravity within the base of support, without affecting the balance can be defined as postural control. The trunk plays a crucial role because it maintains centre of all body mass and therefore centre of gravity, as it organizes postural control and balance reactions\textsuperscript{4}.

For efficient distal movements, proximal stability should be sufficient i.e for hand usage, development of trunk stability and central axis control is one of the important prerequisites\textsuperscript{1,9}. In children with cerebral palsy, brain lesions will affect hand functioning, making it difficult for them to perform many manual activities. Hand functioning requires integrity of the central nervous system, which may be altered by different brain disorders. Hand function is impaired due to increased or varying muscle tone leading to imbalance and sometimes even contractures. Hand function includes different components such as gripping and releasing objects, reach, speed and accuracy, grip strength and sensations\textsuperscript{5}. Arm hand dysfunction is present in almost 50\% of cerebral palsy children. The hand and its components i.e muscles, joints, and bone, and also several body functions i.e muscle strength, control of rapid co-ordinated movements, sensations and stereognosis may be affected in cerebral palsy children\textsuperscript{3}.

Skills are divided into two groups such as gross motor and fine motor skills. Manipulation of large objects controlled with arm and hands movements are often included in gross manual motor skills, whereas manipulation of smaller objects controlled with hand and fingers are included in fine motor skills. For daily life activities and overall functioning, fine motor skills are necessary\textsuperscript{7,9}.

In cerebral palsy children, gross motor dysfunction is the primary problem\textsuperscript{8}. For various activities of daily life, arm movements such as reaching and grasping are very essential\textsuperscript{6}.

Fine motor skill is dependent upon the development of gross motor skills. For many day to day activities such as dressing, feeding, holding objects, cutting, etc their development is necessary. Children have less control over the movements and almost all the movements are dominated by primitive reflexes at the time of birth. Reflexes disappear and are replaced by sophisticated intentional movements as the development takes place, and are controlled by the brain. Children should have ability to pinch and grasp little objects between the fingers, at the end of first year of life\textsuperscript{9}.

It is especially important for the children having motor problems to use their hands to support themselves in activities like sitting, standing, and walking, or during transfer activities. They also have difficulty in coordinating their fingers while gripping and releasing their grip. The ability to perform and participate in day to day activities needs proper upper extremity functioning. There is a strong positive correlation between trunk control and upper extremity in cerebral palsy children. Hence, it is important to understand the effect of gross motor and fine motor activity training on trunk control in cerebral palsy children\textsuperscript{1}.

**Methodology**

Total 35 subjects were approached in Krishna college of physiotherapy and out of them only 21 subjects were selected for the study according to the inclusion and exclusion criteria. Inclusion criteria were age group between 6-12 years, have a diagnosis of cerebral palsy and GMFCS level 3 and 4 and the exclusion criteria were previous surgery or pain in the upper limbs, vision and hearing problems, Cardio- respiratory problems and previous BoNT-A injections in the upper limbs. Demographic data and assent and consent form was taken from the child and his/her parents, respectively. Pre and post assessment was taken on the basis of Gross Motor Function Classification System for Cerebral Palsy, Manual Ability Classification System and Trunk Control Assessment before and after 6 weeks (total 16 sessions) of the treatment respectively. Each session was of 45 mins\textsuperscript{6,11,12,13}.

Exercise protocol was started with warm up exercises i.e stretching for wrist flexors, followed by somato-sensory stimuli (finding objects in beans, rice or sand, pulling piece of clay off a ball of clay, pushing fingers into clay, stretching rubber bands around finger), then gross motor activities (objects of different shapes like rectangular and circular, with different texture like rough and smooth, and also heavy or light in weight), and then fine motor activities (ADL activities, picking up buttons, wooden beads, marbles, hold thick crayons or thick chalk, pencils and scribble on paper and also begin screwing action)\textsuperscript{10,15}.

**Statistical Analysis**

Statistical analysis of the recorded data was done by
using the software SPSS version 20. The paired T-test and one way ANOVA test were used for analysis of data.

### Findings

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Subjects</th>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Male</td>
</tr>
<tr>
<td>6-8yrs</td>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td>9-12yrs</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>21</td>
<td>10</td>
</tr>
</tbody>
</table>

1. **Age and gender wise distribution.**

**INTERPRETATION:** Above table represents, two age groups i.e 6-8 yrs which consists of total 12 subjects (male-5 and female-7) and in other age group 9-12 yrs it consists of total 9 subjects (male-5 and female-4).

2. **Gross Motor Function Classification System**

<table>
<thead>
<tr>
<th>GMFCS</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>p value</th>
<th>Interference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre test</td>
<td>3.571</td>
<td>0.5071</td>
<td>0.0156</td>
<td>Considered significant</td>
</tr>
<tr>
<td>Post test</td>
<td>3.238</td>
<td>0.6249</td>
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</tbody>
</table>

**INTERPRETATION:** In the present study pre interventional mean and standard deviation of GMFCS was 3.571±0.5071, whereas post-interventional mean ± SD was 3.238±0.6249. It concluded that interference was considered significant. This was calculated by Wilcoxon test (W=28.00). 9.1% improvement is seen in pre and post GMFCS.

3. **Manual Ability Classification System.**

<table>
<thead>
<tr>
<th>MACS</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>p value</th>
<th>Interference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre test</td>
<td>3.667</td>
<td>0.7303</td>
<td>0.0001</td>
<td>Considered extremely significant</td>
</tr>
<tr>
<td>Post test</td>
<td>3.00</td>
<td>0.8367</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**INTERPRETATION:** In the present study pre interventional mean and standard deviation of MACS was 3.667±0.7303, whereas post- interventional mean ± SD was 3.0±0.8367. It concluded that p value was 0.0001 and interference was considered extremely significant. This was calculated by Wilcoxon test (W=105.00). 18% improvement is seen in pre and post MACS.
4. Trunk Control Measurement Scale

<table>
<thead>
<tr>
<th>TCMS</th>
<th>Pre test Mean±SD</th>
<th>Post test Mean±SD</th>
<th>p value</th>
<th>Interference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Static sitting balance</td>
<td>7.810±1.078</td>
<td>9.048±1.431</td>
<td>0.0002</td>
<td>Considered extremely significant</td>
</tr>
<tr>
<td>Dynamic sitting balance</td>
<td>5.952±0.9735</td>
<td>6.905±1.70</td>
<td>0.0010</td>
<td>Considered extremely significant</td>
</tr>
<tr>
<td>Dynamic reaching balance</td>
<td>4.524±0.8136</td>
<td>5.571±1.248</td>
<td>0.0010</td>
<td>Considered extremely significant</td>
</tr>
<tr>
<td>Total score</td>
<td>18.286±1.056</td>
<td>21.286±3.379</td>
<td>0.0003</td>
<td>Considered extremely significant</td>
</tr>
</tbody>
</table>

Interpretation: In this study, pre interventional Mean±SD was 7.810±1.078 for static sitting balance, Mean±SD was 5.952±0.9735 for dynamic sitting balance, Mean±SD was 4.524±0.8136 for Dynamic reaching balance and Mean±SD was 18.286±1.056 for total score. Post-interventional Mean±SD was 9.048±1.431 for Static sitting balance, Mean±SD was 6.905±1.70 for Dynamic sitting balance, Mean±SD was 5.571±1.248 for Dynamic reaching balance and Mean±SD was 21.286±3.379 for Total score. 16.2% improvement is seen in pre and post TCMS.

Discussion

Cerebral palsy is defined as non progressive disorders and it is the most prevalent form of physical disability in children. Cerebral palsy can result from brain injury occurring during the prenatal, perinatal or postnatal periods, because brain development continues during the first two years of life. Inability to use movement control for balance and also inability to use the hands for reaching and manipulation in day to day activities is one of the major problem in cerebral palsy children. The ability to maintain centre of gravity within the base of support, without affecting the balance can be defined as postural control. The trunk plays a crucial role because it maintains centre of all body mass and therefore centre of gravity, as it organizes postural control and balance reactions.

This research was undertaken with the aim to study the effect of gross motor and fine motor exercises on trunk control in subjects with spastic cerebral palsy.

The study was carried out and the result was drawn by Gross Motor Function Classification System, Manual Ability Classification System, Trunk Control Measurement Scale and NPRS.

An approval for the study was obtained from the Protocol committee and the Institutional Ethical Committee of KIMSDU. Total 35 subjects were approached in Krishna college of physiotherapy and out of them only 21 subjects were selected for the study who fulfilled inclusion criteria. The procedure was explained and consent was taken from those willing to participate and written assent was taken from caregivers.

Demographic data of the subjects was taken. The individuals were explained about the purpose of the study. Also, they were informed about the procedure. Subjects were selected for the study according to the inclusion and exclusion criteria using convenience sampling method. Demographic data and assent and consent form was taken from the child and his/her parents, respectively. Pre and post assessment was taken on the basis of of Gross Motor Function Classification System for Cerebral Palsy, Manual Ability Classification System and Trunk Control Assessment before and after 6 weeks (total 16 sessions) of the treatment respectively.
Each session was of 45 mins.

Exercise protocol was started with warm up exercises i.e stretching for wrist flexors, followed by somato-sensory stimuli (finding objects in beans, rice or sand, pulling piece of clay off a ball of clay, pushing fingers into clay, stretching rubber bands around finger), then gross motor activities (objects of different shapes like rectangular and circular, with different texture like rough and smooth, and also heavy or light in weight), and then fine motor activities (ADL activities, picking up buttons, wooden beads, marbles, hold thick crayons or thick chalk, pencils and scribble on paper and also begin screwing action).

It was found that among 21 subjects, 57% subjects belonged to 6-8 years of age group and remaining 43% belonged to 9-12 years of age group. In age group 6-8 years, there were total 12 subjects out of which 5 were males and 7 were females. In age group 9-12 years, total 9 subjects were there, out of which 5 were males and 4 were females.

Among 21 subjects, 7(33%) subjects showed changes in their level of Gross motor function classification system and remaining 14(67%) subjects showed no change in their level. In the present study pre interventional mean and standard deviation of GMFCS was 3.571±0.5071, whereas post-interventional mean ± SD was 3.238±0.6249. It concluded that interference was considered significant (p=0.0156). This was calculated by Wilcoxon test (W=28.00).

In total 21 subjects, 14(67%) individuals showed changes in their level of manual ability classification system, whereas remaining 7(33%) individuals showed no change in their level. In the present study pre interventional mean and standard deviation of MACS was 3.667±0.7303, whereas post- interventional mean ± SD was 3.0±0.8367. It concluded that p value was 0.0001 and interference was considered extremely significant. This was calculated by Wilcoxon test (W=105.00).

Out of 100%, 57%(12 subjects) had changes in their trunk control measurement scale and remaining 43% (9 subjects) had no changes in their scoring. In this study, pre interventional Mean±SD was 7.810±1.078 for static sitting balance, Mean±SD was 5.952±0.9735 for dynamic sitting balance, Mean±SD was 4.524±0.8136 for dynamic reaching balance and Mean±SD was 18.286±1.056 for total score. Post-interventional Mean±SD was 9.048±1.431 for Static sitting balance, Mean±SD was 6.905±1.70 for Dynamic sitting balance, Mean±SD was 5.571±1.248 for Dynamic reaching balance and Mean±SD was 21.286±3.379 for Total score. It concluded that interference was considered extremely significant (p=0.0003).

Passive stretch is used to improve range of motion and also improves flexibility. Somato-sensory stimuli helps to activate or facilitate muscle motor response. Gross motor exercises are used to improve grasping and fine motor exercises are used to produce small precise movements.

It concluded that, 9.1% improvement is seen in pre and post treatment GMFCS, 18% improvement is seen in pre and post treatment MACS and 16.2% improvement is seen in pre and post treatment TCMS.

**Conclusion**

On the basis of the results of the study, it can be concluded that gross motor and fine motor exercise program is effective in improving trunk control in spastic cerebral palsy. Effect of gross motor and fine motor exercises on trunk control was found more within the age group 6-8 yrs as compared to 9-12 yrs.

**Conflicts of Interest:** There is no conflict of interests in this study.

**Ethical Clearance:** This study has undergone ethical clearance through the university level ethical committee of Krishna institute of medical sciences, deemed to be University, Karad. Protocol number 0101/2019-2020.

**Funding:** This study was funded by Krishna institute of medical sciences’ deemed to be’ university, karad. (Maharashtra).

**References**


Effect of Different Shoe Lacing Pattern on Different Types of Foot in Recreational Runners

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Abstract

Background: There has been an increase in the overall prevalence of obesity in India. There has been a 26% rise in the obesity among the young adults of India. At the same time, an awareness about fitness and health has also been on a rise in our country. Jogging and running have been on a rise in popularity among the youth of India. Heel-to-toe drop, styles of running, brand, fit and shoe lacing are some other factors that affect running. Out of these shoe lacing is one of the simplest factors to modify. It can be done by anybody and is an extremely cost effective measure.

Methodology: An experimental study is being conducted with a sample size of 33 subject in karad. The population under study is Recreational runners age group of 20-40 years both male and female subjects. VAS and Foot Posture Index were the outcome measures used.

Result: There was a significant effect of modifying shoe lacing patterns on FFI scores. (p=<0.001) There was also a significant effect on FPS (p <0.001) and FDS (p <0.001) subscales whereas there was no significant effect on ALS subscale (p >0.05). A significant decrease in pain was also noted. (p <0.05)

Conclusion On the basis of the results of the study, it was concluded that there was a significant effect of modifying shoe lacing patterns on amateur runners.

Keywords: Amateur, Runners, shoe lace, foot type

Introduction

There has been an increase in the overall prevalence of obesity in India.1 There has been a 26% rise in the obesity among the young adults of India.2 At the same time, an awareness about fitness and health has also been on a rise in our country.3 The number of fitness centres and health awareness programs have in turn increased as well.4 However, not everybody has the means necessary to avail the benefits of these facilities.

Jogging, on the other hand, does not require any form of equipment except for a pair of shoes. This makes it easily accessible to a large portion of our population. Thus, jogging and running have been on a rise in popularity among the youth of India.5

Choosing the perfect shoe is dependent on many factors other than the size or brand of the shoe.6,7 It is very important to first assess the type of your foot i.e. the anatomical basis of the foot. There are mainly 3 types of foot; Pronated foot, Neutral foot and Supinated foot.8

The pronated foot is characterized by a very low or flat arch, the supinated foot has a very high and rigid arch and the neutral foot is between the pronated and the supinated type. It is the most common type of foot.8

Normally, while running the foot lands on the heel first and the rolls forward, until the impact is distributed evenly across the forefoot.9 The neutral foot follows this same pattern while the pronated foot rolls inwards and the supinated foot restricts the impact of the stride largely to the outer edges of the foot.

Heel-to-toe drop, styles of running, brand, fit and shoe lacing are some other factors that are also considered. Out of these shoe lacing is one of the
simplest factors to modify.\textsuperscript{10,11} It can be done by anybody and is an extremely cost effective measure. Using the right lacing technique and proper knots will significantly improve the individuals running. Despite being a minor issue, getting the lacing perfectly will make a big difference in the overall support and comfort of the shoes. It can alleviate pain, prevent injuries and relive foot problems.\textsuperscript{12}

However, it is often left out and forgotten by most. There is a vast variety of shoe lacing patterns that are available. They are categorized based on the types of foot and the type of running performed by the individual. The conventional method of lacing is the crisscross to the top of the shoe, which works best for the majority of people.\textsuperscript{13}

Many modifications exist, such as in heel slippage, if your heel slips too much or you need a little more toe room, a lace lock can be made at the top of the shoe. This will pull the foot back into the heel of the shoe and help stop the slippage for a more comfortable fit.

In a supinated foot, the shoe generally fails to provide enough volume for the foot to fit. Thus, a more spread out pattern of lacing increases the available space for the foot to move. In a pronated foot, the exact opposite occurs. There is more space in the shoe compared to the size of the foot which causes the foot to slide around too much inside the shoe. Here, a more snug pattern of lacing is used to avoid this problem.\textsuperscript{13,14}

To assess the effect of these lacing pattern we used the Foot Function Index(FFI). It is a self-administered index consisting of 23 items divided into 3 subscales which helps measure impact of foot pathology on function in terms of pain, disability and activity restriction.\textsuperscript{15} Both sub-scale scores and total scores are calculated. Test-retest reliability of the FFI total and subscale scores ranges from 0.87 to 0.69.\textsuperscript{16}

Visual Analogue Scale (VAS) was also used to assess the amount of pain and discomfort experienced by the runners. VAS was used before and after administration of the treatment to determine the difference in the individual’s pain. VAS is sufficiently reliable to be used to assess acute pain.\textsuperscript{17}

Provision of guidance regarding something as simple as tying a shoelace may prove to be effective in improving the individuals performance and reducing their risk of injury and pain at the same time. According to our knowledge, few studies have been performed to assess the effect of lacing in non-professional runners. Thus, it is important to conduct this study to improve the knowledge of the common man and provide them with better dynamics or running.

**Methodology:** The ethical clearance was taken from the institutional ethical committee of KIMSDTBU, Karad. An experimental study was conducted with a sample size of 33 subject in karad. The population under study is Recreational runners age group of 20-40 years both male and female subjects. The material used in this study include foot posture index, goniometer data collection sheet and consent form. VAS pain scale and Foot Posture Index are the outcome measure that are going to be used. The subject will pre and post assessment can taken. The data will be collected and analysed.

**DATA PRESENTATION, ANALYSIS AND INTERPRETATION**

1. **Age wise distribution:**

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Group A</th>
<th>Percentage</th>
<th>Mean SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-24</td>
<td>34</td>
<td>85%</td>
<td>21.741.46</td>
</tr>
<tr>
<td>25-30</td>
<td>6</td>
<td>15%</td>
<td>25.830.75</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100%</td>
<td>22.35 0.02</td>
</tr>
</tbody>
</table>

**Interpretation:** Table no.1 shows the age wise distribution of runners.

2. **Gender wise distribution:**

<table>
<thead>
<tr>
<th>Gender</th>
<th>Players</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>MALE</td>
<td>26</td>
<td>65%</td>
</tr>
<tr>
<td>FEMALE</td>
<td>14</td>
<td>35%</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Interpretation:** Table no.2 shows the gender wise distribution.
3. **Distribution according to type of foot:**

<table>
<thead>
<tr>
<th>Type of foot</th>
<th>Players</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>High arch</td>
<td>7</td>
<td>17.50%</td>
</tr>
<tr>
<td>Neutral arch</td>
<td>18</td>
<td>45%</td>
</tr>
<tr>
<td>Low arch</td>
<td>15</td>
<td>37.50%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

**Interpretation:** Table no.3 shows the distribution of runners according to type of foot

4. **Pain score**

<table>
<thead>
<tr>
<th>Pain Score(VAS)</th>
<th>Mean SD</th>
<th>Paired t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre Intervention</td>
<td>Post Intervention</td>
</tr>
<tr>
<td>Pre Intervention</td>
<td>6.53 0.99</td>
<td>3.93 1.64</td>
</tr>
</tbody>
</table>

**Table 4: Distribution and association of pain score**

**Interpretation:** Table no.4 shows the distribution and association of pain score pre and post intervention

5. **Foot Function Index Score according to Subscales:**

<table>
<thead>
<tr>
<th>FFI Subscales</th>
<th>Mean SD</th>
<th>Paired t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre Intervention</td>
<td>Post Intervention</td>
</tr>
<tr>
<td>Foot Pain subscale</td>
<td>35.34</td>
<td>15.51</td>
</tr>
<tr>
<td>Foot Disability Subscale</td>
<td>51.82</td>
<td>26.82</td>
</tr>
<tr>
<td>Activity Limitation Subscale</td>
<td>5.13</td>
<td>5.05</td>
</tr>
</tbody>
</table>

**Table 5: Distribution and association of FFI subscale scores**

**Interpretation:** Table no.5 shows the distribution and association of FFI subscale scores

6. **Foot Function Index Score:**

<table>
<thead>
<tr>
<th>Foot Function Index</th>
<th>Mean SD</th>
<th>Paired t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre Intervention</td>
<td>Post Intervention</td>
</tr>
<tr>
<td></td>
<td>42.51±11.54</td>
<td>23.40±6.30</td>
</tr>
</tbody>
</table>

**Interpretation:** Table no.6 shows the distribution and association of FFI scores
Discussion

The aim of this study was to study and find the effectiveness of various shoe lacing patterns in amateur runners. The objectives of this study were to determine the effect of administration of shoe lacing patterns according to their foot type on their performance and foot pain. An effort to find the association between the effects of shoe lacing patterns on runners before and after its administration was made.

In this study, 40 individuals who ran for recreation were taken. Individuals in the age group of 20-40 years were included in this study, out of which 34 (85%) individuals were in the (20-24) age group and 6 (15%) individuals were in the (25-30) age group.

The reason behind such a significant discrepancy in the distribution of age groups may be due to the fact that generally the young adults between the ages of 20-24 years are more conscious about their health and appearance thus leading to an increase in their interest in running. Whereas, those between the ages of 25-30 years normally belong to the working class and seldom get time or have the motivation to run.

They were also divided according to their gender. Out of the total 40 runners, 26 (65%) were male and remaining 14 (15%) were female.

Our study is male dominant, maybe because the region included in our study is a rural-urban area where not many women are exposed to recreational activities. Thus, the female population engaging in running as a hobby/ recreational activity is less compared to the males.

Their foot type was also classified. 7 (17.50%) runners had a high arch or a supinated foot, 18 (45%) runners had a neutral arch or a normal type of foot and 15 (37.50%) runners had a low arch or a pronated type of foot out of the total of 40 runners.

Pain score according to Visual Analogue Scale (VAS) and Foot Function Index score of subjects of both the groups were taken before the treatment/intervention was given.

The mean pain score measurements prior to the intervention was 6.53 and after the intervention was 3.93. Statistical analysis of the pain score before and after intervention was done. The comparison for pre and post pain scores was found to have a p-value of (<0.05) which was significant.

The reason behind such a significant difference between the pre and post scores may be due to the fortifying effect of the shoe lacing patterns which reinforce the movement of the foot within the shoes. This in turn improves comfort and also reduces the risk of the foot being injured while running due to slippage. Thus, there is an overall increase in comfort and reduction in pain.

To analyse the impact of foot pathology on function in terms of pain, disability and activity restriction of foot was done by using the Foot Function Index (FFI). It is divided into 3 subscales viz; Foot Pain subscale (FPS), Foot Disability subscale (FDS) and Activity Limitation subscale (ALS) which consists of 23 items. Same as Pain score, measures of FFI were taken before and after the treatment. The mean score of FFI pre intervention according to the FPS was 35.3, FDS was 51.80 and ALS was 5.13, and post intervention, FPS was 15.50, FDS was 26.82 and ALS was 5.05. Here, the difference in scores of FDS was found to be more among the three subscales. Statistical analysis was done to compare the mean pre and post intervention scores of Foot Function Index subscales to confirm whether they were significant or not and FDS was found to have a p-value of (<0.001) which was very significant, FPS had a p-value of (<0.001) which was very significant and ALS had a p-value of (>0.05) which was not significant.

We have already seen that there was a significant reduction in pain thus in relation to that the FPS scores also have a significant reduction in them. Here, the difference in scores of FDS was found to be more among the three subscales. This may be due to the disability subscale consisting of questions related to activities of daily living such as walking, climbing and descending stairs, getting up from a chair etc. All of these activities involves use of the foot dynamically thus aggravating pain. Hence, the scores already were very high for FDS and due to that a very significant difference can be seen in the score post treatment. ALS did not have any significant change in their scores maybe due to the fact that it involved questions which were relevant only when the pain and disability were extremely high and in our study the participants did not have a high pain score to begin with.

The mean scores of pre and post intervention of FFI were 42.51 and 23.40 respectively. Statistical analysis
was done to compare the mean pre and post intervention scores of Foot Function Index to confirm whether they were significant or not and was found to have a p-value of (<0.001) which was very significant.

According to Hagan & Hennig, 2009 and Hagan et al., 2008, lacing variations can improve shoe fit-to-foot, optimize biomechanical assistive components of footwear, and influence perceived comfort and stability without affecting mass of the shoe. They also concluded that the amount of motion of the foot in a shoe can alter biomechanical efficiency and perceived comfort. The results of these studies also show that foot movement in heel–toe running is influenced by the lacing pattern of the shoe. Therefore, shoe lacing has to be considered when undertaking biomechanical comparisons of running shoes.9,10

Another study by Hong et al., 2011 also had similar findings in their research where they studied changes in running mechanics using conventional shoelace versus elastic shoe cover.18

Thus, it can be said that modifying the shoe lacing patterns in recreational runners has a significant impact on their performance as well as on the prevention of injuries and reduction of pain. This small modification will in turn encourage the runners to participate more and will give them the ability to modify their shoes by themselves. It will also improve the specificity of the fit of the shoe as it can be changed according to the individual needs of the runners.

Conclusion

On the basis of the results of the study, it was concluded that there is a significant effect of modifying shoe lacing patterns on amateur runners. The effect was most profound on foot disability, then on foot pain and the least on activity limitation. The pain score of individuals who had undergone shoe lacing modification was significantly lower compared to the pre intervention pain score.

Conflict of Interest: There were no conflicts of interest in this study

Ethical Clearance: Ethical clearance was taken from institutional committee of Krishna Institute of Medical Sciences, Deemed to be University, Karad.

SOURCE OF FUNDING: Krishna Institute of Medical Sciences Deemed to be University, Karad

References


Effectiveness of Gluteus Maximus Strengthening on Gait in Patients with Hemiparesis

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Abstract

Background: Seventy five per cent of patients who outlive stroke have inadequacies whilst walking and the hemiparetic gait is the most prevalent form of walking. The asymmetric pattern of walking is most commonly seen in hemiparetic gait.

Aim and Objectives: To find the effectiveness of gluteus maximus strengthening on gait in patients with hemiparesis.

Materials and Method: The hemiparetic patients were assessed for the MMT and gait, prior to the treatment. The muscle strength and gait was assessed by Manual Muscle Testing and objective method respectively. Subjects signed the consent form then total number of three exercises were given-i) Standing leg lifts with trunk supported, ii) Quadruped leg lifts, iii) Standing extension. Statistical analysis was done once the data was collected.

Results: In this study the gluteus maximus strengthening had effect on the gait of the hemiparetic individuals. The gait parameters taken in this study step length, step width, stride length, cadence and speed significantly increase after the treatment.

Conclusion: On the basis of the result of this study, it was concluded that the strengthening of gluteus maximus muscle has effect on gait in patients with hemiparesis. The gait parameters taken in this study such as step length, step width, stride length, cadence and speed has increase in the averaged values before and after treatment.

Keywords: Gluteus Maximus, Strengthening, hemiparesis, Stroke, Gait.

Introduction

Weakness of muscle usually occurring after stoke is referred as paresis. Patients are generally unable to generate the force which is necessary to initiate and control the movement (¹). The word ‘hemi’ means ‘one side’ while ‘paresis’ means ‘weakness’ so hemiparesis denotes the weakness of the one side of the body. (²)

World Health Organization defines stroke as ‘rapidly developed clinical sign of focal disturbance of cerebral function of presumed vascular origin and of more than 24 hours’ duration’. Ischemic stroke, one of the types of stroke, is due to occlusion or atheroma or emboli in the artery. This type of stroke shows symptoms of headache, hemiparesis or dysphasia. The other type, Hemorrhagic stroke is usually due to hypertension which causes lipohyalinosis in the small penetrating arteries in the brain. The symptoms are severe headache, vomiting, and

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loss of consciousness.\(^{(3)}\)

Gluteus Maximus is the largest muscle of the body situated superficially. It originates from outer slope of the dorsal segment of iliac crest and posterior gluteal line and dorsal surface of lower part of sacrum and it’s deep fibers are inserted on the gluteal tuberosity and the greater part of the muscle is inserted into the iliotibial tract.\(^{(4)}\) This important muscle is different in its characteristics with other primates as a result of progression in postural alteration from quadrupeds to bipeds. First and foremost it serves the hip extension and lateral rotation because of its attachment. Gluteus maximus has a major function in pelvis stability. This muscle carries out many daily activities like lifting, walking, running.\(^{(5)}\) The studies has shown that more importance should be employed on contraction in the course of early phase of the lift to provide pelvic stability which will enable a secure and well-organized movement to occur.\(^{(5)}\)

Seventy five per cent of patients who outlive stroke have inadequacies whilst walking and the hemiparetic gait is the most prevalent form of walking.\(^{(6)}\)

**Gait**

The period from heel strike of one extremity to heel strike of same extremity is described as gait cycle and includes a stance and swing phase.\(^{(7)}\) Gait includes Time and distance variable. Temporal variable include stance time, single-limb and double limb support time, swing time, stride and step time, cadence and speed. The distance variables include stride length, step length, width, and degree of toe out.\(^{(8)}\)

**Gluteus Maximus in Gait**

A basic understanding of a role of gluteus maximus is mandatory as a complete discussion on muscles contributing throughout the gait cycle fall outside the scope of this topic. The flexor moment during the loading response is coordinated by the hip extensor muscles, and the hip extension is initiated by the gluteus maximus muscle. A posterior lurch of the trunk occurs at foot contact with loss of extensor function to shift the centre of the gravity of the trunk, posterior to the hip.\(^{(9)}\)

**Gait Alterations in Hemiparesis**

The gait after stroke is mostly considered as decelerated at speed of walking.\(^{(10)}\) The symptoms such as contralateral motor weakness, motor control deficits, sensory and/or proprioceptive loss, and/or ataxia associated with the asymmetric pattern of walking are most commonly seen in hemiparetic gait.\(^{(11)}\)

**SPATIOTEMPORAL PARAMETERS**

The distance taken to complete one gait cycle is referred as stride length. The distance between heel strike of an ipsilateral limb to heel strike of the contralateral limb step length. The number of steps per unit time (minute) is defined as cadence. The distance per unit time is referred as walking speed and, is the most important interpreter of ambulation status after stroke. In hemiparetic individuals the walking velocity, stride length, step length, cadence, single-stance duration and stance duration is decreased while double-stance duration and swing duration is increased.\(^{(11)}\)

So the paucity in the literature regarding this field denotes the need to study.

**Methodology**

Prior to the commencement of the study the ethical clearance was taken from the Institutional ethical committee. The purpose of this study is to find the effectiveness of gluteus maximus strengthening on gait in hemiparetic patients.

Individuals with hemiparesis were selected as per inclusion and exclusion. The informed consent was taken from the subjects. The sample size for this study was 40. Prior to the treatment the pre-treatment assessment of the muscle strength and gait was assessed by Manual Muscle Testing and objective method respectively. To assess the muscle strength of the gluteus maximus muscle the subjects were asked to do side lying position on plinth with testing limb superior to the other limb. Once the patient acquires suitable position, patient is asked to extend the hip. The gait assessment was executed by a 10m pathway which was covered with white cardboard for every subject. The participants were asked to put their foot in coloured talcum which as kept in a tray. Then subjects were instructed to walk in their normal way along the pathway. Then cardboard was preserved for foot print analysis.

Then detailed instructions were given to the participants about treatment protocol. Total number of three exercises were given out of which first was standing leg lifts with trunk supported in which the patients stands on the edge of the plinth with trunk supported on the table. Then patient is asked to extend both the hips one
by one. In the second exercise, Quadruped Leg Lifts, the patient acquires quadruped position. Then patient is asked to perform alternate hip extension while keeping the knee flexed. The third exercise is standing extension. In this the patient position is single leg stance and patient is directed to extend the opposite hip. Patient was instructed to perform these exercises two times per day for 6 weeks.

After treatment the post-treatment assessment of manual muscle testing and gait were done. Then derived values were entered in the master chart and the collected data was sent for the statistical analysis.

**STATISTICAL ANALYSIS AND INTERPRITATION:**

**Table 1. MMT of Gluteus Maximus Muscle before and After Treatment**

<table>
<thead>
<tr>
<th>MMT of Gluteus Maximus Muscle</th>
<th>Mean</th>
<th>SD</th>
<th>Paired t-value</th>
<th>p-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRE</td>
<td>2.85</td>
<td>0.5799</td>
<td>27.92</td>
<td>&lt;0.0001</td>
<td>-0.1072 to -0.9276</td>
</tr>
<tr>
<td>POST</td>
<td>3.85</td>
<td>0.5796</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Result

The above table revealed that the effectiveness on gluteus maximus muscle, in this study the strengthening protocol appeared to be on gluteus maximus muscle with paired t value of 27.92 when the p-value <0.0001. The 95% confidence interval was -0.1072 to -0.9276. Here we found the extreme statistical significance.

**Table 2. Step Length Before and After Treatment**

<table>
<thead>
<tr>
<th>Step Length</th>
<th>Mean</th>
<th>SD</th>
<th>Paired t-value</th>
<th>p-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRE</td>
<td>23.025</td>
<td>1.387</td>
<td>9.56</td>
<td>&lt;0.0001</td>
<td>-1.636 to 1.064</td>
</tr>
<tr>
<td>POST</td>
<td>24.375</td>
<td>0.9789</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Result

The above table shows the effectiveness of strengthening protocol on Step Length. In this study the step length parameter had the paired t value of 9.56 while the 95% confidence interval ranging from -1.636 to 1.064. We had found the extreme significance with p-value <0.0001.

**Table 3. Stride Length Before and After Treatment**

<table>
<thead>
<tr>
<th>Stride Length</th>
<th>Mean</th>
<th>SD</th>
<th>Paired t-value</th>
<th>p-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRE</td>
<td>52.775</td>
<td>1.510</td>
<td>13.79</td>
<td>&lt;0.0001</td>
<td>-1.290 to -0.9601</td>
</tr>
<tr>
<td>POST</td>
<td>53.9</td>
<td>1.464</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Result

The above table indicates the effect of treatment on stride length parameter of gait. The paired t value and 95% confidence interval for this parameter was 13.79 and -1.290 to 0.09601 respectively. Here we obtained extreme statistical significance when the p-value was <0.0001.
Table 4. Step Width Before and After Treatment

<table>
<thead>
<tr>
<th>Step Width</th>
<th>Mean</th>
<th>SD</th>
<th>Paired t-value</th>
<th>p-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRE</td>
<td>8.95</td>
<td>1.280</td>
<td>8.832</td>
<td>&lt;0.0001</td>
<td>-1.229 to -0.7710</td>
</tr>
<tr>
<td>POST</td>
<td>9.95</td>
<td>1.300</td>
<td>8.832</td>
<td>&lt;0.0001</td>
<td>-1.229 to -0.7710</td>
</tr>
</tbody>
</table>

Result:

The above table revealed the effect of treatment protocol on step width. For this parameter of gait the paired t value and 95% confidence interval was 8.832 and -1.229 to -0.7710 respectively with p-value <0.0001. It was found that there is extreme statistical significance.

Table 5. Cadence Before and After Treatment

<table>
<thead>
<tr>
<th>Cadence</th>
<th>Mean</th>
<th>SD</th>
<th>Paired t-value</th>
<th>p-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRE</td>
<td>80.65</td>
<td>11.615</td>
<td>11.322</td>
<td>&lt;0.10</td>
<td>-11.816 to -82.34</td>
</tr>
<tr>
<td>POST</td>
<td>90.675</td>
<td>11.674</td>
<td>11.322</td>
<td>&lt;0.10</td>
<td>-11.816 to -82.34</td>
</tr>
</tbody>
</table>

Result

The above table shows the effectiveness on cadence parameter of gait. In this study the cadence parameter had the paired t value <0.10 and 95% confidence interval ranging from -11.861 to -82.34. Hence it is found that there is extreme statistical significance when p value <0.10.

Table 6. Speed Before and After Treatment

<table>
<thead>
<tr>
<th>Speed</th>
<th>Mean</th>
<th>SD</th>
<th>Paired t-value</th>
<th>p-value</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRE</td>
<td>3.675</td>
<td>1.047</td>
<td>13.964</td>
<td>&lt;0.0001</td>
<td>-2.290 to -1.710</td>
</tr>
<tr>
<td>POST</td>
<td>5.675</td>
<td>1.207</td>
<td>13.964</td>
<td>&lt;0.0001</td>
<td>-2.290 to -1.710</td>
</tr>
</tbody>
</table>

Result

The above table revealed effectiveness of strengthening program on speed of the gait. In this study the speed parameter had paired t value and 95% confidence interval ranging -2.290 to -1.710 respectively. Therefore it is proved that there is extreme significance with p value <0.0001.

Results

In this study the gluteus maximus strengthening had effect on the gait of the hemiparetic individuals. The gait parameters taken in this study step length, step width, stride length, cadence and speed significantly increase after the treatment.
Discussion

Seventy five per cent of patients who outlive stroke have inadequacies whilst walking and the hemiparetic gait is the most prevalent form of walking. The purpose of this study is to find the effectiveness of gluteus maximus strengthening on gait in hemiparetic patients.

Individuals with hemiparesis were selected as per inclusion and exclusion. The sample size for this study was 40. Demographic data including name, age, gender, address was collected .Prior to the treatment the pre-treatment assessment of the muscle strength and gait was assessed by Manual Muscle Testing and objective method respectively.

Then total number of three exercises were given -i) Standing leg lifts with trunk supported, ii) Quadruped Leg Lifts, iii) Standing extension. Patient was instructed to perform these exercises two times per day for 6 weeks.

After treatment the post- treatment assessment of manual muscle testing and gait were done. Then derived values were entered in the master chart and the collected data was sent for the statistical analysis.

In this study the statistical analysis of the recorded data was done by using the software SPSS version20. Arithmetic mean & standard deviation was calculated for each outcome measure. MS Excel was used for drawing various graphs with given frequencies and the various percentages that were calculated with the software.

Combined Task-Specific Training and Strengthening Effects On Locomotor Recovery Post-Stroke: A Case Study concluded that functional locomotor recovery was associated with increase in magnitude of the paretic leg gluteus maximus and gluteus medius activation during gait. Their study analysis confirmed an increase of hip and knee extension throughout stance and swing (12). Hence Outcome measure used in this study , Manual Muscle Testing, had positive effect of strengthening protocol with paired t value of 27.92 when the p-value <0.0001. The 95% confidence interval was -0.1072 to -0.9276.

The effect of strengthening exercises on biomechanical parameters of gait in chronic hemiparesis following stroke ,supported that the muscle strength training has a positive effective in improving gait patterns as well as velocity and stride length in the chronic stage of rehabilitation following stroke(13). In this study the paired t value and 95% confidence interval for this parameter was 13.79 and -1.290 to 0.09601 respectively. Here we obtained extreme statistical significance when the p-value was <0.0001.

The effect of step climbing exercise on balance and step length in chronic stroke patients, concluded that the step climbing exercise improved the muscle strength in the lower limbs of the stroke patients, as well as their timed Up and Go results and step lengths(14). The present study the step length parameter had the paired t value of 9.56 while the 95% confidence interval ranging from -1.636 to 1.064 .we had found the extreme significance with p-value <0.0001.

The effect of water exercise on gait characteristics in the elderly post- stroke patients” stated in the results of their study that there was significant increase in the gait velocity, step length & step width after the water exercises(15). For this parameter of gait, step width, the paired t value and 95% confidence interval was 8.832 and -1.229 to -0.7710 respectively with p-value <0.0001. It was found that there is extreme statistical significance.

Effects Of Aerobic Treadmill Training On Gait Velocity, Cadence, And Gait Symmetry In Chronic Hemiparetic Stroke: A Preliminary Report” have stated in their results that the exercise training given to the patients produced a 9% increase ‘straight-away-walk’ cadence from a mean of 89 ± 9 to 97 ± 8 steps/min(16). In this study the cadence parameter had the paired t value <0.10 and 95% confidence interval ranging from -11.861 to -82.34. Hence it is found that there is extreme statistical significance when p value <0.10.

Effects Of Muscle Strengthening And Physical Conditioning Training On Temporal, Kinematic And Kinetic Variables During Gait In Stroke Survivors” provided evidence in their study that gait speed at post-training was 0.76 ± 0.37 m/second, which was significantly faster than speed observed at baseline 37.2%. Associated with improved speed, increase in cadence and stride length was observed(17). In this study the speed parameter had paired t value and 95% confidence interval ranging -2.290 to -1.710 respectively. Therefore it is proved that there is extreme significance with p value <0.0001.

Thus , the present study is postulating evidence that the strengthening of the gluteus maximus muscle has significant effect on gait in patients with hemiparesis. Hence the alternative hypothesis is accepted.
Conclusion

On the basis of the result of this study, it was concluded that the strengthening of gluteus maximus muscle has effect on gait in patients with hemiparesis. The gait parameters taken in this study such as step length, step width, stride length, cadence and speed has increase in the averaged values before and after treatment.

Conflicts of Interest: None

Ethical Clearance: Ethical clearance was taken from institutional committee of Krishna Institute of Medical Sciences Deemed To Be University, Karad.

Source of Funding: Krishna Institute of Medical Sciences Deemed To Be University, Karad

References

Role of Rigor Mortis in Assessment of Time Since Death

Sabina Bashir1, Deepak Walia2

1JR, Department of Forensic Medicine, 2Professor & Head, Department of Forensic Medicine

Abstract

Background: Evaluating time since death is an fundamental part of medico-legal investigations. Rigor Mortis is determined by routine conventional method of corpse examination and detecting development of postmortem changes which are affected by many internal and external factors.

The study was done on 100 medico-legal autopsies. Presence of Rigor Mortis in the cadavers was observed both in voluntary and involuntary muscles. Voluntary muscles were tested by gently moving the parts (eyelids, jaw) or by gently flexing the joints. Involuntary muscles like heart by slightly compressing it.

Most of the cases belonged to 21-40 years of age group (45%) followed by 41-60 years (32%). 78% of the victims were males while only 22% were females. 66% of the cases were reported to be the Road traffic accidents, 13% were poisoning cases, 7% natural death and 4% hanging. Majority of the cases seen were those of brought dead cases i.e; 57% and the hospital deaths recorded were 43%. 99% of victims were clothed. Mean maximum temperature was 33.86±6.6hrs and minimum temperature noted was 24.31±6.5hrs &percentage humidity recorded was 33.51±20.2 . In this study 95% Rigor Mortis was recorded in eyelids, 95% of Rigor Mortis was seen in jaw, 95% in the neck, 96% in the right upper limb, 94% in the left upper limb, 80% cases in right lower limb and 80% in the left lower limb. Minimum Postmortem interval recorded was 4 hrs and maximum postmortem interval reported was 36 hrs. Mean PMI reported was 14.80±5.87 hrs. Majority of the cases were reported from two police stations Mullana, which were 46 in number and from Barara ,24 in number.

Key words: Rigor Mortis; Postmortem interval; Time since death; Autopsy; Forensic case work.

Introduction

Estimating the time gap in between death and autopsy is an important aspect of every medico-legal case after death.

Determination of approximate time since death is important in all the unnatural cases and criminal cases which include homicide, accidents, and suicide cases. Development of Rigor Mortis is based upon different physical and chemical changes known to occur within the dead body.1

The term Rigor mortis is a Latin origin word which means stiffness of death. It is one of the identifiable signs of death, which is characterized by stiffening of the muscles of the body caused by chemical changes that occur in muscle postmortem.2 The primary reason for the development of rigor mortis is the loss of adenosine triphosphate from the anoxic tissue3,4. Rigor mortis starts to develop 2–4 hours after death and develops fully by 6 to 12 hours and gradually dissipates until approximately 72 hours after death. It has been found that post-mortem muscle proteolysis is responsible for the relaxation following rigor mortis5,6.

The onset of Rigor Mortis after death depends on the surrounding temperature. The biochemical changes that take place in the dead body is chemical breakdown of energy molecules i.e; ATP in the muscles, which is
the source of energy required for activity. In absence of ATP, myosin molecules adhere to actin filaments and the muscles become firm, hard and rigid\(^7\).

Various factors affecting the process of Rigor Mortis are age and condition of the body, mode of death, surroundings, various environmental conditions have an effect on the development and disappearance of rigor mortis like in various tropical and temperate zones.

Work regarding the appearance, duration and disappearance of stiffness in various muscles in a cadaver has been extensively carried out both in India and abroad by many researchers.\(^8,9\) These researchers have conducted this study for assessing the time of death from the onset and time span of Rigor Mortis which rely on many factors including weather.\(^10,11\) India is having diverse weather conditions that exist throughout its various parts at a given time. Haryana is one such place in North India which experiences extremes of weather conditions.\(^12,13,14\)

The factors that interfere with the onset and duration of rigor mortis are temperature, existing antemortem pathologies, age, body muscular mass, presence of infections, temperature, climatic conditions and the degree of muscular activity immediately before death.\(^15,16,17\)

District Ambala is one such place in North India, which experiences extremes of weather conditions. Available literature on this topic is patchy and scanty especially from this geographical location. As per best of my knowledge, no study has been conducted on factors influencing rigor mortis from Ambala. Therefore, it was planned to study the effect of temperature, humidity and other factors on the onset, duration and sequence of appearance and disappearance of rigor mortis in subjects of Ambala.

**Aims and Objectives**

- To correlate the known postmortem interval with the extent of Rigor Mortis.
- To ascertain the effect of local temperature and humidity on Rigor Mortis and variation in the post mortem interval.
- To correlate and evaluate the variation of various external and internal factors which influence the Rigor Mortis.

**Material and Method**

The study conducted was a cross-sectional study in which total of 100 cases were collected which were preserved in deep freezer at a temperature between 0-4\(^\circ\)C. Presence of Rigor Mortis in the corpses was observed in the both voluntary as well as involuntary muscles. Voluntary muscles were be tested by gently moving the parts eyelids, jaw, neck, upper limbs, lower limbs or by gently flexing or moving the joints. Involuntary muscle like heart was tested by slightly compressing it. Rigor Mortis of the iris was observed from the dilatation or constriction of the pupils.

**Inclusion Criteria**

Those cases were selected where the time of death was known which would help to ascertain the appearance, progress and disappearance of Rigor Mortis at various intervals.

**Exclusion Criteria**

The following dead bodies were be excluded from the study;

1. Decomposed bodies.
2. Artificially preserved bodies.
3. Bodies showed heat stiffening, cold stiffening and instantaneous Rigor.

**Statistical Analysis**

All the cases were entered in proforma & statistical analysis was done. Chi-square test was applied in our study. The data were presented as mean ± Standard deviation for determining Post-mortem Interval.

**Observations & Result**

The present study of Rigor Mortis was to estimate Post-mortem interval was conducted on 100 medicolegal necropsies which were performed in the Mortuary of Department of Forensic Medicine and Toxicology, Maharishi Markendeshwar Deemed to be University, Mullana, Ambala w.e.f 1\(^\text{st}\) April 2017 to 15th May 2019. Only those cases were selected in which the exact time of death was known and no artificial means of preservation had been employed.
### TABLE 1: AGE AND GENDER WISE DISTRIBUTION OF THE CASES

<table>
<thead>
<tr>
<th>Age group (in years)</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NUMBER</td>
<td>%</td>
<td>NUMBER</td>
</tr>
<tr>
<td>0-20 years</td>
<td>11</td>
<td>14.0%</td>
<td>2</td>
</tr>
<tr>
<td>21-40 years</td>
<td>33</td>
<td>42.3%</td>
<td>11</td>
</tr>
<tr>
<td>41-60 years</td>
<td>25</td>
<td>32.1%</td>
<td>7</td>
</tr>
<tr>
<td>&gt;60 years</td>
<td>9</td>
<td>11.5%</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>78</td>
<td>100%</td>
<td>22</td>
</tr>
</tbody>
</table>

Table 1 shows age and sex wise distribution of the study cases. Among male cases, majority of them fell in the age group of 21-40 years (42.3%), followed by 41-60 years (32.1%). Among females, majority of the cases also fell in the age group of 21-40 years (50%) followed by 41-60 years (31.8%).

**Figure 1:** Shows the mean maximum temperature, mean minimum temperature and percentage humidity of the postmortem subjects.

**Figure 2:** Shows Rigor Mortis (eye lids). Among 95% of the cases, Rigor Mortis was present in the eyelids. In 5% cases, rigor mortis has started disappearing.
Table 2: MEAN POST MORTEM INTERVAL

<table>
<thead>
<tr>
<th>Mean POSTMORTEM INTERVAL (Hours)</th>
<th>NUMBER</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PMI (in hours)</td>
<td>100</td>
<td>4</td>
<td>36</td>
<td>14.80</td>
<td>5.871</td>
</tr>
</tbody>
</table>

Table: 2 Result showed that the maximum postmortem interval recorded was 36 hours while minimum postmortem interval recorded was 4 hours. Mean PMI was found to be 14.80± 5.871 hours.

![FIGURE 3 Testing of Rigor Mortis in Upper Limb](image)

**Discussion**

In the present study 100 medico-legal cases were taken. Among those, 78% of the participants were males while only 22% were females. Age and sex wise distribution of the study cases showed that among male cases large proportion of them fell in the age group of 21-40 years (42.3%), followed by 41-60 years (32.1%). Among females majority of the cases were also in the age group of 21- 40 years (50%) followed by 41-60 years (31.8%). In my study the main cause of death was found to be Road traffic accident which constitutes 66% of the cases, followed by 13% of the poisoning cases, 7% natural death and 4% hanging. In my study majority of the deaths were brought dead cases they were 57%, while 43% death cases were those which were admitted in hospital. 99% of the cases were wearing clothes. Mean TMAX in the present study was calculated to be 33.86± 6.6 hours, mean TMIN was found to be 24.31±6.49 hours and mean HUM% was estimated to be 33.51±20.5 %. In my study among 95% of the cases were those in which Rigor Mortis was present in the eyelids and 5% were those in which rigor mortis is seen to be disappearing. In 95% of the cases Rigor Mortis was present in the jaw, 95% cases of Rigor Mortis was seen in neck, in 96% in the right upper limb, in 94% in left upper limb, in 80% cases in right lower limb and in 80% of the cases in left lower limb. Also from my study the maximum number of cases that came to mortuary for autopsy were seen in the month of April i.e 22 while the minimum number of cases seen were in January and February i.e 2. Also the minimum duration of Postmortem interval was 4 hours and maximum duration of Postmortem interval was 36 hours. The mean postmortem interval calculated was 14.80±5.87hrs.

Similar finding were observed by Dalal J et al presented with almost same findings .he has done his study on rigor mortis from the Amritsar which is bordering state adjacent to Haryana where present study was done.

In this study also the mean duration for completely developed Rigor Mortis was 18 hours and 19 minutes, the shortest duration being 3 hours and 15 minutes and the longest 33 hours and 40 minutes. 94.6% of cases. Rigor Mortis was found to establish first in the muscles of eyelids followed by lower jaw, neck, upper limbs, trunk, lower limbs and lastly fingers and toes. It regressed in the same manner in which it had appeared. However, in 5.4% cases course was found to be uncertain.
Similar study conducted by R.K Gorea from Amritsar in which 128 cases were selected from various medicolegal cases brought to mortuary complex of medical college, Amritsar. In this study if the rigor mortis has not appeared PMI is less then 3 hrs & 15 minutes,while longest duration in which rigor mortis had not completely appeared in the body as 14 hrs. Rigor mortis gives us a satisfactory PMI when due weightage is given to temperature and humidity.

Similar study was conducted by M. sugatha et al. This study was a cross-sectional study in which 500 medicolegal autopsies done at Osmania General Hospital mortuary were the exact time of death was known and the body had been kept at prevailing room temperature. Effect of various factors on the appearance and disappearance of the rigor mortis like temperature, humidity clothing was also observed in the same manner with almost same results.

**Conclusion**

From the present study, the following is concluded:

1. Rigor Mortis is a definite sign of death and is a indicator of postmortem interval when many environmental factors are shown to have an effect upon it like temperature and humidity.

2. Sequence of onset and disappearance of Rigor Mortis is first in eyelids, then lower jaw, neck and rest of the body. It lasted the longest in the lower jaw.

3. Most of cases follow the normal course of appearance and disappearance of rigor mortis but rule of twelve does not apply to all cases.

4. Rigor Mortis is affected by other factors besides temperature and humidity like nourishment, clothing, illness and activity prior to death.

Though much study has been done on animals, a bigger study is required on human corpses beginning from time of death till the time of disposal especially in hospital deaths where disposal is delayed so that hour by hour estimation of time since death from Rigor Mortis can be done. Also while transferring of a dead body from emergency to mortuary rigor mortis get distorted and various factors affect the rigor mortis that should also be taken into consideration in future.

**Acknowledgement:** Authors are thankful to Dr Kanika Kohli, Dr Munish Sharma, Dr Rajinder Kumar for their help at various stages of this project.

**Ethical Clearance:** After taking Institutional Ethical committee clearance the data was collected from the victims coming to the mortuary of the forensic department of MMU university, Mullana

**Source of Funding:** Self

**Conflict of Interest:** Nil

**References**

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11. Smith EB. Changes in elasticity of mammalian...


Original Research Article

An analysis of Socio-Demographic Profile of Asphyxial Deaths in Western Mumbai Region

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Abstract

Background: the study is conducted to determine epidemiology of violent asphyxia deaths in the western Mumbai region and variation in types of asphyxia deaths in relation to age and gender.

Methods: Study was conducted in department of forensic medicine of H. B. T. Medical College & cooper Hospital, Mumbai for period (2 years) of January 2015 to December 2016. Total 3114 of autopsies were conducted during the period of which 187(6%) were asphyxial death which are included in this study.

Result: 187 out of 3114 medicolegal autopsies were of asphyxial death making incidence rate 5.87% of asphyxial death. Age group most commonly involved in asphyxial death was 21-30 years constitutes 28.8% cases. Male victims constitute of 60.42% cases and female victims were 39.58% cases. Drowning is common in age group 1-20 years constitutes 94.4% of all drowning deaths. Age group 1-10 years all the asphyxial deaths were due to drowning. Hanging is commonest in age group 21-30 years and it constitutes 41.22% of hanging case.

Conclusion: Males and young age group population between 11–40 years are more susceptible victims of violent asphyxial deaths. Hanging and drowning was most common cause in this age group. Both types of asphyxial deaths in young population are preventable and needs to be rectified.

Key words: Asphyxial deaths, hanging, drowning, ligature strangulation, unnatural deaths.

Introduction

The term asphyxia commonly means ‘lack of oxygen’. However, etymologically, the term has been translated from the original Greek, implying ‘pulselessness/absence of pulsation’. How the lack/absence of oxygen is related to pulsation may be explainable on the fact that the air (pneuma) necessary for maintaining life is carried through the blood (i.e., through the oxy-Hb) and therefore, this movement of air obviously will come to a standstill when movement of blood ceases, i.e. pulselessness occurs. Hence, failure or interruption of one function is inevitably linked to the each other¹.

Violent asphyxial deaths have significant contribution to unnatural deaths (suicidal, homicidal and accidental). There are various types of violent asphyxial deaths like hanging, strangulation, smothering, throttling, traumatic asphyxia, choking and drowning. The hanging is most common type of asphyxia death and it is one of the leading methods of committing suicide ².

Strangulation is one of the forms of asphyxial death where compression of neck structures caused by a constricting force other than the body’s own weight. The constricting force exerted by different means such as ligature (ligature strangulation), by hand (throttling), by elbow (mugging) and by bamboos (bandsola).³

In drowning, access of air to lungs is prevented by submersion of body in water or fluid medium. Drowning is most commonly accidental in nature. Study conducted by United Nations World Health Organization reveals that in South Asia, about 90,000 people are drowned to death every year. Most South Asian countries have higher drowning death rates than the world average ⁴.

Traumatic asphyxia” or Crush asphyxia” is other form of mechanical asphyxia where asphyxiation is caused due to mechanical fixation of chest and abdomen by restricting respiratory movements and thus prevents inspiration. It provides the most extreme demonstration of the ‘classic signs’ of asphyxia i.e. cyanosis, petechial haemorrhages and congestion. Traumatic asphyxia
occurs in two main conditions building collapse and stampede.

The present study is conducted to aim to study and evaluates the socio- demographic factors of the asphyxial deaths which will help to know the incidence of asphyxial deaths amongst the population of western Mumbai region.

Material and Method

The present study of violent asphyxia deaths was conducted at department of forensic medicine and toxicology at H.B.T. Medical College for the period of two years i.e. 1\textsuperscript{st} January 2015 to 31\textsuperscript{st} December 2016.

The data includes cases of asphyxia deaths referred for post-mortem by police station from western Mumbai (western suburbs) region which comes under the jurisdiction of H. B. T. medical college.

The study includes the asphyxia deaths of victim with age more than year (infant deaths exclude) and case of asphyxia deaths due to environment suffocation.

The preformed proforma was used to record the various parameter of study like age, sex, type of asphyxia death, post-mortem findings and cause of death. The information of cases was obtained from police inquest, ADR forms, statement of relatives of victims, hospital papers, and history obtained from relative, friends accompanying with deceased person.

Observations and results:

Table 1: Total number of autopsy and its relation to asphyxia death autopsies

<table>
<thead>
<tr>
<th>Period</th>
<th>Total autopsies</th>
<th>Asphyxia deaths (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan 2015- Dec 2015</td>
<td>1524</td>
<td>91 (5.7%)</td>
</tr>
<tr>
<td>Jan 2016- Dec 2016</td>
<td>1590</td>
<td>96 (6.03%)</td>
</tr>
<tr>
<td>Total</td>
<td>3114</td>
<td>187 (5.87%)</td>
</tr>
</tbody>
</table>

Total 3114 autopsies were conducted in period of two year i.e. Jan 2015- Dec. 2016 out of which total 187 (5.87%) cases were of asphyxial deaths.

Figure 1: Age and sex wise distribution of asphyxia deaths

The study reveals the predominance of male victims 113(60.42%) over female victims which account for 74 cases (39.58%). Maximum number of victims 52 (28.80%) were found in the age group of 21-30 years, followed by age group of 11-20 years accounts for 45 (24%) of cases. Together age group of 11-30 years accounts for more than half of cases 97 (52.8%) and 31-40, 35(18.7%) of cases were belong to 31-40 years age group. Least numbers of cases 5(2.6%) seen in age group of 51 years and above.

Table 2: Distribution of cases based on the region of deceased.

<table>
<thead>
<tr>
<th>Region</th>
<th>No. of cases</th>
<th>Percentages (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mumbai district</td>
<td>149</td>
<td>79.68</td>
</tr>
<tr>
<td>Thane district</td>
<td>31</td>
<td>16.58</td>
</tr>
<tr>
<td>Rest of Maharashtra</td>
<td>2</td>
<td>1.02</td>
</tr>
<tr>
<td>Rest of India</td>
<td>5</td>
<td>2.67</td>
</tr>
<tr>
<td>Total</td>
<td>187</td>
<td>100</td>
</tr>
</tbody>
</table>

It was observed most of asphyxial deaths were from the Mumbai district region (79.68%), followed by adjacent district Thane (16.58%) region like Meera road, Palghar, Vasai and virar.1.02% deaths were from the rest of Maharashtra. While 2.67% cases were from rest of India region from Bihar, Rajasthan and utter Pradesh.

Table 3: Distribution of asphyxia deaths on the basis of its types

<table>
<thead>
<tr>
<th>Type of asphyxia deaths</th>
<th>No. Of cases</th>
<th>Percentages (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hanging</td>
<td>114</td>
<td>60.9</td>
</tr>
<tr>
<td>Drowning</td>
<td>54</td>
<td>28.8</td>
</tr>
<tr>
<td>Ligature Strangulation</td>
<td>11</td>
<td>05.8</td>
</tr>
<tr>
<td>Manual strangulation (throttling)</td>
<td>3</td>
<td>01.6</td>
</tr>
<tr>
<td>Smothering</td>
<td>2</td>
<td>01.0</td>
</tr>
<tr>
<td>Traumatic asphyxia</td>
<td>3</td>
<td>01.6</td>
</tr>
<tr>
<td>Total</td>
<td>187</td>
<td>100</td>
</tr>
</tbody>
</table>

Hanging is found to be most common type of asphyxial death and accounts for more than half (114
cases, 60.9%) asphyxial deaths, followed by drowning which accounts for 28.8% (54) of cases and ligature strangulation 5.8% (11). Least number of cases seen were of smothering 1% (2).

**Table 4: Distribution of cases on the basis of sex and type of asphyxia**

<table>
<thead>
<tr>
<th>Type of asphyxia</th>
<th>Male (%)</th>
<th>Females (%)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hanging</td>
<td>68(59.64)</td>
<td>46(40.36)</td>
<td>114</td>
</tr>
<tr>
<td>Drowning</td>
<td>33(61.11)</td>
<td>21(38.89)</td>
<td>54</td>
</tr>
<tr>
<td>Ligature Strangulation</td>
<td>07(63.63)</td>
<td>04(36.37)</td>
<td>11</td>
</tr>
<tr>
<td>Throttling</td>
<td>02(66.66)</td>
<td>01(33.34)</td>
<td>03</td>
</tr>
<tr>
<td>Smothering</td>
<td>01(50.00)</td>
<td>01(50.50)</td>
<td>02</td>
</tr>
<tr>
<td>Traumatic asphyxia</td>
<td>02(66.66)</td>
<td>01(33.34)</td>
<td>03</td>
</tr>
</tbody>
</table>

It is observed all types of asphyxia deaths common in males compared to female except smothering which accounts for same number of cases.

**Table 5: Age wise distribution of cases based on type of asphyxia**

<table>
<thead>
<tr>
<th>Age group / Type of asphyxia</th>
<th>Hanging (%)</th>
<th>Drowning (%)</th>
<th>Ligature Strangulation (%)</th>
<th>Throttling (%)</th>
<th>Smothering (%)</th>
<th>Traumatic asphyxia (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-10 years</td>
<td>-</td>
<td>26 (48.14%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>11-20 years</td>
<td>19 (16.66%)</td>
<td>25 (46.29%)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1(33.33%)</td>
</tr>
<tr>
<td>21-30 years</td>
<td>47 (41.22%)</td>
<td>2 (3.70%)</td>
<td>2 (18.18%)</td>
<td>1(33.33%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>31-40 years</td>
<td>28 (24.56%)</td>
<td>1 (1.85%)</td>
<td>5 (45.45%)</td>
<td>1(33.33%)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>41-50 years</td>
<td>18 (15.78%)</td>
<td>-</td>
<td>4 (36.36%)</td>
<td>-</td>
<td>-</td>
<td>2(66.66%)</td>
</tr>
<tr>
<td>51- and above</td>
<td>2 (1.75%)</td>
<td>-</td>
<td>-</td>
<td>1(33.33%)</td>
<td>2 (100%)</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>114 (100%)</td>
<td>54 (100%)</td>
<td>11 (100%)</td>
<td>3(100%)</td>
<td>2(100%)</td>
<td>3(100%)</td>
</tr>
</tbody>
</table>
Study reveals that maximum number asphyxia deaths due to hanging were in the age group of 21-30 years and accounts for 41.22% cases. All the asphyxial deaths in age group of 1-10 years were due to drowning alone. Maximum number of ligature strangulation seen in age group of 31-40 years accounts for 45.45% ligature strangulation cases.

Discussion

In present study asphyxial deaths accounts 5.87% of total autopsies. Finding of this study was consistent with study of Neha Chaurasia, SK Pandey and Amarnath Mishra study which accounts 6.95% of asphyxial death in the city of Varanasi, study conducted by Bhim Singh, Mithun Ghosh et al. reveals that the asphyxial deaths accounts for 8.87% of total autopsies in the city of Meerut. Mangesh R. Ghadge, Dinesh R. Samel study of 10-year duration in thane region reveals that 12.8% of total autopsies were of asphyxial deaths. Patel Ankur P., Bhoot-Rajesh R et al. Study of violent asphyxial death in the Ahmedabad shows Incidence of violent asphyxial deaths is 5.63% of total autopsies and consistent with present study. Srinivasa Reddy P, Rajendra Kumar R, Rudramurthy study of asphyxial deaths at District hospital, Tumkur, Karnataka shows that total 19.14% autopsies were of asphyxial deaths. Syed Zubair, Ahmed Tirmizi, Farhat Hussain Mirza and Hamid Ali Paryar study of Medico legal investigation of violent asphyxial deaths in Karachi Pakistan shows the incidence of asphyxial deaths 7.08% of total autopsies conducted.

Present study shows male predominance in asphyxial deaths comprising of 60.42% of all asphyxial deaths and female constitutes 39.58% of asphyxial deaths. Most common age group involved is 21-30 years constitutes 28.80% of cases followed by 11-20 years comprising 24%. Age group 11-30 together constitutes 52.80% of cases. Neha Chaurasia et al. study in Varanasi reveals predominance of male victims 60.89% and females were 39.11% of total violent asphyxial death and most common age group involved in violent asphyxia death was 21-30 years (35.79%), followed by 11-20 years (20.30%) which is consistent with our study. Bhim Singh et al. study of asphyxial deaths in Meerut city revealed male victims comprising of 68.03% and female victims 31.96% showing predominance of male victims and most common age group involved was 11-30 years constituting 41.55% of asphyxial deaths, this is in consistent with present study. Mangesh R. Ghadge et al. study in thane region also shows predominance of male victims which constitute 64.2% of cases and female were of 26.8% of cases and most common age group involved was 21-30 years (37.9%) followed by age group 31-40 years (17.4%). Patel Ankur P study of 388 asphyxial deaths in Ahmadabad region reveals predominance of male victims male to female ratio was 1.69:1 and most common age group involved was 21-30 years 32.99% cases these findings are consistent with present study. Srinivasa Reddy P study of asphyxial deaths in Tumkur shows predominance of male victims 59.14% and female victims were of 40.86%, most common age group involved was 21-30 years comprising of 34.93% of cases followed by age group 11-20 years constituting 20.105% of cases. These findings are consistent with present study. Syed Zubair et al. study in Karachi reveals the male victims were of 75.68% case and females were of 24.32% of cases. Most common age group involved was 15-25 years (33.1%) followed by age group 25-35 years (27.7%). Zahid Hussain Khalil et al. study in Peshawar also shows predominance of male victims in asphyxial deaths (68.46%) and female victims comprising of 32.64% case and most common age group 20-40 years 64.5% case.

Present study revealed most of asphyxial deaths were from Mumbai region (79.68%) from the area of study followed by adjacent region Thane (16.58%). Mangesh R. Ghadge et al. study finding is similar with present study showing the maximum asphyxial deaths were from region of study i.e. Thane region 81% cases followed by adjacent region of study 8.8%. Rest of Maharashtra constitutes 0.6% of asphyxial deaths followed by 0.3% of asphyxial deaths were from rest of India.

In present study commonest type of asphyxial death found was hanging in 60.9% cases followed by drowning (28.8%) and ligature strangulation 5.8%. Neha Chaurasia et al. study in Varanasi reveals most common type of asphyxial death was hanging 52.21% followed by drowning 45.02% and strangulation 2.21% these finding consistent with present study. Bhim Singh et al. study of asphyxial deaths in Meerut city shows similar finding with most common method of asphyxia was hanging 60.73% cases followed by drowning 19.63% cases, ligature strangulation 9.13% cases and manual strangulation 5.47% cases. Mangesh R. Ghadge et al. study in thane region also reveals most common type of asphyxial death was hanging 62.5% case followed by drowning 31.2% cases. Patel Ankur P et al.
study in Ahmadabad region found most common type of asphyxial death was hanging comprising of 82.48% cases followed by drowning 14.43% cases and ligature strangulation 3.09%. Srivinasa Reddy P et.al.\textsuperscript{9} study of asphyxial deaths in Tumkur reveals most common method of asphyxial death was hanging constituting 61.19% of cases followed by drowning 31.96% cases and ligature strangulation 4.34% cases. Findings of study in Pakistan, Karachi region by Syed Zubair et.al.\textsuperscript{11} also similar to present study showing most common type of asphyxial death was hanging constituting 36.48% cases followed by drowning 32.43% cases and ligature strangulation 16.21% cases. However, Findings of study in Pakistan, Peshawar region by Zahid Hussain Khalil et.al.\textsuperscript{12} inconsistent with present and other study discussed above showing most common method of asphyxial death was ligature strangulation comprising of 69.2% cases followed by smothering 10.8% cases. Cause of this inconsistent finding may be difference in geographical region/ country.

In present study major types of asphyxial deaths i.e. hanging (59.64%), drowning (61.11%) and strangulation (63.6%) were common in males compared to females. Neha Chaurasia et.al\textsuperscript{6} study also shows similar finding hanging (54.5%) and drowning (68.6%) was common in males. Mangesh R. Ghadge et.al.\textsuperscript{8} study reveals hanging (74%) and drowning (81%) was common in males however ligature strangulation was common in females (84%). Patel Ankur P et.al.\textsuperscript{9} study found hanging (60%) and drowning (85.7%) was common in males however strangulation was common in females (66%). Srinivasan Reddy P et.al.\textsuperscript{10} study found hanging (57.83%) and drowning (69.28%) was common in males however strangulation was common in females (78.9%). Syed Zubair et.al.\textsuperscript{11} study shows hanging (72.2%), drowning (97.9%) and ligature strangulation (58.3%) was common in males compared to females.

Present study found drowning is common in age group 1-20 years constitutes 94.4% of all drowning deaths. However, in the age group 1-10 years all the asphyxial deaths were due to drowning. Hanging is commonest in age group 21-30 years and it constitutes 41.22% of hanging cases. Bhim Singh et.al.\textsuperscript{7} study also found that drowning was commonest in age group 1-10 years and hanging was commonest in age group 21-30 years. Mangesh R. Ghadge et.al.\textsuperscript{8} study found that the drowning is commonest among the age group 1-20 years and it constitutes 42.2% of drowning cases. Hanging is common in the age group 21-30 years and it constitutes 43.8% of hanging cases. Finding of this study is consistent with present study. Patel Ankur P et.al.\textsuperscript{9} study reveals that drowning was common in age group 1-20 years and constitutes 49.23% of drowning cases, hanging was common in age group 21-30 years and it constitutes 40% of all hanging cases.

Conclusions

Present study reveals that males and young age group population between 11–30 years are more susceptible victims of violent asphyxial deaths. Suicidal deaths as a result of hanging and accidental deaths as a result of drowning in this age group are the major causes of asphyxial deaths constituting both together 49.73% asphyxial deaths in present study. This young adult group is most active group of population and more exposed to external environment and stress and strain of life which leads to suicide by means of hanging in this age group. However accidental deaths by drowning are second common cause of asphyxial deaths in young group indicates lack of supervision and carelessness. Both these types of asphyxial deaths part of young population are preventable and needs to be rectified.

Ethical Clearance- Taken from institutional ethics committee at H. B. T. Medical College Mumbai.

Source of Funding- Self

Conflict of Interest - nil

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Effect of Posture Correction and Moderate Intensity Exercises on Respiratory System in Teenagers

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Abstract

Background: Teenage is the time of shaping health behaviour and preventing postural defects and improving respiratory fitness. The teenagers possess insufficient knowledge about their respiratory system. Postural defects are commonly seen among teenagers due to lack of physical activity and poor postural habits which can lead to non harmonious development of organs and affect respiratory system as well. For efficient respiratory function, moderate intensity exercises with posture correction would be useful. There is paucity of literature showing effect of posture correction and moderate intensity exercises on respiratory system in teenagers, hence this study would be helpful to analyse the same.

Objectives: To find out effect of posture correction exercise on respiratory system in teenagers. To find out effect of moderate intensity exercises on respiratory system in teenagers.

Methodology: The study was carried out in karad area. The subjects were selected according to inclusion and exclusion criteria. Total 35 subjects were participated in this study. Prior consent and assent form was taken. Aim and procedure were explained to the subjects in their preferred language before data collection. Pre and post assessment was done by 6 minute walk test for respiratory function and flexicurve was measured using flexible ruler to recognize spinal postural defect. Peak flow meter was used to measure lung function

Result: In conducted study, 6minute walk test, peak flow meter and flexicurve showed statistically significant difference between pre and post treatment values.

Conclusion: On the basis of the result of the study, it can be concluded that posture correction and moderate intensity exercises helps in improving respiratory function in teenagers.

Keywords: Moderate intensity exercise, spine posture correction, teenagers.

Introduction

Teenage is the time of shaping health behaviour. Throughout the life there is various body posture changes occur. Teenage is the age where most dynamic changes occur. The type of posture depends on many factors such as age, gender, day today activities.¹

If the postural defects are left untreated it may cause spinal deformities in the spine and also can affect development of lungs and other motor organs. Further it can also affect respiratory function due to low oxygen consumption. Lack of physical activity can also cause spinal deformities. Conditions of the external environment in which individuals live have great impact on the posture.² Nowadays teenagers spent most of their time in leisure activities such as watching television and playing video games and mostly play
indoor games. Also habits like wearing school bags on one arm only, maladjustment of school desk to the individual’s height, standing with stressing on one leg, and other psychological factors can also cause poor postural habits.  

Obesity and overweight are most commonly seen in the society which leads to lack of physical activities, inability to cope in sports. Back pain is commonly seen in the individuals with postural defect. An increasing deformity in the spine can also affect psyche of the individual and lack of acceptance of body image. Neglected or untreated postural habits can further cause defects like scoliosis, rounded shoulders, flat back, kyphosis. Postural defect are more commonly found in girls compared to boys. Where the thoracic hyperkyphosis were prevalent in boys at the age of 14 years.  

Low level of physical activity not only affects the posture but also the development of osteoarticular system and thus future development of the body. The physical development is marked by increase in sources of energy that are provided in the anaerobic metabolism. The effect of this change improves exercise capacity. These abilities close by the end of the maturation. Hence it is important to stimulate physical activity in younger age because it has beneficial effect on health which also influences adult life.  

Metabolic equivalent (MET) is defined as resting metabolic rate, that is, amount of oxygen consumed at rest, which is equal to 3.5 ml O2 per kg body weight per minute. METS are used to describe the functional capacity of the individual and provide repertoire of activities in which individual can safely participate. Activities requiring only 1- 4 METS are considered low intensity activities and are not suitable for improving respiratory function in normal individuals. Activities in the 5-8 METS are considered as moderate intensity activities and are sufficient for sedentary persons. Activities in the METS above 8 is considered as high intensity activities and are vigorous for fit individuals.  

Moderate intensity exercises are beneficial for respiratory health. Physically active individuals have controlled blood pressure, favourable plasma lipoprotein profile. Respiratory endurance training is associated with increased levels of circulating high density lipoprotein and reduction of triglyceride level.  

**Cardiac effect:**  
They stimulate small myelinated and unmyelinated fibres in skeletal muscles and increase myocardial activity. It involves sympathetic nervous system response which includes peripheral vasoconstriction in nonexercising muscles, increase in heart rate, increase in systolic blood pressure.  

**Peripheral effect:**  
It causes generalized vasoconstriction that allows blood to be shunted from non working muscles to working muscles. There is increase in stroke volume, heart rate, cardiac output, blood flow through working muscles because increase in myocardial contractility. There is also increase in systolic blood pressure.  

**Respiratory response:**  
Gas exchange increases across the alveolar capillary membrane. Alveolar ventilation also increases by 10 to 20 fold during exercise to supply additional oxygen requirement.  

**Posture correction:**  
Posture correction exercise contributes to an increase in lung capacity and increase in depth of breath. Posture correction exercise also positively affect nervous system through simulating the process of maturing the motor areas of brain which contribute to the locomotor skill. All the above factors help in improving posture.  

Relaxed or slouched posture is characterized by shifting the entire pelvic segment anteriorly resulting in hip extension and shifting of thoracic segment posteriorly, resulting in flexion of thorax. This is mostly caused by relaxed posture in which muscles are not used to provide support.  

Flat back posture is characterised by decreased lumbar lordosis and posterior tilting of the pelvis. This is caused by continued slouching or flexion in sitting or standing attitude.  

Scoliosis is lateral curvature of spine and it commonly causes due to faulty or poor postural habits. These all types of postural defects most commonly seen among teenagers due to poor postural habits, poor respiratory fitness and due to weak muscles.  

Prevention of postural impairments is very difficult procedure of securing general health both physical and
mental. This problem is commonly seen among teenagers and adolescents because during this phase there are many risk factors which can cause posture disorders and these disorders can affect future life. Thus posture correction exercises and moderate intensity exercises can help in improving respiratory system.

**Material and Methodology**

This was a study to find the effect of posture correction and moderate intensity exercises on respiratory system in teenagers. The study was carried out in karad area. The subjects were selected according to inclusion and exclusion criteria. Total 35 subjects were taken according to inclusion criteria. The inclusion criteria were subjects with age group between 12 to 18 years and subjects having spinal postural defect. The exclusion criteria were subjects with any recent surgery, any recent trauma, structural deformity, any systemic diseases, and unexplained weight loss. Demographic data of the subjects was taken. Prior consent and assent form was taken. Aim and procedure were explained to the subjects in their preferred language before data collection. Pre and post assessment was done by 6 minute walk test for respiratory function and flexicurve was measured using flexible ruler to recognize spinal postural defect. Peak flow meter was used to measure lung function. Included participants received moderate intensity exercises for 30 minutes daily for 5 times a week. Exercises are run and jump in place, jumping jacks, side to side hop and standing side hop. Participants also received exercises for posture correction. Exercises are chin tuck in 3 sets 10 repetition, scapular retraction 3 sets 10 repetition, cat and camel 3 sets 10 repetition. Patient was taught about reinforcement to reinforce proper performance by using cues throughout the day to check correct posture. The effect of treatment was noted using outcome measures. The experimental results were statistically analyzed.

**Statistical Analysis**

The paired T test and one way ANOVA test were used for analysis of data. Statistical analysis of recorded data was done using the software SPSS version 20.

**Findings**

**AGE AND GENDER WISE DISTRIBUTION**

<table>
<thead>
<tr>
<th>SERIAL NO.</th>
<th>AGE GROUP</th>
<th>SUBJECTS</th>
<th>GENDER</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age group</td>
<td>Total</td>
<td>Male</td>
</tr>
<tr>
<td>1</td>
<td>12-15 years</td>
<td>21</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>16-18 years</td>
<td>14</td>
<td>8</td>
</tr>
</tbody>
</table>

**Interpretation:** Above table represents, two age group i.e. 12-15 years which consist of 21 subjects (male-10 and female-11) and in other age group 16 to 18 years which consist of 12 subjects (male-8 and female-6).

**Walking distance in 6 min walk test:**

<table>
<thead>
<tr>
<th></th>
<th>PRE</th>
<th>POST</th>
<th>P Value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean + SD</td>
<td>508+ 126.37</td>
<td>544.14+ 121.95</td>
<td>0.0007</td>
<td>Extremely significant</td>
</tr>
</tbody>
</table>

**Interpretation:** In the present study pre interventional mean and standard deviation of walking distance in 6 min walk test was 508± 126.37, whereas post interventional Mean± SD was 544.14± 121.95. It concluded that interference was considered extremely significant.
Peak flow meter

<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>G</th>
<th>P value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre</td>
<td>21</td>
<td>14</td>
<td>0.0079</td>
<td>Very significant</td>
</tr>
<tr>
<td>Post</td>
<td>9</td>
<td>26</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Interpretation:** In pre interventional study 21 subjects were in Y Zone while 14 subjects were in G zone whereas in post interventional study 9 subjects were in Y Zone and 26 subjects were in G zone. This was calculated by chi-square test. It concluded that interference was considered extremely significant.

Cervical lordosis index

<table>
<thead>
<tr>
<th></th>
<th>PRE</th>
<th>POST</th>
<th>P Value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean±SD</td>
<td>31.142± 5.151</td>
<td>29.857± 4.440</td>
<td>0.0007</td>
<td>Extremely significant</td>
</tr>
</tbody>
</table>

**Interpretation:** In the present study pre interventional mean and standard deviation of cervical lordosis index was 31.142± 5.151, whereas post interventional Mean± SD was 29.857± 4.440. It concluded that interference was considered extremely significant.

Kyphosis index

<table>
<thead>
<tr>
<th></th>
<th>PRE</th>
<th>POST</th>
<th>P Value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean±SD</td>
<td>34.74+ 5.83</td>
<td>31.44+ 5.74</td>
<td>&lt;0.0001</td>
<td>Extremely significant</td>
</tr>
</tbody>
</table>

**Interpretation:** In the present study pre interventional mean and standard deviation of kyphosis index was 34.74± 5.83, whereas post interventional Mean± SD was 31.44± 5.74. It concluded that interference was considered extremely significant.

Lumbar index

<table>
<thead>
<tr>
<th></th>
<th>PRE</th>
<th>POST</th>
<th>P Value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean±SD</td>
<td>48.45± 11.622</td>
<td>45.94± 11.877</td>
<td>0.0095</td>
<td>Very significant</td>
</tr>
</tbody>
</table>

**Interpretation:** In the present study pre interventional mean and standard deviation of lumbar index was 48.45± 11.622, whereas post interventional Mean± SD was 45.94± 11.877. It concluded that interference was considered extremely significant.

**Discussion**

Teenage is the time of shaping health behaviour. Throughout the life there is various body posture changes occur. Teenage is the age where most dynamic changes occur. The type of posture depends on many factors such as age, gender, day today activities. If the
postural defects are left untreated it may cause spinal deformities in the spine and also can affect development of lungs and other motor organs. Further it can also affect respiratory function due to low oxygen consumption. Lack of physical activity can also cause spinal deformities. Conditions of the external environment in which individuals live have great impact on the posture. Nowadays teenagers spent most of their time in leisure activities such as watching television and playing video games and mostly play indoor games. Also habits like wearing school bags on one arm only, maladjustment of school desk to the individual’s height, standing with stressing on one leg, and other psychological factors can also cause poor postural habits.

This research was undertaken with the aim to study the effect of posture correction and moderate intensity exercises on respiratory system in teenagers.

The study was carried out and the result was drawn by 6 min walk test, peak flow rate and flexicurve by using flexible ruler.

The study was carried out in karad area. Subjects with a sample of 50 were screened for inclusion and exclusion criteria. Subjects fulfilling inclusion criteria were recruited in the study with a sample of 35. Total 35 Prior consent and assent form was taken. Aim and procedure were explained to the subjects in their preferred language before data collection.

Pre and post assessment was done by 6 minute walk test for respiratory function and flexicurve was measured using flexible ruler. Peak flow meter was used to measure lung function

Included participants received moderate intensity exercises for 30 minutes daily for 5 times a week. Participants will also receive exercises for posture correction.

According to previous study of Michel Latalski, Jerzy Bylina, Marek Fatyga, et al Risk factor of postural defects in children at school age. The study concluded that there is relation between physical activity and occurrence of postural defect in children and identification and recognition of risk factors may facilitate their elimination. Hence postural correction exercises may help to prevent postural defects.

Also moderate intensity exercises increases gas exchange across the alveolar capillary membrane. Alveolar ventilation also increases by 10 to 20 fold during exercise to supply additional oxygen requirement.

It was found that among 35 subjects, 64% subjects belonged to 12-15 years of age group and remaining 36% belonged to 16-18 years of age group. In the age group there were 21 subjects out of whom 10 were males and 11 were females. In the age group there were 14 subjects out of whom 8 were males and 6 were females.

Pre interventional mean and standard deviation of walking distance in 6 min walk test was 508± 126.37, whereas post interventional Mean± SD was 544.14± 121.95. It concluded that interference was considered extremely significant. (P- 0.0007, t- 3.719)

According to American lung association there are three zones used to measure peak flow rate. They are Green zone (G) which indicate 80 to100 percent of your normal peak flow rate and condition is under control. Yellow zone(Y) which indicates 50 to 80 percent of usual or normal peak flow rate and airways are narrowing and may require treatment and red zone which indicates less than 50 percent of normal rate. It shows that airways are severely narrowing and its medical emergency. As per the present study there were no subjects in the red zone. In pre interventional study 21 subjects were in Y Zone while 14 subjects were in G zone whereas in post interventional study 9 subjects were in Y Zone and 26 subjects were in G zone. This was calculated by chi-square test. It concluded that interference was considered extremely significant. (p- 0.0079)

According to the study of WENDY RHEAULT, MA, STEVE FERRIS,et al , Intertester reliability of the flexible ruler for the cervical spine , the study was done to determine whether flexible ruler had intertester reliability for the cervical spine curvature in normal subjects and the data suggested that flexible ruler is reliable tool for measuring cervical spine curvature.15 As per the present study pre interventional mean and standard deviation of cervical lordosis index using flexible ruler was 31.142± 5.151, whereas post interventional Mean± SD was 29.857± 4.440. It concluded that interference was considered extremely significant. (P-0.0007, t- 3.707)

According to the study of Teri L Yanagawa, Murray E. Maitland, Keith Burgess, et al. Assessment of thoracic kyphosis using the flexicurve for individuals with osteoporosis, the study was done to assess the test-retest reliability of the measurements of thoracic kyphosis using flexicurve ruler with individuals with osteoporosis
and the study concluded that flexicurve ruler can be used for the measurement of kyphosis in elderly women with osteoporosis based on reliability outcome. As per the present study pre interventional mean and standard deviation of kyphosis index was 34.74 ± 5.83, whereas post interventional Mean ± SD was 31.44 ± 5.74. It concluded that interference was considered extremely significant. (P < 0.0001, t = 5.732)

Pre interventional mean and standard deviation of lumbar index was 48.45 ± 11.622, whereas post interventional Mean ± SD was 45.94 ± 11.877. It concluded that interference was considered extremely significant. (P = 0.0095, t = 2.750).

Moderate intensity exercise and posture correction is used to improve respiratory function. Moderate intensity activities are beneficial for respiratory health. Physically active individuals have controlled blood pressure, favourable plasma lipoprotein profile. Respiratory function improvement is associated with increased levels of circulating high density lipoprotein and reduction of triglyceride level.

**Conclusion**

On the basis of the result of the study, it can be concluded that posture correction and moderate intensity exercises helps in improving respiratory function in teenagers.

**Conflicts of Interest:** There is no conflict of interest in this study.

**Source of Funding:** The study was funded by Krishna institute of medical sciences deemed to be university, karad.

**Ethical Clearance:** This study is undergone ethical clearance through the university level ethical committee. Protocol number is 0102/2019-2020.

**References**


Mandibular Canine Index as A Tool in Gender Identification - A Study in Malwa Population

Sandhya Jain¹, Merin Kuriakose²

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Abstract

Teeth are the hardest tissue in the body. Mandibular canines are important tooth in the human body which shows significant sexual dimorphism. Mandibular canine index can be used for gender identification during mass disasters and crime scenes. The purpose of this study was to investigate the accuracy with which gender can be differentiated in Malwa population by using the Mandibular Canine Index and sexual dimorphism.

Materials and Method: The study sample includes 300 Mandibular casts of people residing in Malwa. It included 137 males and 163 female participants. Mesio distal diameter of mandibular canines were measured from mesial contact point to distal contact point of right and left mandibular canines. Inter canine distance was measured between tips of both canines. These were used for deriving MCI and determining sexual dimorphism exhibited by mandibular canines.

Results: The mesiodistal width of mandibular canine were larger in males than in females. The mean difference of MCI between males and females were more on the left canine, thus making it highly significant (P Value<0.001). The standard mandibular canine index for Malwa population was obtained as 0.262. Sexual dimorphism of right mandibular canine was estimated as 4.30% and for left mandibular canine was 5.58%. Sexual dimorphism of mandibular canine is more on left side. The overall percentage accuracy of sex prediction using standard mandibular canine was found to be 65.52%. Conclusion: Tooth remains obtained from crime scenes or disasters can be used for gender identification as this method is very simple, accurate and useful.

Keywords: Canine, Mandibular Canine Index, Sexual Dimorphism, Gender Identification, Forensic odontology, sex prediction.

Introduction

Teeth are the hardest tissues in the body which can withstand most of the physical, chemical and thermal insults to a great extent. Forensic odontology or forensic dentistry is the application of dental knowledge to those criminal and civil laws that are enforced by police agencies in a criminal justice system. Forensic dentistry is the proper handling, examination and evaluation of dental evidence, which will then presented in the interest of justice.

Sexual dimorphism refers to the differences in size, stature, and appearance between male and female. This can be applied to dental identification also because no two mouths are alike¹. Various features such as tooth morphology and tooth size are characteristics of male and female.

The human males have permanent canines that are more masculine in form². The mandibular canines usually exhibit greater sex difference in mesio distal crown size and canine separation or arch width. These
teeth erupt by the age of 12 years, mean age of eruption being 10.87 years. Canines are less affected by periodontal diseases than other teeth and are usually the last teeth to be extracted with respect to age. Canines are also better likely to survive severe trauma, major disasters, natural calamities etc. These findings indicate that the mandibular canines may be considered as the ‘key tooth’ for the purposes of personal identification.

The purpose of this study was to investigate the accuracy with which gender can be differentiated in Malwa population by using the Mandibular Canine Index and sexual dimorphism.

**Materials and Method**

The study sample includes 300 Mandibular casts of patients visiting outpatient department of Government college of Dentistry Indore.

**Inclusion criteria**

- Age group between 15 and 35 years
- Having all fully erupted teeth
- Healthy periodontium
- No caries
- Non attrited teeth
- No restorations

**Exclusion criteria**

- Partially erupted and ectopically erupted teeth
- Teeth showing wear and tear (e.g. attrition, abrasion, abfraction, erosion)
- Patients with oral habits (e.g. bruxism)
- Trauma
- Carious teeth
- Restorated teeth

**Measurement of the Mesiodistal Width**

Mesio distal diameter of mandibular canines were measured from mesial contact point to distal contact point of right and left mandibular canines with the help of dividers. The divider was then held against the digital Vernier calipers accurate to 0.01 mm and read. Each reading was taken 3 times, and the average of three values was obtained to minimize the intra observer error.

**Intercanine distance measurement**

Intercanine distance was measured between tips of both canines. The divider points were applied to the tips of the right and left mandibular canines. The divider was then held against the Vernier caliper, and read.

The Mandibular Canine Index (MCI) is derived as a ratio between canine crown width and canine arch width (measured in mm and is calculated as follows:

\[
MCI = \frac{\text{Mesio distal crown width of mandibular canine}}{\text{Mandibular canine arch width}}
\]

The standard MCI value was used as a reference to differentiate males from females, which is obtained by applying following formula:

\[
\text{Standard MCI (MCIs)} = (\text{mean male MCI} - \text{SD}) + (\text{mean female MCI} + \text{SD})/2
\]

Calculation of sexual dimorphism can be done according to the formula given by Garn et al.

\[
\text{Sexual dimorphism in mesio distal width} = \frac{\left(\frac{Xm}{Xf} - 1\right) \times 100}{Xm} = \text{Mean value of canine width in males} \\
Xf = \text{Mean value of canine width in females.}
\]

**Results**

The present study involved 300 samples (mandibular casts) of people residing in Malwa. It included 137 males and 163 female participants.

The results are shown in Table 1 and table 2.

The result showed that the mean value of right mandibular canine width in males was 7.328±0.470mm and in females 7.02±0.444mm. The mean value of left mandibular canine width in males was 7.381±0.496mm and in females 6.990±.389mm. The mean inter canine width in males was 27.41±2.42mm and in females 26.69±1.90mm.
The mean value of right mandibular canine index in males was 0.268±0.0227 and in females 0.263±0.017 (chart 1). The mean value of left mandibular canine index in males was 0.270±0.025 and in females 0.262±0.017 (chart 2). The mean difference between males and females were more on the left canine, thus making it highly significant (P Value<0.001).
Table 1. Descriptive statistics of the study variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males (Mean±SD)</th>
<th>Females (Mean±SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mesiodistal Width Right (In mm)</td>
<td>7.328±0.470</td>
<td>7.02±0.444</td>
</tr>
<tr>
<td>Mesiodistal width Left (In mm)</td>
<td>7.381±0.496</td>
<td>6.990±0.389</td>
</tr>
<tr>
<td>Inter-Canine width(In mm)</td>
<td>27.41±2.42</td>
<td>26.69±1.90</td>
</tr>
<tr>
<td>MCI Right Canine</td>
<td>0.268±0.0227</td>
<td>0.263±0.017</td>
</tr>
<tr>
<td>MCI Left Canine</td>
<td>0.270±0.025</td>
<td>0.262±0.017</td>
</tr>
</tbody>
</table>

Table 2. Independent samples t test to test the significance between mean M <CI values between gender groups.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males Mean±SD</th>
<th>Females Mean±SD</th>
<th>Mean Difference</th>
<th>t statistic</th>
<th>P Value</th>
<th>Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCI Right Canine</td>
<td>0.268±0.0227</td>
<td>0.263±0.0179</td>
<td>0.00491</td>
<td>2.049</td>
<td>0.042</td>
<td>0.000191-0.00964</td>
</tr>
<tr>
<td>MCI Left Canine</td>
<td>0.270±0.025</td>
<td>0.262±0.017</td>
<td>0.00813</td>
<td>3.332</td>
<td>0.001</td>
<td>0.00317-0.01310</td>
</tr>
</tbody>
</table>

The independent samples ‘t’ test (Student’s t) reveals that the mean values of MCI on the left and right canine were significantly different between males and females (slightly higher in males compared to females). The mean difference between males and females were more on the left canine, thus making it highly significant (P Value<0.001).

Table. 3 Summary of Canonical Discriminant function coefficient for the dimensions

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Standard coefficient</th>
<th>Structure matrix</th>
<th>Centroid - Male</th>
<th>Centroid - Female</th>
<th>Prediction accuracy for males</th>
<th>Prediction accuracy for females</th>
<th>Overall Accuracy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCI</td>
<td>1</td>
<td>1</td>
<td>0.177</td>
<td>-0.149</td>
<td>66%</td>
<td>51.8%</td>
<td>65.52%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Constant-a (Canonical Discriminant constant)</th>
<th>Constant-b (Unstandardized coefficient)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MCI</td>
<td>-13.284</td>
<td>49.950</td>
</tr>
</tbody>
</table>

The above mentioned formulae is in the format of the discriminant formula

\[ y = a + b \cdot (p) \] Where, Gender(y) = a + b*(Parameter)
For MD dimension assessed, several stepwise univariate discriminant function statistics were used to develop a formula to determine sex [Table 3]. Coefficients and sectioning points were calculated for each dimension. The group centroids indicated the average discriminant scores for each sex. Sectioning point is the mean of male and female group centroids.

Unstandardized coefficients (b) are the discriminant function coefficients used to calculate the discriminant score. To assess the sex, tooth dimensions are multiplied with the respective raw or unstandardized coefficients (b) and added to the constant (a). If the values (y) thus obtained were greater than the sectioning point the individual was considered a male and if less than the sectioning point the individual was considered female.

\[ y = a + b \times x \]

where x is dimension of the tooth in millimeters.

[Graph 1. Shows the discriminant function values for 300 samples of MCI. The accuracy of predicting males using MCI is 66% and females is 51.8%.

The prediction accuracy for males was found to be 66% and for females it is 51.8% using discriminant analysis.

The overall percentage accuracy of sex prediction using standard mandibular canine was found to be 65.52%. The standard canine index for Malwa population was obtained as 0.262. Sexual dimorphism of right mandibular canine was estimated as 4.30% and for left mandibular canine was 5.58%. Sexual dimorphism of mandibular canine is more on left side.

**Discussion**

In this present study, the values obtained for mesiodistal width of right and left canine, intercanine width, right and left mandibular canine index was found to be significantly higher in males than in females. This is consistent with results of similar previous studies. The mesiodistal width of right and left canines were
larger in males than in females similar to other previous studies\(^7\)\(^8\).

In this study, the mean right mandibular canine index for males was obtained as 0.268±0.0227. The mean right mandibular canine index for females was obtained as 0.263±0.0179. The mean left mandibular canine index for males was obtained as 0.270±0.025. The mean left mandibular canine index for females was obtained as 0.262±0.017. The independent samples ‘t’ test (Student’s t) reveals that the mean values of MCI on the left and right canine were significantly different between males and females (slightly higher in males compared to females). The mean difference between males and females were more on the left canine, thus making it highly significant (\(P\) Value<0.001). This finding is in agreement with previous studies done by Rao et al\(^3\), Reddy et al\(^12\), Yadav et al\(^13\), Kaushal et al\(^5\).

The studies conducted in other countries by Sherfudivin et al\(^9\) and Al Rafaiy et al\(^11\) on Saudi Arabian population and by Bishara et al\(^10\) on the population of the United States Egypt, and Mexico showed that the mesiodistal width of the mandibular canines is more in males than females, and the difference is statistically significant. Similar results were obtained by Ibeachu et al\(^14\) in Nigerian population, Alia O et al\(^15\) in Egyptian population and Lew and Keng\(^16\) in Chinese population.

Table 4. Shows the standard MCI values obtained in various studies in Indian populations.

<table>
<thead>
<tr>
<th>Study</th>
<th>Standard MCI value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rao et al(^3) (South Indian population Karnataka)</td>
<td>0.274</td>
</tr>
<tr>
<td>Yadav et al(^13) (South Indian population Karnataka)</td>
<td>0.298</td>
</tr>
<tr>
<td>Kaushal et al(^5) (North Indian population Patiala)</td>
<td>0.256</td>
</tr>
<tr>
<td>Latif et al(^17) (North Indian population)</td>
<td>0.257</td>
</tr>
<tr>
<td>Srivastava et al(^18) (North Indian population Uttar pradesh)</td>
<td>0.257</td>
</tr>
<tr>
<td>Agarwal et al(^8) (North Indian population)</td>
<td>0.274</td>
</tr>
<tr>
<td>Patel et al(^19) (North Indian population Gandhinagar)</td>
<td>0.254</td>
</tr>
<tr>
<td>Present study (North Indian population Malwa Madhya Pradesh)</td>
<td>0.262</td>
</tr>
</tbody>
</table>

In the present study, sexual dimorphism of right mandibular canine was estimated as 4.30% and for left mandibular canine was 5.58. Left mandibular canine shows more sexual dimorphism.

Garn et al., in their study in Caucasians in 1967, had found that the left mandibular canine showed the maximum sexual dimorphism at 6.4%\(^4\) and right mandibular canine showed sexual dimorphism of 5.7%. Study by Patel et al\(^19\) exhibited 8.42% sexual dimorphism for right mandibular canine while the left canine exhibited 8.40%. Study by Kaushal and Patnaik (2004) who reported 9.058 and 8.891%, on the right and left sides, respectively. Study by Nair et al\(^7\) on South Indian population reported that the left mandibular canine exhibited a sexual dimorphism of 7.7% and the right mandibular canine exhibited 6.2%. Study by Ibeachu et al\(^14\) on Nigerian population exhibited left mandibular canine sexual dimorphism of 16.74% while the right mandibular canine was 15.23%. In all studies left mandibular canine showed maximum sexual dimorphism. So left mandibular canine can be a useful
tool for gender identification in forensic odontology.

In this study the overall accuracy in predicting gender using mandibular canine index was found to be 65.52%. The percentage accuracy of gender determination in males was found to be 66% and for females 51.8%. Discriminant analysis is used for calculating accuracy of gender prediction.

**Conclusion**

The mesiodistal width of mandibular canine were larger in males than in females. The right and left mean mandibular canine index in males and females showed statistically significant difference. Left mandibular canine showed more sexual dimorphism. The predictability of gender using standard mandibular canine index is also reasonably accurate ie, 65%.

Tooth remains obtained from crime scenes or disasters can be used for gender identification as this method is very simple, accurate and useful in forensic odontology.

**Conflict of Interest** – Nil

**Source of Funding**- Nil

**Ethical Clearance** – Not applicable

**References**


Effectiveness of Short Foot Exercises Versus Towel Curl Exercises to Improve Balance and Foot Posture in Individuals with Flexible Flat Foot

Sayali N. Pisol1, Khushboo Chotai2, Smita Patil2

1Internee, 2Assistant Professor, Krishna College of Physiotherapy, Krishna Institute of Medical Sciences deemed to be University, Karad, Maharashtra

Abstract

Background: Flexible flat foot is a condition of foot in which the medial longitudinal arch is lowered which is visible in weight bearing foot. This condition may be asymptomatic and needs to be treated to prevent further overuse injuries. Many of the literature suggest that individuals with flexible flat foot shows imbalances in the strength of IFM like abductor hallucis, flexor hallucis brevis, flexor digitorum brevis and interosseous muscles which plays major role in maintaining stability. The dynamic balance is found to be more affected in flexible flat foot which needs to be treated by strengthening the IFM. Strengthening IFM with greater efficacy can improve the dynamic balance and also have impact on foot posture of individuals with flexible flat foot.

Objective: to find the effect of 2 different types of IFM strengthening on dynamic balance

Material and Method: In this pre-post intervention study 40 individuals with flexible flat foot were included. They were randomly divided into 2 groups with 20 individuals in each group. Group A was instructed to perform short foot exercises and Group B was instructed to perform towel curl exercise for four weeks. After pre-post assessment, data was analysed with help of appropriate statistical methods.

Results: According to result the in Group A and Group B there is significant increase in both right and left anterior, posteromedial and posterolateral directions with p value < 0.0001.

Conclusion: Both short foot exercise and towel curl exercise are found to be equally effective in improving the dynamic balance in individuals with flexible flat foot. The impact of these exercises on foot posture needs to be taken into consideration.

Keywords: Flexible flat foot, intrinsic foot muscles (IFM), short foot exercises, towel curl exercise, Y balance test, foot posture index.

Introduction

Flat foot (pes planus) is a condition of foot in which the medial longitudinal arch (MLA) is lowered such that it is close or in contact with the ground. [2] There are two types of flat foot, rigid (congenital) flat foot and flexible (acquired) flat foot. [12] The characteristic feature of rigid flat foot is lower medial longitudinal arch in both weight bearing and non-weight bearing foot. [12] Flat foot is normal in infants and young children that is up to 2-3 years of age as there is presence of fat pad in the longitudinal arch of foot. As the child starts walking and bearing weight on the foot the fat pad is reduced and gradually the flat foot is diminished. In children congenital flat foot is most common. The characteristic feature of flexible flat foot is presence of normal medial longitudinal arch in non-weight bearing position and lower medial longitudinal arch in weight bearing position. [4] Flexible flat foot may be present due to number of factors such
as poor postural habits, malalignment of body weight on foot in standing, improper foot wear. Flexible flat foot may be asymptomatic but may lead to lower limb pain, fatigue, overuse injuries and also postural instability. [10]

There is a relationship between medial longitudinal arch and balance. The foot structure and the functions of the foot arches like shock absorption, even distribution of body weight on foot are related to each other and has its effect on posture and stability while walking or propulsion of body. [4] Many literature suggest that there is postural instability or balance issues in individuals with flat foot. Foot complex is the major component on which the whole body weight is equally distributed and balanced. Foot complex plays a measure role in gait, posture and balance and any imbalance is this component may alter the functions. The bony structures, muscles and ligaments play a measure role to maintain the stability. [6] Literature suggest that there are imbalances in the intrinsic foot muscle (IFM) strength in individuals with flat foot as IFM supports the medial longitudinal arch. It is believed that IFM plays a major role in providing stability. [4] The intrinsic foot muscles that is abductor hallucis, flexor hallucis brevis, flexor digitorum brevis and interosseous muscles become weak in flat foot due to which there are balance issues in individuals with flat foot. [11]

The intrinsic foot muscles need to be strengthened in individuals with flexible flat foot in order to improve the balance and to prevent further complications in these individuals. [5] As this condition is sometimes asymptomatic in many individuals, it remains undiagnosed and hence untreated. Many of the literature suggest that asymptomatic flexible flat foot needs seldom treated or should be treated only if symptoms such as pain or associated injuries are evident. [10] But in fact flexible flat foot if remains untreated may lead to overuse injuries or severe postural deformities due uneven forces acting on the foot. There is presence of pronated foot in individuals with flat foot which increases the risk of overuse injuries. [2] Hence Intrinsic Foot musculature training exercises must be incorporated in the management of flexible flat foot. [4]

There are mainly two forms of intrinsic foot musculature training according to the recent studies, short foot exercises and towel curl exercises. Both forms of exercise focus on the intrinsic foot muscle strength. These exercises have their own effects on foot and is believed that both are helpful in increasing strength of IFM. [4]

There are several methods to assess dynamic balance test; Y balance test, modified star excursion balance test (SEBT). [5]

In this study dynamic balanced was assessed by using Y balance test. It is a simple yet reliable test. The reliability of this test is 95%, Interrater test reliability for maximal reach is 0.80-0.85 and interrater test reliability for average reach of 3 trials 0.85-0.93 which indicates good reliability.

This test is very simple to perform and requires minimal equipment and can be performed in multiple settings and safer environment. So in this study Y balance test was used to assess dynamic balance. [5]

In this study foot posture was also assessed to find the presence of flexible flat feet. There are several methods to assess the presence of flexible flat feet such as foot posture index 6, foot posture index 8 and navicular drop test. [1]

In this study foot posture index 6 was used as it indicates good reliability with inter-tester reliability ranging from 0.81-0.91. This test is simple to perform, can be conveniently performed in multiple setting and requires minimal equipment and hence this test is used to assess the presence of flexible flat feet in this study. [1]

Materials and Methodology

· Type of study: Experimental study
· Study design: Pre and post study
· Sampling method: Simple random sampling
· Sample size: 40

Formula:

\[ N = \frac{(SD_1^2 + SD_2^2) * (Z_{1-a/2} + Z_{1-b})^2}{D^2} \]

\[ D = 16.81 \]

\[ SD_1 = 6.2 \]

\[ SD_2 = 7.1 \]

\[ N = \text{Size of sample} \]

\[ Z_{1-a/2} = \text{Value of standard variable at given confidence level i.e. at 85% CI.} \]
$Z_{1-b}$ = Value of standard variate at given power

$D$ = Difference between two means that practically meaningful.

$SD$ = Standard deviation

- **Study duration**: 4 months.
- **Place of study**: Karad
- **Inclusion criteria**:
  1. Younger individuals between the age group of 18 to 25 years
  2. Individuals with presence of flexible flat foot.
  3. Individuals willing to participate.
  4. Individuals with dynamic balance impairment.
- **Exclusion criteria**:
  1. Individuals with history of recent lower limb surgeries.
  2. Individuals with history of recent lower limb injuries.
  3. Individuals with any structural deformities of foot.
  4. Individuals with recent low back injuries.
  5. Individuals with neurological deficits which will hinder the balance.

- **Material**:
  - Tape
  - FPI-6 data collection sheet
  - Inch tape
  - Consent form.

- **Outcome measures**:
  - Y balance test
  - Foot posture index.

**PRODUCTION**

All the subjects were selected for the study according to the selection criteria. Demographic data and consent from were taken from them. Included participants will be divided in 2 groups by simple random sampling method. Pre and post assessment will be taken after 4 weeks of the treatment respectively with the help of outcome measures.

Group A received Short foot exercise. Participant were instructed to raise the medial longitudinal arch of the foot by drawing in the metatarsal heads towards the calcaneus without flexing the toes and holding an isometric contraction for 5 seconds during each repetition. Participant were instructed to perform 100 repetitions of the prescribed exercise on a daily basis for 4 weeks.

Group B received Towel curl exercise. Participants were instructed to place a towel on a slick surface (tile or hardwood floor) and place their toes on the edge of the towel. They were then instructed to drag the towel under their foot by flexing their toes, generating a strong grip on the fabric and hold for 5 seconds per repetition. Participant were instructed to perform 100 repetitions of the prescribed exercise on a daily basis for 4 weeks.

The effect of the treatment given to each group was noted immediately using the outcome measures. The experimental results was statistically analysed. The significant difference between the two groups was investigated with the un-paired t test and within the group with paired t test.

**Findings**

Pre and post data was analysed, according to the result the within the Group A the anterior, posteromedial and posterolateral direction of both right and left are considered extremely significant with p value <0.0001.

The mean pre intervention of Group A for Right anterior is 61.27 (SD=3.6), for posteromedial direction mean is 62.20 (SD=5.2) and for posterolateral mean is 62.19 (SD=5.5), changed to post intervention mean for anterior direction 66.49 (SD=3.4), for posteromedial direction mean is 66.9 (SD=5.1) and for posterolateral direction mean is 66.8 (SD=5.13). (Fig.1)

The mean post intervention of Group A for Left anterior is 61.47 (SD=5.2), for posteromedial direction mean is 60.62 (SD=5.0) and for posterolateral mean is 61.1 (SD=5.2), changed to post intervention mean for anterior direction 65.64 (SD=5.0), for posteromedial direction mean is 65.08 (SD=5.0) and for posterolateral direction mean is 65.1 (SD=5.08). (Fig.2)
According to the pre and post data analysis within the Group B the anterior, posteromedial and posterolateral direction of both right and left are considered extremely significant with p value <0.0001.

The mean pre intervention of Group B for Right anterior is 64.08 (SD=2.4), for posteromedial direction mean is 64.26 (SD=3.0) and for posterolateral mean is 64.08 (SD=2.2), changed to post intervention mean for anterior direction 66.8 (SD=2.2), for posteromedial direction mean is 66.7 (SD=2.5) and for posterolateral direction mean is 66.58 (SD=1.9). (Fig.3)

The mean post intervention of Group B for Left anterior is 63.4 (SD=2.4), for posteromedial direction mean is 63.8 (SD=2.2) and for posterolateral mean is 63.60 (SD=2.3), changed to post intervention mean for anterior direction 65.25 (SD=2.1), for posteromedial direction mean is 65.32 (SD=2.1) and for posterolateral direction mean is 65.20 (SD=2.2). (Fig.4)
Conclusion

On the basis of the result of the study it is concluded that the short foot exercises and towel curl exercises appears to be equally effective in improving the dynamic balance in individuals with flexible flat foot. The impact of these exercises on the foot posture needs to be taken into consideration.

Discussion

The aim of this study was to study the effect of short foot exercise versus towel curl exercise to improve dynamic balance and foot posture in individuals with flexible flat foot with an objective of finding the benefits of each exercise and comparing its effects to fulfil the aim of the study.

The individuals included in this study had flexible flat foot which was assessed using foot posture index.
(FPI-6) measure and individuals were scored according to the outcome measure were included in the study.

There were 40 participants which were selected according to the criteria and they were randomly divided into 2 groups (group A and group B) with each containing 20 participants. Group A was asked to perform short foot exercises according to given procedure and group B was asked to perform towel curl exercises. This study was carried out for 4 weeks on daily basis and pre and post assessment was taken using Y balance test after 4 weeks. After the pre and post assessment the data was statistically analysed.

According to this both the exercise groups appeared to be equally effective in improving the dynamic balance in the participants and were considered extremely significant with p value <0.0001 for both right and left leg.

According to a literature variety of exercises must have been used in improving balance. Some literature suggest that the short foot exercises were helpful in improving the muscle activity of intrinsic foot muscles and balance in flexible flat feet. [11] The short foot exercise must have appeared to be more effective than towel curl exercise in improving the static and dynamic balance in some literature but this study was done in individuals without any lower limb pathology or in participants with normal posture. [4]

Conflict of Interest: There were no conflicts of interest in my study.

Source of Funding: Source Of Funding: Krishna Institute Of Medical Sciences Deemed to be University, Karad

Ethical Clearance: The Institutional Ethics committee has hereby given permission to initiate the research project titled, “Effect of short foot exercises versus towel curl exercises to improve balance and foot posture in individuals with flexible flat foot”

References
11. Perkins G. Pes planus or instability of the longitudinal arch: President’s address.
Morphometric Study of External Nose for Sex Determination and Ethnic Group Differentiation

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Abstract

Background: External nose is one of the anatomical structures that give a look in an individual’s face. The size and shape of the nose vary from one individual to another individual.

Aim: To determine the sex based on morphometry of external nose.

Materials and Methods: This cross-sectional study was done on 100 Malaysians and 100 South Indians of age group (20 to 30 years). The morphometric measurements of the external nose such as nasal length (NL), nasal breadth (NB), nasal height (NH), nasal depth (ND), width of columella (WC), nostril breadth (NB), alar length (AL) and alar width (AW) were measured using digital caliper by standard procedure.

Results: The nasal width was found to be larger in Malaysian females as compared to that of Indian females. The nasal height was found to be larger in Indian males followed by Indian females and vice versa in Malaysian population. When compared among the population the nasal length was lengthier in Indian population and in Malaysian males when compared to Malaysian females. Alar length slight difference was found between male and female of both the population when compared on both the sides. The alar width was found to be more in Indian population when compared to Malaysian population. The nostril breadth was found to be wider in Malaysian population when compared to the Indian population.

Conclusion: The present study shows that their do exist gender difference in nasal morphometry and nasal index of both males and females.

Key words: Nasal morphometry, Nasal index, Indian population, Malaysian population.

Introduction

The external nose is one of the anatomical structures which continue to get modified and enlarged throughout our life even after the attainment of skeletal maturity.1

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External nose is one of the anatomical structure that give a look to an individual’s face. The size, shape and proportions of the nose provide beauty as it is at the center of the face. The shape of the external nose varies from one to another considerably.2 Ethnic variation do exist which can be identified on careful examination of different features of nose. Every race has their specific nasal features as in case of Caucasian, Africans or Asians.3 The unique shape of the nose among the race, ethnic and sex is more important for a forensic expert. The morphometry of external nose provides a baseline data to interpolate the ethnic and racial differences.4,5 Anthropometric parameters vary with age, sex, and ethnic background, and several authors have documented the normative values which may serve as references for forensic experts.6 A sound knowledge on the anatomy of
human nose is essential for plastic surgeons undertaking esthetic repair and reconstruction of noses. Congenital anomalies, pre- and postnatal abnormalities in nose dimensions and shape can be found in various genetic disorders. Individuals with Down’s syndrome during prenatal ultrasonography findings shows absence of nasal bone or hypoplasia, coupled with a flat facial profile. Thus, the morphometry of external nose gains its importance in many fields. As the morphometry of external nose is essential for sex determination and ethnic variations the following study was designed and carried in two different races.

**Aim and Objectives**

The aim of the study is to determine the sex based on morphometry of external nose.

**Primary Objective:**

Ø To compare the morphometric data of external nose between right and left side.

**Secondary objective:**

Ø To compare and correlate the morphometry of external nose among two groups of population - South Indian vs. Malaysians.

**Materials and Method**

The study participants include 100 Malaysians (50 males and 50 females) and 100 South Indians (50 males and 50 females) of age group (20 to 30 years). An informed consent was taken before starting the measurements of external nose. This present cross-sectional study was a part of facial morphometry analytic study which was approved by Institutional Ethical Committee; reference (VMKVMC/IEC/18/02) of Vinayaka Mission’s Kirupananda Variyar Medical College & Hospitals, Salem. The present study was carried out in 2 constituent colleges, VMKV Medical College & Hospitals, Salem, TamilNadu and Penang International Dental College, Salem Campus. In both the population group the volunteer participants were chosen by random sampling method. Volunteers with any anomalies on external nose were excluded from the study. Various morphometric measurements of external nose such as nasal length (NL) nasion to pronasale, nasal breadth (NB) between 2 alacrepidon, nasal height (NH) nasion to subnasale, nasal depth (ND) pronasale to subnasale, width of collumella (WC) between 2 alare, nostril breadth (NB) nasion medial to nasion lateral, alar length (AL) pronasale to alacrepidon and alar width (AW) alacrepidon to nasion posterior (fig. 2) were measured using digital caliper.

**Statistical Analysis**

The data’s were tabulated and analyzed by One way ANOVA to find out the significance among the sex and populations and Post HOC pairwise comparison for comparison among the groups. The analysis was done using the online graph pad calculator (Free version).

**Results**

The morphometric data was collected and analyzed by one way ANOVA to find out the significance among the population and Post HOC pairwise comparison to compare between the sexes.
Table 1. Nasal Morphometry in Indian and Malaysian Population

<table>
<thead>
<tr>
<th>Population</th>
<th>Sex</th>
<th>Nasal Width (cm)</th>
<th>Nasal depth (cm)</th>
<th>Nasal height (cm)</th>
<th>Nasal length (cm)</th>
<th>Width of Collumella (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indian</td>
<td>Male</td>
<td>3.7±0.7</td>
<td>1.81±0.3</td>
<td>4.9±0.5</td>
<td>4.05±0.7</td>
<td>1.5±0.03</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3.4±0.9</td>
<td>1.7±1.0</td>
<td>4.7±0.5</td>
<td>4.14±1.4</td>
<td>1.4±0.03</td>
</tr>
<tr>
<td>Malaysian</td>
<td>Male</td>
<td>3.9±0.06</td>
<td>1.84±0.09</td>
<td>4.63±0.7</td>
<td>3.77±0.1</td>
<td>3.4±1.4</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>3.96±0.05</td>
<td>2.07±0.2</td>
<td>4.78±0.09</td>
<td>4.1±0.1</td>
<td>3.2±0.5</td>
</tr>
<tr>
<td>P value</td>
<td>0.89#</td>
<td>0.97#</td>
<td>0.98#</td>
<td>0.98#</td>
<td>0.10#</td>
<td></td>
</tr>
</tbody>
</table>

Values are expressed as Mean ± SEM, n = 100 in each population with 50 males & 50 females, # - non significant, * - significant, P value *P<0.05, Statistical analysis – Independent t test & One Way ANOVA.

The nasal width was larger in Malaysian females as compared to that of Indian females. Nasal breadth was found to be larger in Malaysian population when compared to Indian population (Table 1). The nasal width was found to be larger in Malaysian females and males followed by Indian males and females (Table 1). The nasal height was found to be more in Indian males followed by Indian females and vice versa in Malaysian population (Table 1). When compared among the population the nasal length was found to be lengthier in Indian population and Malaysian males when compared to Malaysian females. The data were not statistically significant when compared among the population (Table 1 & 2).

Table 2. Post HOC Pairwise Comparison of Nasal Morphometry in Indian and Malaysian Population

<table>
<thead>
<tr>
<th></th>
<th>Nasal Width</th>
<th>Nasal depth</th>
<th>Nasal height</th>
<th>Nasal length</th>
<th>Width of Collumella</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaysian M vs Malaysian F</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Malaysian M vs Indian M</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Malaysian M vs Indian F</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Malaysian F vs Indian M</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Malaysian F vs Indian F</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Indian M vs Indian F</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
</tbody>
</table>

M – Male, F – Female, vs – versus, n = 100 in each population with 50 males & 50 females, NS - non significant, S - significant, P value *P<0.05, Statistical analysis – Post HOC Pairwise Comparison.

Nasal index was calculated by using the formula width of nose/ length of nose X 100. The nasal index showed the gender difference in Indian population (Male - 91.35 and female - 82.12) whereas in case of Malaysian population it showed a wide difference (Male – 103.4 and female – 96.6).

Alar length slight difference was found between male and female of both the population when compared on both the sides. The alar width was found to be more in Indian population when compared to Malaysian population and the difference was found to be statistically significant when compared on both sides. The nostril breadth was found to be more in Malaysian population when compared to the Indian population but was not statistically significant when compared on both sides. The alar length and nostril breadth was not statistically significant whereas the alar width was statistically significant when compared among the population (Table 3 & 4).
Table 3. Morphometry of External nose in Indian and Malaysian population

<table>
<thead>
<tr>
<th>Population</th>
<th>Sex</th>
<th>Alar length (cm)</th>
<th>Alar width (cm)</th>
<th>Nostril breadth (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Rt</td>
<td>Lt</td>
<td>Rt</td>
</tr>
<tr>
<td>Indian</td>
<td>Male</td>
<td>3.15±0.3</td>
<td>3.1±0.4</td>
<td>5.2±0.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.2±0.3</td>
<td>1.2±0.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>2.8±0.5</td>
<td>2.8±0.7</td>
<td>4.7±0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.2±0.6</td>
<td>1.3±1.2</td>
<td></td>
</tr>
<tr>
<td>Malaysian</td>
<td>Male</td>
<td>3.2±0.07</td>
<td>3.17±0.07</td>
<td>1.51±0.03</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.01±0.1</td>
<td>2.02±0.01</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>2.5±0.1</td>
<td>3.0±0.05</td>
<td>1.5±0.03</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.2±0.06</td>
<td>2.17±0.06</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.30#</td>
<td>0.92#</td>
<td>0.001***</td>
</tr>
</tbody>
</table>

Values are expressed as Mean ± SEM, n = 100 in each population with 50 males & 50 females, # - non significant, * - significant, P value *P<0.05, Statistical analysis – Independent t test & One Way ANOVA.

Table 4. Post HOC Pairwise Comparison of External nose in Indian and Malaysian population

<table>
<thead>
<tr>
<th>Population</th>
<th>Alar length</th>
<th>Alar width</th>
<th>Nostril breadth</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rt</td>
<td>Lt</td>
<td>Rt</td>
</tr>
<tr>
<td>Malaysian M vs Malaysian F</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
<tr>
<td>Malaysian M vs Indian M</td>
<td>NS</td>
<td>NS</td>
<td>S</td>
</tr>
<tr>
<td>Malaysian F vs Indian M</td>
<td>NS</td>
<td>NS</td>
<td>S</td>
</tr>
<tr>
<td>Malaysian F vs Indian F</td>
<td>NS</td>
<td>NS</td>
<td>S</td>
</tr>
<tr>
<td>Indian M vs Indian F</td>
<td>NS</td>
<td>NS</td>
<td>S</td>
</tr>
</tbody>
</table>

M – Male, F – Female, vs – versus, n = 100 in each population with 50 males & 50 females, NS - non significant, S - significant, P value *P<0.05, Statistical analysis – Post HOC Pairwise Comparison.

Discussion

Racial origin can be identified by different features of nose. Each race such as Caucasian, Africans or Asians has got specific nasal features. Each race has its own special beauty [11]. In an Indian morphometric study, the mean width of the nose was 3.5 cm in total, 3.74 cm in male and 3.43 cm in female respectively. The width of the nose was significant when the male and female groups are compared. In the present study the mean width / breadth was 3.7 cm in male and 3.4 cm in female similar to that of Snehal Deulkar et al study. Kurulkar et al reported the width of nose as 3.56cm in male and 3.26 cm in female respectively in 200 adult Bombay populations and also reported that there is a similarity in columellar width between Chinese and Indians. Generally, surgeons plan the surgical procedures of external nose reconstruction based on their surgical case experiences, which includes the subjective as well as the objective factors. The subjective factor includes the nasal esthetics varies depending on the ethnic background as well their geographical and cultural differences. Springer et al., reported that there exist gender related effects with respect to the assessment of nasal shape in women as compared to men. In a morphometry study, the narrow noses were predominated in 46 (78%) females than in 39 (70%) males and a total of 85 cases (74%) narrow nose among all subjects.
<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Nasal Index</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American females</td>
<td>79.7</td>
<td>Porter et al. 2003.16</td>
</tr>
<tr>
<td>India-Raj puts*</td>
<td>71.60</td>
<td>Mulchand et al. 2004.17</td>
</tr>
<tr>
<td>Bantus</td>
<td>85.0</td>
<td>Nichani et al. 2004.18</td>
</tr>
<tr>
<td>Caucasian</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>65.5</td>
<td>Farkas et al. 2005.169</td>
</tr>
<tr>
<td>Female</td>
<td>64.2</td>
<td></td>
</tr>
<tr>
<td>Turkish males</td>
<td>59.4</td>
<td>Uzun et al. 2006.20</td>
</tr>
<tr>
<td>Nigerian Igbo Male</td>
<td>95.9</td>
<td>Oladipo et al. 2007.21</td>
</tr>
<tr>
<td>Nigerian Igbo Female</td>
<td>90.8</td>
<td></td>
</tr>
<tr>
<td>Iran-Baluchestan female</td>
<td>59.2</td>
<td>Heidari et al. 2009.22</td>
</tr>
<tr>
<td>Ukwuani</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>97.47</td>
<td>Ebob et al. 2011.23</td>
</tr>
<tr>
<td>Female</td>
<td>98.08</td>
<td></td>
</tr>
<tr>
<td>Isokos</td>
<td>91.0</td>
<td>Anibor et al. 2011.24</td>
</tr>
<tr>
<td>Nepal mongoloid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>74.6</td>
<td>Koirala et al. 2014.25</td>
</tr>
<tr>
<td>Female</td>
<td>75.9</td>
<td></td>
</tr>
<tr>
<td>Gujarati population India*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>80.00</td>
<td>Kanan et al. 2012.26</td>
</tr>
<tr>
<td>Female</td>
<td>76.00</td>
<td></td>
</tr>
<tr>
<td>Western Uttar Pradesh, India*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>75.86</td>
<td>Ray, et al. 2016.27</td>
</tr>
<tr>
<td>Female</td>
<td>72.08</td>
<td></td>
</tr>
<tr>
<td>South Indian Population*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>84.99</td>
<td>Patil et al. 2014.28</td>
</tr>
<tr>
<td>Female</td>
<td>67.75</td>
<td></td>
</tr>
<tr>
<td>South Indian</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>91.35</td>
<td>Present Study</td>
</tr>
<tr>
<td>Female</td>
<td>82.12</td>
<td></td>
</tr>
<tr>
<td>Malaysian</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>103.4</td>
<td>Present Study</td>
</tr>
<tr>
<td>Female</td>
<td>96.6</td>
<td></td>
</tr>
</tbody>
</table>

Ray et al reported that males have a significantly higher nasal index than females (P < 0.05) similar to that of the present study (Table 5). This confirms the existence of sexual dimorphism in nasal parameters among south Indian and Malaysian population.

In a study done by Sforza et al.,¹ nostril breadth in male was 2.2cm and female was 1.9cm whereas in the present study it was 1.2 cm in both Indian male and female. In case of Malaysians it was found to be quite wider when compared to Indians, male (2.0 cm) and female (2.1cm). Ogah et al reported that the mean nasal length, width, height were higher in males than in the female as incase of the present study. The existence of sex difference in morphometric measurements of nose were due to genetic the make-up and inheritance which can be manifested as sexual dimorphism in this study in both the populations.
Conclusion

The study shows that there exist gender differences in nasal morphometry and nasal index of both males and females. This morphometric data of this study including nasal index can serve as a baseline data for various purposes such as reconstructive nasal plastic surgery including rhinoplasty, medico-legal aspects of identifying an individual along with other facial morphometric data’s.

Acknowledgement: Author thanks all the volunteers from Vinayaka Mission’s Kirupananda Variyar Medical College and Penang International Dental College, Salem campus who had participated in the study and contributed their nasal morphometric data’s. Author also thanks all the researchers whose articles are cited and included in the references of this article.

Funding Sources: Nil.

Conflict of Interest: Nil.

Ethical Clearance: Taken from Institutional Ethical Committee of Vinayaka Mission’s Kirupananda Variyar Medical College & Hospitals, Salem - reference (VMKVMC/IEC/18/02)

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18. Nichani JR, Willatt DJ, Willatt DJ. Dimensional analysis–its role in our preoperative surgical


Pattern of Poisoning Cases and Poisoning Deaths: A Retrospective Study Conducted at Raichur Institute of Medical Sciences, Raichur

Sharanabasavappa Karaddi1, Praveen Kumar2, Ravi Shankar MG3, Mounika Ragini4

1Associate Professor, 2Tutor, 3Final Year Postgraduate Student, Dept of Forensic Medicine And Toxicology, Raichur Institute Of Medical Sciences, Raichur

Abstract

The present study is a retrospective study conducted in Raichur institute of Medical sciences, Raichur Karnataka. During the study period that is from January 2017 to March 2017, out of 547 medico-legal cases which came to casualty, 164 cases were poisoning. Among 164 poisoning cases, 13 cases died in hospital and postmortem examination is done in mortuary RIMS Raichur hospital. The most common type of poisoning case in and around the Raichur district was organo-phosphorus poisoning (58.53%) followed by kerosene poisoning (13.41%). Males (55.48%) were the more common victims of the poisoning. Age group between 11-20 years (32.92%) was most commonly affected. Majority of poisoning cases was suicidal (84.14%) in manner. In 26.56% the motive for suicidal poisoning was financial crisis leading to depression and consumption of poisonous substance.

Key Words: Poisoning, Demographic profile, Manner of death

Introduction

Poison is any substance which if introduced in the living body by any route could cause ill health or death. Poisoning both accidental and intentional is a significant contributor to morbidity and mortality throughout the world. According to WHO data in 2012, an estimated 1,93,460 people died worldwide from unintentional poisoning. Of these deaths, 84% occurred in low- and middle-income countries.

Poisoning forms a major problem in developing countries like India too, though the type of poison and the associated morbidity and mortality varies from one place to another and it may change over a period of time owing to availability and access of poison socio-economic status cultural and religious influences, life style, urbanisation, agricultural growth, industrialisation, geographical factors. The exact incidence of poisoning in India remains uncertain, but 1 to 1.5 million cases occurs every year, of which almost one third are fatal. It has been estimated that in India five to six persons per lakh of population die due to acute poisoning every year. Poisoning is the fourth most common cause of mortality in rural India. The mortality rate due to poisoning in developed countries is only 1%-2% but in developing countries like India, it varies in between 15% -30%.

Suicides by poisoning are increasing in the recent past in an exponential manner. Adaptation of modern life style and effects of globalization and urbanization might be the reason. Wide spread use of chemicals in the form of pesticides and herbicides in agricultural field, unrestricted use of wide variety of chemicals in industries and extended use chemicals for household work also reason for increased incidence of accidental poisoning.

Materials and Method

This is a retrospective cross sectional descriptive study of poisoning cases admitted in Raichur institute of medical sciences, Raichur. The study period is from
January 2017 to March 2017. During the study period we gathered data from poisoning cases, which were admitted, treated and discharged from the hospital as well as from postmortem examination report where death occurred due to poisoning case. The required information was collected from outpatient department card, inpatient department sheet, police inquest report, postmortem examination report, RFSL report. The data collected in performa was later statistically analyzed with respect to age, sex, rural / urban, type of poison and manner of poisoning, expressed in number of cases and percentage. Snake bite and scorpion bite cases were excluded from the study group. Ethical clearance was taken from institutional ethical committee.

Observation and Results

During three months of study period i.e January 2017 to March 2017, we noticed that a total of 547 medico-legal cases were admitted in our RIMS Raichur tertiary care hospital, wherein 164 cases (29.98%) belong to poisoning cases. Among 164 poisoning cases, 13 cases (7.92%) died in hospital and postmortem examination is done in mortuary RIMS Raichur hospital.

<table>
<thead>
<tr>
<th>TYPE OF POISONING</th>
<th>NUMBERS</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organo-Phosphorus compound</td>
<td>96</td>
<td>58.53</td>
</tr>
<tr>
<td>Kerosene</td>
<td>22</td>
<td>13.41</td>
</tr>
<tr>
<td>Unknown compound</td>
<td>14</td>
<td>8.53</td>
</tr>
<tr>
<td>Alprazolam</td>
<td>7</td>
<td>4.26</td>
</tr>
<tr>
<td>Aluminum/Zinc Phosphide</td>
<td>7</td>
<td>4.26</td>
</tr>
<tr>
<td>Vegetable oil+Alcohol</td>
<td>4</td>
<td>2.43</td>
</tr>
<tr>
<td>Turpentine oil</td>
<td>4</td>
<td>2.43</td>
</tr>
<tr>
<td>Paracetamol tablets</td>
<td>2</td>
<td>1.21</td>
</tr>
<tr>
<td>Permethrin</td>
<td>2</td>
<td>1.21</td>
</tr>
<tr>
<td>Formalin</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Phenobarbitone</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Datura</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Phenol</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Salbutamol tablets</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>Iron tablets</td>
<td>1</td>
<td>0.6</td>
</tr>
<tr>
<td>TOTAL</td>
<td>164 CASES</td>
<td>100</td>
</tr>
</tbody>
</table>

In our study period we observed wide variety of poisoning cases as shown in the table no.1. The most common type of poisoning case in and around the Raichur district was organo-phosphorus poisoning (58.53%) followed by kerosene poisoning (13.41%), unknown compound consumption poisoning (8.53%), Alprazolam and Aluminum/Zinc Phosphide poisoning cases (4.26% each).
TABLE NO.2: AGE WISE DISTRIBUTION OF POISONING CASES

<table>
<thead>
<tr>
<th>AGE</th>
<th>NUMBERS</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 10 years</td>
<td>16</td>
<td>9.75</td>
</tr>
<tr>
<td>11-20 years</td>
<td>54</td>
<td>32.92</td>
</tr>
<tr>
<td>21-30 years</td>
<td>48</td>
<td>29.26</td>
</tr>
<tr>
<td>31-40 years</td>
<td>28</td>
<td>17.07</td>
</tr>
<tr>
<td>41-50 years</td>
<td>10</td>
<td>6.09</td>
</tr>
<tr>
<td>51-60 years</td>
<td>5</td>
<td>3.04</td>
</tr>
<tr>
<td>More than 61 years</td>
<td>3</td>
<td>1.82</td>
</tr>
<tr>
<td>TOTAL</td>
<td>164</td>
<td>100</td>
</tr>
</tbody>
</table>

In our study, age group between 11-20 years (32.92%) were common sufferer of poisoning, followed by age group 21-30 years (29.26%), 31-40 years (17.07%), children age less than 10 years (9.75%).

In our study, we observed that, people from rural background (76.22%) were more troubled by poisoning cases compared to urban people with 23.78% cases of poisoning and married (53.05%) persons were more affected than unmarried (46.95%) persons.

In our study, males (55.48%) were the more common victims of the poisoning cases and females accounted for 44.52% of cases and suicidal manner was common (84.14%) followed by accidental (15.86%) poisoning cases. There were no homicidal poisoning cases.

TABLE NO.3: REASON FOR SUICIDAL POISONING

<table>
<thead>
<tr>
<th>MOTIVE/REASON</th>
<th>NUMBERS</th>
<th>PERCENTAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Financial Crisis</td>
<td>34</td>
<td>26.56</td>
</tr>
<tr>
<td>Psychiatric illness</td>
<td>29</td>
<td>22.91</td>
</tr>
<tr>
<td>Chronic ill health</td>
<td>23</td>
<td>18.17</td>
</tr>
<tr>
<td>Chronic-alcoholism</td>
<td>19</td>
<td>15.01</td>
</tr>
<tr>
<td>Family problems</td>
<td>7</td>
<td>5.53</td>
</tr>
<tr>
<td>Failed in exams</td>
<td>6</td>
<td>4.74</td>
</tr>
<tr>
<td>Love failure</td>
<td>5</td>
<td>3.95</td>
</tr>
<tr>
<td>Pre-menstrual syndrome</td>
<td>3</td>
<td>2.37</td>
</tr>
<tr>
<td>TOTAL</td>
<td>126</td>
<td>100</td>
</tr>
</tbody>
</table>

In our study, we noted that, in 34 cases (26.56%) the reason for suicidal poisoning was financial crisis leading to depression and consumption of poisonous substance. We also observed that farmers were the major group of people who faced major hurdle of financial crisis. In 29 cases (22.91%) chronic psychiatric illness was the reason behind the poisoning. In 23 cases (18.17%) a chronic ill health which neither improving nor the person able to bear the expenses of the treatment was reason. In 19 cases (15.01%), chronic alcoholism leading to various hampered interpersonal relationship, financial burden on family, frequent quarrels leading to depression was
the issue. In 7 cases (5.53%), interpersonal problems among the family members with respect to dowry, land, expenses, habits etc lead to arguments and conflicts was the reason. In most of these cases females were the victims. In 6 cases (4.74%), students who were not doing well in school or failed in annual exams took a self destructive extreme step. In 3 cases (2.37%), mentally disturbed pre-menstrual syndrome sufferer took an extreme step of poisoning themselves.

**TABLE NO.4: LEVEL OF EDUCATION**

<table>
<thead>
<tr>
<th>Education</th>
<th>Numbers</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child less than 6 years</td>
<td>14</td>
<td>8.53</td>
</tr>
<tr>
<td>1st -5th class</td>
<td>2</td>
<td>1.21</td>
</tr>
<tr>
<td>6th-10th class</td>
<td>17</td>
<td>10.36</td>
</tr>
<tr>
<td>PUC</td>
<td>19</td>
<td>11.58</td>
</tr>
<tr>
<td>Degree</td>
<td>17</td>
<td>10.36</td>
</tr>
<tr>
<td>Master Degree</td>
<td>3</td>
<td>1.83</td>
</tr>
<tr>
<td>Uneducated</td>
<td>92</td>
<td>56.1</td>
</tr>
<tr>
<td>Total</td>
<td>164</td>
<td>100</td>
</tr>
</tbody>
</table>

In our study, 92 cases of poisoning were seen in uneducated (56.1%) peoples. In 19 cases (11.58%) the level of education was PUC followed by 17 cases (10.36%) in degree and 6th-10th class level education. In 14 cases (8.53%) child was less than 6 years of age and all were accidental in manner.

**Discussion**

Among the medico-legal cases admitted in our hospital, 29.98% cases belong to poisoning cases which was far higher than study done by Guntheti BK et al (11.65%) and Mugadlimath A et al (6.67%). Contrary to above observations, study conducted by Panda BB et al observed that, most common poisoning was insecticidal poisoning (26.92%) followed by alcohol (11.53%), rat poisoning cases (11.53%) and sedatives (11.53%). Study done by Guntheti BK et al observed that, organophosphorus compound poisoning (74%) is most common followed by zinc phosphide poisoning (5.8%), benzodiazepines (3.18%) and medicinal drugs (3.18%) were equally abused.

In all the studies including ours, most common type of poisoning was due to organo-phosphorus insecticides (51.63%) followed by alcohol poisoning cases (10.31%). Study conducted by Panda BB et al observed that, most common poisoning was insecticidal poisoning (26.92%) followed by alcohol (11.53%), rat poisoning cases (11.53%) and sedatives (11.53%). Study done by Guntheti BK et al observed that, most common poisoning was insecticidal poisoning (26.92%) followed by alcohol (11.53%), rat poisoning cases (11.53%) and sedatives (11.53%). Study conducted by Mugadlimath A et al observed that, during the study period 21 (5.55%) of the patients had mortality due to poisoning. Study conducted by Ali I et al observed that, 83.91% poisoning cases improved while 16.09% expired. Mortality was higher with use of aluminium phosphide poisoning (57.38%) and organophosphate consumption (9.84%). Study done by...
Guntheti BK et al observed that, 17.33% deaths were due to insecticide, maximum with organo-phosphorus compounds (82.75%) followed by zinc Phosphide (13.79%), organochlorines (6.89%) and carbamates (6.89%).

In our study, males (55.48%) were the more common victims of the poisoning cases and females accounted for 44.52% of cases. Male to female ratio was 1.2:1, the same observation was made by various authors.

A high incidence of poisoning among men may be attributed to high degree of stress in academic, love affairs, financial crisis and emotional disturbances, inability to achieve targets and also due to easy accessibility to poisons. However, some studies show that incidence of poisoning was more in women than men.

In our study, age group between 11-20 years (32.92%) were common sufferer of poisoning, followed by age group 21-30 years (29.26%), 31-40 years (17.07%), children age less than 10 years (9.75%). Contrary to our observation, majority of studies observed that age group 21-30 years were the major victims.

In our study majority of cases (32.92%) were from age group 11-20 years. This can be explained by the fact that the persons of this age suffer from stress of the modern lifestyles, failure in love, failure in education, impulsive behaviour. Second most common age group 21-30 years (29.26%) the reason may be unemployment, marital problems, failure in love, family problems etc.

In our study, we observed that, people from rural background (76.22%) were more troubled by poisoning cases compared to urban people with 23.78% cases of poisoning. The same observations were made by various authors with varying percentage of rural background from 75% to 85%.

More prevalence of poisoning cases in rural area in our study may be due to widespread use of pesticide in agriculture sector. Poverty, failure of crops, family problems and easy availability of the poison in their household, made people of rural area more prone for poisoning. However, some studies from state of Karnataka, the incidence was more in those who were from urban background.

In our study, married (53.05%) persons were more affected than unmarried (46.95%) persons. Similar observations were made by Ali I et al, Guntheti BK et al, Mugadlimath A et al. Contrary to above studies, in Panda BB et al study most of the victims found were unmarried (53.86%).

Ali I et al observed that, 68.34% were suicidal in nature and in 31.66% cases poison was consumed accidentally. Study conducted by Panda BB et al observed that, Suicide was the most common manner of poisoning (65.39%), followed by accidental pattern (34.61%). Study done by Shetty VB et al observed that, commonest manner of poisoning was suicide (78%) followed by accidental poisoning accounting for 22.67%. Acute poisoning in children is almost entirely accidental; while in adults it is mainly suicidal. Not a single case of homicidal poisoning was observed in any of the above studies.

Table No.3

Similar observation was made by Subhash Chandra Joshi et al study, where financial crisis was the reason for suicidal poisoning in 53.22% cases.

Contrary to our observation, Ali I et al observed that, marital discord (33.20%), love affairs (4.25%), family problems like problems/altercations with family members other than spouse (46.33%), financial difficulties (1.16%), addiction/friend dispute/depression (5.79%) and unknown (9.27%) were the various reasons for consuming poison.

Table No.4

Ali I et al observed that, one third of the patients (33.77%) were illiterate. Educational status of 36.68% patients was up to high school, 13.72% intermediate and rest 15.83% were graduates/postgraduates.

Contrary to our observation study done by Guntheti BK et al observed that, most of the victims was either literate (71.91%) or educated up to high school level and 28.08% illiterate. Authors like Guptha BD et al, Eddleston M et al and Joshi SC et al also observed in their studies that poisoning was more common in literate people.
Conclusion

A complete and accurate knowledge about the nature and depth of the problem in a particular area is essential for early diagnosis and treatment which in turn help in making new policy by government for prevention of poisoning cases because nature, profile and burden of poisoning varies significantly in the different parts of India.

We suggest the policy making bodies should regulate the import, manufacture, sale, transport, distribution and use of insecticides and pesticides meticulously. Upgrading the peripheral health centres to manage cases of poisoning in emergency including training of staff to give first aid treatment of poisoning including timely intubation and respiratory support on AMBU bag and make sure the availability of antidote in sufficient quantity. Further we need to establish a poison information centre in this region and manage a Clinical Toxicology Unit for the better management and prevention of poisoning cases. Simultaneously increase the public awareness about the seriousness of problem through health education. Proper and correct implementation of various social and economic projects aimed for upliftment of the rural poor population will definitely decreases the burden indirectly.

Conflict of Interest: None

Source of Funding: Self

Ethical Clearance: Institutional Ethical Clearance Taken

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An examination of Some Commonly Utilized Techniques for Perception of Secret Writing

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Abstract

Secret writing is the art of covered or hidden writing. The art of secret writing is meant to create a message unreadable by a third party however doesn't hide the existence of the secret communication. This paper is meant as a technical introduction to secret writing for those unacquainted with the field. Invisible inks are generally used for secret writing. These are fluids used to write hidden messages that do not appear unless exposed by a revealing process. Invisible inks can be classified into three main categories: those that are revealed by heat, those revealed by chemical reactions and those that are visible under ultraviolet light. Some common household invisible inks are diluted fruit juices, vinegar and laundry detergent, all which can be applied by a paintbrush, special invisible ink pen or even a toothpick, Historically, used in times of war by governments and insurgents alike. The chemical processes of invisible inks are well known, so a variety of detection methods exist. The simplest invisible ink experiment consists of dipping a brush in vegetable juice, biological fluids and different chemicals and writing on a piece of blank varieties of paper. When the “ink” dries, it will be invisible to the naked eye, but if the paper is held up to a moderate heat source such as a light bulb, a radiator or an iron using UV lamp to deciphering invisible writing. Many other mild chemicals also used for restoration of secret writing.

Keywords – Secret Writing, Invisible inks, decipherment, physical, chemical methods

Introduction

Invisible inks are used for secret writing. These are fluids used to write hidden messages that do not appear unless exposed by a revealing process. Invisible inks can be classified into three main categories: those that are revealed by heat, those revealed by chemical reactions and those that are visible under ultraviolet light. Some common household invisible inks are diluted fruit juices, vinegar and laundry detergent, all which can be applied by a paintbrush, special invisible ink pen or even a toothpick, Historically, used in times of war by governments and insurgents alike. The chemical processes of invisible inks are well known, so a variety of detection methods exist. The simplest invisible ink experiment consists of dipping a brush in vegetable juice, biological fluids and different chemicals and writing on a piece of blank white paper. When the “ink” dries, it will be invisible to the naked eye, but if the paper is held up to a moderate heat source such as a light bulb, a radiator or an iron using UV lamp to deciphering invisible writing. Many other mild chemicals also used for restoration of secret writing.

Invisible Inks

Broadly, invisible inks can be categorized as: organic fluids and sympathetic inks. The former consists of the “natural” methods many of us tried our hand at as kids: lemon juice, vinegar, milk, sweats saliva, onion juice, and even urine and diluted blood, to name a few. These organic invisible inks can be developed through heat, such as with fire, irons, or light bulbs, and some can be seen when placed under ultraviolet light. The organic fluids alter the fibers of the paper so that
the secret writing has a lower burn temperature and turns brown faster than the surrounding paper when exposed to heat. Sympathetic inks are more complicated chemical concoctions. Sympathetic inks contain one or more chemicals and require the application of a specific “reagent” to be developed, such as another chemical or a mixture of chemicals.3-6

An acidic citrus juice, of which lemon juice is most often the preferred choice because it dries without leaving any evidence it has been applied. The juice takes the place of ink, and is applied by swabbing with cotton. After the juice dries, the acid remains on the paper, which it weakens, and therefore the message is readily exposed when heat is applied to the paper. Other liquids for invisible ink include milk, which is mildly acidic, as well as white wine, vinegar, or apple juice. In the past, prisoners of war have used their own sweat, saliva, or even urine, all of which contain acidic secretions that adhere to the paper, weakening it, even after the water in those bodily fluids has evaporated.7

A slight variation on this technique is the use of a baking soda and water mixture as the invisible ink, and, after drying, applying grape juice concentrate with a paint brush. The acid in the grape juice reacts with the baking soda (a base or alkali in chemical terms), exposing the message.8

Types of Invisible inks

· Heat-Activated Invisible Inks: Iron the paper, set it on a radiator, place it in an oven (set lower than 450° F), or hold it up to a hot light bulb.

1. Any Acidic Fruit Juice (E.G., Lemon, Apple, Or Orange Juice)
2. Onion Juice,
3. Baking Soda (Sodium Bicarbonate)
4. Vinegar
5. White Wine
6. Dilute Cola
7. Diluted Honey
8. Milk
9. Soapy Water
10. Sucrose (Table Sugar) Solution
11. Urine

· Inks Developed by Chemical Reactions:
These inks are sneakier, because you have to know how to reveal them. Most of them work using pH indicators, so when it doubts, paint or spray a suspected message with a base (like sodium carbonate solution) or an acid (like lemon juice). Some of these inks will reveal their message when heated with vinegar.

1. Phenolphthalein (Ph Indicator), Developed by Ammonia Fumes or Sodium Carbonate (Or Another Base),
2. Thymolphthalein, Developed by Ammonia Fumes or Sodium Carbonate (Or Another Base),
3. Vinegar or Dilute Acetic Acid, Developed by Red Cabbage Water,
4. Ammonia, Developed by Red Cabbage Water,
5. Sodium Bicarbonate (Baking Soda), Developed by Grape Juice,
6. Sodium Chloride (Table Salt), Developed by Silver Nitrate,
7. Copper Sulfate, Developed by Sodium Iodide, Sodium Carbonate, Potassium Ferricyanide, Or Ammonium Hydroxide,
8. Lead (II) Nitrate, Developed by Sodium Iodide,
9. Iron Sulfate, Developed by Sodium Carbonate, Sodium Sulfide, Or Potassium Ferricyanide,
10. Cobalt Chloride, Developed by Potassium Ferricyanide,
11. Starch (E.G., Corn Starch or Potato Starch), Developed by Iodine Solution,
12. Lemon juice, developed by iodine solution.

Inks Developed by Ultraviolet Light: Most of the invisible writing visible under UV light gives characteristic fluorescence.

1. Dilute laundry detergent (the bluing agent glows),
2. Body fluids,
3. Tonic water (quinine glows),
4. Vitamin B-12 dissolved in vinegar.

**Materials & Method**

**MATERIAL USED:** Organic fluids mainly Fruit juices (lemon juice, onion juice), Biological fluids (saliva, urine) and three types of paper mainly copier, bond paper and cheque of different GSM.

**METHOD:** The paint brush was dipped in the required invisible ink and messages were written over the papers. The papers with secret messages were marked at the top, with date of sample preparation, name of the invisible ink and the respective day on it is examined. Extra samples of secret messages were also prepared in the same manner. The papers containing written messages were kept under a running fan, so that the inks dry up.

**Results**

**Visibility of Organic Fluids on Bond Paper (A4 Sheets) 74 GSM**

**Lemon Juice (S2)- Visibility with the use of Physical and chemical methods**

- Direct light
- Oblique light
- Transmitted light
- UV
- Heat (By Iron)
- Iodine fuming

**Visibility of Organic Fluids on Cheque 95 GSM**

**Lemon Juice (S4)- Visibility with the use of Physical and chemical methods**

- Direct light
- Oblique light
- Transmitted light
- UV
- Heat (By Iron)
- Iodine fuming
<table>
<thead>
<tr>
<th>Organic fluid</th>
<th>Sample No.</th>
<th>Direct light</th>
<th>Oblique light</th>
<th>Transmitted light</th>
<th>UV</th>
<th>Heat (By iron)</th>
<th>Silver Nitrate</th>
<th>Iodine fuming</th>
<th>Phenolphthalein</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lemon juice</td>
<td>1</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>++</td>
<td>+++</td>
<td>-</td>
<td>+++</td>
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<tr>
<td></td>
<td>2</td>
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<td>+</td>
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<td></td>
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<td>+</td>
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<td>++</td>
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<td>-</td>
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<td>+++</td>
<td>++</td>
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<td>Onion juice</td>
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<tr>
<td></td>
<td>2</td>
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<td>-</td>
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<tr>
<td></td>
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Table 4: The above table shows deciphering secret writing using various physical and chemical methods.

<table>
<thead>
<tr>
<th>Organic fluids</th>
<th>Writing surface</th>
<th>Result (Physical method)</th>
<th>Chemical Method</th>
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</thead>
<tbody>
<tr>
<td>Lemon Juice</td>
<td>Copier paper</td>
<td>UV &gt; Heat &gt; Direct &gt; Oblique</td>
<td>Iodine Fuming</td>
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<tr>
<td></td>
<td>Bond paper</td>
<td>Heat &gt; UV &gt; Oblique &gt; Direct</td>
<td>Iodine Fuming</td>
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<tr>
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<td>Cheque</td>
<td>Heat &gt; UV &gt; Direct</td>
<td>Iodine Fuming</td>
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<tr>
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<td>Bond paper</td>
<td>UV &gt; Heat &gt; Direct</td>
<td>Iodine Fuming</td>
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<tr>
<td>Onion Juice</td>
<td>Copier paper</td>
<td>Heat &gt; UV</td>
<td>Iodine Fuming</td>
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<td>Cheque</td>
<td>Heat &gt; UV &gt; Direct / Oblique</td>
<td>Iodine Fuming</td>
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<tr>
<td>Saliva</td>
<td>Copier paper</td>
<td>Heat &gt; UV &gt; Direct</td>
<td>Iodine Fuming</td>
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<td>Bond paper</td>
<td>Heat &gt; UV &gt; Direct</td>
<td>Iodine Fuming</td>
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<td>Urine</td>
<td>Copier paper</td>
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<td>Bond paper</td>
<td>UV</td>
<td>Iodine Fuming</td>
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<td>Heat in very few</td>
<td>In some cases Iodine Fuming</td>
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</table>

Secret writing written with samples it turns into Brown in color when heated. This is because these samples are either mildly acidic or alkaline in nature and such as an acid or base weakens the paper. When the paper is then held near a heat source these acidic parts of the paper burn or turn brown faster before the rest of the paper revealing the message. These samples were visible under UV light because of their fluorescence or the differentiation of absorbance or reflection of UV rays of them. The reason that lemon juice shows slightly brown fluorescence in most of the cases may due to more concentration of juice.

Iodine fluming of samples revealed secret message in white paper contain starch and when iodine fumes come in contact with the paper they react with starch and produce purple color.

Secret writing written by different organic fluids by using silver nitrate gives brown color and with phenolphthalein gives pink(Colorless) results but in all types of paper the results were negative.

Discussion

Secret writing samples written with different biological fluids and vegetable juices were deciphered by physical and chemical methods. Secret writings written with biological fluids and vegetable juices turned brown in color when heated. This is because these fluids are either mildly acidic or alkaline in nature and such an acid or base weakens the paper. The acid or base from these fluids remains in the paper after the water has evaporated and the paper has dried. These fluids were visible under UV light because of their fluorescence or the differential absorption and reflection of UV rays by them.

The reason that lemon juice showed slightly brown fluorescence in most cases, may be due to more concentration of the juice. Iodine fuming of fruit juices revealed secret messages in white color with purple-brown background because the paper contains starch and when iodine fumes come in contact with the paper, they react with starch and produce purple color while the fruit juices do not react with the fumes and remain colorless. Iodine fuming of chemical and biological fluids revealed
the writing in brown color. Some of the invisible inks appeared transparent when treated with phenolphthalein solution. This may be due to the fact that these fluids are mildly acidic in nature and phenolphthalein is colorless in acidic condition.

The appearance of brown color in case of apple juice, when treated with silver nitrate solution, may be due to some chemical reaction between silver nitrate and certain salt present in the juice. As we know that, certain salts react with silver nitrate and produce a silver salt that decomposes to silver metal on exposure to light and this metallic silver gives brown color. The visibility of the invisible inks used in this project, differed over a period of one month. Although, some of the inks showed neither decrease nor increase in their visibility for the whole month. The visibility of some of the inks, as expected, decreased with time. The constant visibility exhibited by some of the inks may be because they require longer than one month for their fading.

Conclusions

From the results obtained in this study, it could be concluded that the secret writings written with different vegetable juices and biological fluids can be deciphered by physical and chemical methods. Among physical methods, heating is the best for deciphering these fluids as it does not take much time and the document is also not affected if it is heated carefully. Visualization under UV light also doesn’t ruin the document, but all the invisible inks cannot be visualized easily under it, so it becomes time consuming and will require effort for the visibility of messages. Among chemical methods, iodine fuming is the best because it does not spoil the documents extensively, like the phenolphthalein and silver nitrate solution does, for further testing. The purple color of iodine fades away after a few minutes. However, it requires a little more time than heat treatment to develop the secret messages. Both of these methods give good results up to one month. Further studies considering a larger sample size and considering more factors will help gain a better understanding of the visualization methods most suitable for developing secret writing.

Ethical Clearance – Taken from the departmental research committee of Amity University, Noida

Source of funding- Self funding

Conflict of interest – The authors declare no conflict on interest

References

Immediate Effect of Stretching Versus Strengthening Exercises on Blood Glucose Level in Chronic Diabetes Mellitus

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Abstract

Background: Diabetes mellitus affects the muscles as muscle play notable role in the regulation of blood sugar level. The lack of glucose can lead to muscle cells atrophying and therefore loss of muscle mass. Stretching can increase cellular glucose uptake. Strengthening may improve strength, enlarged muscle mass and to improve insulin sensitivity and glycaemic control. Their paucity of literature on immediate effect of stretching versus strengthening exercises on blood glucose level in diabetes mellitus.

Objective: To find out immediate effect of stretching on blood glucose level in diabetes mellitus individuals.
To find out immediate effect of strengthening exercises on blood glucose level in diabetes mellitus individuals.
To compare the immediate effectiveness of stretching and strengthening exercises on blood glucose level in diabetes mellitus individuals.

Methodology: The study was conducted in Krishna hospital, in physiotherapy department. 44 subjects were selected with simple random sampling method. Chronic type 2 diabetes mellitus individuals were divided into two groups. Group A (stretching) and group B (strengthening exercises) was given. The pre- and post–treatment postprandial Blood glucose values was measured by glucometer.

Result: In conducted study, postprandial BGL showed statistically significant difference between pre and post treatment values in both group A and B.

Conclusion: From the above conducted study it concludes that both stretching and strengthening exercises are effective in decreasing postprandial blood glucose level in type 2 diabetes mellitus, as there is no significant difference between both the groups. Strengthening exercises increased more flexibility in females than passive stretching and males were benefited with both stretching and strengthening exercises.

Key words: type 2 diabetes mellitus, stretching, strengthening exercises, postprandial blood glucose level (BGL).

Introduction

Type 2 Diabetes mellitus (DM) is a long-term metabolic disorder that is characterized by high blood sugar, insulin resistance, and relative lack of insulin¹. There are two types of diabetes mellitus; Type 1 diabetes mellitus: insulin dependent and Type 2 diabetes mellitus: non-insulin dependent¹. In India, there are about 50.8 million adults with DM². In Maharashtra there are 9.3% of people with type 2 DM, 51% in females and 49% in males². The onset of this chronic condition and associated comorbidities, a life-long reduction of quality of life and premature mortality due to micro- and macro vascular complications occurs³. Diabetes mellitus (DM) causes disturbance of carbohydrates, fat and protein metabolism resulting in defect in insulin secretion⁴. In DM muscle atrophy is caused by an imbalance in contractile protein synthesis, degradation and overall poor glucose control. As it reduce muscle quality and affects muscle functional capacity to perform physical activities which ultimately can increase secondary complications such as mortality, long term DM damages, inability to function
and failure of organs such as kidneys, eyes, heart and blood vessels\(^{(5,6)}\).

As there is lack of physical activity causing sedentary lifestyle. Hence, body mass index (BMI) increases which leads to obesity. The evidence shown that hemoglobin A1c (HbA1c) is the gold standard for monitoring glycemic control, may to find for diabetes hence, there is changes in HbA1c .In type 2 diabetes mellitus ,the maximal oxygen uptake Vo\(_2\)max values are lower than comparatively normal individuals. This causes alteration in oxygen delivery.\(^{(7)}\)

The type 2 DM is also known as adult onset diabetes which include insulin deficiency and having combination of three main metabolic problems – reduced beta cell function with decreased insulin production, insulin resistance in peripheral tissues, increased hepatic glucose production.\(^{(5)}\)

To achieve good glycemic control in type 2 DM individuals ,an adequate exercise therapy is needed.in aerobic exercise muscles get activated to extract energy in the form of adenosine triphosphate (ATP) it includes jogging ,walking etc.\(^{(6)}\) stretching can increase glucose level uptake when sustained tension develops in muscles trough external forces.\(^{(4)}\) As strengthening exercises can increase muscle strength and enlarge muscle mass and to improve insulin sensitivity and glycemic control.\(^{(5)}\)

**Material and Methodology**

Patients presenting with the history of chronic type 2 diabetes mellitus were diagnosed by physician of KIMS hospital, karad who reported to physiotherapy department of KIMS hospital volunteered to participate in the study were selected as subjects. An approval for the study was obtained from the protocol committee and ethical committee of KIMSDU. Each of the subjects was screened as per inclusion and exclusion criteria and they were briefed about the study and intervention. Informed consent was taken from the subjects. The subjects in group A and group B, stretching and strengthening exercises groups respectively assessed for postprandial BGL by glucometer and exercise regimen was carried out 2 hours after meal according to their allocated groups. Pre and post-exercise blood glucose were measured and documented.

A total no. of 44 subjects were divided into 2 groups (18 females, 26 males) with simple random sampling method. In group A (9 females ,13 males) and in group B (9 females, 13 males).Age group selected for exercise was 40 to 65 years\(^{(5)}\).

The exercise regimen consisted for 10 mins warm up phase, 40 mins intervention phase, 10 mins cool down phase. The intervention for both the groups were carried out for 60 minutes duration. The intervention done on two muscles of upper limbs (biceps brachii, triceps brachii) and two muscles of lower limbs (quadriceps, hamstrings) in both the groups. Both the groups initially treated with free exercises for 10 minutes before and after the intervention phase. Circular rotation of both hands, Anti-circular rotation of both hands, Jogging, Walking. In group A (stretching exercise),Patients were given passive stretching for 40 minutes. Each muscles was held in the stretched position for 30 sec and was repeated for 3 times followed by 10 sec relaxation between 3 sets and different stretches were separated by minimum 1 minute. Biceps stretch, Triceps stretch, Quadriceps stretch, Hamstring stretch bilaterly and in group B (strengthening exercises); Strengthening exercises was performed with theraband for 40 minutes. The patients were asked to performed 3 sets of the exercise with 10 repetition each set with 30 sec relaxation period between the sets for each muscle. The muscles selected for the exercise were similar to the stretching group\(^{(4,5,11)}\).

**Findings**

*Table no. 1.1 Comparison of pre and post postprandial BGL values within group.*

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pre-treatment Mean + SD</th>
<th>Post- treatment Mean + SD</th>
<th>p</th>
<th>T</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>126.9 +10.37</td>
<td>123.4 +10.37</td>
<td>0.0014</td>
<td>3.680</td>
<td>Very significant</td>
</tr>
<tr>
<td>B</td>
<td>131.4 + 12.92</td>
<td>128.2 + 13.15</td>
<td>&lt; 0.0001</td>
<td>12.931</td>
<td>Extremely significant</td>
</tr>
</tbody>
</table>
INTERPRETATION: The pre-interventional postprandial BGL values were 126.9 ± 10.37 in group A and 131.4 ± 12.92 in group B respectively, whereas the post-interventional BGL values were 123.4 ± 10.37 in group A and 128.2 ± 13.15 in group B respectively. Intra-group changes in the postprandial BGL values showed statistically very significant reduction in A group and extremely significant reduction in BGL values in group B. This was done by using paired ‘t’ test.

Table no.1.2. Comparison of pre-pre and post-post postprandial BGL values in between groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Pre-treatment</th>
<th>Post-treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
</tr>
<tr>
<td>A</td>
<td>126.9 ± 10.37</td>
<td>123.4 ± 10.37</td>
</tr>
<tr>
<td>B</td>
<td>131.4 ± 12.92</td>
<td>128.2 ± 13.12</td>
</tr>
</tbody>
</table>

P 0.2191 0.1899

**t** 12.24 1.332

Significance Not significant Not significant

INTERPRETATION: The pre-interventional postprandial BGL values were 126.9 ± 10.37 in group A and 131.4 ± 12.92 in group B respectively, whereas the post-interventional BGL values were 123.4 ± 10.37 in group A and 128.2 ± 13.12 in group B. Inter-group changes in the postprandial BGL values showed statistically not significant difference between both the groups. This was done by using unpaired ‘t’ test.

Table no.1.3. Gender-wise comparison of pre and post postprandial BGL values within group A

<table>
<thead>
<tr>
<th>Group A</th>
<th>Pre-treatment</th>
<th>Post-treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
</tr>
<tr>
<td>Male</td>
<td>127.85 ± 9.82</td>
<td>124.1 ± 10.17</td>
</tr>
<tr>
<td>Female</td>
<td>125.75 ± 11.62</td>
<td>122.4 ± 11.19</td>
</tr>
</tbody>
</table>

P <0.0001 0.1890

**t** 7.117 1.436

Significance Extremely significant Not significant

INTERPRETATION: The pre-interventional postprandial BGL values were 127.85 ± 9.82 in males and 125.75 ± 11.62 in females respectively, whereas the post-interventional BGL values were 124.1 ± 10.17 in males and 122.4 ± 11.19 in females respectively. Intra-group changes in the postprandial BGL values showed statistically extremely significant reduction in male and not significant reduction in BGL values in females. This was done by using paired ‘t’ test.

Table no.1.4 Gender-wise comparison of pre and post postprandial BGL values within group B

<table>
<thead>
<tr>
<th>Group B</th>
<th>Pre-treatment</th>
<th>Post-treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
</tr>
<tr>
<td>Male</td>
<td>131.34 ± 13.61</td>
<td>128.27 ± 13.95</td>
</tr>
<tr>
<td>Female</td>
<td>131.34 ± 12.66</td>
<td>128.14 ± 12.73</td>
</tr>
</tbody>
</table>

P <0.0001 0.0001

**t** 8.035 14.116

Significance Extremely significant Extremely significant
INTRODUCTION: The pre-interventional postprandial BGL values were 131.34 + 13.61 in males and 131.4 + 12.66 in females respectively, whereas the post interventional BGL values were 128.27 + 13.95 in males and 128.14 + 12.73 in females respectively. Intra group changes in the postprandial BGL values showed statistically extremely significant reduction in both males and females. This was done by using paired ‘t’ test.

Discussion

Diabetes mostly contributed by type 2 diabetes mellitus which constitutes 80% to 95% among the total diabetic population. Type 2 diabetes mellitus is formerly called adult onset diabetes.

In DM muscles get atrophy due to insulin resistance and pancreas loses its ability to secret enough insulin. As it reduce muscle quality and affects muscle functional to perform physical activities which ultimately leads to secondary complications such as mortality, long term DM damages, inability to function and failure of organs such as kidneys, eyes, heart and blood vessels. Individuals with type 2 DM having lack of physical activity causing sedentary lifestyle.

This research was undertaken with the aim to study and compare the immediate effect stretching and strengthening exercises on blood glucose level in chronic diabetes mellitus.

44 patients (18 females, 26 males) of type 2 DM, age group 40 – 65 years approaching to OPD of Krishna college of physiotherapy participated in the study. They were divided into two groups. Each group had 22 patients. A thorough diagnose was done in medicine OPD before application of treatment strategies.

Group A was treated with passive stretching. 9 females and 13 males participated in the group. and group B was treated with strengthening exercises with theraband. 9 females and 13 males were included in this study. Two muscles of upper limb (biceps, triceps) and lower limb (quadriceps, hamstring) were taken for treatment for both the groups. Pre-treatment outcome measure for postprandial blood glucose level was done with glucometer. The specific protocol was given to the patients according to the groups. The time taken for the both groups was 60 minutes and at the end of the treatment, blood glucose level was measured by glucometer. Statistical analysis was done using paired ‘t’ test within group and unpaired ‘t’ test was applied to compare the results between the two groups.

In the study pre-interventional postprandial BGL values were 126.9 + 10.37 in group A and 131.4 + 12.92 in group B respectively, whereas the post interventional BGL values were 123.4 + 10.37 in group A and 128.2 + 13.15 in group B respectively. Group A (p = 0.0014, t = 3.680), group B (p <0.0001, t = 12.931). Intra group changes in the postprandial BGL values showed statistically very significant and reduction in postprandial BGL values in A group and extremely significant difference and decreased in BGL values in group B. Inter group analysis for postprandial BGL showed statistically not significant difference between group A versus group B (p=0.2191, t= 1.332).

In the study gender-wise comparison within group A the pre-interventional postprandial BGL values were 127.85 + 9.82 in males and 125.75 + 11.62 in females respectively, whereas the post interventional BGL values were 124.1 + 10.17 in males and 122.4 + 11.19 in females respectively. Males (p <0.0001, t = 7.117), females (p = 0.1890, t = 1.436). Intra group changes in the postprandial BGL values showed statistically extremely significant difference and reduction in males and not significant difference in postprandial BGL values in females.

In the study gender-wise comparison in group B pre-interventional postprandial BGL values were 131.34 + 13.61 in males and 131.4 + 12.66 in females respectively, whereas the post interventional BGL values were 128.27 + 13.95 in males and 128.14 + 12.73 in females respectively. Males (p<0.0001, t = 8.035), females (p<0.0001, t = 14.116). Intra group changes in the postprandial BGL values showed statistically extremely significant difference and reduction in both males and females.

In above study, 60 mins of treatment were divided into 3 phase ( warm up phase, treatment phase, cool down phase.) for both the groups.

Free exercises to warm up the body and activate the muscles for further treatment for both the groups. Even after treatment (cool down phase),free exercises which helped in muscle relaxation.

In group A, Passive stretching improved flexibility, elongated a shortened muscle-tendon unit and peri-articular connective tissues. It helped to remove...
contracture formation and other soft tissues that had adaptively shortened. It was found to be extremely significant in males compared to that of females. The other group i.e Strengthening, produced muscle tension and increased in the maximum force – producing capacity of muscle and increased in muscle fiber size and flexibility. Insufficient muscular strength caused major functional losses of even the most activities of daily living\(^{(5,6,8,9,10)}\).

Therefore strengthening increased more flexibility in females than passive stretching and males were benefited with both stretching and strengthening exercises. statistically it was found that the results were not significant difference between group A and group B.

**Conclusion**

Thus, from the above conducted study it concludes that both stretching and strengthening exercises are effective in decreasing postprandial blood glucose level in type 2 diabetes mellitus, as there is no significant difference between both the groups. Strengthening exercises increases flexibility in females than passive stretching and males were benefited with both stretching and strengthening exercises.

**Conflicts of Interest:** There is no conflict of interest in this study.

**Source of Funding:** Self-funded

**Ethical Clearance:** This study undergone ethical clearance through the university level ethical committee. Protocol number 087/2019-2020.

**References**


Origin of Parisian Laws and Regulations in India: “Fons et origo of Zoroastrianism”

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Abstract

The present article is elucidation of Parsi’s and their personal laws to make it a less confused and more comprehensible study matter. The title “Fons et origo of Zoroastrianism” means the source or the origin of Zoroastrianism. Those who believed that there’s only one Supreme God namely “Ahura Mazda” are known as Zoroastrians. The researcher has discussed the status of Parsis from its inception till date. This piece of work starts with a detailed study of their origin, simplifying their upbringing and tracing their movements and further stressing on the enactment & application of their laws in India. This piece of literature, emphasizing on the origin of the Zoroastrians further focuses on the legal provisions relating to Parsi marriages, divorce and maintenance as well. In Toto it’s a compilation of the most needed information and majorly required provisos relating to Parsis.

Keyword: Parsi, Zoroastrian, Personal laws, Marriage, Divorce, Maintenance.

Introduction

“In all religions we hear of the seven planetary genii: The Hindu tells of seven Rishi, The Parsi of seven Ameskaspentas, The Mohammedan of seven Archangels & The Christian religion has its seven spirits before the throne” Max Hoindel

As per my style of upbringing i.e a “typical Hindu”, I was always thought that “God is one” and “All religions are path to the same God” but as I grew to learn the upbringing of every religion, I find differences in origin source, style and words but the essence of a “common truth” remaining constant. Zoroastrianism being a uniquely different on drew my attention first the Parsi people who may also be addressed as the “Tajiks of Afghanistan”, or Tajikistan and Uzbekistan” or the “Tats of Eastern Caucasus (Republic of Azerbaijan)” were a major nomadic branch of the Iranian population that entered Iran during the 10th century B.C.

Varieties of terms were derived from the Greek word “Persis (e.g. Persia) to refer to such people who occupied the major portion of the Pars Province (or Fars), cultural capital of Iran The term “Persia” soon become an official name for all of Iran for many years.1 Soon the western world became familiar to the term “Persian” to refer the Inhabitants of Iran.²

However, it is essential to know who a Parsi is? It is a fairly, well known that the Parsis came from Persian Province of ‘Pers’or“Pars’ from which the word Parsi’, has been originally derived. The Parsis are said to follow “Zoroastrian” religion. The words “Zoroastrian” & “Parsi” are used interchangeably. Although their original faith does allow conversion amongst Parsis but Zoroastrian religion is a non-convertible religion. In India it was held that: “conversion to Zoroastrian religion is against usage and customs”. Thus Parsi means those Persons who are descendants of original Persian emigrants or Person whose father is or was a Parsi and mother an alien but admitted to Zoroastrian faith or Zoroastrians from Iran who are or have been residing in India.

Rise of Persian Empire:

However according to the “Black Obelisk of Shalmaneser III and Merriam Webster online dictionary, the first Persian empire was founded by Cyrus the great in 550 BC which was a small collection of semi nomadic tribes that raised sheep’s, goats & chattel on the Iranian Plateau but by defeating the nearby kingdoms of Media, Lydia & Babylon & so on and bringing them under a single rule, he soon established the world’s first super power uniting: Mesopotamian civilization, Egypt’s Nile Valley Civilization and the Indus Valley Civilization”
known as Achaemenid Empire or Persian Empire.

The above-mentioned empire stretches from Europe’s Balkan Peninsula (in parts of Bulgaria, Romania, Ukraine) to the Indus River Valley in Northeast India and South of Egypt.

The Persian people were highly talented. Their works includes architecture, weaving, painting calligraphy, metalworking, painting, sculpture, stone masonry, literature, music etc. Their art is considered to be one of the richest art heritages in world history. They were the people who developed the various means and routes of communication between Africa, Asia and Europe, and the world’s first portal services as well.

The Persian Empire witnessed the dominance of Islamic religion after the Arab conquests and early Islamic conquests. Thereafter Zoroastrianism prevailed as a religion in the first Persian empires under the beliefs of monotheistic faith of the founder of Zoroastrianism, Prophet Zoroaster (Zarathrustra in ancient Persian) Parsis are followers of Zoroastrianism in India.

A group of these above-mentioned Zoroastrian emigrated from Persia to prevent themselves from the Islamic religious persecution by the Muslim majority after the early Muslim conquests.

The symbol of Zoroastrians was fire purity symbols for Persians were that of fire & water. They worshipped in “fire temples”. Each temple had an altar with an eternal flame that burnt continuously or never extinguished. These were said to have come dulcetly from “Ahura Mazda” (Zoroastrian God).

The most unique feature of Zoroastrian religion being the “sky burial” of the dead. The dead were exposed to the local vultures by putting them on flat, circular toped towers called “dakhmas” or the towers of silence. Their corpse had to follow this procedure until the bones were picked clean & bleached and further collected and placed in ossuaries (lime pits).

In the present time Zoroastrians bury their dead under concert slabs in Iran because of the declaration that “Dakhmas” are illegal in Iran since 1970s. The last “dakham” in operation is located near Mumbai, India. The 19th century novel by the German philosopher Friedrich Nietzsche named “Thus spoke Zarathustra” made the Zoroastrian founder famous amongst the Europeans. In the mentioned novel Nietzsche follows Zaurastra in his travels.

In a similar way Zoroastrianism became known to the western culture through the works of the famous British musician Freddie Mercury who was a Parsi descent and even his funeral was performed by an Zoroastrian priest in London.

Even the American novelist George R.R. Morlin creator of the fantasy series “A song of ice and fire” played a vital role in spreading the concept of Zoroastrianism. Since this novel was later adapted into HBO series “Game of Thrones, developed the legend of “AzorAhai” form Zoroastrianism, where AzorAhai was a warrior demigod who defeated darkness with the help of a fire God “R’hllor”. Here “R’hllor” s’ concept is said to be derived from the Zoroastrian fire God “Ahura Mazda”.

After the doom of the invasion of Greece by Xerxes I IN 480 B.C the Persian Empire entered a period of decline due to the depletion of the funds of the empire leading to a heavier taxation amongst the Persian subjects.

Finally, the Achaemenid dynasty was captured by the invading armies of Alexander the great.

Subsequently the rulers tried to restore the Persian empire to its original boundaries but could not succeed to regain the boundaries, that it had achieved under Cyrus the Great.

Thus, the Indian Parsis belong to the Zoroastrian faith, whose foundation is the belief in one God and on the basic tenets of good thoughts, good words and good deeds. The Indian Zoroastrians enjoy a non-proselytizing faith.

In Sir Denshaw M. Patel V. Sir Jamsetji Jiji Bhaiit was stated that it is against the usage and customs of the Parsis of India. (i.e. conversion to the Zoroastrian religion)

Hindu ruler at the time of immigration of Parsis to Indian had a condition imposed on them that “they would adopt Hindu customs of marriage. However later Parsis were greatly influenced by the customs which were followed by Hindus.

**Application of Parsi Laws**

In modern times Parsi laws apply to:
Ø Persons who have descended from the original Persian emigrants, who are or were born of Zoroastrian parents and profess Zoroastrian faith.

Ø Persons whose father is or was a Parsi and whose mother an alien but has been admitted to Zoroastrian faith

Ø Zoroastrians those who are from Iran but who are either temporarily or permanently residing in India.

Five conditions laid down by the Indian ruler for Parsis were:

Ø “They should adopt the local language.

Ø They should translate their holy teats into the local language.

Ø Their women should wear saree and not their attire.

Ø They should follow the local rites of marriage.

Ø They should surrender their arms.”

(cabinetmaker 1991: 2-3)

Thus, on agreeing to the above five conditions the king allowed them to build their fire temples.

During the rule of East India Company in India, the British charters explicitly saved the customs and usages of Hindus and Muslims in civil matters as they were deemed religious, unlike the Paris’s, Jews, Americans etc.

In exercise of the discretionary powers granted to the Judges, on the English principles of Justice, Equity & Good conscience, the residuary communities of Jews, Parsis etc. were operated under these English Laws. Later the English Common laws were applied to the Parsis and their proper descendants subject to certain exceptions relating to marriage and bigamy. In Sec. 50 & 56 of the Indian Succession Act, 1925 there are special rules for Parsi Intestacy. Arsis are also governed by the Parsi Marriage and Divorce Act of 1936.

There’s no legal adoption been followed to amongst the Parsis and therefore if a Parsi couple adopts a child, such child won’t be able to enjoy the automatic rights of inheritance.

Being one of the most progressive communities Parsis have always been into such conflicts between liberal & orthodox viewpoints.

However, in my opinion the old traditions and cultures should be preserved since India is a country of rich heritage but some sensitization efforts should be made to reform the current personal laws and creating new codified laws in order to preserve such small communities like Parsis, Christians etc. and their rich cultural heritage as well.

Marriage Under Parsi Law:

Marriages under Parsis are being governed under “THE PARSI MARRIAGE AND DIVORCE ACT, 1936 (ACT 3 OF 1936) (23rd April, 1936)” in India.

Parsis or the Zorastrians are generally opposed to inter-caste marriages and most practice endogamy (marrying within their own community or like groups namely, Yazidis, Druze, Mandaens etc.)

A Parsi most likely marries a fellow Parsi because they believe being an ethno religious group, so that one can only become a Parsi if one is born out of such a marriage.

The requisites for a valid Parsi marriage are:

“(1) No marriage shall be valid if:

(a) the contracting parties are related to each other in any of the degrees of consanguinity or affinity set forth in Schedule 1; or

(b) such marriage is not solemnized according to the Parsi form of ceremony called ‘Ashirvad’ by a priest in the presence of two Parsi witnesses other than such priest; or

(c) in the case of any Parsi (whether such Parsi has changed his or her religion or domicile or not) who, if a male, has not completed twenty-one years of age, and if a female, has not completed eighteen years of age.

(2) Notwithstanding that a marriage is invalid under any of the provisions of sub-section (1), any child of such marriage who would have been legitimate if the marriage had been valid, shall be legitimate.”

In cases where the father is a Parsi but the mother is not a Parsi, in those cases the child will be accepted in the religion only if the father applies for the child to be admitted into the religion through proper ceremony and steps as prescribed in their laws and customs.
Chinnappa Reddy, J. in Jorden Diengdeh v. S.S. Chopra observed: “that the law relating to judicial separation, divorce and nullity of marriage is far from being uniform. Surely time has now come for a complete reform of the law of marriage and to make it a uniform law applicable to all the people irrespective of religion caste and creed.”

**Divorce Under Parsi Law:**

Under the Parsi Marriage And Divorce Act 1936 the grounds of divorce has been stated under section 32 as follows: “Any married person may sue for divorce on any one or more of the following grounds, namely:

(a) that the marriage has not been consummated within one year after its solemnization owing to the willful refusal of the defendant to consummate it;

(b) that the defendant at the time of the marriage was of unsound mind and has been habitually so up to the date of the suit:

Provided that divorce shall not be granted on this ground, unless the plaintiff (1) was ignorant of the fact at the time of the marriage, and (2) has filed the suit within three years form the date of the marriage;

12(bb) that the defendant has been incurably of unsound mind for a period of two years or upwards immediately preceding the filing of the suit or has been suffering continuously or intermittently from mental disorder of such kind and to such an extent that the plaintiff cannot reasonably be expected to live with the defendant.”

Under section 32A the proviso relating to “Non-resumption of cohabitation or restitution of conjugal rights within one year in pursuance of a decree to be ground for divorce” have been stated as:

“(1) either parties can sue for divorce under these following grounds:

(i) that there has been no resumption of cohabitation as between the parties to the marriage for a period of one year or upwards after the passing of a decree for judicial separation in a proceeding to which they were parties; or

(ii) that there has been no restitution of conjugal rights as between the parties to the marriage for a period of one year or upwards after the passing of a decree for restitution of conjugal rights in a proceeding to which they were parties.

(2) No decree for divorce shall be granted to the plaintiff if he has failed or neglected to comply with any order for maintenance passed against him under section 40 of this Act or under section 488 of the Code of Criminal Procedure 1898 or section 125 of the Code of Criminal Procedure 1973.”

Under Section 32B of Parsi Marriage and Divorce Act 1936 the proviso for Divorce by mutual consent have been stated as:

“(1) Subject to the provisions of this Act, a suit for divorce may be filed by both the parties to a marriage together, whether such marriage was solemnized before or after the commencement of the Parsi Marriage and Divorce (Amendment) Act, 1988, on the ground that they have been living separately for a period of one year or more, that they have not been able to live together and that they have mutually agreed that the marriage should be dissolved:

Provided that no suit under this sub-section shall be filed unless at the date of the filing of the suit one year has lapsed since the date of the marriage.

(2) The Court shall, on being satisfied, after hearing the parties and after making such inquiry as it thinks fit, that a marriage has been solemnized under this Act and the averments in the plaint are true and that the consent of either party to the suit was not obtained by force or fraud, pass a decree declaring the marriage to be dissolved with effect from the date of the decree.”

**Claim For Maintenance By Parsis:**

Parsis can claim from their partners for maintenance through criminal/civil proceedings or if interested they can even pursue for both the procedures simultaneously. However, the religion matters in case of Civil Proceedings but not in case of the criminal proceedings. In cases where the husband refuses to pay maintenance the wife can inform about the same to the court as it would be treated as contempt of court. Such husband can be sentenced to imprisonment and may be detained unless he pays.

Under the Parsi Marriage And Divorce Act 1936 both alimony pendente and permanent alimony has been recognized.
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The Bombay High Court in Hirabai Bharucha v. Pirojshah Bharucha where, a writ entitled to maintenance under section 40 of the Parsi Marriage and Divorce Act 1936, gave up her right in terms of an agreement.

Conclusion

The urge for migration of the Parsis was not driven by chance but its due to their individual determination to work hard and do the best possible for their Parsi group and family in light of the changing conditions that have occurred in India both socially and economically in the last few decades. Zoroastrianism might ultimately be accepted as the group which has abundant contribution to the society at large not specifically their group but others as well who were in need of spiritual dimension to enhance their personal lives.

Ethical Clearance: Not required, as the research article is based on origin of Parsi Laws and its legal provisions. The research is doctrinally undertaken.

Source of Funding : Self

Conflict of Interest : Nil

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Cheiloscopy – A Tool of Identification

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Abstract

Lip prints are a constant anatomical structure and are absolutely unique to an individual and thus are an infallible means of personal identification. The present study was conducted in the Department of Forensic Medicine & Toxicology, on Undergraduate students (2015 batch) of Osmania Medical College, Hyderabad, Telangana. Sample size comprised of 196 students (78 males & 118 females) and aged between 17 and 20 years. In the present study, it was found that, Type I lip pattern was most commonly seen among males i.e. 70 out of 78 individuals studied (90%) and among females also type I lip print pattern was seen predominant i.e. 99 out of 118 individuals studied (84%). It was recorded that Type I lip print pattern was found to be more frequent among both the genders followed by type I lip print patterns. The analysis of presence of lip print in each quadrant among 196 individuals shows that the most common lip print pattern is in Upper right quadrant (URQ) of male lip was Type I’ 71 (91%), while among females these patterns are found to be 103 (87%). In upper left quadrant (ULQ) Type I’ was found among 71 (91%) males, same as that of 1st quadrant, while in females it is 98 (83%). In lower left quadrant (LLQ) among the male lip Type I’ [72 (92%)] was mostly seen, while in females it is same with type I’ pattern of 99 (84%). In lower right quadrant (URQ) of male showed Type I’ [68 (87%)], while among females type I’ pattern [98 (83%)] was found.

Key words- lip prints, type I pattern, upper right quadrant.

Introduction

Lips are highly sensitive mobile folds, composed of skin, muscle, glands and mucous membrane. They surround the oral orifice and form the anterior boundary of the oral cavity. There are two different kinds of lip covering - skin or mucosa. When the two meet, a white wavy line is formed- the labial cord which is quite prominent in Negroes. Where identification is concerned, the mucosal area holds the most interest. This area, also called Kleint’s Zone, is covered with wrinkles and grooves that form a characteristic pattern- the lip print. However, this is not the only area that deserves careful study. In fact, in cheiloscopy, one should also analyze lip anatomy, considering their thickness and position. The lips can be horizontal, elevated or depressed and, according to their thickness; it is possible to identify the following four groups:

1. Thin lips (common in the European Caucasian)
2. Medium lips (from 8 to 10mm, are the most common type)
3. Thick or very thick lips (usually having an inversion of the lip cord and are usually seen in Negroes) and
4. Mix lips (usually seen in Orientals)¹

Aims and Objectives

1) To determine the identity from lip prints.

2) To determine whether sex can be determined by lip prints.

3) To discover the most common pattern of the lip prints in the study group.

Materials and Method

Lip prints were collected from the subjects after obtaining their informed consent in the month of October.
Dark colored lip stick was used for printing over the rough surface of drawing chart. The subject was asked to rub his/her lips after application of lip stick. Prints were taken on the rough surface of drawing chart with centre portion of lips dabbed first and then pressing it uniformly to either side. Lip prints studied based on KAZUO SUZUKI and Y TSUCHIHASHI classification. For recording the finger prints, imprints of the fingers were taken on a plain white paper using ink pad. Observation of prints done by magnifying lens.

I) Inclusion Criteria
- Subjects willing to participate in the study and providing informed consent
- Subjects free from any active or passive lesions on their lips.

II) Exclusion Criteria
- Gross deformities of lips like cleft lip, surgical interventions, ulcers, traumatic injuries on lips, cracked lips.
- Known allergy to the lip stick ingredients.

III) Sampling Design
- Purposive sampling technique

IV) Study Design
- Observational study

V) Place Of Study
- Department of Forensic Medicine, Osmania Medical College, Hyderabad.

Observations and Results
The present study was conducted to assess the quadrant wise and gender wise predilection of Lip print patterns. Lip print impressions were obtained from both males and females and were classified by Suzuki’s classification. The distribution of lip print types in males and females in each quadrant were compared.

Table 1 depicts the overall results of the present study. The distribution of various types of lip prints in all the four quadrants of both males and females have been summarized here.

<table>
<thead>
<tr>
<th>Type</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type I</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First quadrant</td>
<td>68 (87%)</td>
<td>92 (78%)</td>
</tr>
<tr>
<td>Second quadrant</td>
<td>67 (86%)</td>
<td>73 (62%)</td>
</tr>
<tr>
<td>Third quadrant</td>
<td>65 (83%)</td>
<td>79 (67%)</td>
</tr>
<tr>
<td>Fourth quadrant</td>
<td>67 (86%)</td>
<td>74 (63%)</td>
</tr>
<tr>
<td>Type I’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First quadrant</td>
<td>71 (91%)</td>
<td>103 (87%)</td>
</tr>
<tr>
<td>Second quadrant</td>
<td>71 (91%)</td>
<td>98 (83%)</td>
</tr>
<tr>
<td>Third quadrant</td>
<td>72 (92%)</td>
<td>99 (84%)</td>
</tr>
<tr>
<td>Fourth quadrant</td>
<td>68 (87%)</td>
<td>98 (83%)</td>
</tr>
<tr>
<td>Type II</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First quadrant</td>
<td>56 (72%)</td>
<td>69 (58%)</td>
</tr>
<tr>
<td>Second quadrant</td>
<td>57 (73%)</td>
<td>79 (67%)</td>
</tr>
<tr>
<td>Third quadrant</td>
<td>58 (74%)</td>
<td>85 (72%)</td>
</tr>
<tr>
<td>Fourth quadrant</td>
<td>57 (73%)</td>
<td>77 (65%)</td>
</tr>
</tbody>
</table>
Table 2 shows the percentage distribution of the pattern of the lip prints on the total subjects of 196 (118 females and 78 males) in first quadrant. In males the most common lip print patterns are type I’ (91%) followed by type I (87%), type II (72%), type III (50%), type IV (37%) and type V (3%). In females the most common lip print patterns are type I’ (87%) followed by type I (78%), type II (58%), type III (22%) and type IV (11%). Type V pattern is absent in females.

Table 2: Lip prints in First Quadrant (LUQ)

<table>
<thead>
<tr>
<th>Types</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td>68 (87%)</td>
<td>92 (78%)</td>
</tr>
<tr>
<td>Type I’</td>
<td>71 (91%)</td>
<td>103 (87%)</td>
</tr>
<tr>
<td>Type II</td>
<td>56 (72%)</td>
<td>69 (58%)</td>
</tr>
<tr>
<td>Type III</td>
<td>39 (50%)</td>
<td>26 (22%)</td>
</tr>
<tr>
<td>Type IV</td>
<td>29 (37%)</td>
<td>13 (11%)</td>
</tr>
<tr>
<td>Type V</td>
<td>2 (3%)</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 3 shows the percentage distribution of the pattern of the lip prints on the total subjects in second quadrant. In males the most common lip print patterns are type I’ (91%) followed by type I (86%), type II (73%), type III (50%), type IV (26%) and type V (3%). In females the most common lip print patterns are type I’ (83%) followed by type I (62%), type II (67%), type III (26%) and type IV (15%). Type V lip patterns are not seen in females.
### Table 3: Lip prints in Second Quadrant (RUQ)

<table>
<thead>
<tr>
<th>Types</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td>67 (86%)</td>
<td>73 (62%)</td>
</tr>
<tr>
<td>Type I’</td>
<td>71 (91%)</td>
<td>98 (83%)</td>
</tr>
<tr>
<td>Type II</td>
<td>57 (73%)</td>
<td>79 (67%)</td>
</tr>
<tr>
<td>Type III</td>
<td>39 (50%)</td>
<td>31 (26%)</td>
</tr>
<tr>
<td>Type IV</td>
<td>20 (26%)</td>
<td>18 (15%)</td>
</tr>
<tr>
<td>Type V</td>
<td>2 (3%)</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4 shows the percentage distribution of the pattern of the lip prints on the total subjects in third quadrant. In males the most common lip print patterns are type I’ (92%) followed by type I (83%), type II (74%), type III (47%), and type IV (17%). In females the most common lip print patterns are type I’ (84%) followed by type I (67%), type II (72%), type III (23%) and type IV (5%). Type V lip patterns are not seen both in males and females.

### Table 4: Lip prints in Third Quadrant (RLQ)

<table>
<thead>
<tr>
<th>Types</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td>65 (83%)</td>
<td>79 (67%)</td>
</tr>
<tr>
<td>Type I’</td>
<td>72 (92%)</td>
<td>99 (84%)</td>
</tr>
<tr>
<td>Type II</td>
<td>58 (74%)</td>
<td>85 (72%)</td>
</tr>
<tr>
<td>Type III</td>
<td>37 (47%)</td>
<td>27 (23%)</td>
</tr>
<tr>
<td>Type IV</td>
<td>13 (17%)</td>
<td>6 (5%)</td>
</tr>
<tr>
<td>Type V</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 5 shows the percentage distribution of the pattern of the lip prints on the total subjects in fourth quadrant. In males the most common lip print patterns are type I’ (87%) followed by type I (86%), type II (73%), type III (59%), type IV (4%) and type V (3%). In females the most common lip print patterns are type I’ (83%) followed by type I (63%), type II (65%), type III (24%) and type IV (4%). Type V lip patterns are not seen in females.
Table 5: Lip prints in Fourth Quadrant (LLQ)

<table>
<thead>
<tr>
<th>Types</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td>67 (86%)</td>
<td>74 (63%)</td>
</tr>
<tr>
<td>Type I'</td>
<td>68 (87%)</td>
<td>98 (83%)</td>
</tr>
<tr>
<td>Type II</td>
<td>57 (73%)</td>
<td>77 (65%)</td>
</tr>
<tr>
<td>Type III</td>
<td>46 (59%)</td>
<td>28 (24%)</td>
</tr>
<tr>
<td>Type IV</td>
<td>18 (23%)</td>
<td>5 (4%)</td>
</tr>
<tr>
<td>Type V</td>
<td>2 (3%)</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 6 shows the comparison of the results of this study to other studies which showed the predominant pattern of lip prints in all the quadrants among both males and females.

Table 6: Comparison between the present study and other studies regarding Common lip print pattern among males and females

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Previous studies</th>
<th>Order of frequency of lip print patterns</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Suzuki and Tsuchihashi (1970)2</td>
<td>III &gt; I &gt; II &gt; IV</td>
</tr>
<tr>
<td>2.</td>
<td>Vahanwala (2000)3</td>
<td>I &gt; I’ &gt; II &gt; IV &gt; III</td>
</tr>
<tr>
<td>5.</td>
<td>Gopichand et al (2010)6</td>
<td>III &gt; I &gt; II &gt; IV &gt; I’</td>
</tr>
</tbody>
</table>

Discussion

Studies in relation to lip identification and evaluation have been carried out for more than half a century, and its importance has been recognized and accepted worldwide. Research has characterized lip prints in order to ascertain their features and characteristics, with lip print types, forensic application of the technique, and the method of acquiring lip impressions at the crime scene. Despite of the lip growth with age, the lip print invariably remains the same. A post mortem study revealed that lip prints can be obtained clearly if taken less than 24 hours after death.

Unlike fingerprints, unanimity still does not exist between examiners to accept cheiloscopy as a method of human identification. Some researchers are trying to relate characteristic lip patterns with person’s gender,
and detected DNA in latent lip prints.\textsuperscript{11} Research suggests that there is a conclusive evidence that lip prints are suitable for the successful comparison, analysis and identification of a person to a crime. In fact there have been convictions of perpetrators who were positively identified via the analysis of their known lip prints to those found at the crime scene. There is a need to develop one cohesive cheiloscopy system, practicable in forensic medicine.

In present study common lip print pattern was calculated by considering all the four quadrants among 196 subjects (78 males & 118 females). It was recorded that in males, 85% had type I lip pattern, 90% with type I’ pattern, 73% with type III pattern, 26% with type IV pattern and 2% had type V pattern. In females 73% had type I lip pattern, 84% with type I’ lip pattern, 65% with type II pattern, 24% with type III pattern, 9% with type IV pattern. Type V lip pattern was totally absent among female subjects. Present study had shown that type I’ lip pattern most commonly seen among all the study subjects.

In the study conducted by Amith HV et al\textsuperscript{9} shown that type I’ lip patterns were seen in 45% of males followed by type I pattern which is of 16% in males in the first quadrant.

In the study conducted by Augustine et al had shown that most predominant pattern in the entire study population, taking both the upper and lower lips together, was type III which constituted 48.2\%, followed in order by type II (18.92\%), type IV (17.44\%), type I (11.10\%), type I’ (2.54\%) and type V (1.58\%). The present study did show 51\% of males and 24\% of females had type III lip pattern\textsuperscript{1}.

The present study had showed that type I’ (type I variant) lip patterns are most predominant in all the quadrants followed type I patterns, type II, type III and type IV lip patterns in both males and females. These results are in contrast to the previous studies conducted on lip prints by, Kulkarni et al (2013)\textsuperscript{12}, Ghimire et al (2013)\textsuperscript{13}, Supraneni et al (2015)\textsuperscript{14}, Vahanwala et al (2000)\textsuperscript{2}. Type I pattern was found to be dominant in females in third and fourth quadrants and type II was dominant in males in third and fourth quadrants as reported by Vahanwala et al\textsuperscript{2}. In his study all four quadrants having the same type of patterns was predominantly seen in female subjects. In this study all the four quadrants having same type of patterns and was seen the same both in male and female subjects.

**Conclusion**

This study concluded that lip prints are a constant anatomical structure and are absolutely unique to an individual and thus are an infallible means of personal identification, if collected and analyzed carefully. Even the prints of the upper lip were different from the lower lip. Such is the uniqueness and it is unchangeable even if taken after some time from the same person. Each lip print pattern never occurred singly but present as a combination of all the 4 patterns.

In the present study, we found that Type I’ is common in all the quadrants in both sexes followed by Type I, Type II, Type III and Type IV. The latter two types III and IV are present predominantly in males. Type V lip pattern is present exclusively in males. In finger prints loops are the commonest in both sexes.

With reference to sex, lip prints vary from males and females in the following manner.

1) Grossly, the lips of males are larger in size in length and breadth in comparison to the females.

2) The Vermilion border in males is ill-defined due to the interference of the mustache whereas in females it is well defined with Cupid’s bow.

3) Branching and intersection of grooves is more prominent towards the peripheries of all quadrants in both males and females but it is more significant in males.

4) Patterns 3 and 4 are predominant in all the quadrants in males.

5) The least common pattern is Type V which is not found in females but present only in males.

**Conflict of Interest** – Nil

**Source of Funding** - Self

**Ethical Clearance** – Institutional Ethical Committee clearance taken

**References**


Assessment of Mandibular Condylar Morphology Using Digital Orthopantomogram in Chennai Population

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Abstract

Objective: The present study was performed to evaluate the variation in shapes of mandibular condyle, determine the predominant shape and to assess any peculiarities in either gender in an Orthopantamogram (OPG).

Materials and Method: Radiographic evaluation of 3200 condylar heads after analyzing 1600 digitalized OPG’s were done. On analyzing, there were four different morphology of condyles observed. Variations occurring in the shapes were assessed, and combinations of the condylar shapes present in the population were established.

Result: Of 1600 pairs of condylar heads evaluated, 78% were oval in shape, followed by diamond (12%), crooked finger (6%) and least being bird beak (3%). Oval-oval was commonly occurring combination (60.5%) whereas crooked finger-bird beak combination was found to be very rare.

Conclusion: Dental professionals must have thorough knowledge in differentiating between normal and abnormal condyle morphology in an OPG as it possesses a diagnostic challenge for them. Asymmetries that occur in condyle morphologies radiographically in absence of clinical signs and symptoms of TMDs are considered to be normal.

Keywords: Orthopantomographs, Bird beak, Crooked Finger, Oval, Diamond, Condyle, TMJ.

Introduction

Mandibular condyle is seen roughly as ovoid in outline. Its dimensions are 15-20 mm mediolaterally and 8-10 mm postero-anteriorly. Many assumptions were made towards the shape of a condyle. Most commonly reported shape of condyle was convexity throughout and it should be symmetrical on both the sides i.e. right and left sides of the same individual. Hence, anything, which deviates from this convex morphology, was considered as pathology but normal variation in shape of condyle does occur.

Morphological alterations in the condyle can be due to simple developmental variability or as remodeling of condyle to cope with developmental variations, malocclusion, trauma, endocrine disturbances and radiation therapy. Hence, a thorough understanding of the morphology of mandibular condyle is essential to distinguish between normal variant from abnormal conditions.

The basic morphology of mandibular condyle is thought to be established early, and modified throughout life according to functional load. Condyle morphology variations occur with age, gender, facial type, Occlusal force and also even between condyles on either sides.

Orthopantomographs is of diagnostic importance as it is both cost efficient and it relatively reduces the dosage of radiation received by the patients. Panoramic
radiography remains the main screening modality for TMJ abnormalities if clinical examination suggests any joint pathology. Hence, OPG’s are valuable for determining the presence of osseous changes.

Our study aims to evaluate and document the variations in the shape of condyle on an OPG that aids in diagnostics i.e. distinguishing varying normal condylar shapes from abnormalities. The objective of this study is,

1. To evaluate the variations in shape of condyle seen in Chennai Population.
2. To determine the shape predominant in that population
3. To assess whether there is any peculiarity in either gender
4. To determine the occurrence of symmetry in shape of condyle on either side.

Materials and Method

Digital Panoramic Radiographs (OPG) (Planmeca-exposure parameters: 10 mA, 70 Kvp) which showed a full view of mandibular condyle on right and left side with optimum density and contrast were selected from the Oral Medicine and Radiology Department, Saveetha dental college. This is a retrospective study.

The present study comprised of radiographic evaluation of 3200 condylar heads after viewing 1600 digitalized OPG’s taken for routine radiographic investigation among Chennai Population. In our study, radiographs of 807 males and 793 females ranging from the age 18-65 years were included. OPG’s in which condyle heads can be visualized clearly were included in this study. OPG’s taken for patients who came for treatment of multiple dental caries or generalized periodontal disease were selected. OPGs of patients with history of TMD’s, Trauma, occlusal discrepancy, developmental abnormality, were excluded from this study. Condylar morphology of four types by Chaudry et al were identified which are

1) Type I - Oval shape.
2) Type II - Bird Beak Shape
3) Type III - Diamond shape.
4) Type IV - Crooked finger shape.

Results

A total of 3200 condyles were analyzed from 1600 subjects with age ranging from 18 to 65 years, out of which 807 were male and 793 were female.

A. Type of shape commonly seen: The shapes suggested by Chaudry et al were seen namely i) Oval, ii) Diamond, iii) Bird beak and iv) Crooked finger.

1. The most common shape was found to be Oval (78%), followed by Diamond (12%), Crooked finger (6%) and least being Bird beak (3%).

2. The most common shape observed among both males and females is Oval shape which accounted for about 74% in males and 72% in females respectively.

3. The combination of commonly seen shape among both male and female is Oval-oval which accounted for about 63% and 57% respectively as shown in Figure 1-6.

B: The gender wise distribution of shapes was evaluated. In males, Oval shape (74%) was predominant followed by Diamond shape (18%), Crooked finger (6%) and Bird beak shape being least common (2%). In females, Oval shape accounted for about (72%) followed by Diamond shape (18%), Crooked finger (6%) and Bird beak (4%).

C: To evaluate the combination of shapes occurring radiographically, revealed Oval-oval being the commonest shape which accounted for about 60.5% and Crooked finger-Diamond and Crooked finger-Bird beak is the least common combination which accounted for about 0.02% and 0.03% respectively.

Figure 1: OPG shows Crooked Finger appearance of mandible on either sides.
Figure 2: OPG reveals Diamond Shape of condyles on both the sides of mandible

Figure 3: OPG reveals Bird beak and Crooked finger shape Combination
Figure 4: This OPG shows Oval and bird beak shape combinations of condyle

Figure 5: This OPG reveals Oval and Crooked finger shape combination of condyle

Figure 6: This OPG shows Diamond and Crooked Finger combination of condyle on either sides
Discussion

Condyle responds to continuous stimuli throughout the remodeling process, and thus plays an important role in the final morphological dimensions of the adult mandible. The condyle has a special importance in growth of mandible.

**Figure 1: Shapes of Condyle on a Radiograph**

The appearance of mandibular condyle varies in different shape and size among different age groups and individuals. In 1961, Yale et al. was the first one to report about the different shapes of mandibular condyle. Initially Yale classified condylar head based on superior view into three categories namely concave, convex and flat, however later on he simplified it into five categories namely convex, flattened, angled, rounded and concave.

Evaluation of the shape of condyles upon surgical exposure of TMJ revealed that most of the condyles had a normal size and shape. Other varieties like excavated form, oblique shape, small round condyles and flattened condyles were noted.

Using different radiographic techniques many studies were done to detect the condylar morphology, to compare the accuracy of detecting condylar changes in temporomandibular disorders.

The most prevalent morphologic changes are detected in the TMJ of elderly persons due to the onset of joint degeneration.

The normal morphological variations like diamond, bird beak, crooked finger, oval should not be mistaken with TMJ pathologies like flattening of articular surface, erosions, pencil shaped condyles, osteophytes, anterior lipping of condyle and ely’s cyst.

Flattening is loss of an even convexity of condyle surfaces, Osteophyte is local outgrowth of bone arising from a mineralized joint surface, Erosion is local area of rarefaction in the cortical plate of a joint surface, Sclerosis is thickening of the cortical bone on a joint surface, Ely’s cyst is sub cortical cyst is rounded radiolucent area that may be just below the cortical plate or deep in trabecular bone.

Radiological variations of condyle should be always correlated with clinical signs and symptoms to arrive at the diagnosis of TMDs. Anuna Laila Mathew et al. in their study revealed that, radiographic abnormalities in the condylar morphology increased with age. They were seen more frequently in patients with clinical signs and symptoms of TMD.

Small asymmetries between left and right condyles were common. Small asymmetries are expected to develop during normal condylar growth, but the manner in which this asymmetry occurs has to be differentiated. Asymmetries in size differs from shape, volume or position asymmetries.

Asymmetries in condyle morphology without clinical signs and symptoms of TMD’s, careful radiological examination of condyle are required to rule out TMJ pathologies.

Our study aimed to detect the most common shapes on the head of condyle seen in a radiograph among Chennai Population. Of 3200 heads 78% were oval in shape, followed by diamond (12%), crooked finger (6%) and least being bird beak (3%). Our results showed a variation to previous study done by Sonal V et al, where the most common shape was found to be oval (60%), followed by bird beak (29%), diamond (9%), and crooked finger (2%).

In the same study, the oval was the most common shape in both males and females which accounted for about 61% and 46%. Similar results were obtained from our study in which oval being the commonest shape showed a high prevalence of about 74% in males and 72% in females as shown in the figure 3.

Combination of condyle shapes in OPG revealed that Oval-oval combination, was 60.5%, followed by Oval-diamond combination (12.25%), Diamond-diamond (7.6%), Bird beak-bird beak (5.43%), Oval-crooked finger(5.31%), Crooked finger-crooked finger (4.93%) and Crooked finger-Diamond and Crooked finger-Bird beak is the least common combination which accounted for about 0.02% and 0.03% respectively. In the similar study conducted by Sonal V et al, Oval-oval combination (67%) was most prevalent followed by Oval-bird beak (25%), Oval-diamond (5%), Bird beak-bird beak (3%) and Crooked finger- crooked finger is least common combination which accounted for about 1% only.

In the study Sonal et al, the combination of shapes commonly seen in male and females were evaluated where oval-oval combination was seen most prevalent in 58% of female population and 42% of male population. In our study, Oval-oval combination was seen in 63%
of male population and 37% of female population.

Gender wise distribution of shapes was recorded. In males, Oval shape (74%) was predominant followed by Diamond shape (18%), Crooked finger (6%) and Bird beak shape being least common (2%). In females, Oval shape accounted for about (72%) followed by Diamond shape (18%), Crooked finger (6%) and Bird beak (4%). But in previous study done by Sonal V et al, only the prevalence of commonest shape was recorded which showed Oval being most common in both males (62%) and females (46%).

Panoramic radiography is a screening tool for diagnosing TMDs. Various advanced imaging techniques are needed to confirm any pathology in addition to diagnosis made by OPG such as Radionuclide bone scanning which is a useful technique for showing early functional and biochemical bone changes, CT images which are highly accurate for osseous abnormality and Cone-beam computed tomography images which are superior over others for the bony morphology of mandibular condyles and detection of condylar cortical erosion. CBCT is a useful tool to measure and evaluate the condylar dimensions.

**Conclusion**

Dentists should have thorough knowledge on the characteristic normal mandibular condyle variations to give a diagnosis of TMD’s. Amount of condyle morphology asymmetry is considered as ‘normal asymmetry’ in the absence of signs and symptoms of TMD’s. Genetic, acquired, functional factors, age groups, individuals have a role in morphologic changes of condyle. Thus variability in the shapes and sizes of condyles should be an important factor in diagnosing the disorders of temperomandibular joint. OPG’s are preferred imaging technique as it is easily prescribed by most of the dental surgeons and is a screening tool for TMD’s. Hence, Dental professionals must have thorough knowledge in differentiating between normal and abnormal condyle morphology in an OPG, as it possess a diagnostic challenge for them.

**Declaration on Conflict of Interest:** we have no conflict of interest

**Financial support and sponsorship:** Nil

**Source of Funding:** Self

‘All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008 (5). Informed consent was obtained from all patients for being included in the study.’

**References**

11. Anuna Laila Mathew, Amar A, Sholapurkar ,


Awareness of Medical Negligence among Practitioners

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Abstract

Introduction The cases of medical negligence in the recent years have been gradually increasing. Unless knowledge about medical negligence is strictly implicated in the medical practice the rate of medical negligence will increase. Nearly 50 lakh Indians die due to medical negligence every year.

Aim & Objective The present study was aimed to assess the level knowledge and awareness regarding medical negligence among medical practitioners.

Materials & Method The present cross sectional study was conducted in saveetha medical college and hospitals, Chennai. A total of 100 practitioners were studied. The study period was from 24th February to 12th March 2019.

Result; In total, 100 medical practitioners were studied, of which almost all had knowledge about medico legal cases, only 88 of them take precautions during handling medico legal cases. only 47% were aware of the punishments given for medical negligence.

Conclusion The awareness among the practitioners is satisfactory. But 37% of the practitioners couldn’t differentiate medical negligence from medical errors. The knowledge about the punishments given for an act of medical negligence is not satisfactory only 40% had knowledge in that area. The attitude of taking precautions during handling a medical legal case was satisfactory, only 12% of them don’t take precautions.

Keywords: Negligence, Medical practitioners, Knowledge and awareness, Medical negligence.

Introduction

An act or omission (failure to act) by a medical professional that deviates from the accepted medical standard of care, is one definition of medical negligence.

Black’s Law Dictionary defines negligence per se conduct, whether of action or omission, which may be declared and treated as negligence without any arguments or proof, as to the particular surrounding circumstances, either because it is in violation of statute or valid municipal ordinance or because it is so probably opposed to the dictates of common prudence that it can be

without hesitation or doubt that no careful person would have been guilty of it. As general rule the violation of a public entry enjoyed by the law for the protection of person or property so constitutes.

Medical profession at present has changed from motive of service to commercialization.

Medical profession includes the knowledge of various disease, their treatment and understanding human feelings with care taking aspect. Nowadays the skills and knowledge of the practitioner is applied carelessly.

Medical profession is considered as the most divine of all professions worldwide. A doctor is placed second to god, his mission is to improve quality of life and help people from their sufferings.

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Creating a rapport with the patient builds a relationship between a doctor and a patient. Speaking of which this have become the talk of the olden days. With commercialization spreading like a wild fire it has captured the medical profession under it’s hood

All doctors should know about medicolegal cases Concerned procedure and felt relevant Provisions . Usually what happens is that medical legal duties of a registered medical practitioner I thought in second year of MBBS graduation and then fortunately afterwards nobody bothers about it till one faces some problems in composition of a case of negligence

Okay surely the obstetricians and gynecologists have to face the challenges of negligence on or the cases of alleged contaminations off MP, PCPENDD act, and how to defend themselves in the courtroom. Hence from the legal point of view relations in the duties and obligations, or lapses or Ignorance (advertent or in advertent) committed by doctors give rise to Litigations related to civil and/or criminal legal liabilities

Indian society is experiencing a growing awareness regarding patient rights. In India, the consumer protection act(CPA) came into action in 1986, which was enacted for the better protection of the interests of consumers. The provision of consumer protection act now covers deficiency of service by medical professionals in such case to provide redressed to the patient

In the decisions Rendered by the Supreme Court of India, namely doctor Laxman Balakrishna Joshi vs. Dr. Trimbak Bapu godbole & Anr., 1969 [13] and A.S.Mittal bs. state of U.P.,1989[7],It was laid down .That when Dr consulted by a patient, the former, namely, Dr close Owes To his patient certain duties which are (a) duty of care deciding whether to undertake the case; (b) duty of care deciding what treatment to give; (c) A duty of care in the administration of the treatment

The 3 ingredients of negligence:

1. The defendant owns a duty of care to the plaintiff
2. The defendant breached the duty of care
3. The plaintiff has suffered injury

Negligence is the breach of a legal duty to care. It means carelessness in a matter in which the law mandates carefulness. A breach of this duty gives a patient the right to initiate action against negligence

A doctor can be held liable for negligence only if one can prove that she/he is guilty of failure that no doctor with ordinary skills would be guilty of if acting with reasonable care.

However, no human being is perfect and even the most renowned specialist could make a mistake in detecting or diagnosis the true nature of a disease. And this comes under the medical error(6) not under medical negligence. In this judgement, reliance was placed on the decision of the house of lords in White House vs. Jordan & Anr., (1981)[2] Lord Fraser, While receiving the judgement of Lord Denning (Sitting in the court of appeal), observed as under :

“The true position is that an error of judgement may or may not be negligent, it depends on the nature of error.

An error of judgment constitutes negligence only if a reasonably competent professional with the standard skills that the defendant professes to have, and acting with the ordinary care, would not have made the same error.

Indian criminal law has placed the medical professional on a different footing as compared to an ordinary human. Criminal law and medical negligence section 304A[10] of the Indian penal code of 1860 states that “whoever causes the death of a person by rash or negligent act not amounting to culpable for a term of two years, or with a fine or without.”

Getting an informed consent is an crucial thing in medical practice. The patient must be told the nature and purpose of the procedure/treatment, its benefits and potential risks/side effects. Failure to communicate and disclose potential risks is considered medical negligence.

Nearly 50 lakh Indians die due to medical negligence every year in different hospitals

Ignorance of law is no excuse for violating it. It is duty of everyone to know the law which concerns him or her nowadays practising medicine is hazardous & risky. Mutual faith replaced with mutual suspicion. This study was taken up assess the knowledge of medical negligence and professionalism among doctors working in Saveetha medical college, Thandalam

**Methods and Materials**

The present cross-sectional retrospective study was
conducted in Saveetha medical college and hospitals, Chennai. Medical practitioners were included in this study. A total of 100 medical practitioners were studied. The participants include practitioners from both clinical and non-clinical departments of Saveetha medical college and Hospital, Chennai. In this study 105 doctors were approached, out of which 100 of them were willing to take part in the study. They were given the liberty to pull of from the study whenever they wanted if they felt unsafe or uncomfortable. Only the questionnaires in which consent was filled properly were included in the study. The study period was from 24th February to 12th March 2019. Institutional Ethical committee clearance (IEC) was applied and obtained before starting. All the medical practitioners who took part in the study was briefed on the study’s purpose, and requested to participate in it. The questionnaire was distributed after describing the purpose of study. The participants were assured that participation is voluntary and confidentiality would be maintained. A structured, self-administered questionnaire containing 20 questions relating to awareness and knowledge about medical negligence was devised and pretested based on previous research studies and in consultation with faculty members of the department of forensics and state medicine. Each question had 3 options. Those who refused and who weren’t present on the third visit was excluded from the study.

Consent was obtained from which respondent. Confidentiality was maintained. After collecting the data, it was entered in the excel spreadsheet and the data was analyzed using SPSS software and frequencies and percentages were obtained and presented with graphs and chart.

**Result**

100% of the medical practitioners who participated in the survey had knowledge about medico legal cases.

Among 100 participants, 88% take precautions and 12% take precautions to some extent while handling medico legal cases.

The graphic analysis given below describes that 26% saying yes, 46% saying NO, and 28% saying don’t know, that whether Red Cross emblem belongs to doctors?

![Figure 1](image-url)
From the above graph For the statement “wrong diagnosis followed by wrong treatment is considered negligence” 35% agree

37% Disagree 28% Not sure

For the question “duration for which medical records for MEDICO LEGAL CASES of the hospital have to be maintained?” The analysis showed that 7% opting for 5yrs, 69% opting for 10yrs, 24% opting for 7yrs.
For the question “are you aware of punishments of medical negligence?” The answer percentages were 47%-yes, 26%-no, 27%-not sure

All of the practitioners get informed consent.

**Discussion**

Negligence within the medical world has assumed nice importance in reference to the medical malpractices suits in numerous countries Asia, Europe, USA And a lot of therefore in India.

Almost every participant in the study have knowledge of informed consent on this. Concerned requires that the patient fully understands the information given, but if the patient is debilitated be due to serious illness/mental condition, a suitable Surrogate should make decisions.
Written records, as well as medical record, chart notes, radiographs, and images should be meticulous, and it’s necessary for the documents to be signed and dated. Under article 51 A (h) of the Constitution of India, there is a Moral obligation on the doctor, and a legal duty, to maintain and preserve medical, medico-legal, and legal documents in the best interest of social and professional justice.

The findings of the present study shows the knowledge and awareness about medical negligence among the medical practitioners in Saveetha Medical College, Chennai. The participants of this study included both doctors working in clinical and non-clinical departments of the college.

In the present study, most of the participants had knowledge and awareness about medical ethics. The respondents think that their main source of knowledge about medical negligence was during various workshops, seminars, and clinical training.

The questionnaire consist of various questions about the awareness of medical negligence, precautions to be taken during medico-legal cases, record maintenance, legal punishment, proper consent, rights of the patients, euthanasia, Medical errors and lawsuits.

During the survey 100 practitioners from the clinical department of Saveetha Medical college it was observed that everyone had knowledge about medico legal cases. Around 80% of the respondents do take precautions during handling medico-legal cases, while 12% of them don’t and remaining to some extent. Almost every participant in the study have knowledge of informed consent, since everyone here takes proper consent before any examination or procedure.(5)

Around 2/3rd of the participants agree that refusing to attend a patient during emergency is negligence.

It is important do differentiate Medical negligence from medical error. Wrong diagnosis followed by wrong treatment is considered negligence is the statement but it is a medical error. Equal number of respondents agree and disagree on or not sure about the statement Wrong diagnosis followed by wrong treatment is considered as medical negligence. More than half of the participants aren’t aware of the punishments given for medical negligence. Maintenance of medical records and documents is Mandatory for hospitals. And duration for which the records has to be maintained Is also important. Very few respondents know the actual time period for which the medical records has to be maintained.

**Conclusion**

Most doctors have good knowledge on medical negligence but few lacked proper and detailed knowledge on medical negligence. Since there is a growing awareness about medical negligence among patients, doctors also need to have a strong knowledge of medical and medico legal cases. The knowledge about medical negligence, and as precautions to avoid medical negligence should be emphasized in the MBBS under graduate so also in post graduate syllabus and examination. The results of the study are consistent in the previous studies by Haripriya.A (1) and Dave. D . S.D.Nanandkar, G.S.Chavan have suggested that periodical CME programmes, re orientation programmes and medical ethics and acts related to medical practices in postgraduate curriculum to solve the lack of awareness among doctors.(5) There is always a continuum between practice and education a medical career is of a life-long learning.

**Conflict of Interest**: Nil

**Source of Funding**: Self Funding

**Ethical Clearance**: Obtained from institutional ethical clearance board

**References**

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Spinal Cord Belt (MSB) as a Method of Reducing the Level of Low Back Pain in Cashier Pos Ticket Worker at Panakkukang Mall in Makassar

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Abstract

Background. PT.Centerpark in collaboration with Panakkukang Makassar Mall is a formal company engaged in providing parking services. Worker in this company work every day with an average of 8 hours a day, in a day worker is able to sit for 7 hours. So the risk of complaints pos ticket workers is very high. The purpose of this study was to determine the effect of using MSB on decrasing complaints of low back pain in the cash register cashiers at Panakkukang Mall Makassar in 2019. This study used pre and post tests to assess the level of low back pain in workers. Material and Method. The type of research used was an experimental quasi. The sampling method uses simple purposive sampling. The study was conducted in November - February 2020. The number of sampling was 30 people. The data analysis technique used in this study is Chi-square and Mann Whitney test. Results. The results showed that as The average level of low back pain before and after the use of MSB in the intervention group before using MSB the mean value is 4.93 mg/dl (SD = 1.03) after using MSB the mean value is 2.53 mg/dl (SD = 0.91). The use of MSB on the level of low back pain after treatment in the intervention group p (0,000) < p (0.05). The use of MSB on the level of low back pain after treatment in the control group was p (0,317) > p (0.05). There was a difference in changes in the scale of low back pain before and after using MSB in the intervention and control groups p (0,000) <p (0.05). Conclusion. There is a difference in the average level of the lower back before and after the use of MSB on the basis of the time before the use of MSB the average value of the worker level is 4.93 mg/dl (SD = 1.03) after using MSB 53 mg/dl (SD = 0.91). It is recommended for workers to use MSB tools every time they work.

Keywords: Spinal cord belt (MSB), Low Back Pain, Method of Reducing, age, length of work, years of service

Introduction

Back pain is a complaint that is found in everyday life. Almost everyone has experienced back pain. Lower back pain remains a major public health burden throughout the industrial world. Epidemiological data show that lower back pain (LBP) ranks 19th (27%) and lifetime prevalence is 60%. [1] The World Health Organization (WHO) explains that 2-5% of employees in industrialized countries suffer from low back pain every year, and 15% of absenteeism in the steel industry and trade industry is caused by low back pain (LBP). [2]

The application of modality can reduce low back pain needs to be applied, one of them by using the spinal cord belt (MSB). MBS is useful for reducing pain, correcting incorrect posture at work, and is also used as a prevention tool. Spinal cord belt is a tool that is used on the body, especially in the waist that serves as a body buffer to make it more stable and comfortable when work activities take place, spinal cord belt is recommended for people with LBP complaints as stabilizing the lumbar region, facilitating bending movements, and reduce pain.

This research was conducted at formal sector postal cash register workers at Panakkukang Mall in Makassar. The results of preliminary observations have found that
research has not been carried out specifically in the area of occupational health and safety. Cashier at the mall often does not pay attention to the compatibility between work facilities and work attitude, causing complaints of low back pain. This is seen by the presence of lower back pain complaints felt by the worker.

Material and Method

The type of research used was quasi experimental. The sampling method uses simple purposive sampling. The study was conducted in November-February 2020. The number of sampling was 30 people (intervention group 15 people, control 15 people). This research will involve intervention and control groups. The intervention group (workers use SBM 3 hours per day for 2 weeks) and control (no treatment is given) will each be pre-tested, namely the measurement of pain scale. The data analysis technique used in this study is Chi-square and Mann Whitney test.

Results

The number of ticket workers who experience LBP in this study is 30 people (intervention group 15 people, control 15 people). The results of these measurements can be seen in the following table.

Table 1. Distribution of Pretest and Posttest Back Pain Levels Based on Age, Work Period, and Length of Work at the Cashier Post Shop Ticket

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mild pain</td>
<td>Moderate pain</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 25 years</td>
<td>14</td>
<td>9</td>
</tr>
<tr>
<td>&gt;25 years</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>Work Period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 1 years</td>
<td>11</td>
<td>1</td>
</tr>
<tr>
<td>&gt;1 years</td>
<td>5</td>
<td>13</td>
</tr>
<tr>
<td>Length of Work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intervention</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td>Control</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>14</td>
</tr>
</tbody>
</table>

Table 1 shows that for workers aged ≤25 years with LBP of 14 respondents (mild pain) and increased to 19 respondents (Mild pain), work period> 1 year with LBP of 13 respondents (moderate pain) decreased to 5 respondents (moderate pain).

Table 2. Back Pain Scale of Post Ticket Cashier Worker Intervention Group

<table>
<thead>
<tr>
<th>LBP</th>
<th>Min Mm (mg/dl)</th>
<th>Max (mg/dl)</th>
<th>Mean±SD</th>
<th>Shapiro -wilk</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>4,0</td>
<td>6,0</td>
<td>4,93±1,03</td>
<td>0,000</td>
<td>0,000</td>
</tr>
<tr>
<td>Posttest</td>
<td>1,0</td>
<td>4,0</td>
<td>2,53±0,91</td>
<td>0,009</td>
<td></td>
</tr>
</tbody>
</table>
Table 2 shows that the pretest back pain scale of the intervention group obtained a minimum pain scale of 4.00 mg/dl, a maximum pain scale of 6.0 mg/dl and an average pain scale of 4.93 mg/dl (SD = 1.03). The posttest back pain scale of the intervention group obtained a minimum pain scale of 1.0 mg/dl, a maximum pain scale of 4.0 mg/dl and an average pain scale of 2.53 mg/dl (SD = 0.91).

Table 3. Back Pain Scale of Post Ticket Cashier Worker Control Group

<table>
<thead>
<tr>
<th>LBP</th>
<th>Group Control</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Min Mm (mg/dl)</td>
<td>Max (mg/dl)</td>
</tr>
<tr>
<td>Pretest</td>
<td>1.0</td>
<td>4.0</td>
</tr>
<tr>
<td>Posttest</td>
<td>1.0</td>
<td>4.0</td>
</tr>
</tbody>
</table>

Table 3 shows the back pain scale (control group) pretest obtained minimum pain scale 1.0 mg/dl, maximum pain scale 4.0 mg/dl and average pain scale 2.13 mg/dl (SD = 0.99). The posttest back pain scale received a minimum pain scale of 1.0 mg/dl, a maximum pain scale of 4.0 mg/dl and an average pain scale of 2.20 mg/dl (SD = 1.08).

Table 4. Effects of Use of the Medulla Spinalis Belt (MSB) Tool on Post Cashier Workers

<table>
<thead>
<tr>
<th>Mann-Whitney Test</th>
<th>Mean Rank</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervensi</td>
<td>8.00</td>
<td>0.000</td>
</tr>
<tr>
<td>Kontrol</td>
<td>23.00</td>
<td></td>
</tr>
</tbody>
</table>

Table 4 shows that the mean rank value for the intervention group is smaller than the control group, the change in the back pain scale of the intervention group (8.00) is smaller than the control group (23.00). The statistical test results using the Mann-Whitney Test p = 0.000 <p (0.05).

**Discussion**

Table 1 shows that there are differences in complaints of pretest back pain and means that there is a change in complaints of low back pain in this case back pain decreases from moderate pain to mild pain. The control group of mild pain pretest results 14 people changed to 13 people in the posttest, meaning that there was a change in pain complaints, namely increased pain complaints because the control group did not use MSB tools. Tarwaka (2015) explains that the complaint factors of low back pain are caused by work factors (type of work tenure, body posture at work, length of work and equipment), individual factors (age, sex, nutritional status, disease, and physical activity and sports), As well as physiological factors (scoliosis, HNP, spondylitis and osteoporosis). [3]

Other factors that cause LBP are poor health problems, psychological and psychosocial problems, degenerative arthritis, smoking, mayor scoliosis (more than one hundred and a hundred degrees), obesity, excessive body weight, work-related things such as prolonged sitting, or standing for hours, vibration, lifting, carrying weights, pulling weights, bending, twisting, and growing. [4], [5] The results of this study indicate that the lack of awareness of workers who do not pay attention to ergonomic posture while working and the lack of occupational health and safety knowledge in cashier workers who experience complaints of low back pain.

In this study, the largest number considered was 60% intervention group, 93.3% control group. Age is a predisposing factor that can restore the lower back and is usually suffered by people who open, change the shape
of the body made of bone so it is not elastic anymore like when young. Age of lower back recovery associated with aging increases, including increased degeneration of the spine at an increased risk of lower back pain. [6], [7], [8] Uninstalling, even though he was still a teenager but could experience lower back recovery, this happened to the cash ticket manager at the Makassar. Amod, et al (2015) conducted a study with no significant correlation between age and lower back pain in truck drivers in Nagpur India p 0.060 > 0.05. [9]

A person who works in daily work without rest can spend days and reduce the body’s work power decreases. Based on the distribution of the rate of recovery of pretest backs in the intervention and control groups based on the length of work (8 hours) in postal cashier workers showed in the intervention group with mild comfort (0%) and those who improved moderate pain (100%), while the control group with mild care comfort (93.3%) and those experiencing moderate pain (6.7%).

The researcher assumes that all respondents in the intervention group experienced moderate pain before treatment due to static work positions, long sitting for more than 3 hours and un ergonomic positions and uncomfortable worker chairs. Therefore, researchers recommend that workers’ chairs be replaced with chairs that have back cushion or backrest. This is supported by the research of Tomita et al. (2015) which shows that NBP does not increase during sitting 1-3 hours per day but NBP is related to sitting for more than 3 hours. [10]

Based on the distribution of the backpain level of the control group based on the length of work (8 hours) at the cashier post workers before treatment was obtained (6.7%) experienced moderate pain, after treatment was obtained (13.3%) who experienced moderate pain. The level of back pain in workers has increased because when assessing the level of pain there was an error because the assessment of pain was only assessed on a subjective basis. This is consistent with the results of research conducted by Tonapa Veny about factors associated with complaints of Lower Back Pain in Workers in Plantation PT. Toarco Jaya Kab. North Toraja in 2016, there is no relationship between length of work and complaints of low back pain. [11]

However, with long-sitting work activities and non-ergonomic sitting positions, cashier workers will need to mobilize large amounts of energy, but do not have enough time to rest so that the risk of experiencing muscle pain will increase. Respondents in this study are contract workers determined by the company with a contract system every 6 months contract renewal, so there are very few workers who work for more than five years. Based on the results of the study obtained that the highest percentage of cashier workers with complaints of low back pain is in the category of long years of working more than one year who experience complaints of moderate pain (93.3%) the intervention group (26.7%) control group and the length of service category less than one year experienced mild pain complaints (6.7%) in the intervention group, and (73.3%) in the control group.

The high level of pain is at the cashier workers whose work period is less than one year due to the high stress of the workers due to the low salary with high workload. This research is in accordance with the theory put forward by Tarwaka (2015) which states that the working period causes a continuous static burden if workers do not pay attention to ergonomic factors will more easily cause complaints of low back pain. [12]

Boshuizen reports that respondents who have more than 1 year of service have a higher risk of NPB exposure compared to respondents whose tenure is less than 1 year, this is due to the results of long-term spinal loading in the disk cavity that is permanently narrowed and also causes bone degeneration behind which will cause LBP. Most patients with acute low back pain have a previous history and therefore need a perfect clinical examination. The main purpose of the initial examination is to try to identify “danger signals” and to make certain diagnoses. [13], [14], [15]

Table 2 shows that there is a difference in the average level of low back pain before and after the use of MSB in the intervention group where before the use of MSB the mean value of worker pain level is 4.93 mg / dl (SD = 1.03) after using the MSB mean value of pain level is 2, 53 mg / dl (SD = 0.91) with p 0.000 < 0.005. Table 3 and 4. shows the It can be concluded that there is no difference in the average rate of return before and after the use of the MSB control group. The statistical test results using the Mann-Whitney Test p = 0.000 <p (0.05) means that there is a significant difference in effect between the groups that use the Medulla Spinalis Belt (intervention) and the groups that do not use the Medulla Spinalis Belt (control). The results showed that there was a decrease in pain scale in the intervention group after using the Medulla Spinalis Belt (MSB).
Because this tool when used causes a feeling of massage on the back because of this tool there is a buffer on the back. This can be seen from the decrease in pain scale felt by respondents.

Researchers use MSB to overcome this which is useful to reduce or eliminate lower back pain, MSB is made from simple materials namely from rubber and fabric, as well as a reinforcement tool that serves to avoid loose tools when used made of plastic material, MSB is functioned or useful to provide comfort to the lower back at work, especially to reduce pain when doing long sitting activities such as the cashier workers. This study gives the result that there is a decrease in the average pain scale in the intervention group due to the use and compliance of respondents in using MSB, so that it can cause the comfort of workers when sitting as a cashier and provide comfort when after the respondent works.

In most sufferers of low back pain have a tendency to experience improvement within a period of two weeks to three months. During this time period, when complaints of low back pain are in the process of resolution, or if back pain is chronic, it is necessary to consider appropriate conservative management. [16]

Conclusion

There is a difference in the average level of the lower back before and after the use of MSB on the basis of the time before the use of MSB the average value of the worker level is 4.93 mg/dl (SD = 1.03) after using MSB 53 mg/dl (SD = 0.91). It is recommended for workers to use MSB tools every time they work.

Financial support and sponsorship: Own cost

Ethical Considerations: Ethical clearance was obtained from Institute of Health Science “Maluku Husada”, Ambon, Indonesia; with number” RK.21/KEPK/STIK/ XI/2019. Just before the interview, written (or thumb impression) consent was obtained from each participant in Institute of Health Science Ambon guidelines.

Conflicts of Interest: The authors alone are responsible for the views expressed in this article and they do not necessarily represent the views, decisions, or policies of the institutions with which they are affiliated.

References


Comparative Study of Heavy Metals Accumulation in the Nails of Drinkers and Non-Drinkers of River Water

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Abstract
Heavy metals can incorporate into humans by contaminated drinking water and can then be distributed into different tissues, which leads to an internal accumulation that can induce different alterations, adverse effects and acute/chronic metal poisoning. Nails can be used as bio-indicator for biological monitoring for the purpose of forensic examination in poisoning cases, assessment of metal exposures, as occupational marker and for health risk assessment. This paper deals with the comparative quantitative study of iron, lead, zinc, cadmium, copper and nickel concentration in nails of male subjects drinking and not drinking water from river. The levels of these metals were analyzed by Atomic Absorption Spectrophotometer (AAS). The result of this study showed Fe and Cu were significantly higher in concentration in the nail samples of people consuming river water whereas Zn concentration was slightly higher in the nail sample of people not consuming river water and Cd, Ni and Pb showed negative result in the both type of subjects. The present comparative study showed significant difference in heavy metal concentration in both the type of subjects. So it can be stated that people consuming river water are more affected, due to continuous exposure from these metal through the river. This study can prove that nail samples can be used as biological indicator and biological monitoring tool for assessment of heavy metal.

Keywords: heavy metals, nails, AAS, Biological monitoring, Bio-indicator, Forensic examination, Health risk assessment.

Introduction
The effect of environmental exposure to heavy metals on human health has received a great deal of interest in recent years. People are exposed to variety of heavy metal pollutants that are released into the environment as consequences of their living place and workplace activities. These heavy metal pollutants can be incorporated into the human by drinking water and can be stored and distributed in different tissues, consequently have a potential to lead an adverse health effect and/or disease. Prayagraj is blessed with most scared and important rivers i.e Ganga, Yamuna and third mythical river “Saraswati” (the point where Ganga and Yamuna River meet is called as Saraswati, Sangam in Sanskrit). Due to increased urbanization and industrialization these rivers are under intimidation of high-water pollution, the heavy metals contamination (such as- Mn, Cr, Pb, Zn, Fe and Cu) in the river water of various sites of Prayagraj region was found exceeding. 1

Nail have many advantages when compared to other biological materials in monitoring heavy metals:

1. They can easily be sampled and analyzed for accumulated toxic and essential metals in the tissue. So nails can be used as bio-indicators. 2-4

2. The higher concentrations of residues are found in nail samples, when compared to those on blood and urine.

3. Unlike blood that gives transient concentrations, nails can provide a continuous record of the metal concentration in body. 5
4. The capacity of nail to accumulate metals during extended periods, reflecting up to 1 year of exposure.

Nail can be the ideal matrix for most common heavy metal forensic examination due to its reliability, nail as evidences can be easily transported and stored for longer period of time, obtained without injuring the donor, have significant role in identification of suspected death through heavy metal poisoning (e.g. arsenic), also socio-ethically better option than post-mortem medico-legal findings.

**Methodology**

(1) Studied Area and Sample Collection

Study area is situated in the southern part of Uttar Pradesh in the Prayagraj (Allahabad) district (fig.1). People living near Arail Ghat mostly depend on the river water for drinking purpose because most of the people’s occupation is boat sailing and they do not carry water bottle with themselves, also because of spiritual believes that Ganga/Yamuna river water is the purest whereas as people living far from the river consume regular government tap water for drinking purpose.

![Figure-1 shows map of studied area.](image)

Finger and toenail clipping from 10 people drinking river water (living near Arail Ghat) and 10 non-drinkers of river water were collected. In all 20 samples 6 metals were analyzed (Iron, Copper, Nickel, Zinc, Lead and cadmium). Distal edge/Free margin (margo liber) of nail plate were cut with clean stainless steel nail cutters. All the nail samples were sealed in plastic bags prior to analysis.

(2) Procurement of Nail Samples

Nail samples of males (age range 30-50 year) were collected from both the types of subject. Following details of subject were collected:

a. Gender
b. Age
c. Drinker or non-drinker of river water
d. Occupation

Followed by this, fingernails and toenails of the relevant subjects were collected.

(3) Washing of Nail Samples

The nail samples was kept soaked in non-ionic soap solution for 2 hours in a labeled glass beaker and wash to free from debris then the sample was soaked in acetone for 1 hour to remove external contamination subsequently sample was rinsed five times with distilled deionized water and finally oven dried at 60-110 degree Celsius and kept in desiccator for further procedure.

(4) Digestion of the nail samples

Dried nail samples (0.5 grams) were placed in muffle furnace at 550 degree Celsius for four hours. After four hours in muffle furnace the nail samples became ash. The ashes were then digested with 10 ml of 6:1 mixture of concentrated nitric acid and per chloric acid, kept overnight at room temperature to prevent excessive foaming and subsequently the samples were heated at 160-180 degree Celsius until the mixture become water clear and reduces to 1 ml. Each sample solution was then diluted with 0.1N nitric acid and made to volume of 50ml with distilled water.

(5) Analysis of heavy metal concentration in nail samples from AAS

Metal concentrations of each sample were assayed by using Perkin Elmer-400 AAS with air acetylene flame. A series of standards were prepared in deionized water for instrumental calibration by diluting commercial standards containing 1000 ppm of the metals. All reagent used were of analytical grade.
Table-1 Parameter used for metal analysis in Atomic Absorption Spectrometer Unit (AAS) Perkin Elmer analyst 400 is shown in below table.

<table>
<thead>
<tr>
<th>Name of Element</th>
<th>Wavelength (nm)</th>
<th>Sensitivity Check (ppm)</th>
<th>Standard Solutions for Metal (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cadmium (Cd)</td>
<td>228.80</td>
<td>1.500</td>
<td>0.5 &amp; 1.0</td>
</tr>
<tr>
<td>Zinc (Zn)</td>
<td>213.86</td>
<td>1.000</td>
<td>0.26 &amp; 0.50</td>
</tr>
<tr>
<td>Lead (Pb)</td>
<td>283.31</td>
<td>20.000</td>
<td>5.0 &amp; 10.0</td>
</tr>
<tr>
<td>Copper (Cu)</td>
<td>324.75</td>
<td>4.000</td>
<td>1.0 &amp; 2.0</td>
</tr>
<tr>
<td>Nickel (Ni)</td>
<td>232.00</td>
<td>7.000</td>
<td>2.5 &amp; 5.0</td>
</tr>
<tr>
<td>Iron (Fe)</td>
<td>248.33</td>
<td>5.000</td>
<td>1.5 &amp; 3.0</td>
</tr>
</tbody>
</table>

Results

The results of quantitative analysis of heavy metals in nail samples of drinkers and non-drinkers of river water are shown in Table 2 and 3 respectively. Comparison of iron, copper and zinc concentrations in drinkers and non-drinkers of river water is shown in Table 4.

Table-2 Heavy metal concentrations in nails of people drinking river water.

<table>
<thead>
<tr>
<th>No. of Samples</th>
<th>Fe mg/L</th>
<th>Ni mg/L</th>
<th>Cu mg/L</th>
<th>Cd mg/L</th>
<th>Zn mg/L</th>
<th>Pb mg/L</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.5</td>
<td>0</td>
<td>1.9</td>
<td>0</td>
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Table-3 Heavy metal concentrations in nails of non-drinkers of river water.

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<thead>
<tr>
<th>No. of Samples</th>
<th>Fe mg/L</th>
<th>Pb mg/L</th>
<th>Zn mg/L</th>
<th>Cd mg/L</th>
<th>Cu mg/L</th>
<th>Ni mg/L</th>
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Table-4 Comparison of iron, copper and zinc concentrations in drinkers and non-drinkers of river water.

<table>
<thead>
<tr>
<th>Nail Samples</th>
<th>IRON (mg/L)</th>
<th>Copper (mg/L)</th>
<th>ZINC (mg/L)</th>
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<tbody>
<tr>
<td></td>
<td>Drinkers</td>
<td>Non-Drinkers</td>
<td>Drinkers</td>
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The results of this comparative study showed that heavy metals in the nails of both type of subjects accumulate differently based on exposure. It was observed that highest concentration of Fe (4.9mg/L) and Cu (3.4mg/L) was obtained in the nail sample of people drinking river water whereas highest concentration Zn (0.63mg/L) was obtained in the nail samples of non-drinkers of river water.

The level of Fe and Cu concentration were significantly higher in the people drinking river water when compared to the results of metal concentration of non-drinkers of river water, such differences recorded might be attributed to exposure of the people to heavy metal by drinking the studied area river water. Similar trend was observed for highest Fe and Cu concentration in the river water of studied area i.e. Fe 1.939mg/L > Cu 1.712mg/L. This indicates that the concentration of metals in the nail is a function of metal concentration in the work environment or exposure, this was in line with the work of Adulrahman et al. Metabolic activity is absent in nails. Hence it acts as a reliable diagnostic tool for environmental contamination assessment.

Zn concentration was higher in the non-drinkers of river water but concentrations were almost same in both the types of subjects. The reason behind such result may be because in natural surface waters, the concentration of zinc is usually below 10 µg/L, and in groundwater, 10–40 µg/L. In tap water, the zinc concentration can be much higher as a result of the leaching of zinc from piping and fittings. Drinking-water usually makes a negligible contribution to zinc intake unless high concentrations of zinc occur as a result of corrosion of piping and fittings.

Ni, Cd and Pb showed negative result in both types of subjects. The reason for the negative results of Ni, Cd and Pb concentration in the nail of the people drinking river water might be because of the fact that these metals were not present in high amount in the river i.e. Ni- 0.345±0.0093mg/L, Cd- 0.33±0.0013mg/L and Pb- 0.284±0.0525mg/L which is comparatively very less than the concentration of Fe-1.939±0.0494mg/L and Cu- 1.712mg/L. The reason for the negative results of Ni, Cd and Pb concentration in the nail of the people not drinking river water might be because they are not exposed to these heavy metals in daily routine.

**Conclusion**

Fe and Cu concentration was significantly high in the nails of people drinking river water and Zn concentration was slightly higher in the nails of non-drinkers of river water whereas negative results were obtained for Pb, Cd and Ni in both the type of subjects.

**Conflict of Interest**- Nil

**Source of Funding**- Self
Ethical Clearance- Verbal consent was taken from each person before taking nail clipping from the free margin/distal edge (margo liber) of nail plate.

References


Open Court Principle in the Implementation of Courtroom Television in Indonesia and the Psychological Mind of Defendant

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³Associate Professor, Universitas Sebelas Maret

Abstract

This research aims to analyze and carry out theoretical criticism related to the open court principle, in the implementation of courtroom television in Indonesia. There are differences in the implementation of courtroom television in several cases in Indonesia. As in the case of Jessica Kumalawongso, the entire trial process, including the verification process, was broadcasted live. The research method is the social-juridical method. In such events, the presumption of innocence principle and the principle of witnesses being prohibited from communicating with each other were also damaged. The implementation of courtroom television affected the defendant’s psychological condition. Thus, this research will conduct a theoretical study related to the open court principle in the implementation of courtroom television in Indonesia and its consequences.

Keywords: Open Court, Courtroom Television, Psychological, Defendant, Principle

Introduction

Screening of court proceedings via television or what is known as courtroom television shows the influence of information technology advantages in the legal world. [1] Until now, there is no definite definition of the term courtroom television, but in his book, Paul Lambert states that courtroom television is “...one of central concerns in relation to television courtroom broadcasting is that television cameras or television operators will distract the various people who are required as part of the courtroom process. This includes witnesses, the jury, judges, lawyers, and court staff.”[2]

Screening of criminal case trial proceedings has also taken place in America, namely courtroom television of the O.J Simpson case in 1994.[3] Courtroom television is also carried out in Indonesia, in the case of a planned murder trial with cyanide coffee. The defendant was Jesica Kumala Wongso and this event reaped a lot of pros and cons. Also, a courtroom television was held for the blasphemy case against the accused Basuki Tjahaja Purnama or Ahok (ex governor of Jakarta Special Territory).

The implementation of courtroom television is inseparable from the discussion regarding the open court principle. Also, the application of courtroom television certainly has various consequences. Another interesting thing about it is the independence of judicial power in deciding a case amid the multiple public perceptions of the trial process, which is broadcasted live on television. [4] As is known, the truth should not influence a judge to shift their views according to the public or social trust. “Judges are accountable to God, not to social trust.” The magnitude of the judges’ responsibility to God and the important role of enforcing justice in the society require the realization of judicial power freedom from various influences, especially public opinion.[5]

That’s why what is more important is how the power of the media should be used to guard the people, and the media is also expected to have a conscience (the conscience of the press).[6] Courts in the UK also apply the open court principle. English criminal trials are held in public. A fundamental principle of the law of many modern societies is that justice should be done in public before an open court. An open court principle is one way to maintain public confidence.[7] Another purpose of the open court principle is “to protect trial fairness
by preventing abuse judicial authority. “[8] This certainly affects the court process and it indirectly impacts the evidence. So, the manifestation of the criminal law procedure’s function to seek and to find material truth or to come close to material truth is null and void.[9]

The trial process, as a process of law enforcement in the context of prosecution must be independent. It is part of the judicial power duty. The independence, after this referred to as the independence of judicial power, is a complex idea, not merely as a value, but also a useful instrument to pursue other higher values, namely the rule of law. [10] Independence implies giving authority to a judiciary that is free from interference from any party and is also free from the influence of other powers.[11]

The application of open court principle in the era of information technology development has shifted and may cause multi-interpretations. As a result, three is the trial by the press, which becomes a consequence of this open court principle. It has the potential to violate other principles, such as the principles of legality, the defendant’s presumption of innocence of, and the principle of where witnesses may not communicate with each other. Also, the implementation of the courtroom television is still different in each court in Indonesia. This is because the trial broadcasting permit policy is returned to each related court.

It is undeniable that openness by conducting broadcast in court is a demanded for transparency. It is an effort to maintain the integrity of judges as law enforcers, and also to control the proceedings of the judicial process. However, if this openness turns out to have consequences that damage other principles and other rights in a fair trial, [12] including the condition where the defendants are disturbed as they receive the public’s judgement before receiving verdict, there needs to be an idea to regulate the implementation of the broadcasting process by the mass media in the judicial process.

Based on the explanation above, it becomes a crucial question for sure, how the meaning of the open court principle shifted in the era of information technology development and the consequences of applying courtroom television in Indonesia. This is the urgency of the research.

**Research Method**

The method used in this paper is a legal research method. This research will explain the shift in the meaning of the open court principle in the era of information technology development and the consequences of the implementation of courtroom television in Indonesia, so that it can find a solutive regulatory model related to courtroom television. This study uses a statutory approach, a conceptual approach, a comparative approach, and a case approach.

**Results And Discussion**

1. Conceptual Meaning of the Open Court Principle

The principles of law are the basics or directions (richtlijn) in the formation of positive law. Regarding the, Meuwissen explained, [13] “From that principle, positive law obtains its legal meaning. It also contains criteria by which the quality of the law can be assessed ... the code can be understood against the background of a principle ... a principle that underlies”.

When we come to the discussion of the law principles, we also discuss the most important and the most essential elements of the rule of law. It is reasonable that the principle is interpreted as the heart of the legal regulations.[14] Because the legal principle holds ethical requirements, the legal principle is a bridge between the legal regulations and social ideals and the ethical views of the people. So, it can be said that through this legal principle, the rule of law changes its nature and becomes part of the ethical level. [15]

Fuller put forward an opinion to fathom whether we can talk about the existence of a legal system. The measure is mentioned in eight principles which he called the principles of legality. Fuller himself said that the eight principles he proposed were actually more than just requirements for the existence of a legal system, but instead, he gave qualifications to the legal system, as a legal system that contained an absolute morality.[16]

If we examine, there is a contradiction between the application of the open court principle which is achieved through courtroom television, with the presumption of innocence and also how the defendant’s psychological condition is affected by the public’s judgement. The absence of laws related to the courtroom television implementation subsequently violates the values of the other. The presence of courtroom television’s excessive reports on judicial cases in the process of the trial also has an indirect impact on judges, witnesses, and defendants.
It is what puts pressure on the psychological burden on the defendant regarding the judge’s decision.

Besides contradicting the principle of the presumption of innocence, the implementation of courtroom television that has no clear boundaries will also conflict with other provisions. It is contrary to the regulations governing the protection of witnesses and victims to maintain their security, safety, and comfort in providing their statements in the court. The domino effect of courtroom television can cause law enforcement to be hampered. It may even be dangerous for the defendant and their psychological mind.

2. The Shift in the Open Court Principle Meaning in Criminal Law Procedures

Criminal law procedure has principles which accompany the act. One of them is the open court principle. Basically, in a criminal case, an open trial is the right of the defendant, namely the right to be tried in a trial that is open to the public. Everyone can see and monitor the proceedings of the trial. The law requires the trial to be conducted not only by the parties concerned but also by the public. The purpose is to create a fair trial, to avoid arbitrary or deviant hearings so that the trial process becomes a media of educational prevention. It may also give information to the general public.

The practice of courtroom television in the narrow sense is by broadcasting the proceedings of the trial directly, whether it is a translation by the press in interpreting the open court principle or not. As a principle, of course, the sentence has an intense philosophical foundation. The nature of technology in a mediating position changes from the quality of transparency in the relationship to the quality of opacity in the hermeneutical relationship.

The development of courtroom television in response to the demands for openness in the era of information technology development turned out to be a boomerang for the parties in the trial. Judges, defendants, witnesses, and victims were targeted by the community’s opinion and the media to be discussed during the trial process. Public enthusiasm about the trial’s direct broadcast became very high. These methods of press reporting can lead to “trial by press or trial by masses opinion” and because this contradicts the principle of presumption of the defendant’s innocence, where a person must be deemed as not guilty before a definitive ruling from an unauthorized public judge.

Although sometimes the coverage made by the mass media related to a case is not entirely true, with the continuous reporting through various media, it can ultimately lead to public opinion and make people believe that the defendant must be guilty. This phenomenon is also influenced by what is called the post-truth, which can turn a thousand lies into a truth. At this stage, justice begins to experience siltation. Justice only becomes a textual narrative and is separated from the context. Justice brings about simplification, which reduces various details of the value it contains, because it is covered by the post-truth reality. As an illustration, there is an artificial reality in the tangible court, in the emergence of various kinds of public opinion regarding negative opinions created by the mass media related to the defendant which affects the truth value of the community, that the defendant must be convicted.

3. Ideal Concept of the Courtroom Television Implementation in Indonesia

Openness is a human right and is a means to maintain the spirit and integrity of the judiciary. The government and all law enforcement devices have committed to carrying out justice based on the open court principle. With regard to the process of applying the open court principle in America, the United States also did not allow coverage in any form in the courtroom, but in 1994 in the O.J. Simpson case was broadcasted due to the demands from public to access the progress of the case. Finally, the court conducted courtroom television for the O.J. Simpson’s case. But, the trial process which was broadcasted live by the mass media was apparently able to lead the opinion of the public that O.J. Simpson was innocent. The public opinion was able to influence the decision of the jury who has the authority to determine someone guilty or innocent. On October 3, 1995, O.J Simpson was found not guilty.

Therefore, in the implementation of the principle to open to the public in Poland, the practice of courtroom television is common. The courtroom television project is referred to as the Re Court Project. The difference between the implementation of courtroom television in Poland and other countries is that the witnesses who are asked for witness evidence by judges can directly see the recording of themselves live on the live broadcast appearance screen. Based on the implementation of courtroom television in the United Kingdom, America,
and Poland, it can be concluded that they apply strict rules and restrictions for the application of courtroom television for trial processes. These strict limits are aimed to maintain a noble court spirit, to minimize the misuse of recording results, and to protect the identity and security of all parties in the court.

Based on comparison with several countries, Indonesia must also make strict rules and limits related to the reporting and broadcasting mechanism of the trial process that is open to the public. So, the authors provide recommendations for setting courtroom television in Indonesia as follows: The strict regulation on the mechanism of courtroom television in Indonesia is expected to be able to prevent and minimize various interventions in the trial process. It is hoped to guarantee the fulfillment of the presumption of innocence principle, to protect the psychological mind of defendant from public judgement, and to protect the safety of the parties in the trial. These regulations are also aimed to create a fair trial.

**Closing**

**Conclusions**

The meaning of the open to the public trial principle underwent a change along with the development of the information technology era. At first, the meaning of ‘open to the public’ meant that the general public could attend and witness the proceedings in the courtroom. In its development, the public wishes to be able to witness the trial process anywhere, both inside and outside the courtroom, and also anytime. Then courtroom television came as an answer to the demands of openness in the trial process in the era of information technology development.

However, in its practice, the implementation of courtroom television in Indonesia, has various consequences. These consequences include broadcasting the trial process directly by the media and that the press can continuously create public opinion, which can then lead to trial by the press. It may also disturb the psychological condition of the defendant. In addition, the limitless courtroom television violates the defendant’s rights and may disturb the principle of presumption of innocence. In fact, broadcasting the trial directly which highlights the parties in the trial also endangers the security of these parties, both directly and indirectly.

**Conflict of Interest : No**

**Ethical Clearence : Yes**

**Source of Funding : Authors**

**References**

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Effect of Ankle Dorsiflexors Facilitation on Gait in Cerebral Palsy

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Abstract

Background- Cerebral palsy is a permanent and non-progressive group of disorders in the development of movement and posture causing functional and activity limitations. Children with cerebral palsy have dorsiflexor weakness and ankle deformity, which negatively affect their gait. This study mainly focuses on facilitation of dorsiflexors to improve gait. Facilitatory techniques are useful for facilitation and enhancement of muscle activity to achieve improved motor control.

Objective: To find effect of ankle dorsiflexors facilitation on gait in cerebral palsy.

Material and Methodology- In this pre-post interventional study 25 cerebral palsy children with gait abnormalities were included. Treatment protocol including facilitatory techniques was set for 6 weeks. After pre-post assessment data was analysed by using appropriate statistical techniques.

Result- According to this study there is an improvement in gait parameters and ankle joint range of motion with P value <0.0001, which considered extremely significant. This indicates an overall improvement in gait of children with cerebral palsy.

Conclusion- This study concludes that facilitation of dorsiflexors is beneficial for improving gait in cerebral palsy children.

Key Words- Cerebral palsy, ankle dorsiflexors, facilitatory techniques, gait.

Introduction

Cerebral palsy is a group of permanent movement disorders caused by abnormal development or damage to the brain. It occurs during pregnancy, during childbirth or shortly after birth¹. It is the most prevalent physical disability originating in childhood², ⁶. A diagnosis of cerebral palsy is often made based on the abnormal muscle tone or posture, delayed motor milestones, or the presence of gait abnormalities³, ⁴.

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Signs and symptoms can vary greatly in cerebral palsy children. Movement and coordination problems associated with cerebral palsy includes- abnormal tone, involuntary movements, lack of balance, rigidity, delayed milestones, excessive drooling, difficulty with fine motor skills, difficulty in walking, etc.⁵ However , as child gets older some symptoms might become more or less apparent. And muscle shortening and muscle rigidity can worsen if not treated properly. The hallmark of cerebral palsy is a motor control deficit that differs in distribution, presentation, as well as severity across children. Promoting, improving or restoring the ability to walk is the most common goal in neurological physical therapy⁵, ⁶.

Cerebral palsy children show complex and heterogeneous motor disorders that causes gait deviations. They are primarily related to deficits such as
muscle spasticity, muscle weakness and loss of selective motor control, and secondary deficits such as muscle contractures and bony deformity. Foot drop and toe walking are among the most frequent clinical problems in children with cerebral palsy. The main underlying cause of these problems is reduced force in the ankle dorsiflexors and reduced motor control.

Management of gait deviations in cerebral palsy is complex and requires early identifications and better understanding of the gait deviations. Cerebral palsy present various possible combinations of impairments that can be managed by numerous types of treatments. Physiotherapy is certainly the most common treatment.

One of the major goals of physical therapy for children with cerebral palsy is to promote independent mobility. To accomplish this, children must have adequate active range of motion which is not hindered by spasticity, dystonia or contracture, sufficient strength to maintain body weight support, and motor control abilities to allow them to advance their limbs forward to take steps in an effective and efficient manner. The speed and energy costs of walking are also major factors in how functional the gait pattern will be for an individual child. Intense task specific training has been shown to be effective in several neurological populations as well as cerebral palsy.

Walking is essential for activities of daily living and social participation. Depending on the severity of gait impairment children with cerebral palsy are subject to different types of functional limitations and these functional limitations pose adverse effects on their health related quality of life. Because of the impact of gait abnormalities on participation and quality of life, the main focus of physical therapy interventions is often on improving gait.

Equinus or foot drop is a common deformity in children with cerebral palsy which occurs due to reduced motor control of ankle dorsiflexors. Facilitation and enhancement of muscle activity to achieve motor control are the key to many of the techniques used in neurological rehabilitation, it is a system of therapeutic exercises enhanced by cutaneous stimulation for patients with neuromuscular dysfunctions.

Facilitation of dorsiflexors can be done to achieve improved motor control of ankle joint and to improve or initiate gait. It includes various proprioceptive manoeuvres like positioning, joint compression, stretch and resistance, the more emphasis is given on exteroceptive applications such as tapping, brushing, icing, pressure and vibration in order to achieve optimal muscular action.

Material and Methodology

An experimental study was conducted with a sample size of 25. An ethical clearance certificate was obtained by Institutional Ethical Committee. The population under study is the cerebral palsy children with gait abnormality and/or dorsiflexor weakness. The study sample included individuals within the age group of 5 to 15 years. Subjects were chosen according to the inclusion and exclusion criteria. The motive and procedure of the study was thoroughly explained to them. Appropriate consent was taken from the guardians of the participants. A pre-assessment was taken by using gait parameters and range of motion. The patient underwent treatment using facilitatory techniques to ankle dorsiflexors to improve motor control and to train the gait, which included joint positioning, joint compression, stretch, resistance and various exteroceptive applications such as tapping, brushing, icing, pressure and vibration. The treatment was given for 6 weeks, 3 days/week for duration of 40min/session. After 6 weeks of treatment protocol, post assessment was taken by using outcome measures to study the level of improvement. According to the result obtained a conclusion was given.

Statistical Analysis and Results

Statistical analysis of the recorded data was done. Study design is pre and post. Arithmetic mean and standard deviation was calculated for each outcome measure. Paired T test was done. The study has P value <0.0001 and is extremely significant.
Cerebral palsy is one of the prevalent movement disorder originating in childhood. Although the condition is non-progressive, the musculoskeletal impairments and functional limitations associated with cerebral palsy are indeed progressive if not treated. Equinus or foot drop is one of the common deformity in cerebral palsy children and also a cause for the gait abnormalities. This deformity occurs due to loss of motor control, muscle shortening and contractures of ankle dorsiflexors. Improving gait and promote independent mobility is most common motor goals in neurorehabilitation. To achieve this, children must have adequate range of motion, muscle strength to maintain body weight.

**Discussion**

Cerebral palsy is one of the prevalent movement disorder originating in childhood. Although the condition is non-progressive, the musculoskeletal impairments and functional limitations associated with cerebral palsy are indeed progressive if not treated. Equinus or foot drop is one of the common deformity in cerebral palsy children and also a cause for the gait abnormalities. This deformity occurs due to loss of motor control, muscle shortening and contractures of ankle dorsiflexors. Improving gait and promote independent mobility is most common motor goals in neurorehabilitation. To achieve this, children must have adequate range of motion, muscle strength to maintain body weight.
Facilitation of dorsiflexors can be performed to improve ankle joint range of motion, to correct the deformity, to gain motor control and to improve or initiate gait.

In this study we wanted to determine whether facilitation of ankle dorsiflexors is effective for improving gait in cerebral palsy children. This study was completed with 25 cerebral palsy children of both sexes who were between the age group of 5 and 15 years with dorsiflexor weakness.

Applying facilitatory techniques to ankle dorsiflexors might have improved motor control and gait, which included various proprioceptive manoeuvres such as joint positioning, joint compression, stretch, resistance and exteroceptive applications such as tapping, brushing, icing, pressure and vibration.

Facilitatory techniques is useful to achieve improved motor control. Joint positioning is used widely to prevent joint contracture and to depress unwanted reflex activity. Proprioceptors are involved with the awareness of joint position and movement which are stimulated by joint compression. Joint compression facilitates posture extensors which are needed to stabilise the body. Stretching achieves its effect via stimulation of muscle spindle primary endings which results in reflex facilitation of the muscle. Resistance is used to improve strength and achieve sustained muscle contraction.

The maximum importance is given on exteroceptive applications. Three to five taps over muscle belly is used to assess reflex activity with brisk muscle contraction. While brushing and icing are used to facilitate movement response and enhance static hold. By using vibration and pressure sustained muscle contraction can be achieved.

The ankle range of motion assessment and gait parameter assessment score as shown in figure 1 and 2 respectively indicates improvement in gait with P value <0.0001, which considered extremely significant. According to the data analysis study concludes that ankle dorsiflexors facilitation is beneficial for gait in cerebral palsy children.

Conclusion
This study concludes that facilitation of dorsiflexors is beneficial for improving gait in cerebral palsy children. The data analysis shows an improvement in gait parameters and ankle joint range of motion, thus resulting in an overall progression in gait.

Conflict of Interest: The authors declare that there is no conflict of interest.

Ethical Clearance: An ethical clearance certificate was obtained from the Institutional Ethical Committee Krishna Institute of Medical Sciences Deemed to be University, Karad.

Acknowledgement: The authors would like to express their special gratitude towards all the patients that participated in the study. We would also like to thank our families and institution for their everlasting support which enabled us to continue our research activities.

Source of Funding: Self.

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A Study of Histochemical Characteristics of Mucosubstances in Normal Endocervical Glands

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Abstract

Background: The apical epithelial surfaces of mammalian respiratory, gastrointestinal, and reproductive tracts are coated by mucus, a mixture of water, ions, glycoproteins, proteins, and lipids. Mucins are mainly of two types- Neutral and Acidic. Mucus plays an important role in reproductive function and defence of the female reproductive tract. Objectives: To know the mucin distribution in normal endocervical glands.

Methodology: This is a retrospective, observational, analytical, case control study aimed to evaluate mucin histochemical pattern in normal endocervical glands. Ten histologically proven blocks of normal endocervical glands were taken. Tissue sections were stained by, PAS, PAS-diastase, Phenylhydrazine-PAS, Alcian blue pH 2.5, Alcian blue pH 1, combined Alcian blue-PAS, Aldehyde fuschin and combined Aldehyde fuchsin-Alcian blue techniques. Results: Results were tabulated according to colour intensity into different grades ranging from + to +++++. Regarding mucin histochemistry of normal endocervical glands; the epithelium and glands show mixture of both neutral and acidic mucins. Acidic mucins are more in amount than neutral. In acidic mucins, sialomucins are predominantly seen.

Conclusion: Mucin histochemical patterns serve as valuable, cost-effective tool for diagnosis in histopathology and for the researchers in histology, where a slight change in the mucin pattern may help in the early diagnosis of the disease process.

Keywords: Mucosubstances, Special stains, Cervical mucins, Normal

Introduction

Mucus is a complex viscous adherent secretion synthesized by specialized goblet cells in the columnar epithelium that lines all the organs that are exposed to the external environment. This includes the respiratory tract, the gastrointestinal tract, the reproductive tract and the oculo-rhino-otolaryngeal tracts.1,2 Mucus plays an important role in reproductive function and defence of the female reproductive tract.3 Cervical mucus, reported to be secreted at a rate of 20-60 mg/day, 3,4 provides a barrier to sperm and pathogen entrance into the endometrium and provides a protective covering for the vaginal epithelium. Just before ovulation, mucus character changes from a viscous to a watery consistency to allow sperms to penetrate into the uterus. Alterations in mucus quantity and quality are related to hormone/reproductive status changes, infections, and pathology of the female reproductive tract.3,4

Mucins are high molecular weight glycoproteins that are found dispersed throughout the epithelia of the gastrointestinal, respiratory and reproductive tract.5 The term mucosubstances is used, as recommended by Spicer, Leppi and Stoward (1965), to denote all tissue components other than glycogen, rich in carbohydrates, which are present in connective tissue or as secretion of certain epithelial structures.6 Connective tissue mucosubstances are called “mucopolysaccharides”, while those secreted by epithelia are referred to as “mucins”.7

Mucins perform a wide variety of functions like lubrication, protection against acids etc. The

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Mucosubstances also contain immunoglobulins primarily of IgA type, lactoferrin which chelate the iron necessary for growth of some bacteria and lysosomes which destroy some of the bacteria. Hence they act as antibacterial and antiviral agents and have protective mechanism.8

Mucins are classified into two main categories namely,

a) Neutral mucins, b) Acidic mucins.

Neutral mucins are slightly alkaline in nature and mainly help for reducing the pH and toxicity of substances. They are first to appear during development in intrauterine life by fourth to fifth month. Acidic mucins are subclassified into weakly acidic and strongly acidic.9, 10, 11 weakly acidic mucins contain terminal carboxyl groups and are called as carboxylated mucins or sialomucins. They contain chelating agents and have antibacterial and antiviral property. Strongly acidic mucins contain sulphate groups and are called as sulphomucins. They are thick, viscous and help for formation of protective coat for lubrication.10, 11

In malignancy, the malignant cells change their behavioural pattern and secrete different types of mucin than normal. During carcinomatous changes, cells revert back to their embryonic stage. Secretory changes occur even before the nuclear changes are visible and hence study of mucins may help to identify cancerous conditions at an early stage.12

Material and Method

The present study was conducted in the Department of Anatomy, Krishna Institute of Medical Sciences, University, Karad from May 2010 to June 2012. The type of study was observational, analytical and case control study. Sample size was 10 blocks of histologically proven normal endocervical glands. Staining with special stains as PAS, PAS-D, PAS-PH, AB 2.5 and 1, AF, combined AB-PAS, AF-AB was carried out and results were interpreted.

1) P.A.S. -- Periodic acid Schiff reagent stains all carbohydrates including mucosubstances. Therefore mucosubstances are P.A.S. positive.

2) P.A.S. Diastase -- Diastase dissolves glycogen like carbohydrates, but mucin remains unaffected. This stain is used for confirmation of mucosubstances.

3) P.A.S. Phenyl hydrazine -- Phenyl hydrazine dissolves neutral mucosubstances only and hence used to prove their presence.

4) Alcian blue -- This stain can be used at various pH levels.

   a) AB pH 1.0 -- This stain is highly acidic and stains sulphomucins only.

   b) AB pH 2.5 -- This stain is weakly acidic and stains both carboxylated and sulphomucins.

5) Aldehyde Fuchsin -- This stain only stains sulphomucins and confirms their presence.

6) Combined AB-PAS -- This staining procedure will stain all different types of mucin.

   Neutral –Magenta ; Carboxylated –Blue ; Sulphated --Purple.

7) Combined AF-AB - This staining procedure helps for differentiation and confirmation of carboxylated and sulphated mucins.

   Carboxylated –Blue; Sulphated--Purple.

All the results obtained were tabulated according to colour intensity into different grades ranging from + to ++++.13, 14, 15

Observations and Results

During the period from May 2010 to June 2012, ten blocks of histologically proven normal endocervical glands were collected. Histological technique with special stains as PAS, PAS-D, PAS-PH, AB 2.5 and 1, AF, combined AB-PAS, AF-AB was carried out.

All the results were tabulated according to colour intensity into different grades ranging from + to ++++.13, 14, 15

Colour Index:

++++ : Very strong positive reaction.

+++  : Strong positive reaction.

++   : Moderate reaction.

+    : Weak reaction.

-    : Negative reaction.
Table 1: Showing Histochemical result of normal endo-cervical glands.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Stains used</th>
<th>Result</th>
<th>Inference about Mucosubstances</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PAS</td>
<td>+++</td>
<td>PAS +ve substances like carbohydrate &amp; mucins present.</td>
</tr>
<tr>
<td>2</td>
<td>PAS-Diastase</td>
<td>+++</td>
<td>No glycogen, mucosubstances present.</td>
</tr>
<tr>
<td>3</td>
<td>PAS-Phenylhydrazine</td>
<td>++</td>
<td>Few neutral mucins present.</td>
</tr>
<tr>
<td>4</td>
<td>AB pH 2.5</td>
<td>+++</td>
<td>Acidic mucosubstances present.</td>
</tr>
<tr>
<td>5</td>
<td>AB pH 1</td>
<td>+</td>
<td>Very few sulphomucins present.</td>
</tr>
<tr>
<td>6</td>
<td>AB-PAS</td>
<td>++ blue + magenta</td>
<td>Mixture of both Acidic and neutral mucins. Acidic predominant.</td>
</tr>
<tr>
<td>7</td>
<td>Aldehyde Fuchsin</td>
<td>+</td>
<td>Presence of sulphomucins.</td>
</tr>
<tr>
<td>8</td>
<td>Combined Aldehyde Fuchsin- Alcian Blue</td>
<td>+++ Blue ++Purple</td>
<td>Mixture of both sulpho &amp; sialomucins . Sialomucins are predominant.</td>
</tr>
</tbody>
</table>

**Inference:**

Regarding mucinhistochemistry of normal endocervical glands, a mixture of mucosubstances was observed. The epithelium and glands are showing mixture of both neutral and acidic mucins. Acidic mucins are more in amount than neutral. In acidic mucins, sialomucins are predominantly seen.

**Normal Endocervical Glands**

![Photomicrograph 1 (PAS 10X)](image1.png) ![Photomicrograph 2 (PAS-D 10X)](image2.png)

![Photomicrograph 3 (PAS-PH 10X)](image3.png) ![Photomicrograph 4 (AB PH 2.5 10X)](image4.png)
Discussion

The term “mucosubstances” is used to denote all tissue components, other than glycogen, rich in carbohydrates which are present in connective tissue or as secretion of certain epithelial structures by Spicer et al.6, 15

Numerous types of mucins occur depending on the site of production. Example of connective tissue mucins are chondroitin sulphate, heparin sulphate, keratin sulphate and hyaluronic acid. Epithelial mucins may be neutral or acidic. Neutral mucins are hexosamine units which may be associated with glucoronic or sialic acid; the reactive group being carboxyl. In sulphated mucins this group is blocked by a sulphate group which becomes the active group16. Strongly sulphated mucins are of connective tissue type; the weakly sulphated groups are of epithelial type. The non-sulphated mucins are sialic acid and hyaluronic acid (carboxylated D-glucoronic acid). These can be enzymatically digested, though enzyme resistant forms do occur.16

The presence of carboxylated or sulphated groups was determined by various staining techniques and confirmed using enzyme digestion methods.16

With the development of new histochemical methods by special stains, specific chemical composition of mucosubstances is documented by various scientists. But there have been very few studies on human endocervical mucosubstances such as by J. N. Bulmer et al (1988), Vatsala Misra et al (1997), Zhao Shumei et al (2003) and Hayashi, Isamu M.T et al (2003).
Table 2: Showing comparative study of mucin histochemistry of normal endocervix

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Worker</th>
<th>Inference/Observation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lapertosa G et al17(1986)</td>
<td>Abundant amounts of neutral mucins. Sialomucins were trace and predominant over sulphomucins.</td>
</tr>
<tr>
<td>2</td>
<td>Vatsala Misra et al 18(1997)</td>
<td>Mixture of neutral and acidic mucins, with neutral mucins being predominant.</td>
</tr>
<tr>
<td>4</td>
<td>Present study</td>
<td>Mixture of neutral and acidic mucins. Acidic mucins are more in amount than neutral. Sialomucins are predominantly seen.</td>
</tr>
</tbody>
</table>

Summary and Conclusion

Mucin histochemistry of normal endocervical glands was undertaken in the department of Anatomy at Krishna Institute of Medical Sciences University, Karad from 2010 to 2012.

In the present study, special histochemical methods were applied.

- Special stains such as PAS, PAS-Diastase, and PAS-Phenyl hydrazine were used for confirmation of neutral mucins.
- Alcian blue pH 2.5 was used to assess acidic mucin. Further categorization of acidic mucins into sulpho and sialomucins was carried out by Alcian blue pH 1 and Aldehyde fuchsin.
- Combined stains such as AB-PAS, AF-AB and PAS-Phenyl hydrazine were used to differentiate between neutral and acidic mucins.
- In the present study the results were compared with various other studies and the results correlated with them.
- The varied heterogeneity of acidic mucins was indicated by a mixture of sulpho and sialomucins.
- In the present study mucin histochemistry of normal endocervical glands showed mixture of mucosubstances, both neutral and acidic. Acidic mucins were more in amount than neutral. In acid mucinssialomucins were predominantly seen.

The present study correlates with workers like, Lapertosa G et al17 V. Misra et al18 Zhao and Shumei et al19 in the histochemical study of normal endocervix

Ethical Clearance: Taken from institutional ethics committee, KIMSDU, Karad.

Source of Funding: KIMSDU.

Conflict of Interest: None

References


Significance of Cheiloscopy and Dermatoglyphics in Sex Determination

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²CRRI, Department of Public Health Dentistry, Sathyabama Dental College and Hospital, Chennai

Abstract

Background: Personal identification has an important role in forensic sciences. Lip print and thumb print can be used for personal identification since they are unique for individuals and do not change during the life of a person.

Objective: To analyse predominant patterns of lip print in females and males, To analyse predominant patterns of finger print in females and males, To identify if there exists any correlation between lip prints and finger prints.

Material and Method: A cross sectional study was conducted in Sathyabama Dental College among 500 individuals (250 females and 250 males) between age group of 18-40 years. Fingerprint and lip print of all the subjects were collected and compared, and the results were analyzed based on Micheal Kucken classification system for fingerprints and Suzuki and Tsuchihashi classification for lip prints. Descriptive and inferential statistics were carried out. Level of significance was set as 0.05.

Result: Reticular lip print pattern was found in majority (36.4%) of the males, whereas vertical grooves (29.6%) and branched grooves (29.6%) are common in females. Finger prints showed that loop pattern is more common in both males and females. This study showed a significant correlation between lip prints and thumb pattern in males while females showed no significance.

Keywords: Lip Print; Finger print; Sex determination; Cheiloscopy; Dermatoglyphics.

Introduction

Every human being is distinct and discernible in that they exhibit their own pattern of characteristics¹. Personal identification is one of the key areas in the forensic sciences. The common techniques which are employed to ensure fast and secure identifications were DNA comparisons and finger print analyses, but there are certain crime scenarios where other supplemental aids like lip prints, palatal rugae pattern, bite marks, etc, are used². However, personal identification by physical appearance and visual examination may play a role in adjunct mode rather than confirmatory. One such physical evidence for personal identification in forensic scene is lip print analysis and finger print analysis³.

Lip print and thumb print can be used for personal identification since they are unique for individuals and do not change during the life of a person. It has been verified that lip prints recover after undergoing alterations such as minor trauma, inflammation and herpes and that the disposition and form of furrows does not vary with environmental factors⁴.

Lip prints are a characteristic pattern formed by the wrinkles and grooves on labial mucosa and is unique to one person except in monozygotic twins. The study of lip print is known as “Cheiloscopy”. Unique set of minute raised ridges seen on the volar pads are called the fingerprints, the study of which is called “Dermatoglyphics”.

Due to the immense potential of fingerprints and lip prints as an effective method of identification an attempt has been made in the present work to investigate whether the lip prints are unique to any fingerprint in the population under investigation based on gender and to see if this association will help forensic odontologists in
the personal identification of the person at the scene of crime and in solving crimes.

**Methodology**

A cross sectional study was conducted after obtaining ethical clearance from the Institutional Ethical Committee Sathyabama Dental College [Ref No: Sathyabama university/ IHEC/study no 011] among 500 individuals (250 females and 250 males), who had morphologically healthy look, devoid of congenital or developmental abnormalities. The study procedure was explained to the participants and a written consent was obtained from each individual before the start of the study. Analysis of lip prints and finger prints was done as follows

*Lip print analysis:*

The lips of the individuals were cleaned. A thin coat of dark coloured lipstick was applied uniformly on the lips by a lipstick applicator brush starting at middle and moving laterally. The sticky side of the cellophane tape was placed over the lip in resting position and pressed uniformly. Tape was then gently removed from the lip without distorting the lip print and then stuck to the chart sheet. The Lip prints were interpreted using magnifying glass. While studying the various types of Lip prints, the lips were divided into 6 compartments. Lip prints was studied on all the compartments and the type of pattern which was prominent was observed based on Suzuki and Tsuchihashi classification.

According to this classification, the lip print pattern is divided as; Type I: Clear cut vertical grooves that run across the entire lip; Type I’: Similar to type-I but do not cover the entire lip; Type II: Branched grooves; Type III: Intersecting grooves; Type IV: Reticular grooves; Type V: Grooves that do not fall in any of the pattern.

*Finger print analysis:*

For recording finger print, the imprint of the left thumb was recorded using an ink pad on chart sheet, after cleaning and drying the hand. The primary patterns of the finger prints was observed using a magnifying glass and interpreted using Michael Kucken classification as Loop pattern, Arch pattern and Whorl Pattern.

*Statistical analysis:*

The data collected was compiled in Microsoft excel sheet and transferred to version 20 SPSS software. Descriptive and inferential statistics were carried out. Level of significance was set as 0.05.

**Results**

Table 1 and 2 shows there is a statistically significant difference among male and female considering lip prints and finger prints. Majority of the male population shows Reticular pattern whereas vertical grooves and branched grooves are common in females. Finger prints showed that loop pattern is more common in both males and females. Table 3 shows there is a significant correlation among males in lip pattern and finger print with r value of -0.133 and there is no correlation among females in lip print and finger print with r value of 0.081.

<table>
<thead>
<tr>
<th>Lip patterns</th>
<th>Male</th>
<th>Female</th>
<th>Chi square value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>Percent</td>
<td>Frequency</td>
<td>Percent</td>
<td></td>
</tr>
<tr>
<td>Clear cut vertical grooves that run across the entire lip.</td>
<td>39</td>
<td>15.6</td>
<td>74</td>
<td>29.6</td>
</tr>
<tr>
<td>Similar to type-I but do not cover the entire lip.</td>
<td>24</td>
<td>9.6</td>
<td>33</td>
<td>13.2</td>
</tr>
<tr>
<td>Branched grooves.</td>
<td>49</td>
<td>19.6</td>
<td>74</td>
<td>29.6</td>
</tr>
<tr>
<td>Intersecting grooves.</td>
<td>46</td>
<td>18.4</td>
<td>55</td>
<td>22</td>
</tr>
<tr>
<td>Reticular grooves.</td>
<td>91</td>
<td>36.4</td>
<td>13</td>
<td>5.2</td>
</tr>
<tr>
<td>Grooves that do not fall in any of the pattern.</td>
<td>1</td>
<td>0.4</td>
<td>1</td>
<td>0.4</td>
</tr>
<tr>
<td>Total</td>
<td>250</td>
<td>100</td>
<td>250</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 02: Comparison of Finger prints between male and female population

<table>
<thead>
<tr>
<th>Fingerprints</th>
<th>Male</th>
<th>Female</th>
<th>chi square value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loop Pattern</td>
<td>144</td>
<td>138</td>
<td>9.82</td>
<td>0.044*</td>
</tr>
<tr>
<td>Arch Pattern</td>
<td>27</td>
<td>42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Whorl Pattern</td>
<td>79</td>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>250</td>
<td>250</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 03: Correlation between of lip and Finger patterns among male and female.

<table>
<thead>
<tr>
<th></th>
<th>Spearman’s Correlation Coefficient</th>
<th>Sig. (2-tailed)</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male lippatterns</td>
<td>-.133</td>
<td>0.035</td>
<td>250</td>
</tr>
<tr>
<td>Male fingerpatterns</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female lippatterns</td>
<td>0.081</td>
<td>0.2</td>
<td>250</td>
</tr>
<tr>
<td>Female fingerpatterns</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 04: Age distribution among male and female.

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
<th>Age</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minimum</td>
<td>Maximum</td>
<td>Mean</td>
<td>Std. Deviation</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>18</td>
<td>47</td>
<td>25.01</td>
<td>6.866</td>
</tr>
<tr>
<td>Female</td>
<td>17</td>
<td>43</td>
<td>23.83</td>
<td>6.245</td>
</tr>
</tbody>
</table>

Discussion

Lip prints and thumb print are unique for any individual and hence its being used significantly in the field of forensic sciences for individual identification. The Klein’s zone, in the lips is the area which is usually concerned for identification and is covered with wrinkles and grooves that forms a unique characteristic pattern. The primary dermal ridge in the fingerprint formed during 12-13 weeks of intrauterine life is fixed throughout the life of an individual. The size and shape may vary with age but the basic pattern remains permanent. This study was undertaken to identify whether certain lip prints are unique to any fingerprint in the population under investigation.

The present study reports predominant lip pattern in males is reticular grooves and in females, branched and vertical grooves running across entire lip is equally predominant. This study is in accordance with studies done by Vahanwala et al9 and Krishnan RP et al.10 In contrast, Nagasupriya et al11, Negi A et al12 reports branch pattern predominant in males. Loop pattern is common in both males and females followed by Whorl pattern in this study. This finding is similar to other Indian studies conducted by Srilekha N et al (2014)13, Nagasupriya A et al (2011)14 and Mutalik VS et al (2013)15.

This study shows a significant correlation between lip prints and thumb pattern in males while females shows no significance. This is similar with the findings of Naik R et al (2017)15 and Nagasuriya et al(2011)14 who found significance of finger pattern and lip prints in males and not in females. However, it is observed that the associated finger pattern and lip print in both studies
are different. Naik R et al (2017) suggests Intersecting grooves in lip prints and whorl type of thumbprint in males are significant, whereas, Nagasupriya et al(2011) suggests branching type of lip print and arch pattern in finger prints are significant.

From this study, it can be concluded that the reticular grooves is commonly seen lip print in males. Branched and vertical grooves running across entire lip is equally predominant lip print in females. Loop pattern is finger pattern is common in both males and females. There is a significant correlation seen between lip print and finger pattern in males.

Conflicts of interest: There are no conflicts of interest.

Source of funding: Nil.

Acknowledgement: Dr. Mahesh J, Senior Lecturer, Department of Public Health Dentistry, J.K.K. Nattraja Dental College and Hospital. (For statistical assistance).

Ethical Clearance: Ref No: Sathyabama university/IHEC/study no 011

References
Effectiveness of a Dynamic Ergonomic Chair in Individuals with Postural Dysfunction

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Abstract

Objectives: Low back pain in postnatal women is a major issue. So, lumbar curvature is a key feature to maintain core strength for which it has to be assessed. The individual variations in spinal curvature and lordotic pattern signifies the bio mechanics of the spine and it responds according to the load / activities. To find out the pre-test measures of flexibility, functional capacity and discomfort level related to lumbar spine in the subjects with postural dysfunctions. To find out the post-test flexibility, functional capacity and discomfort level in the subjects with postural dysfunctions. To analyze the difference between the pre-test and post-test values. People should also have awareness about the posture maintenance. So, early assessment is necessary. Also secondary factors like the type of shoes wear, Occupation and Lifestyle can influence the spinal curvatures which can be dealt with easier with the outcome of the research.

Methodology: In this experimental study, 29 people with age group of 25 to 60 years who have chronic low back pain. Their lumbar spine flexibility, functional capacity, and discomfort level was measured pre-test and post-test. Results were obtained and compared.

Result: The average mean value of lumbar spine flexibility pre-test measured with schober test was 1.81 while post-test was 2.08. Average mean value of VAS for lumbar spine was 6.06 while post-test was 3.24. Average mean value for pre-test functional capacity measured with 6 min walk test was 647.58 while post-test was 665.17.

Conclusion: On comparing summary score of lumbar spine flexibility, VAS, and functional capacity, the differences showed were 0.27 cms, 2.82, 17.59 metres respectively.

So, we can conclude that there was a significant difference in the improvement of lumbar spine flexibility, functional capacity and also decrease in pain after the treatment.

Key Words: Lumbar spine flexibility, VAS, functional capacity, schober test, 6 minute walk test, low back pain, postural dysfunction.

Introduction

Low back pain is a leading cause of disability. It occurs in similar proportions in all cultures, interferes with quality of life and work performance, and is the most common reason for medical consultations. Few cases of back pain are due to specific causes; most cases are non-specific. Acute back pain is the most common presentation and is usually self-limiting, lasting less than three months regardless of treatment.¹ Chronic back pain is a more difficult problem, which often has strong psychological overlay: work dissatisfaction, boredom, and a generous compensation system contribute to it. Among the diagnoses offered for chronic pain is fibromyalgia, an urban condition (the diagnosis is not made in rural settings) that does not differ materially from other instances of widespread chronic pain²,³. Although disc protrusions detected on X-ray are often blamed, they rarely are responsible for the pain, and surgery is seldom successful at alleviating it. No single treatment is superior to others; patients prefer
Manipulative therapy, but studies have not demonstrated that it has any superiority over others.  

Some activities—such as jogging and running on cement roads rather than cinder tracks, heavy lifting, and prolonged sitting (especially in cars, trucks, and poorly designed chairs)—can provoke back pain. Nevertheless, strong psychological factors do play a role.

The following measures to be included in all studies to be reported (but not necessarily for consultations by individual patients):

- Appropriate history and physical examination—functional capacity.
- Modified Schober test of spinal mobility
- Measurement of pain on a visual analogue scale.

Bed rest, supportive corsets, and braces, which used to be prescribed almost routinely, are no longer advocated for back pain, as they are thought to prevent the muscles from providing the necessary structural support. “Back schools”—in which posture, exercises, and other training for the back are taught—have limited value, especially for chronic pain, but they do have a potential role in education.

Two of the most common causes of lower back pain in older adults include osteoarthritis and spinal stenosis. Degeneration of joints in the lumbar spine is a common cause of back pain in older adults.

The lumbar spine supports the upper body and transmits the weight of the trunk with upper body to the pelvis and lower limbs. Lumbar spine consists of 5 vertebrae. The normal resting position of the lumbar spine is in S shaped and is midway between flexion and extension. Lumbar spine plays an important role for posture and stability providing the strength needed for stability especially utilized in static and dynamic postures.

Lumbar lordosis: The anterior concavity in the curvature of the lumbar spine as viewed from the side.

Or

An abnormal increase in lumbar curvature.

Methodology

An approval for the study was obtained from the Protocol committee and the Institutional Ethical Committee of KIMSDU. Individuals were approached and those fulfilling the inclusion criteria were selected. Total 29 individuals were selected. The procedure was explained and written informed consent was taken from those willing to participate.

Demographic information of the subjects was taken. The individuals were explained about the purpose of the study. Also, they were informed about the procedure. Each of them was assessed for the lumbar spine flexibility, VAS, functional capacity.

In this experimental study, 29 women with age group of 25 to 60 years who have chronic low back pain. Results were obtained and compared.

Data was documented and statistical analysis was done.

Data Presentation, Analysis And Interpretation:

1. Comparison of Pre-Test And Post-Test In Lumbar Spine Flexibility With Schober Test:

<table>
<thead>
<tr>
<th>LUMBAR SPINE FLEXIBILITY (MEAN) PRE-TEST</th>
<th>LUMBAR SPINE FLEXIBILITY (MEAN) POST-TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.81</td>
<td>2.08</td>
</tr>
</tbody>
</table>

2. Comparison of Pre-Test And Post-Test In Functional Capacity With 6 Min Walk Test:
TABLE NO 2- COMPARISON OF PRE-TEST AND POST-TEST IN FUNCTIONAL CAPACITY WITH 6MWT.

<table>
<thead>
<tr>
<th>6MWT Distance (MEAN)</th>
<th>6MWT Distance (MEAN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRE-TEST</td>
<td>POST-TEST</td>
</tr>
<tr>
<td>647.58</td>
<td>665.17</td>
</tr>
</tbody>
</table>

3. COMPARISON OF PRE-TEST AND POST-TEST IN VAS:

TABLE NO 3- COMPARISON OF PRE-TEST AND POST-TEST IN VAS:

<table>
<thead>
<tr>
<th>VAS (MEAN)</th>
<th>VAS (MEAN)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRE-TEST</td>
<td>POST-TEST</td>
</tr>
<tr>
<td>6.06</td>
<td>3.24</td>
</tr>
</tbody>
</table>

Interpretation:

From the above data, it is clear that there is significant difference between pre-test and post-test values with a positive result that is improvement in the condition of subjects.

Significant difference

1. Differences In The Pre-Test And Post-Test Values:

TABLE NO. 4: DIFFERENCES IN THE PRE-TEST AND POST-TEST VALUES:

<table>
<thead>
<tr>
<th></th>
<th>PRE-TEST</th>
<th>POST-TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schober test (in cms)</td>
<td>1.81</td>
<td>2.08</td>
</tr>
<tr>
<td>6MWT (in m)</td>
<td>647.58</td>
<td>665.17</td>
</tr>
<tr>
<td>VAS</td>
<td>6.06</td>
<td>3.24</td>
</tr>
</tbody>
</table>

**Result**

The average mean value of lumbar spine flexibility pre-test measured with schober test was 1.81 while post-test was 2.08. Average mean value of VAS for lumbar spine was 6.06 while post-test was 3.24. Average mean value for pre-test functional capacity measured with 6 min walk test was 647.58 while post-test was 665.17.

**Conclusion**

After analyzing the data, it was found that the mean value of VAS is 6.06 Pretest and 3.24 Posttest.

Pretest schober test value (in cms) was 1.81 while posttest it was 2.08.

Pretest 6MWT (in m) value was 647.58 while posttest it was 665.17.

On comparing summary score of

1. VAS, significant difference of 2.82 was noted.
2. Schober test, significant difference of 0.27 cms was noted.
3. 6MWT, significant difference of 17.59 metres was noted.

Thus concluding that there is an improvement in the functional capacity, flexibility, and VAS of an individual in the post test results.
Conflicts of Interest: There were no conflicts of interest in this study

Ethical Clearance: Ethical clearance was taken from institutional committee of Krishna institute of medical sciences.

Funding: Self

References
2. Dorland W. Dorland’s pocket medical dictionary.
Prevalence of Piriformis Tightness with Relevance of Sitting Duration in Bankers

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2 HOD and Professor, Department of Community Health Sciences, Faculty of Physiotherapy, KIMS “Deemed To Be University” Karad, Maharashtra, India

Abstract

Objectives: Piriformis tightness is one of the potential cause of pain, discomfort and dysfunction in community. However the ergonomic risk factors, pain (type, intensity, precipitating factors), physical anthropometrics specific to piriformis tightness were unclear. Hence the attempt was made to find the data and trends in piriformis tightness and its prevalence in bankers.

Methodology: Study was conducted by approaching 36 banks in Karad taluka. Total 260 subjects (M:162; F:98) were included in the study who were assessed for their piriformis tightness by piriformis stretch test. There demographic data, no. of working years, pain (type, intensity, precipitating factor), chair height, chair width, cushion support were also documented.

Result: Prevalence of piriformis tightness in bankers was 51.92%. Out of 135(M:93; F:42) bankers having tightness, 44 were having only right side involved, 22 were having left side involved and 69 were having bilateral tightness. Prevalence was more in people with BMI between 25-29kg/m² (pre-obese) and in fourth decade of life.

Conclusion: Out of 260 subjects 135(51.92%) bankers were having piriformis tightness. There is increasing risk of getting piriformis tightness with increasing BMI, Age. There is not significant relation between the chair height, Chair weight and Cushion support on the chair and the piriformis tightness. There was increasing pain in sitting position (after maintaining for long time) and is relieved by rest.

Key Words: Demographic data, ergonomic risk factor, physical anthropometrics, piriformis stretch test, Piriformis tightness, precipitating factor, physical anthropometrics.

Introduction

Technology and physical activity are inversely proportional to each other that is as the technology progresses physical activity decreases which turn out to be the reason for sedentariness.1 People are spending most of the time in the environment which make them confined of sit at one place like in home, work place.2,3

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Sedentary life style comes hand in hand with poor health and mortality.4 According to survey, in India the average working time of bankers is 6-7 hours per day , so from this we come to know that bankers are at high risk to get musculoskeletal problems related to sedentary lifestyle. Sitting constantly for 6-7 hours per day means sitting is forward flexion position of sagittal plane which can lead to muscle imbalance. One of the most common condition resulting due to physical inactivity is LBP. 52.4% bankers suffer from LBP.5 It is documented that 6.5% LBP worldwide is due to Piriformis tightness.6

The three joint muscle below gluteal muscle is piriformis.7 It is one of the important and powerful
muscles in the pelvis. If the hip flexion is 60° or less than it act as external rotator and above 60° it acts as internal rotator. It is reported that during sitting position piriformis muscle is constantly under low grade contraction. Piriformis Syndrome is a neuromuscular disorder that take place when sciatic nerve is pinched and inflamed by piriformis muscle. This causes pain, altered sensations in buttocks all the way of sciatic nerve course from low back to thigh and down the leg. The pain location described by the patient is vague, the describe pain as is the hip, tailbone, buttocks and groin or radiating down back the leg.

According to one survey conducted on patient in Adam malik General hospital, Quality of life correlates with the intensity of pain in patient with low back pain especially on the grounds of physical function, litigation due to emotional problems, vitality, social function and feeling of pain and general health.11

Types of Piriformis Syndrome:12
1. Primary Piriformis Syndrome
2. Secondary Piriformis Syndrome

Primary Piriformis Syndrome has an anatomic cause, such as a split piriformis muscle, split sciatic nerve or an anomalous sciatic nerve path.12

Secondary Piriformis syndrome occurs as a result of 12:
1. precipitating cause,
2. macrotrauma
3. microtrauma
4. ischemic mass effect
5. local ischemia

Physical findings of Piriformis Syndrome13:
1. Tenderness over the sciatic notch
2. Isolated atrophy of gluteus maximus ani chronic stage
3. Dysesthesia in the posterior aspect of thigh
4. Tenderness over the rectal wall

Signs specific to piriformis syndrome are 12:

Delayed Diagnosis of piriformis tightness may lead to pathological conditions of the sciatic nerve, chronic somatic dysfunction and compensatory changes and it may cause pain, paraesthesia, hyperesthesia and muscle weakness. In extreme cases, misdiagnosis of piriformis syndrome-related back pain with “sciatica” as prolapsed intervertebral disc may lead to unnecessary surgery. Prevalence of piriformis tightness with relevance with sitting duration is scarce in the literatures. Therefore the present study to find the prevalence of piriformis tightness with relevance to the sitting duration is necessary so the proper corrective and preventive measures can be taken in time which may reduce the rate of low back pain because of piriformis tightness.

**Methodology**

An approval for the study was obtained from the Protocol committee and the Institutional Ethical Committee of KIMSDU. Individuals were approached and those fulfilling the inclusion criteria were selected. Total 260 (M:162; F:98) individuals were selected. The procedure was explained and written informed consent was taken from those willing to participate.

Demographic information of the subjects was taken. The individuals were explained about the purpose of the study. Also, they were informed about the procedure. Each of them was assessed for the Piriformis tightness using Piriformis stretch test. Piriformis stretch test was performed with the patient positioned in supine, the tested leg was placed in flexion at hip and knee so that the foot of the tested leg rests on the table lateral to the contralateral knee (the tested leg was crossed over the straight non-tested leg. The angle of hip flexion was maintained at 60°. It was ensured by measuring goniometer Therapist was standing beside the plinth at the test side to stabilize the no-tested side ASIS by one hand to prevent the pelvic motion during the test. The knee of the test side was pit in to adduction, to place stretch on the piriformis muscle. If the adduction ROM
was limited and the patient recorded discomfort posterior to the tested greater trochanter tested side piriformis was considered tight (positive). Pain assessment was done by the Visual Analogue Scale (VAS) which is taken of Rest and On Activity. Chair width and chair height was measured of each subject using inch tape, presence or absence of cushion was noted.

Data was documented and statistical analysis was done

Data Presentation, Analysis And Interpretation:

1. Right side Piriformis Tightness in the study

<table>
<thead>
<tr>
<th>Piriformis tightness</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absent</td>
<td>147</td>
<td>56.5</td>
</tr>
<tr>
<td>Present</td>
<td>113</td>
<td>43.5</td>
</tr>
<tr>
<td>Total</td>
<td>260</td>
<td>100</td>
</tr>
</tbody>
</table>

Table no 1: Right side Piriformis tightness

Interpretation: From this table it is clear that out of 260 bank employees assessed, 113 that is 43.5% bank employees had right side piriformis tightness and 147 that is 56.5% bank employees were negative piriformis stretch test.

2. Left side Piriformis tightness in the study:

<table>
<thead>
<tr>
<th>Prevalence</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absent</td>
<td>169</td>
<td>65</td>
</tr>
<tr>
<td>Present</td>
<td>91</td>
<td>35</td>
</tr>
<tr>
<td>Total</td>
<td>260</td>
<td>100</td>
</tr>
</tbody>
</table>

Table no. 2: left side piriformis tightness

Interpretation: From this table it is clear that out of 260 bank employees assessed, 91 that is 35% bank employees had piriformis tightness and 169 that is 65% bank employees were negative on piriformis stretch test.

3. Association between Age and Left Side by Piriformis Stretch Test:

<table>
<thead>
<tr>
<th>Age</th>
<th>Piriformis Stretch Test</th>
<th>Total</th>
<th>Chi-square</th>
<th>p-value</th>
<th>Relative Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Left</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Absent</td>
<td>Percent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46 and above</td>
<td>62(24%)</td>
<td>62(24%)</td>
<td>124(48%)</td>
<td>22.2</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>30.00 - 45.00</td>
<td>107(41%)</td>
<td>29(11%)</td>
<td>136(52%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>169(65%)</td>
<td>91(35%)</td>
<td>260(100%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table no. 3: Association between Age and Left Side by Piriformis Stretch Test.

Interpretation: According to graph it is clear that out of 91 bank employees with positive left side piriformis test, 29 employee that is 11% were in the age group of 31-45 years and 62 employees that is 32% were in the age group of 46 and above. Association between this two variables was calculated by the Pearson Chi-square test whish found out to be 22.2 with the p-value of <0.0001 which is a significant value.

4. Association between Age and right Side by Piriformis Stretch Test:

<table>
<thead>
<tr>
<th>Age</th>
<th>Piriformis Stretch Test</th>
<th>Total</th>
<th>Chi-square</th>
<th>p-value</th>
<th>Relative Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Right</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Absent</td>
<td>Percent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>46 and above</td>
<td>47(18%)</td>
<td>77(30%)</td>
<td>124(48%)</td>
<td>32.068</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>31- 45</td>
<td>100(38%)</td>
<td>36(14%)</td>
<td>136(52%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>147(56%)</td>
<td>113(44%)</td>
<td>260(100%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table no. 4: Association between Age and right Side by Piriformis Stretch Test.
Interpretation: According to table it is clear that out of 113 bank employees with positive right side piriformis test, 36 employee that is 14% were in the age group of 31-45 years and 77 employees that is 30% were in the age group of 46 and above. Association between this two variables was calculated by the Pearson Chi-square test whish found out to be 32.068 with the p-value of <0.0001 which is a significant value.

5. Association between Pain due to piriformis tightness and BMI

<table>
<thead>
<tr>
<th>BMI</th>
<th>Present</th>
<th>Absent</th>
<th>Chi-square</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-24.9</td>
<td>57</td>
<td>97</td>
<td>33.157</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>25-29.9</td>
<td>76</td>
<td>29</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ 30</td>
<td>2</td>
<td>0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table no.5: Association between Pain due to piriformis tightness and BMI

Interpretation: According to the above table out of 135 bank employees with pain because of piriformis tightness 57 subject were of BMI 18-24.9 (normal), 76 were of BMI 25-29.9 (pre-obese) and 2 subject were of BMI above 30 (obese). Association of BMI and Pain due to Piriformis tightness was calculated by Chi-square test which found out to be 33.157 with the p-value of <0.0001 which is significant.

6. Association between Gender and Pain due to piriformis tightness:

<table>
<thead>
<tr>
<th>Gender</th>
<th>PAIN</th>
<th>Total</th>
<th>Chi-square</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Absent</td>
<td>Present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Females</td>
<td>56</td>
<td>42</td>
<td>98</td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>69</td>
<td>93</td>
<td>162</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>135</td>
<td>260</td>
<td></td>
</tr>
</tbody>
</table>

Table no. 6: Association between Gender and Pain due to piriformis tightness:

Interpretation: From the above table out of 135 bank employees present with pain due to piriformis tightness 93 subject were females and 42 were males. Association between gender and pain due to piriformis tightness was calculated by the Chi-square test which found out to be 5.179 with the p-value of 0.023 which is significant.

7. Association between Age and Pain Due to piriformis tightness:

<table>
<thead>
<tr>
<th>Age</th>
<th>PAIN</th>
<th>Total</th>
<th>Chi-square</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Absent</td>
<td>Present</td>
<td></td>
<td></td>
</tr>
<tr>
<td>46.00+</td>
<td>29</td>
<td>95</td>
<td>124</td>
<td></td>
</tr>
<tr>
<td>31.00 - 45.00</td>
<td>96</td>
<td>40</td>
<td>125</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>135</td>
<td>260</td>
<td></td>
</tr>
</tbody>
</table>

Table no. 7: Association between Age and Pain Due to piriformis tightness:

Interpretation: From the above table out of 135 bank employees present with pain due to piriformis tightness 40 subject were in the age group of 31-45 years and 95 were in the age group above 46 years. Association between age and pain due to piriformis tightness was calculated by the Chi-square test which found out to be 59.869 with the p-value of <0.001 which is significant.
Result

In this study, 260 (M:162; F:98) bank employees were taken. It was found that 135 bank employees had piriformis tightness out of which 44 subjects had only right side tightness of piriformis muscle, 22 subjects were having tightness if left side piriformis muscle and 69 subject had bilateral piriformis tightness. Prevalence of piriformis tightness in bankers was found out to be 51.92%.

The study stated that there is significant risk of having piriformis tightness as the age increases as most of the subjects with positive piriformis stretch test were in have the age above 45 years. The reason for this might be the more amount of time spent in sitting positions.

All the subjects with positive piriformis stretch test were screened for the pain patterns at rest and on activity by the use of VAS scale. The average pain on rest of the subject present with piriformis tightness which was calculated on VAS scale was 5.5 cms and the average pain on activity of subjects positive with piriformis stretch test is 1.82 cm.

The study also documented other demographic variable of the subjects such as the BMI and gender. The study also stated that BMI and piriformis tightness are directly proportional to each other that is as the BMI increases the risk of getting piriformis tightness also increases and this is clear as most of the subjects (76 subjects) with piriformis tightness were in the BMI category of 25-29.9 (pre-obese).

The risk of piriformis tightness is more in males than in females. From the study it is also clear that as the working years of the bankers increases the chances of them getting piriformis tightness are high.

Now talking about the ergonomic risk factors, from this study we get to know that there is not a significant relation between the chair height, chair width, and the cushion support on the chair and the piriformis tightness.

According to the study there is 51% prevalence of piriformis tightness in the bankers which if not treated can compress the sciatic nerve passing just beneath the muscle which will lead to piriformis syndrome which has variety of disturbing symptoms like radiating pain from the buttock to the back of the thigh with the association of the tingling sensation.

So to prevent the tightness of this small triangular muscle of the buttock it is necessary to implement stretching and change in activity so that it will not strain the piriformis muscle much.

Conclusion

On the basis of the result of the study, it was concluded that there is prevalence of 51.92% of piriformis tightness in bankers. There is increases in risk of getting piriformis tight with increase in BMI, with male gender, with increases in age. And there is not any significant relation between the chair height, chair width, and the cushion support on the chair and the piriformis tightness.

Conflicts of Interest: There were no conflicts of interest in this study

Ethical Clearance: Ethical clearance was taken from institutional committee of Krishna institute of medical sciences.

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7. Syed Imtiaz Hussain Shas1, Gul-e-Zahar2, Sunaina Muneer3 Prevalence of Piriformis Syndrome in
Working And Non Working Women with Low Back Pain


12. Umesh Shyamkesho Singh, Raj Kumar Meena, Ch Arun Kumar Singh, AK Joy Singh¹, A Mahendra Singh, Roel LangshongJournal Medical Society / May-August 2013/ Vol 27/Issue 2

Assessment of Effective Oral Health Status among Diabetic population by Modified Special Tooth Brush with Beat Sound-An observational study

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Abstract

Background of the study: Proper guided brushing technique improves the oral health status especially among diabetic individuals who are more susceptible for periodontal disease. Aim and objective: To find the outcome efficacy of modified design special tooth brush with beat sound by evaluating oral hygiene status among diabetic individuals. Material and methods: The present observational study included 25 study participants irrespective of age and gender divided and categorized as 13 non-diabetic (control) group and 12 belong to diabetic (study) group. All the study participants were educated to use modified special tooth brush with beat sound regularly for a period of 1 week and their oral hygiene status were evaluated by using Oral hygiene index simplified (OHI-S), periodontal index (PI) and Gingival index (GI) at regular intervals on 1st, 3rd, 5th and 7th day. Results: It was observed that all the study participants showed significant improvement in oral health status at the end of 7th day. It was also observed that diabetic individuals showed superior OHI-S (P=0.002), PI (P=0.0001) and GI (P=0.0004) scores with greater significance (p<.05) than non-diabetic individuals. Conclusion: From the above results it can be concluded that the modified special tooth brush with beat sound used in the present study can reduce the burden of periodontal disease status by improving oral health among diabetic individuals.

KEYWORDS: Modified Special Tooth Brush, Gingival Index, Plaque, Bleeding, Diabetes.

Introduction

Oral health is often ignored by this age group due to poor oral health care practices, nutritional habits and exposure to illegitimate practices that adversely affecting the quality of life [1]. Dental plaque or calculus is the major etiological factor in the causation of gingivitis which subsequently left untreated leads to periodontitis [2]. Mechanical control using tooth brush for removing of the deposits is the gold standard in its prevention or progression of disease process however; it is insufficient in the interdental areas [3]. According to a study in 2010 conducted on the basis of consumer usage, almost half of the population of India did not use toothbrush to clean their teeth[4].Therefore, Effective Oral hygiene practices such as proper brushing technique, appropriate use of brushes; use of adjunctive oral hygiene aids, interdental aids like interdental toothbrushes, toothpicks and floss along with tooth brushes is often recommended. These practices play a vital role in maintaining a good oral health thereby preventing gingival or periodontal diseases[5]. In addition to professional care, successful management of periodontal disease depends on the capacity of patient’s oral self-care [6].

The presence of systemic conditions such as diabetes mellitus, hypertension, cardiovascular disease, respiratory disorders, endocrine disorders, etc. can individually or collectively attribute to tooth loss.
According to the Diabetes Atlas (2006), published by the International Diabetes Federation, the number of people with diabetes in India currently around 40.9 million is expected to rise to 69.9 million by 2025 unless urgent preventive steps are taken [7]. Low levels of insulin to achieve adequate response and/or insulin resistance of target tissues, mainly skeletal muscles, adipose tissue, and to a lesser extent, liver, at the level of insulin receptors, signal transduction system, and/or effector enzymes or genes are responsible for these metabolic abnormalities [8]. Studies establishing the relationship among diabetes mellitus, periodontal health and subsequent tooth loss have been broadly reported (Campus et al 2005 [9]; Khader et al 2008 [10]; Furukawa et al 2007 [11]; Taylor and Borgnakke 2008 [12]). Individuals with diabetes tend to have higher values for indices of plaque, dental calculus, and gingival inflammation, and deeper periodontal pockets. They are frequently in greater need of periodontal treatment and prophylactic procedures [13]. Various studies have shown abrupt periodontal destruction and more severe periodontitis in individuals with uncontrolled diabetes compared to individuals with well controlled blood glucose level. The patients with poorly controlled diabetes are at greater risk of developing periodontal disease. It starts with gingivitis and then with poor glycaemic control it progresses to advanced periodontal disease [14, 15].

The present study was aimed to evaluate the oral health status among diabetic individuals and to find the outcome efficacy of this method by modified design special tooth brush with beat sound.

**Materials And Method**

The present observational study included 26 random study participants categorized as two groups among which 13 were non-diabetic (control) group and 12 belong to diabetic (study) group irrespective of age and gender. All the study participants were given modified design tooth brush which is designed in such a way to guide proper brushing technique by presence of beads in the shank portion capable of producing beat sound (Figure 1). The beads are placed in a regular interval for effective movement of the handle in the direction of vertical along with circular motions hence by producing noise only at the time of proper brushing technique. The instructions were given and study participants were educated to use modified special tooth brush regularly twice a day for a period of 1 week and not to use any other oral hygiene aids.

Oral hygiene status was evaluated by using Oral hygiene index simplified (OHI-S) given by John C Greene and Jack R Vermillion (1964), Periodontal index (PI) given by Russell A L (1956) and Gingival index (GI) given by Loe H and Silness J (1963) at regular intervals on 1st, 3rd, 5th and 7th day. Indices scores were recorded. All the data collected was tabulated. Statistical analysis was performed by using SPSS software version 21.0 (SPSS V21.0 Illinois, Chicago).

**Findings**

All the score were validated and compared for evaluation by chi-square test and One-Way ANOVA. Among the non-diabetic individuals interrelation within the group OHI-S scores showed f-ratio value of 12.99911 (Table 1), PI scores showed f-ratio value of 13.73005 and GI scores showed f-ratio value of 17.58903 with p-value is < .00001. All the three indices showed significant at p < .05. Similarly Among the diabetic individuals interrelation within the group OHI-S scores showed f-ratio value of 63.6499 (Table 2), PI scores showed f-ratio value of 121.582 and GI scores showed f-ratio value of 261.30 with p-value is < .00001. All the three indices showed significant at p < .05. Pearson’s correlation coefficient was used to evaluate the efficacy of present technique on oral health status among diabetic and non-diabetic individuals. A moderate positive correlation was found with OHI-S index which means there is a tendency for high diabetic variable scores go with high non-diabetic variable scores (and vice versa). The value of R is 0.5868. This is The P-Value is .002047. Similarly a moderate positive correlation was also observed with PI indices scores with R value of 0.6848 and P-value of .000159 and with GI indices score with R value of 0.6504 and P-Value of .000432. All these results were significant at p < .05 among the three indices a greater correlation was observed with periodontal indices than other indices used in the present study (Table 3).
TABLE 1: INTERRELATION WITHIN THE GROUPS OF OHI-S SCORES AMONG NON-DIABETIC INDIVIDUALS

<table>
<thead>
<tr>
<th></th>
<th>DAY 1</th>
<th>DAY 3</th>
<th>DAY 5</th>
<th>DAY 7</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N</strong></td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>52</td>
</tr>
<tr>
<td><strong>∑X</strong></td>
<td>32.6</td>
<td>26</td>
<td>17.2</td>
<td>11.8</td>
<td>87.6</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td>2.5077</td>
<td>2</td>
<td>1.3231</td>
<td>0.9077</td>
<td>1.685</td>
</tr>
<tr>
<td><strong>∑X²</strong></td>
<td>84.28</td>
<td>57.42</td>
<td>31.28</td>
<td>18.42</td>
<td>191.4</td>
</tr>
<tr>
<td><strong>Std.Dev.</strong></td>
<td>0.4591</td>
<td>0.6721</td>
<td>0.8428</td>
<td>0.8015</td>
<td>0.927</td>
</tr>
<tr>
<td><strong>Between-treatments</strong></td>
<td>19.6462</td>
<td>6.5487</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Within-treatments</strong></td>
<td>24.1815</td>
<td>48</td>
<td>0.5038</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>43.8277</td>
<td></td>
<td></td>
<td></td>
<td>51</td>
</tr>
</tbody>
</table>

The f-ratio value is 12.99911. The p-value is < .00001. The result is significant at p < .05.

TABLE 2: INTERRELATION WITHIN THE GROUPS OF OHI-S SCORES AMONG DIABETIC INDIVIDUALS

<table>
<thead>
<tr>
<th></th>
<th>DAY 1</th>
<th>DAY 3</th>
<th>DAY 5</th>
<th>DAY 7</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>N</strong></td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>48</td>
</tr>
<tr>
<td><strong>∑X</strong></td>
<td>41.5</td>
<td>34.4</td>
<td>22</td>
<td>8.6</td>
<td>106.5</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td>3.4583</td>
<td>2.8667</td>
<td>1.8333</td>
<td>0.7167</td>
<td>2.219</td>
</tr>
<tr>
<td><strong>∑X²</strong></td>
<td>146.41</td>
<td>101.92</td>
<td>45.36</td>
<td>7</td>
<td>300.69</td>
</tr>
<tr>
<td><strong>Std.Dev.</strong></td>
<td>0.5125</td>
<td>0.5483</td>
<td>0.676</td>
<td>0.2758</td>
<td>1.1705</td>
</tr>
<tr>
<td><strong>Between-treatments</strong></td>
<td>52.334</td>
<td>3</td>
<td>17.4447</td>
<td></td>
<td>F = 63.6499</td>
</tr>
<tr>
<td><strong>Within-treatments</strong></td>
<td>12.0592</td>
<td>44</td>
<td>0.2741</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>64.3931</td>
<td></td>
<td></td>
<td></td>
<td>47</td>
</tr>
</tbody>
</table>

The f-ratio value is 63.6499. The p-value is < .00001. The result is significant at p < .05.

TABLE 3: SUMMARY OF DIABETIC AGAINST NON-DIABETIC OHI-S, PI, GI INDEX SCORE CORRELATION ANALYSIS
**TABLE 1:**

<table>
<thead>
<tr>
<th>DIABETIC VS NONDIABTEIC</th>
<th>PI</th>
<th>GI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean X= 1.685</td>
<td>Mean X= 0.39</td>
<td>Mean X= 0.977</td>
</tr>
<tr>
<td>(\sum(X - Mx)^2 = SSx = 43.828)</td>
<td>(\sum(X - Mx)^2 = SSx = 4.405)</td>
<td>(\sum(X - Mx)^2 = SSx = 11.772)</td>
</tr>
<tr>
<td>Y Values</td>
<td>Y Values</td>
<td>Y Values</td>
</tr>
<tr>
<td>(\sum = 106.9)</td>
<td>(\sum = 119.3)</td>
<td>(\sum = 71.3)</td>
</tr>
<tr>
<td>Mean = 2.056</td>
<td>Mean = 2.294</td>
<td>Mean = 1.371</td>
</tr>
<tr>
<td>(\sum(Y - My)^2 = SSy = 80.968)</td>
<td>(\sum(Y - My)^2 = SSy = 77.328)</td>
<td>(\sum(Y - My)^2 = SSy = 24.987)</td>
</tr>
<tr>
<td>N = 52</td>
<td>N = 52</td>
<td>N = 52</td>
</tr>
<tr>
<td>(\sum(X - Mx)(Y - My) = 34.955)</td>
<td>(\sum(X - Mx)(Y - My) = 12.639)</td>
<td>(\sum(X - Mx)(Y - My) = 11.155)</td>
</tr>
<tr>
<td>R Calculation</td>
<td>R Calculation</td>
<td>R Calculation</td>
</tr>
<tr>
<td>(r = \frac{\sum((X - My)(Y - Mx))}{\sqrt{(SSx)(SSy)}})</td>
<td>(r = \frac{\sum((X - My)(Y - Mx))}{\sqrt{(SSx)(SSy)}})</td>
<td>(r = \frac{\sum((X - My)(Y - Mx))}{\sqrt{(SSx)(SSy)}})</td>
</tr>
<tr>
<td>r = 0.5868</td>
<td>r = 0.6848</td>
<td>r = 0.6504</td>
</tr>
</tbody>
</table>

**FIGURE 1:** Photograph showing the modified tooth brush with presence of beads in the shank portion capable of producing beat sound

**Discussion:**

Periodontitis is the most common multifactorial oral disease often associated with systemic conditions such as Hypertension, Diabetes Mellitus, Cardiovascular diseases, smoking. Over the years numerous epidemiological studies were carried out to confirm that diabetes is a substantial risk element for periodontitis, and the risk of periodontitis is greater if glycaemic levels are poor or less controlled[16].
Accumulation of dental plaque and calculus is usually caused by improper toothbrushing techniques, failure to carry out interdental cleaning and irregular dental visits. This accumulation probably results in gingival inflammation. Faulty tooth brushing techniques, improper use of oral hygiene aids involving excessive pressure may not efficiently or effectively remove plaque but also considerably increase gingival recession and loss of tooth substance by mechanical abrasion [17].

In the present study it was observed among the diabetic individuals interrelation within the group on OHI-S scores, PI scores and GI scores showed significant at p < .05. The present study is similar to the study by Toda et al [18], Lee et al [19] who also observed patients with diabetes are likely to have more severe periodontitis in terms of average plaque index (PI), average gingival index (GI), and clinical attachment loss (CAL), but exhibit the same extent of periodontal disease. This could be attributed to the fact that duration of the disease process play a role in the increasing magnitude of periodontal disease, 1 week follow up was made in the present study in contrast to their studies this may explain the apparent contradiction to the study by Emrich et al [20].

The results of the present investigation revealed that the diabetic patients exhibited significantly higher levels of gingivitis, periodontitis and bone loss than the non-diabetic patients. The above findings are in agreement with the studies by Collin et al [21], Taylor et al [22] and Sznajder et al [23]. However, the reduction of gingival or OHI-S Index may not have been greater due the age group of selected patients and for the low quality of brushing technique that they presented previously. Hence a higher significance was present with the periodontal status of an individual especially on diabetic group.

In a study by Rohit et al on severity of scores of periodontal index, gingival index, oral hygiene index simplified and bone loss score showed no significant difference in their severity [24] where as in the present study a moderate positive correlation was found with OHI-S index, PI indices scores and with GI indices score that explained by the fact that Bass technique was followed producing beat sound emphasizes the sulcular placement of the bristles, removing the plaque not only from the gingival margin but also with the cleaning efficiency can reach a depth of 0.5 mm subgingivally [25].

Ueno et al in a community based study observed the outcome of periodontal disease seemed to be influenced by the diabetic state to some degree, but a clear association between diabetes and oral health status was not found in the study [26]. In contrast, our study showed a moderate positive correlation which means there is a tendency for high diabetic indices variable scores go with high non diabetic indices variable scores (and vice versa). Differences in types of subjects (i.e., race, gender, and age) and degree of diabetes or using more rigorous and systematic study by evaluating CPITN index, Plaque Index on a large population, will be necessary to confirm the current observations which might have produced these conflicting results.

**Conclusion**

Within the limits of this study and based on clinical implication of the obtained results when comparing diabetic and non-diabetic individuals, it can be concluded that modified special tooth brush with beat sound technique show effectiveness on the plaque control by improving the overall oral health indices score in patients especially in individuals with good diabetic control. Further studies may be important to confirm these findings by long term follow up of patients to demonstrate the effectiveness of this method on the periodontal tissues health and also in improving the overall health status of an individual.

**Conflict of Interest:** NONE DECLARED

**Source of Funding:** Not applicable.

**Ethical Clearance:** Not applicable.

**Acknowledgement:** NIL

**References**


Age Estimation by Dental Eruption in Schoolchildren of 14-16 Years Age Group

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Abstract

The estimation of age is an important and is commonly carried in medico legal area. Assessment of age is often required while administering justice to an individual involved in the civil and the criminal litigation. Teeth are known to aid in personal identification and age estimation as they are highly durable and resist putrefaction, fire, chemicals etc. Objective: To study the status of dental eruption in schoolchildren of age group between 14- 16 years. The study was carried out involving 100 students of age group of 14-16 years from BGS High School, B G Nagara, Mandya District. Out of 100 subjects, 50 males and 50 females constituted the study population. In the present study, Upper jaw, on both right and left sides, there was no space behind 2nd molar tooth in 14 years males while space was present in one female of same age group. Only 1 male and 1 female of 15 years age group had developed space behind 2nd molar tooth. Considering the Lower jaw, space behind 2nd molar tooth was developed in 7 cases right side and 8 cases left side in case of 14 years boys. In case of girls of 14 years age it was present in 12 cases on right side and 9 cases on left side. In case of boys of 15 years, it was present in 18 cases on right side and 19 cases on left side. In case of girls of 15 years, it was present in 18 cases on right side and 20 cases on left side. The dental system is an integral part of the human body, its growth and development can be studied in parallel with other physiological maturity indicators such as bone age, menarche and height.

Keywords: Age Estimation, Dental Eruption, 14-16 Years of Age group.

Introduction

The estimation of age is an important and is commonly carried in medico legal area. Assessment of age is often required while administering justice to an individual involved in the civil and the criminal litigation. Teeth are known to aid in personal identification and age estimation as they are highly durable and resist putrefaction, fire, chemicals etc. Dental age estimation in the living is mostly based upon non-invasive methods, which evaluate the timing and sequence of defined growth stages of the developing dentition and the sequence or modification of traits in the mature dentition and the surrounding tissues. Eruption of teeth is one of the changes observed easily among the various dynamic changes that occur from the formation of teeth to the final shedding of teeth. The times of eruption of teeth are fairly constant and assessment of age of an individual by examination of teeth is one of the accepted methods of age determination. This fact can be made use of in ascertaining the average age of eruption of the tooth.1

It is well accepted by several authorities that the principal methods that enable one to give a fairly accurate range regarding the age of an individual are on the basis of appearance of secondary sexual characteristics, eruption of teeth. As determined by various studies so far in India, it is well known that there exists considerable variation in ossification of bones and teeth eruption in different regions of the country. So also there is divergence in the pattern of appearance of secondary sexual characteristics in various regions of our country and in different socio-economic groups.

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EMAIL ID: drsureshjfm@gmail.com
Examination of teeth is very important in medico-legal cases as it helps in identification and age estimation of living as well as dead since the teeth resist putrefaction for a long time. From eruption of 20 temporary teeth, one can estimate approximate age from 6 months to 30 months. Temporary or deciduous teeth are replaced by 32 permanent teeth in later life which starts around 6th year. From eruption of first permanent molar until eruption of all the four permanent canines, it is called as period of mixed dentition. Teeth eruption is affected by climatic, racial, geographical factors. Also nutritional deficiency status and some diseases either delay eruption of teeth or may cause premature dentition.2,3

**Objective**

To study the status of dental eruption in school children of age group between 14-16 years

**Methodology**

The study was carried out involving 100 students of age group of 14-16 years from BGS High School, B G Nagar, Mandya District. Out of 100 subjects, 50 males and 50 females constituted the study population.

**Results**

**Table 1: Space behind Second Molar Tooth**

<table>
<thead>
<tr>
<th></th>
<th>14 years</th>
<th>15 years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right Upper Quadrant</td>
<td>0 1</td>
<td>1 1</td>
</tr>
<tr>
<td>Left Upper Quadrant</td>
<td>0 1</td>
<td>1 1</td>
</tr>
<tr>
<td>Right Lower Quadrant</td>
<td>7 12</td>
<td>18 18</td>
</tr>
<tr>
<td>Left Lower Quadrant</td>
<td>8 9</td>
<td>19 20</td>
</tr>
</tbody>
</table>

In the Upper jaw, on both right and left sides, there was no space behind 2nd molar tooth in 14 years males while space was present in one female of same age group. Only 1 male and 1 female of 15 years age group had developed space behind 2nd molar tooth.

Considering the Lower jaw, space behind 2nd molar tooth was developed in 7 cases right side and 8 cases left side in case of 14 years boys. In case of girls of 14 years age it was present in 12 cases on right side and 9 cases on left side. In case of boys of 15 years, it was present in 18 cases on right side and 19 cases on left side. In case of girls of 15 years, it was present in 18 cases on right side and 20 cases on left side.

**Discussion**

In the present study, Upper jaw, on both right and left sides, there was no space behind 2nd molar tooth in 14 years males while space was present in one female of same age group. Only 1 male and 1 female of 15 years age group had developed space behind 2nd molar tooth.

Considering the Lower jaw, space behind 2nd molar tooth was developed in 7 cases right side and 8 cases left side in case of 14 years boys. In case of girls of 14 years age it was present in 12 cases on right side and 9 cases on left side. In case of boys of 15 years, it was present in 18 cases on right side and 19 cases on left side. In case of girls of 15 years, it was present in 18 cases on right side and 20 cases on left side.

Kumar and Sridhar studied a total of 1008 individuals in between 5 years – and 14 years of age residing in Tirupati, Andra Pradesh. This study was community based on eruption times of permanent teeth to establish age of the individual. The median age of the eruption was computed based on the concept of “Ex” which is defined as the age at which specified percent of individuals shows eruption of a given permanent tooth. The median age “E50” was computed by transforming of percentages to probits and plotting a graph between age and probits. The individual’s age can be computed according to E50 value of permanent tooth, which erupted last. Given individuals probability being above or below the assessed age can be estimated by referring to graph and probit transformation table.1

Helm and Prydso recorded permanent emergence of mandibular third molar at an early age of 14 years in 235 Danish Medieval skulls, 52 of whom were in various stages of mixed dentition. They argued that assessment of age at death could be made fairly accurately for the age group 5 to 30 years.4
Kaul et al. studied deciduous teeth emergence of 312 children aged 4 months to 31 months with Punjabi parenthood. For calculating medium age of tooth emergence, they used probit analysis. They found earlier tooth emergence in females than their male counterparts. In comparison with other population, it was found that in general, mean number of emerged teeth in Punjabi children is more at most ages and with lower medium age of eruption for most teeth. Variability in the eruption time was highest in 16-17 and 20-21 months. Thus, their study suggests that the number of teeth can be used as a parameter for estimation of age.\(^5\)

Foti et al. studied for age determination both in living and dead children with the help of linear regression. The equation can be applied based on the number of erupted teeth and tooth germs detected during the clinical examination and radiograph. This equation helps in age estimation until 20 years of age.\(^6\)

**Conclusion**

The dental system is an integral part of the human body, its growth and development can be studied in parallel with other physiological maturity indicators such as bone age, menarche and height. Several authors have shown that dental parameters are more suitable for age estimation in children because the variability is lower since calcification rates of teeth are more controlled by genes than by environmental factors. Rate of formation of the permanent teeth is not affected by premature loss of the primary teeth. Gingival emergence also called tooth eruption represents only one stage in the continuous process of dental eruption.

**Ethical Clearance:** Obtained from Institutional Ethical Committee

**Source of Funding:** Self

**Conflict of Interest:** Nil

**References**


A Retrospective Study of Fatal Road Traffic Accidents on Autopsies done at Madurai Medical College and Hospital

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Abstract

Aims: To study the demographic and injury profile in autopsy cases with an alleged history of RTA.

Design: It is a retrospective observational study.

Setting: Department of Forensic Medicine and Toxicology, Madurai Medical College, Madurai.

Subjects and Method: All autopsies of RTA victims which were performed between January 2018 to June 2018, were analysed for sex, age, time of RTA, type of vehicle, position of victim during RTA, nature of injury, and cause of death.

Exclusion Criteria: None

Statistical Analysis: All parameters were expressed in percentage.

Results: A total of 568 RTA victims were referred for autopsy during the period of January 2018 to June 2018. 301 (53%) victims were between 21-30 years of age, males constituted 71% of the total victims. Injuries involving limbs constituted 31% of the total injuries, followed by injuries involving head, thorax, abdomen, pelvis and spine. Among head injuries, fractured skulls occurred in 67%, Subdural Haemorrhage in 78%, Subarachnoid Haemorrhage in 62%, Extradural Haemorrhage in 49% and Intra-cranial injuries in 22%. Head injury accounted for 67% of deaths, and haemorrhagic shock for 27% of deaths.

Conclusion: Various preventive measures like speed control, helmet use, no driving under alcohol influence etc., enforcing road safety regulations, and improving emergency medical services could be used to control the increasing toll of deaths due to RTA.

Key Words: RTA, Autopsies, Injury profile, Demographic profile, Road safety

Introduction

Each year, road traffic injuries take the lives of 1.2 million people around the world and seriously injure millions more[1] The death rate is highest, and still growing in low and middle-income countries, where pedestrians, motorcyclists, cyclists and passengers are especially vulnerable[1] Moreover, estimated costs of road traffic injuries are between 1% and 2% of GNP per annum in these countries, and accounts for a loss of approximately US$ 65 billion every year; almost twice the total development assistance received worldwide by developing countries[1] India accounts for about 10 percent of road accident fatalities worldwide, 85% of all road accident deaths occur in developing countries, and nearly half in the Asia-Pacific region[1] According to the World Health Report 2002, 30.3% morbidity and 28.7% mortality occurred in the South-East Asia Region due to injuries[2]; Road traffic injuries are predicted to rise from ninth place in 2004 to fifth place by 2030 as a contributor to the global burden of diseases[3]; The purpose of the present study is to describe the demographic and injury profile in autopsy cases with an alleged history of RTA, thereby drawing public attention and awareness in order
to prevent/control Road traffic accidents.

**Material and Method**

The present retrospective study was conducted on 568 autopsy cases brought to the Forensic Department of Madurai Medical College during the period between January 2018 to June 2018 with an alleged history of RTA. For the purpose of the study, a RTA was defined as an accident which took place on the road between two or more objects, one of which must be any kind of a moving vehicle. Various study variables analyzed were sex, age, type of vehicle (light vehicle like two wheelers, three wheelers, car, jeep etc. and heavy vehicle like truck, bus, train, tractor) and position of the victim during RTA (occupant/ pedestrian/ driver), nature of injury, and cause of death. The data sources were statements of patient (dying declaration), history from relatives and friends, and police investigation reports. A detailed proforma for the purpose of recording history, epidemiological data and the details of injuries etc. was prepared for the filling observation of the present study. All the parameters were expressed in percentage and numbers.

**Observation and Results**

A total of 568 RTA victims were autopsied during the period of January 2018 to June 2018. The highest number of victims 301 (53%) belonged to age group of 21-30 years. If we considered age group of 21-40 years, it showed more than 3/4th of total RTA victims (73%). The males outnumbered the females in totality and male to female ratio was 3:1. Two wheelers were involved in 42% of RTA. Head injuries constituted 27% of the total injuries, followed by injuries involving limbs, thorax, abdomen, pelvis, and spine [Table 3]. Among the head injuries Subdural Haemorrhage was most common.

**Discussion**

In the present study, males constituted 71% and females constituted only 29% of the total victims. Moreover, age between 20-40 years was found to be more vulnerable to RTA. Similarly, in a study from South India, there were 83% males and 17% female accident victims. Among the motorized vehicles, two wheeler drivers were more (42%) involved in accidents. Being knocked down was the common mode of accidents. However, in our study, a majority of victims were pedestrians (58%). Previously a study from Delhi reported 69% injuries in the age group of 15 to 35, and males were four times more affected than females.

In a study from Maharashtra, maximum cases of RTA were among males (83.20%), and in the age group of 20 to 39 years (51.20%) [5]. Banerjee K.K. from Delhi reported 81.80% victims of thoraco-abdominal injuries all of which were in males, and all of, 40% were in the age group of 21-30 years [6]. A study from Nepal also reported 16-30 years as commonest age-group involved in RTA. Males sustained craniofacial injuries about 4 times more than females in this study [2]. A few studies reported pedestrians as the majority of victims involved in RTA, as reported in our study [5, 7]. In our study, limb injuries constituted 31% of the total injuries, followed by injuries involving head, thorax, abdomen, pelvis and spine. Among head injuries, fractured skulls occurred in 69%, Subdural Haemorrhage in 78%, Subarachnoid Haemorrhage in 63%, Extradural Haemorrhage in 47%, Intra-cranial injuries in 23%, and Contusion and Lacerations in 32% of the victims. In an earlier study from India, head was the commonest site to be injured in RTA, and Subdural Haemorrhage was the commonest haemorrhage. Laceration of brain tissue was highest among all brain tissue injuries, as reported in our study [5].

In a study from Nepal, 39% of medicolegal cases that were brought to the emergency department, were of craniofacial trauma (in 70% cases, cause is RTA [2]. Ganveer GB and Tiwari RR also reported in their study that out of total 423 subjects, 363 (85.8%) were males, while only 60 (14.2%) were female subjects, and a majority of the victims (75%) were in the age group 18-37 years [8]. Moreover, in the above study, two wheelers and LMV were the most common vehicles involved, and fracture of the bones was the common injury afflicted in accidents, as reported in our study [8]. In the present study, head injury was the major cause of death (67%), as reported earlier by Chaudhary B L, et al [5].

**Table No – 1: Age Wise Distribution**

<table>
<thead>
<tr>
<th>Age</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-10</td>
<td>16</td>
<td>2%</td>
</tr>
<tr>
<td>11-20</td>
<td>39</td>
<td>7%</td>
</tr>
<tr>
<td>21-30</td>
<td>301</td>
<td>53%</td>
</tr>
<tr>
<td>31-40</td>
<td>111</td>
<td>20%</td>
</tr>
<tr>
<td>41-50</td>
<td>60</td>
<td>11%</td>
</tr>
<tr>
<td>51-60</td>
<td>27</td>
<td>5%</td>
</tr>
<tr>
<td>More than 60</td>
<td>14</td>
<td>2%</td>
</tr>
<tr>
<td></td>
<td>568</td>
<td>100%</td>
</tr>
</tbody>
</table>
Table – 2: Cause of Death

<table>
<thead>
<tr>
<th>Cause of death</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head injury</td>
<td>380</td>
<td>67%</td>
</tr>
<tr>
<td>Haemorrhagic shock</td>
<td>153</td>
<td>27%</td>
</tr>
<tr>
<td>Multiple causes</td>
<td>17</td>
<td>3%</td>
</tr>
<tr>
<td>Thrombo embolism</td>
<td>6</td>
<td>1%</td>
</tr>
<tr>
<td>Spine injury</td>
<td>6</td>
<td>1%</td>
</tr>
<tr>
<td>Sepsis</td>
<td>6</td>
<td>1%</td>
</tr>
<tr>
<td>Total</td>
<td>568</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table –3: Pattern of injuries

<table>
<thead>
<tr>
<th>Site of injury</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limbs</td>
<td>436</td>
<td>31%</td>
</tr>
<tr>
<td>Head</td>
<td>380</td>
<td>27%</td>
</tr>
<tr>
<td>Thoracic</td>
<td>268</td>
<td>19%</td>
</tr>
<tr>
<td>Abdomen</td>
<td>239</td>
<td>17%</td>
</tr>
<tr>
<td>Pelvis</td>
<td>70</td>
<td>5%</td>
</tr>
<tr>
<td>Spine</td>
<td>14</td>
<td>1%</td>
</tr>
<tr>
<td>Total</td>
<td>1407</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table – 4: Pattern of Head Injuries

<table>
<thead>
<tr>
<th>Injury</th>
<th>No of victim</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fracture of skull</td>
<td>262</td>
<td>69%</td>
</tr>
<tr>
<td>Extradural haemorrhage</td>
<td>179</td>
<td>47%</td>
</tr>
<tr>
<td>Subdural haemorrhage</td>
<td>296</td>
<td>78%</td>
</tr>
<tr>
<td>Subarachnoid haemorrhage</td>
<td>239</td>
<td>63%</td>
</tr>
<tr>
<td>Intra cerebral haemorrhage</td>
<td>87</td>
<td>23%</td>
</tr>
<tr>
<td>Contusion / Laceration</td>
<td>122</td>
<td>32%</td>
</tr>
</tbody>
</table>

Table – 5: Position of victim

<table>
<thead>
<tr>
<th>Position</th>
<th>No of victim</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupant</td>
<td>114</td>
<td>20%</td>
</tr>
<tr>
<td>Driver</td>
<td>125</td>
<td>22%</td>
</tr>
<tr>
<td>Pedestrian</td>
<td>329</td>
<td>58%</td>
</tr>
<tr>
<td>Total</td>
<td>568</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table – 6: Type of Vehicle involved:

<table>
<thead>
<tr>
<th>Type of vehicle</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Two wheeler</td>
<td>238</td>
<td>42%</td>
</tr>
<tr>
<td>Three wheeler</td>
<td>34</td>
<td>6%</td>
</tr>
<tr>
<td>Car/ Jeep</td>
<td>80</td>
<td>14%</td>
</tr>
<tr>
<td>Heavy vehicle</td>
<td>216</td>
<td>38%</td>
</tr>
<tr>
<td>Total</td>
<td>568</td>
<td>100%</td>
</tr>
</tbody>
</table>
Conclusion

RTA is one of the major causes of disability and death all over the world and continues to be a growing menace, incurring heavy loss of valuable human resources, along with wastage of potential economic growth. Every 4 minutes, a person killed or injured in India due to RTA[1] Behaviour of the road user, vehicle characteristics, and traffic environment, coupled with human errors, have been cited as the main causes. The All India road data shows that 83.5% of the accidents were due to the driver’s fault. Other contributory factors were: mechanical defects in vehicles, pedestrian fault, fault of the passenger, bad roads, and bad weather[9]RTA is the third major preventable cause of all deaths[8]. Various preventive measures like avoiding high speeding and driving under the influence of alcohol; promoting the use of helmets, seat belts and other restraints, ensuring that people walking and cycling are more easily visible, improving the design of roads and vehicles, enforcing road safety regulations, and improving emergency medical services, could be used to control the increasing toll of deaths due to RTA. More importantly there should be legislation and stringent punishment against drunken driving. Society should be involved in implementing many campaigns such as Motorcycle Helmet Campaign, Anti-Drunk-Driving Campaign etc. In addition setting speed limits, separate lane for bicycles, proper pavement for pedestrians in vehicle congested areas and over bridge or subway in national highways crossovers is an effective strategy that minimises the risk of fatal road traffic accidents.

Conflict of Interest- None

Ethical Clearance- Not necessary as it is a retrospective study

Source of Funding - Self

References

Identification of Sex from Facial Index in Western Maharashtra Population

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1Assistant Professor Department of Forensic Medicine and Toxicology, 2Professor, 3Associate professor, Department of Anatomy Vedantaa Institute of Medical Sciences Dhundalwadi DahanuPalghar (Dist), Maharashtra

Abstract

Background: Facial Index anthropometry has well known, implications in health-related fields, identification of person in Forensic Medicine, Plastic Surgery, Orthodontics, Archaeology, hair style design and examination of differences between races and ethnicities.

Method: 120 (60 Male and 60 female) adults aged between 25 to 45 were studied. Facial height is divided by Breadth of Zygomatic arch and multiplied by 100. The Measurement were taken from Nasion to Gnathion and distance between two zygoma by asking the volunteers to sit in upright position, spreading calliper used for measurement of two zygoma and sliding calliper for Nasion to Gnathion.

Results: The man value of Male Facial Index was 92.1 (SD±0.40) female was 89.2 (SD±0.19), t test value was 1.97 and p value was highly significant (P<0.01) and anthropologically obtained values belong to Leptoproscopic Index.

Conclusion: The present study of western Maharashtra will be useful for medico legal expert, anthropologist to differentiate from other parts of country and abroad as well. Moreover, it would be useful to orthodontics plastic surgeons for reconstruction of face.

Key words: Spreading calliper, Sliding calliper, Ethnic, Medico-legal, Volunteers.

Introduction

The pioneer to measure the Facial Index was William.R. Leonard Professor of Anthropology from North-western university in 1987 from Evanston to study the ethnicity and race. The face is the body part that, epitomises a human person. The face is required for identification of individuals in the passport, driving license and other documents yet human face is an anatomical entity that arise through biological processes during the course of human evolution and its structure is regulated by same embryological, anatomical and physiological mechanism that form all other parts of the body thus the facial parameters have scientific identity.

Slight Modifications in the structural elements of the face (bones, muscle, cartilage) allow individual features or facial morphology to be interposed over the general, modern human face pattern. These variations in the facial morphology arise through differential growth and create an individual face that allow us to distinguish one person to another. These variations are controlled by multiple factors like hormonal, genetic, environmental and nutritional factors. Hence attempt was made to study the facial index in western Maharashtra people.

Material and Method

60 adult Males and 60 adult females regularly visiting Vedantaa hospital of Medical sciences were studied.

Inclusive Criteria: 60 Males, 60 Females normal Facial Index well-nourished volunteers aged between 25 to 40 years volunteers were selected for study.
Exclusive Criteria: Patients had history of mandibular fracture or fracture Normafacials, malnourished or any bone diseases was excluded from the study.

Method The volunteers were asked to sit in upright position. The facial Index was measured with the help of spreading calliper and sliding calliper.

Facial Height – is measured straight distance between Nasion to Gnathion (Measured by sliding calliper)

Breadth of zygomatic Arch – It was measured straight distance between twozygoma (Measured by spreading calliper).

Facial Index =Facial height X 100

Breadth of zygomatic arch

Measurements were taken as

1) Nasion – The point at Nasal root intersected by Midsagital plane (Nasal root is a depression of Nose) but at the Naso-frontal suture which can be felt by slightly probing the root of the Nose.

2) Gnathion – is the lowest point jaw intersected by the Mid Sagital plane. This point can be palpated on the lower jaw slightly another to chin.

3) Zygoma – is the most laterally placed point on zygomatic Arch.

Duration of study was about 2 years.

Statistical analysis – The obtained values of males and females were compared by ‘t’ test by using SPSS 2007 software.

Observation and Results

Table – 1: Mean values Male Facial Index was 92.78 (SD±0.40) and female Index 89.1 (SD±0.19) t test was and P value was P<0.0.

Table – 2: present Facial Index was compared with anthropological Index.

Table-3: The present study was compared previous workers.

Discussion

In the present study of Facial Index in western Maharashtra population. The mean value of Male facial Index was 92.1 (SD±0.40) and female was 89.2 (SD±0.19) t test value was 64.5 and p<0.000 (p value was highly significant) (Table-1). As per the anthropological Index both obtained values fall under Leptoprosopic anthropological Index. (Table-2). The present values were more or less in agreement with previous studies. (3)(6)(7)

The obtained anthropological values were due to nutritional, genetic and environmental factors.8 Harmony and disharmony of the face depends on the relationship between individual measurements of craniofacial Index. It was also observed that, variations of facial Index in new born and adults. Moreover, it was concluded that, facial anthropometry can change with age due to re-absorption of cranial bones including mandible.9

In addition, this bone being mesoderm origin is more plastic tissue after blood hence it adapts with environmental and nutritional changes.10 Moreover dates of fusion are usually delayed in normal individuals of short stature and accelerated in tall individuals. The factors which determine. The time of ossification is obscure. Different times of ossification of bones of skull ossify earlier. Functional and morphological factors may be involved in such cases.11 It is established fact genes became active if they get proper nutrition otherwise, they are called as silenced genes, which retard the biomechanical functions of the body.

Summary and Conclusion

The present study of Facial Index in western Maharashtra population in both sexes will be useful to medico – legal expert, anthropologist, Oral Maxillofacial surgery, plastic surgery, but this demands further genetic, hormonal, nutritional, anthropological study because exact morpho-metric values of Mesodermal derivatives are still un-certain.

This research paper was approved by ethical committee of Vedanta Institute of Medical Sciences Dhundalwadi DahanuPalghar (Dist) – 401610 (Maharashtra)

- No Conflict of Interest
- No Funding
Table-1: Comparative study of both Male and Female Facial Index

<table>
<thead>
<tr>
<th>Male Facial Index</th>
<th>Female Facial Index</th>
<th>t test value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean value 92.1 (SD±0.40)</td>
<td>Mean value 89.1 (SD±0.19)</td>
<td>64.5</td>
<td>P&lt;0.00</td>
</tr>
</tbody>
</table>

P value was highly significant (SD±0.40)

Table-2: Anthropological Index

<table>
<thead>
<tr>
<th>No</th>
<th>Facial types</th>
<th>Male Index</th>
<th>Female Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hyper Euryprosopic</td>
<td>78.9</td>
<td>76.9</td>
</tr>
<tr>
<td>2</td>
<td>EuryProscopic</td>
<td>79 to 83.9</td>
<td>77 to 80.9</td>
</tr>
<tr>
<td>3</td>
<td>Mesoproscopic</td>
<td>84 to 87.9</td>
<td>81 to 84.9</td>
</tr>
<tr>
<td>4</td>
<td>LeptoProscopic</td>
<td>88 to 92.9</td>
<td>85 to 89.9</td>
</tr>
<tr>
<td>5</td>
<td>Hyper leptoprosopic</td>
<td>93</td>
<td>90</td>
</tr>
</tbody>
</table>

In the present study both Male and female Index falls under LeptoProscopicmale 92.1 (SD±0.40) and female 89.2 (SD±0.19).

Table-3: Present study was compared with previous workers.

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Name and year</th>
<th>Ethnic Group</th>
<th>Male Facial Index</th>
<th>Female Facial Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mahesh Kumar 2013</td>
<td>Hariyanvi adults</td>
<td>86.09</td>
<td>84.89</td>
</tr>
<tr>
<td>2</td>
<td>ZohreAbatobae 2010</td>
<td>Yazd</td>
<td>108.3</td>
<td>106.9</td>
</tr>
<tr>
<td>3</td>
<td>AgropnRExhepi 2008</td>
<td>Kosova Subject</td>
<td>90.38</td>
<td>90.27</td>
</tr>
<tr>
<td>4</td>
<td>Vaishali Shetty 2010 2011</td>
<td>a) Indian b) Malaysain (students)</td>
<td>85.72</td>
<td>87.71</td>
</tr>
<tr>
<td>5</td>
<td>Neeta chhabra 2015</td>
<td>North India</td>
<td>90.68</td>
<td>89.2</td>
</tr>
<tr>
<td>6</td>
<td>Present study 2020</td>
<td>Western Maharashtra</td>
<td>92.1</td>
<td>89.2</td>
</tr>
</tbody>
</table>
References


4) Mukesh Singla, Prabhat Goel, Rashmi Ghai – Facial Index in adult Indian Punjabi Males JAtshiks and Banias Ind-J-of public health and Research and development 2011, 2(1), 52-56.


11) L. E. Tanner and Wright – Recent investigations regarding the fate of princess in the Tower Archologia 1935, 84, 32-34.
A Cross Sectional Study of Correlation of ATD Angle with Body Fat Distribution in North Indian Population

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Abstract

Introduction: Obesity is associated with significant global morbidity and mortality. The prevalence of obesity is on the rise, especially in low- and middle-income countries and there is a need for a tool for the prevention of this disease. As per the available pieces of evidence, dermatoglyphics can be utilized for this purpose to some extent. Dermatoglyphics is a study of configurations of epidermal ridges on certain body parts, namely, palms, fingers, soles, and toes. The term is derived from ancient Greek: derma = skin, glyph = carving. Dermatoglyphic patterns begin to develop in the 10th week of gestation and are complete by the 24th week.

Aim: The primary objective of this study was to investigate the correlation of the “atd angle” (a dermatoglyphic parameter) with the body fat distribution (or obesity).

Methods: This cross-sectional study was conducted in the department of anatomy, Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana (Ambala). It included 400 participants (200 males and 200 females) from students and employees of the college. All demographic and anthropometric parameters along with the hand imprints were obtained using standard procedures. For determining statistical significance of difference among various variables qualitative data was analyzed by Pearson’s Chi square test and quantitative data by student’s independent t-test and one way ANOVA. P-value of < 0.05 was considered significant. All analysis was done using SPSS version-20.

Results: Overall 24% of subjects (32% of males and 16% of females) were found to be obese (BMI≥25kg/m²). A statistically significant difference was observed in the values of both right and left hand “atd angle” for the comparison of obese and non-obese subjects (p=0.009 and <0.001, respectively). A statistically significant positive correlation of left hand “atd angle” was observed with BMI.

Conclusion: Dermatoglyphics can potentially be used as a tool for the prediction of obesity.

Recommendations: A large-scale study with a well-defined protocol is required for establishing dermatoglyphics as a screening tool for obesity.

Key Words: Obesity, Dermatoglyphics, BMI, anthropometric parameters, axial triradii, digital triradii

Introduction

Obesity is derived from a Greek word that means ‘overeating’ and is defined as abnormal or excessive fat accumulation that may lead to impaired health. Body mass index (BMI) is a simple and widely used parameter for the classification of overweight and obesity. According to
World health organization (WHO), people with BMI ≥25 are termed as overweight and those with BMI ≥30 are termed as obese. In 2016, about 39% and 13% of the world’s adult (individuals ≥18 years of age) population, which corresponds to 1.9 billion and 650 million adults, were overweight and obese, respectively. The prevalence of obesity has increased three-folds in 2016 when compared with that in 1975. Obesity is considered a major risk factor for the development of various non-communicable diseases such as cardiovascular diseases, diabetes mellitus, musculoskeletal disorders, and a certain type of cancers. As common hypothesis obesity occurs when caloric intake is greater than the energy expenditure. However, with the developments in our knowledge about obesity, it is now considered to be an inheritable disorder that is caused by a complex interaction of genetic, environmental, and behavioral factors. Previously regarded as an epidemic of the western world, obesity is now a major concern for low-and middle-income countries like India. Presently, identification of individuals at high risk of obesity and related co-morbidities is an important goal for healthcare providers worldwide.

Due to increase awareness about the management of obesity, various researches are being carried out to invent methods for preventing this chronic disease. Dermatoglyphics, a term derived from two Greek words: ‘derma’ meaning skin and ‘glyphic’ meaning carving, is the study of epidermal ridges and their arrangement on the volar aspect of the hand, finger, feet, and toe. Abnormal dermatoglyphics pattern arises when any disturbance occurs in the growth of the fetus during early stages of fetal life. Arches, loops, and whorls are the three basic patterns found in hand. Dermatoglyphics has proved to be helpful in the prediction of various genetic disorders and in diagnosing certain congenital malformations. Many studies have indicated the role of dermatoglyphics in the prediction of different diseases like hypertension, diabetes mellitus, asthma, rheumatoid arthritis and schizophrenia. The researchers have proposed that there might be some genetic abnormality involved in the occurrence of these diseases, which can be predicted from the analysis of dermatoglyphic parameters. For the management of obesity, it would be really helpful to have a handy tool like dermatoglyphics to predict the probability of having obesity later in life. This will help in saving many lives and resources.

Certain studies have reported that evaluation of centralized obesity (measured using anthropometric indices such as waist circumference, hip circumference, waist-to-hip ratio, and waist-to-height ratio) is a method for predicting co-morbidities associated with obesity compared with the evaluation of BMI alone. Hence, the objectives of the current study were: 1) To study the prevalence of disordered anthropometric indices in the study population;

2) To explore the correlation, if any, between body fat distribution (or obesity) and the “atd angle”, a dermatoglyphic parameter.

**Material and Method**

The present cross sectional study was conducted in the Department of Anatomy, Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana (Ambala) after ethical clearance from IEC (Institutional Ethics Committee vide Project No: IEC-1087). The study included 400 participants (200 males and 200 females) from students and employees of the college. Prior informed consent for the study was obtained from all the subjects in both English and vernacular. No personal information was retained or published without the prior consent of the individual. Subjects with age above 18 years and below 40 years were included in the study. Subjects who had a problem in standing erect, with postural defects or those confined to a wheel chair, with skin diseases like eczema, leprosy involving finger/palm, or with any inflammation, trauma, anomalies of hand were excluded. All demographic and anthropometric parameters such as age, gender, body weight, height, waist circumference, hip circumference, and BMI were collected for the study population. For assessing the prevalence of obesity, the study participants were grouped in the following 4 categories based on the BMI values:

<table>
<thead>
<tr>
<th>Categories</th>
<th>BMI (kg/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>&lt;18.0</td>
</tr>
<tr>
<td>Normal</td>
<td>18.0 to 22.9</td>
</tr>
<tr>
<td>Overweight</td>
<td>23.0 to 24.9</td>
</tr>
<tr>
<td>Obese</td>
<td>≥25</td>
</tr>
</tbody>
</table>

For collecting the dermatoglyphic parameters, the entire palm of all the subjects was covered with ink and hand imprints for both the hands were taken on a pair of white paper sheet placed on a flat surface with a foam
pad underneath. The subject’s wrists were placed on the bottom of the paper and palms were pressed firmly so that the center is printed without any white space. Digits were printed separately and it was reviewed that the entire pattern on each digit is printed. For the purpose of the present study following landmarks of the handprints were considered: a) digital and axial triradii must be present; b) no space present in the center of the palm; c) all the fingertip area must be present and digital wrist creases can be located. The following observations were made in case of palm prints: Axial and digital triradii were observed in the palm. The obtained palm/digit prints were examined with the help of a magnifying glass. By drawing the lines connecting triradii (a, t to d), “atd angle” was measured using a goniometer.6-21
**Statistical Analysis:** For determining statistical significance of difference among various variables qualitative data was analyzed by Pearson’s Chi square test and quantitative data by student’s independent t-test and one way ANOVA . P-value of < 0.05 was considered significant. All analysis was done using SPSS version-20.

**Results**

A total of 400 study subjects comprising of 200 males and 200 females were included in the study. The results obtained for the prevalence of obesity among the study participants are shown in Table 1. The obesity was statistically significantly more prevalent among males compared with females (chi-square value = 26.584, p <0.001).

<table>
<thead>
<tr>
<th>BMI (Kg/m2)</th>
<th>Males</th>
<th>Females</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;18.0 (Underweight)</td>
<td>34 (17%)</td>
<td>42 (21%)</td>
<td>76 (19%)</td>
</tr>
<tr>
<td>18.0-22.9 (Normal)</td>
<td>52 (26%)</td>
<td>93 (46.5%)</td>
<td>145 (36.25%)</td>
</tr>
<tr>
<td>23-24.9 (Overweight)</td>
<td>50 (25%)</td>
<td>33 (16.5%)</td>
<td>83 (20.75%)</td>
</tr>
<tr>
<td>≥25 (Obese)</td>
<td>64 (32%)</td>
<td>32 (16%)</td>
<td>96 (24%)</td>
</tr>
</tbody>
</table>

The results for the “atd angle” measured for both left and right hands for the entire study population are presented in Table 2. The right hand “atd angle” was statistically significantly higher than the left hand “atd angle” for the entire study population ( p-value <0.001). Also, males had statistically significantly higher right and left hand “atd angles” compared with females (p = 0.011 and 0.004, respectively).

<table>
<thead>
<tr>
<th>Atd angle</th>
<th>Entire study population (n=400) Mean ± SD</th>
<th>Males (n=200) Mean ± SD</th>
<th>Females(n=200) Mean ± SD</th>
<th>T-value (Male vs Females)</th>
<th>P-value (Male vs Females)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right atd angle</td>
<td>38.93 ± 2.57</td>
<td>39.26 ± 2.34</td>
<td>38.61 ± 2.75</td>
<td>2.544</td>
<td>0.011</td>
</tr>
<tr>
<td>Left atd angle</td>
<td>37.62 ± 3.06</td>
<td>38.07 ± 2.81</td>
<td>37.18 ± 3.24</td>
<td>2.919</td>
<td>0.004</td>
</tr>
</tbody>
</table>

Results of the left hand “atd angle” were statistically significantly different among subjects in different BMI categories for obesity (p <0.001). A statistically significant difference was observed in the values of both right and left hand “atd angle” for the comparison of obese versus non-obese subjects (p = 0.009 and <0.001, respectively) (Table 3 and Table 4). Interestingly, a numerically higher mean value for both the right and left hand “atd angle” was observed in the obese subjects compared with that of normal subjects.
Table 3: Comparison of the “atd angle” in Subjects with Normal and Increased BMI

<table>
<thead>
<tr>
<th>Atd angle</th>
<th>BMI (kg/m²)</th>
<th></th>
<th></th>
<th></th>
<th>T-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;18.0</td>
<td>18.0-22.9</td>
<td>23-24.9</td>
<td>≥25</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Underweight)</td>
<td>(Normal)</td>
<td>(Overweight)</td>
<td>(Obese)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Right atd angle</td>
<td>38.70 ± 2.68</td>
<td>38.79 ± 2.31</td>
<td>38.72 ± 2.58</td>
<td>39.53 ± 2.79</td>
<td>2.308</td>
<td>0.076</td>
</tr>
<tr>
<td>Left atd angle</td>
<td>36.83 ± 3.05</td>
<td>36.88 ± 2.90</td>
<td>37.80 ± 3.13</td>
<td>39.23 ± 2.62</td>
<td>14.893</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Table 4: Comparison of the “atd angle” in Obese vs Non-obese Subjects

<table>
<thead>
<tr>
<th>Atd angle</th>
<th>Non-obese</th>
<th>Obese (BMI ≥25 kg/m²)</th>
<th>T-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(BMI &lt;25 kg/m²)</td>
<td>(n=304)</td>
<td>Mean ± SD</td>
<td></td>
</tr>
<tr>
<td>Right atd angle</td>
<td>38.75 ± 2.47</td>
<td>39.53 ± 2.79</td>
<td>-2.624</td>
<td>0.009</td>
</tr>
<tr>
<td>Left atd angle</td>
<td>37.12 ± 3.02</td>
<td>39.23 ± 2.62</td>
<td>-6.167</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

A statistically significant positive correlation of right hand “atd angle” was observed with weight and waist-to-hip ratio, while a statistically significant positive correlation of left hand “atd angle” was observed with weight, BMI, waist circumference, hip circumference, and waist-to-height ratio.

Table 5: Correlation of atd Angle with Various Demographic and Anthropometric Parameters

<table>
<thead>
<tr>
<th></th>
<th>Right atd angle</th>
<th>Left atd angle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correlation</td>
<td>P-value</td>
<td>Correlation</td>
</tr>
<tr>
<td>Weight</td>
<td>0.147</td>
<td>0.003</td>
</tr>
<tr>
<td>Height</td>
<td>0.112</td>
<td>0.025</td>
</tr>
<tr>
<td>BMI</td>
<td>0.112</td>
<td>0.025</td>
</tr>
<tr>
<td>Waist circumference</td>
<td>-0.020</td>
<td>0.685</td>
</tr>
<tr>
<td>Hip circumference</td>
<td>0.110</td>
<td>0.028</td>
</tr>
<tr>
<td>Waist-to-hip ratio</td>
<td>-0.170</td>
<td>0.001</td>
</tr>
<tr>
<td>Waist height ratio</td>
<td>-0.066</td>
<td>0.186</td>
</tr>
</tbody>
</table>
Discussion

The current study indicates that a higher value of “atd angle”, especially that of the left hand can be predictive of the risk of obesity in north Indian adults. Results obtained in the current study are in-line with those obtained in earlier studies, that is, the dermatoglyphic parameter such as “atd angle” is positively correlated with the occurrence of obesity. In the past, a few studies have been conducted and data have been published for the correlation between dermatoglyphic parameters including the “atd angle” and obesity in different age, geographic, and ethnic groups. Bhardwaj N. Et. Al. conducted a study to explore the association of the dermatoglyphic patterns with obesity in 370 school-going children of both sexes. An increase in the number of arches in thumb, mainly right thumb, was observed in 42% of the obese children. An increased “atd angle”, abnormal endings of the main palm lines, additional triradii, and reduced line were observed in 29%, 21%, 17%, and 11% of obese children, respectively. Alberti A et al. conducted a study in 2172 children and adolescents aged 10 to 19 years to explore the relationship between dermatoglyphic parameters and obesity in the center-west region of Brazil. The results suggested that a greater number of lines in the left hand finger two, a higher frequency of the radial and ulnar loop pattern can be considered the predictive marker of obesity in the study population. Dermatoglyphic characteristics are influenced by nutritional status of children and adolescents. Sharmila. D conducted another study to assess the correlation between dermatoglyphic patterns and obesity in 300 children. Results showed that an increased number of arches can be used as a predictive marker for obesity in children. Oladipo et al. conducted a study to assess the link between dermatoglyphic features and obesity in subjects from the Ibibio ethnic group in Nigeria. It was reported that subjects with obesity had a high percentage of arch pattern and a significantly higher value of “atd angle” compared with the normal subjects.

Conclusion

Dermatoglyphics could be proved a vital tool for the prediction of various diseases with a genetic link. Despite the positive correlation observed in the current study it is not yet established whether we can use any of the dermatoglyphic parameters to precisely predict obesity, due to limitations of these studies. Thus, large-scale studies with a well-defined protocol are required to be conducted with the involvement of regulatory bodies for establishing the importance of dermatoglyphics as a screening tool for obesity.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Taken from Institutional Ethics Committee (IEC) vide Project No. IEC-1087

References


A Vignette on the Trend of Medicolegal Cases in a Tertiary Care Hospital in South India

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Abstract

Introduction: Profiling of medico-legal cases is an important aspect for the prevention of preventable casualties in future and to study the genuine crime in the area which contributes a substantial workload in casualty department.

Objectives: The aim of the study is to measure the incidence of medicolegal cases recorded in a tertiary care hospital in South India in one year.

Method: A retrospective analytical content based analysis was made on 776 medicolegal cases recorded in a tertiary care hospital in South India in one year from June 1st 2017 to May 31st 2018 and the results were tabulated.

Results: Of the 776 cases, 545 were men and 231 were women with RTA constituting 70.74% (549 cases) of the cases and poisoning with 10.69% (83 cases) of the cases forming the majority of the case profile.

Conclusion: The study concludes that road traffic accidents are the major causes of medicolegal cases recorded in a tertiary care hospital in South India. Preventive measures of better traffic control and road safety are to be instituted at the earliest. More number of medicolegal profiling should be conducted in every region for further measures.

Key words: Medicolegal profile; RTA; Road safety; Casualty Department; Documentation.

Introduction

A medico-legal case is a case of injury or illness where the attending doctor, after eliciting history and examining the patient, thinks that some investigation by law enforcement agencies is essential to establish and fix responsibility for the case in accordance with the law of the land1. Common medico-legal cases include alleged cases of assault, road traffic accidents, burns, poisoning, snake bite, insect bite, industrial accidents, alcoholic intoxications etc.

The casualty department is backbone of every hospital because almost all cases of medical emergencies reported first to Casualty Department of hospital, and also Casualty Department also deals with the medico legal cases more frequently than any other department of hospital and so medico legal cases constitute substantial proportion of workload. A medico-legal register should be maintained in the casualty of every hospital and details of all medico-legal cases should be entered in this register, including the time and date of examination and the name of the doctor who is dealing with the case. This would be of immense help for future reference, when the patient through the court/the police, requests for a copy of the medicolegal report. A case may be registered as an MLC even if it is brought several days after the incident2.

The reporting of medico-legal cases is imperative to recognize the burden of medico legal cases, calculate
their risk and for the avoidance of preventable casualties in future. The idea is to initiate legal proceeding at the earliest so that maximum evidence can be collected to study the crime pattern in the area. The mortalities and morbidities from all medicolegal causes has been increasing at an alarming rate in our country and also throughout the world, yet to be controlled effectively; by the year 2020 mortality from injury will be more than those from communicable diseases. Despite this documentation, injuries are still not well recognized as a major public health problem in our country.

Profiling of medico-legal cases is an important aspect for the prevention of preventable casualties in future and to study the genuine crime in the area. In spite of recent advancement of technology in the field of medical sciences, death and deformities due to all causes, are yet to be controlled successfully; rather incidences of road traffic accidents has been increasing at an alarming rate throughout the world. Not all medicolegal cases are being recorded as many of them remain unnoticed even after thereoccurs a death of an individual. Hence, this study aims to find the profile of various medicolegal cases that was recorded in a tertiary care hospital in South India, most probably covering the data of south Indian population.

### Method

A total of 776 medicolegal cases were studied that was recorded in one year from June 1st 2017 to May 31st 2018 in a tertiary care hospital in South India. It was a retrospective analytical study with secondary data obtained from the Medical Records Department in the hospital. It was a based on content analysis where a proforma was formed related to the nature and details of the medicolegal cases that was used to obtain the data.

All age group registered with medicolegal cases and treated in the hospital were included in the study. Unregistered medicolegal cases and cases that were sent for further referral from the hospital were excluded from the study. The data was analysed and results were tabulated using simple tables and pie charts. Percentage calculations were made for better statistical reporting.

### Results

Of the 776 cases analysed, 545 cases were males and 231 were females accounting for 70.2% and 29.8% respectively. Of all the 776 cases, 99.36% (771 cases) were alive and discharged post treatment and 0.64% (5 cases) were dead in spite of adequate medical care and all of them were due to severe RTA.

With regard to nature of medicolegal cases, 549 cases were due to road traffic accidents forming 70.7% of the total medico-legal cases. There are 30 cases of burns which contributes to 3.87% and 12 cases of assault which amounts to 1.54% of the total cases. 41 cases are due to fall from height constituting 5.28% of the total cases collected.

38 cases are due to occupational injuries which is about 4.89% of the total cases. 10 cases of snake bite and 3 cases of scorpion sting were collected constituting about 1.3% and 0.38% respectively . 6 cases of hanging and 4 cases of self-inflicted wound accounting to 0.77% and 0.51% respectively were collected. A total of 83 cases due to various poisoning were noticed resulting in 10.69% of all the cases. The details of each poisoning are given in the Table 1. Pie charts 1 and 2 are given to depict the sex distribution and the nature of medicolegal cases respectively.

### Table 1: Types of poisoning

<table>
<thead>
<tr>
<th>Type of Poisoning</th>
<th>Number of cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow dung poisoning</td>
<td>21</td>
<td>25.30%</td>
</tr>
<tr>
<td>Rat killer poisoning</td>
<td>10</td>
<td>12.04%</td>
</tr>
<tr>
<td>Antipsychotic poisoning</td>
<td>3</td>
<td>3.61%</td>
</tr>
<tr>
<td>Unknown liquid poisoning</td>
<td>2</td>
<td>2.40%</td>
</tr>
<tr>
<td>Ant killer and alcohol poisoning</td>
<td>1</td>
<td>1.20%</td>
</tr>
<tr>
<td>Cleaning liquid poisoning</td>
<td>2</td>
<td>2.40%</td>
</tr>
<tr>
<td>Insecticide poisoning</td>
<td>4</td>
<td>4.81%</td>
</tr>
<tr>
<td>All out poisoning</td>
<td>6</td>
<td>7.22%</td>
</tr>
<tr>
<td>Paracetamol poisoning</td>
<td>5</td>
<td>6.02%</td>
</tr>
<tr>
<td>Benzodiazepine poisoning</td>
<td>3</td>
<td>3.61%</td>
</tr>
<tr>
<td>OPC poisoning</td>
<td>10</td>
<td>12.04%</td>
</tr>
<tr>
<td>Thyroid tablet poisoning</td>
<td>1</td>
<td>1.20%</td>
</tr>
<tr>
<td>Alprazolam poisoning</td>
<td>1</td>
<td>1.20%</td>
</tr>
<tr>
<td>Phenytoin poisoning</td>
<td>1</td>
<td>1.20%</td>
</tr>
<tr>
<td>Ant killer poisoning</td>
<td>2</td>
<td>2.40%</td>
</tr>
<tr>
<td>Harpic poisoning</td>
<td>3</td>
<td>3.61%</td>
</tr>
<tr>
<td>Insecticide poisoning</td>
<td>2</td>
<td>2.40%</td>
</tr>
<tr>
<td>Pesticide poisoning</td>
<td>2</td>
<td>2.40%</td>
</tr>
<tr>
<td>Paraquat poisoning</td>
<td>4</td>
<td>4.81%</td>
</tr>
</tbody>
</table>
Discussion

Medico-legal case is an integral part of medical practice that is frequently encountered by medical officers working in emergency department. For such patients, not only treatment, but exhaustive documentation is also mandatory. It is the responsibility of a registered medical practitioner to judge each and every case properly and in doubtful cases, it is mandatory to inform the police as required by law. This saves the doctor from unnecessary and needless allegations later.

Injuries account for 10.1% of the world burden of disease in 2013. In 1990, 5 million people died due to trauma and injuries. The number is expected to rise to 8.4 million by year 2020. Road traffic accidents will be the second most common cause of disability in the developing world. In a retrospective study profile of medico-legal cases in the casualty department of Sri Aurobindo Medical College and PGI, Indore for a period of 1 year, from 1st June 2016 to 31st May 2017, Majority of cases about 57.70% were of road traffic accident (RTA). In our study that was done exactly one year after, 70.74% were RTA.
showing the increasing trend of RTA year after year due to various factors like the increasing high speed vehicles, poor traffic control and adventurous mindset of the people especially youngsters.

Earlier reports demonstrated that everyday almost 700 people die from poisonings around the world and for every person that dies, several thousands more are affected by poisoning\textsuperscript{15,16}. It has been estimated that, in India five to six persons per lakh of population die due to acute poisoning every year\textsuperscript{17}. Pattern of poisoning in a region depends on various factors which include availability and access to the poison, socioeconomic status of an individual, cultural and religious influences, etc. In India, as agriculture is the main occupation, insecticides and other agrochemical fertilizers are used to a greater extent and the poisoning with such products are more common\textsuperscript{18}. This was similar to our study where total poisoning cases were found to be 10.69\% (83 cases) of which cow dung (25.30\%) and OPC along with rat killer poison (12.04\%) constituting the bulk of the poisoning proving the fact they are more commonly used, available and easy to handle by the population.

One year retrospective study was carried out between 1\textsuperscript{st} July 2012 to 30\textsuperscript{th} June 2013 from the in the causality data of Government Medical College, Akola which revealed that Burns - 21.87\% (449 cases) constituted majority of medico legal cases\textsuperscript{19} , comparable to our study which has 3.87\% (30 cases) of cases. The decrease in percentage may be attributed to better fire safety precautions and easy availability of fire service on call.

Considerable amount of occupational injuries were recorded which amounts to 4.89\% (38 cases) of total cases. In a study of 173 medico-legal cases reported to the casualty department of Sri Siddhartha Medical College, Tumkur during the period from 1\textsuperscript{st} January 2012 to 31\textsuperscript{st} August 2013, 21 cases were recorded for occupational injuries\textsuperscript{20}. The rise may be due to rapid industrialisation in the past five years engaging more people in hazardous activities.

10 cases of snake bite were recorded in our study – a very lesser number because of the high industrial oriented occupation and less field related work and also better protective measures in houses and fields. The treatment of snake bite cases have gone a far way better in the recent decade with appropriate clinical management and anti-venom availability since there were no deaths among the 10 cases. This was similar to the study done in tertiary care hospital in Bengaluru during the period of January 2013 to June 2013\textsuperscript{21}.

Other cases such as assault and fall from height contributed to 1.54\% (12 cases) and 5.28\% (41 cases) respectively. The fall from height were mostly seen in young children mostly due to accidental slip and fall as a result of lack of attention. Overall, the medicolegal profile reflected on the alarming rise in RTA and a considerable amount of poisoning which may indicate the stress and depression level of the population though accidental poisonings have to be ruled out. Road traffic accidents and poisoning cases continue to be a growing menace, incurring heavy loss of valuable man-power and human resources in the form of death and disability along with a corresponding drain of potential economic growth\textsuperscript{22}. There should be a road-safety program in which all the cities of our country must be ranked on the basis of various criteria like standard of roads, functioning of traffic signals, obeying of traffic rules by the citizens etc. Despite the weight of evidence, the importance of preventing and treating injuries in low and middle income countries has yet to be embraced by global public health community\textsuperscript{23}. Poison prevention strategies can be implemented at various levels such as strict implementation of pesticide act, so that import, manufacture, sale, transport, distribution and use of pesticides can be under the supervision of the government and controlling access to dangerous pesticides and follow secure storage practice\textsuperscript{24}. Health education to adolescents at school and college level about poisoning and its first aid treatment and strict implementation of anti-dowry law, marriage counselling and women empowerment will help in decreasing the day to day tension in married life and decrease the incidence of poisoning among house wives.

**Conclusion**

The study concludes that road traffic accidents are the major causes of medicolegal cases recorded in a tertiary care hospital in South India followed by poisoning. The basic principles of injury prevention are education, engineering, uniform enforcement of law \& order, pre-hospital care and the evaluation. Proper education, training for safety standards and behaviour modification are interlinked; and are required to be implemented in the community to prevent all kind of injuries including domestic violence. Injury related research should be increased; and improvement in health
care facilities and posttraumatic care should be worked on. Further large number of prospective studies should be carried out that would assist various organizations to set various causative risk factors, circumstances, chain of events; and the preventive measures accordingly to bring down the incidence of not only RTA but all medicolegal cases and shaping the future generation and society more towards being more humane and reaching the goal of World Peace.

Conflict of Interest: No.

Source of Funding: Nil.

Ethical Clearance: Yes

References


An Exploration into the Biography of Road Traffic Accident Cases in a Tertiary Care Hospital in South India

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Abstract

Introduction: RTA is the public health issue and cost a lot to individuals, families, communities and nations as injuries and deaths due to road traffic accidents (RTA) are a major public health problem in developing countries.

Objectives: The present study was carried out with the objective to find out the profile of RTA cases in a tertiary care hospital in South India in one year.

Methods: A retrospective analytical content based analysis was made on 549 RTA cases recorded in a tertiary care hospital in South India in one year from June 1st 2017 to May 31st 2018 and the results were tabulated.

Results: Of the 549 cases, 409 cases were males and 140 were females of which head injury with 182 cases (29.50%) forms the majority of the injury followed by orthopaedic injuries with 163 cases (26.04%).

Conclusion: This study thus analyses various aspects of RTA with head injury being the most common and and its various confounding factors which shows that there is clearly a need for road safety education particularly targeting student community.

Key words: RTA; Head injury; Epidemic; Students; Road safety.

Introduction

Globalization has led to the expansion in the road network along with rise in motorization of vehicles. Simultaneous population explosion and rapidly increasing use of motor vehicles has led to rise in the number of road traffic related accidents, road accident injuries and fatalities¹. Death from road traffic accidents (RTA) and in particular Motor vehicle Traffic Accidents have been characterized worldwide as a hidden epidemic which affects all sectors of society². RTA is the public health issue and cost a lot to individuals, families, communities and nations.

Injury and deaths due to road traffic accidents (RTA) are a major public health problem in developing countries where more than 85% of all deaths and 90% of disability-adjusted life years were lost from road traffic injuries³. The statistical profile reflects a global estimate of 5.1 million deaths in 2000, which was due to injuries that accounted for 10% of deaths due to all causes. Out of this a quarter of injury-related deaths occurred in the South-East Asian region⁴.

As a developing country, India is no exception. Not a day passes without RTA happening in the roads in India in which countless number of people are killed or disabled. The data for fatal accidents presented to the Parliament by the Ministry of Road Transport and

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Highways for year 2008 shows that 119,860 people perished in mishaps that year and the national and state highways accounted for nearly half of all road accidents. Deaths due to road accidents in 2009 were reported to be 126,896 and in 2010 it increased to 133,938 which is about 5.5% over and above the previous year’s deaths

The reasons for the high burden of road traffic injuries in developing countries are increase in the number of motor vehicles, poor enforcement of traffic safety regulations, inadequacy of health infrastructure, and poor transport facility. Road crashes deserve to be a strategic issue for any country’s public health and can lead to overall growth crisis, if not addressed properly. In spite of recent advancement of technology in the field of medical sciences, death and deformities due to all causes, are yet to be controlled successfully; rather incidences of road traffic accidents has been increasing at an alarming rate throughout the world. If the current trends continue, the number of people killed and injured on the world’s roads will rise by more than 60% by 2020. Hence, this study aims to provide an insight into the road traffic accidents reported to a tertiary care hospital in South India, probably covering the data from south Indian population.

**Method**

A total of 549 RTA cases were studied that was recorded in one year from June 1st 2017 to May 31st 2018 in a tertiary care hospital in South India. It was a retrospective analytical study with secondary data obtained from the Medical Records Department in the hospital. It was a based on content analysis where a proforma was formed related to the nature and details of the RTA cases that was used to obtain the data.

All age group registered with RTA cases and treated in the hospital were included in the study. Unregistered cases and cases that were sent for further referral from the hospital were excluded from the study. The data was analysed and results were tabulated using simple tables and pie charts. Percentage calculations were made for better statistical reporting.

**Results**

Of the 549 cases, 409 were males and 140 were females accounting for 74.49% and 25.51% respectively. With regards to age distribution, 33 cases (6.01%) under 15 years of age, 170 (30.96%) cases from 16-30 years of age, 141 (25.68%) cases from 31-45 years of age, 135 (24.59%) cases from 46-60 years of age and 70 (12.75%) cases over 60 years of age.

With regard to time of incident, 60 cases (10.92%) occurred before 8am, 220 cases (40.07%) from 8am-4pm and 269 cases (48.99%) from 4pm-12pm. Various injuries that occurred in the RTA cases are tabulated in Table 1. The duration of hospital stay was divided into 3 categories: 238 cases stayed less than 5 days, 170 cases stayed between 6-10 days and 100 cases were hospitalised more than 10 days.

The time lapse between incident and admission in hospital is tabulated in Table 2. Among the 549 cases, 544 were alive and 5 were dead due to treatment failure and 9 cases discharged against medical advice. On the grounds of occupation, 67 cases (12.20%) among professionals, 92 cases (16.75%) among labourers, 81 cases (14.75%) among housewives, 155 cases (28.23%) among students, 42 cases (7.65%) among retired, 61 cases (11.11%) among unemployed, 51 cases (9.28%) among children under 15 years of age were reported. Pie charts 1 and 2 are given to depict the sex distribution and the occupational distribution of poisoning respectively.

### Table 1: Injuries occurred in RTA

<table>
<thead>
<tr>
<th>Injuries</th>
<th>Number of cases (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head injuries</td>
<td>182 (29.50%)</td>
</tr>
<tr>
<td>Chest injuries</td>
<td>10 (1.82%)</td>
</tr>
<tr>
<td>Facial and eye injuries</td>
<td>26 (4.73%)</td>
</tr>
<tr>
<td>Limb injuries and fractures</td>
<td>163 (26.04%)</td>
</tr>
<tr>
<td>Abdomen and pelvic injuries</td>
<td>37 (6.73%)</td>
</tr>
<tr>
<td>Minor injuries</td>
<td>149 (27.14%)</td>
</tr>
<tr>
<td>ENT injuries</td>
<td>2 (0.03%)</td>
</tr>
</tbody>
</table>

### Table 2: Time lapse

<table>
<thead>
<tr>
<th>Time lapse</th>
<th>Number of cases (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 1 hour</td>
<td>137 (24.95%)</td>
</tr>
<tr>
<td>1-6 hours</td>
<td>342 (62.29%)</td>
</tr>
<tr>
<td>6-12 hours</td>
<td>49 (8.92%)</td>
</tr>
<tr>
<td>&gt;12 hours</td>
<td>21 (3.82%)</td>
</tr>
</tbody>
</table>
DISCUSSION

William Haddon (Head of Road Safety Agency in USA) has pointed out that road accidents were associated with numerous problems each of which needed to be addressed separately. Human, vehicle and environmental factors play roles before, during and after a trauma event. Accidents, therefore, can be studied in terms of agent, host and environmental factors and epidemiologically classified into time, place and person distribution.

In our study, there was a male preponderance similar to the study done in Delhi and it is due to greater male exposure on urban streets and predominance of male drivers in Indian roads. Also maximum number of cases were recorded in the age group of 16-30 years- the most active and productive years of life similar to a study done by Henricksson et al. Tendency of this age group to show scarce attention to traffic rules and regulations and nonuse of safety devices such as helmets, seatbelts, restraints, and so on, can be a possible explanation for the same. This reveals that the most active and productive age group of population are affected in RTAs, which poses a serious economic loss to the community.
This is in accordance with higher incidence among students in our study (155 cases) similar to an epidemiological study done in South India\textsuperscript{14}. The road accidents are happening most often due to the reckless and speedy driving of the vehicles, not obeying or following traffic rules\textsuperscript{15} and the adventurous nature of the youth are the main factors behind rise in RTA among student population. The next major affected group is labourers- the reason may be that the labourers travel in trucks carrying bricks, sand and other heavy materials. It is interesting to note that among the type of motorized vehicles trucks were involved in the highest number of accidents, and labourers often travelled in the truck as part of their work\textsuperscript{10}. Housewives are affected as they most often travel as pillion riders with their spouse.

Most number of cases occurred post 4pm which is similar to study done by Nilambar et.al\textsuperscript{16}. These hours are the busiest as commuters go to and return from the schools, offices, factories and business place. Among the injury profile, head injury remains the most common injury similar to study done in Mangalore\textsuperscript{17} which shows the lack of awareness of safety equipments like helmet or wearing a seat belt in a car etc. This was followed by fractures in limbs (163 cases) more commonly seen with two wheeler riders as they tend to fall outwards and stretch their arms or legs. Facial injuries are almost always grievous injuries which may require the treatment of plastic surgery. Minor injuries like abrasions, sprains, contusions are treated with bandages and simple medications.

The time lapse is crucial in RTA because the first hour is crucial in trauma management as cases reaching more than one hour are subjected to more severe morbidity and mortality\textsuperscript{18}. Majority of cases were addressed with a time lapse of 1-6 hours (342 cases) in our study. A positive linear trend as well as logarithmic trend was observed with delay in admission to the hospital and severity of outcome\textsuperscript{19}. So an effort should be made to provide timely and proper medical services to RTA victims via mobile emergency services, quality trauma centers and proper rehabilitation services. This was evident in our study as 5 cases died due to late admission in the hospital. 9 cases were discharged against medical advice due to lack of adherence, affordability, disbelief in the treatment of the doctor etc.

Human factor contribute significantly to increasing number of road accidents in India. Most drivers continue to be acting like maniacs in a tearing hurry and error in judgment often leads to major accidents. Reckless driving, over speeding, decline to follow traffic rules, and drunken driving are main reasons for road accidents. Small bars along the Indian highways are of prime concern to control drunken driving. India has laws to check the drunken driving but its effective implementation is still to be worked upon.

Realizing this serious Public Health Issue happening globally, the WHO in 2004 came out with a theme of “Road Safety is No Accidents” to highlight the urgency to tackle the issue on a priority basis\textsuperscript{20}. Prevention of RTA is a responsibility of various agencies and a multi-disciplinary approach will effectively reduce the incidence of RTA and reduction in injuries and deaths on the roads. “Road Safety Week” is observed throughout the country every year in the month of January in order to highlight and emphasize the need for safe roads by taking up activities to promote the concept\textsuperscript{21}.

Measures promoting safe driving behavior such as mobile usage, eating, inadequate attention, fatigue, negligence; maintenance of vehicle condition; adequate protection including abs, helmets, safety, and others; promoting licensed vehicle and coping skills when integrated with efficient and effective legislation of traffic regulation and maintenance and implementation by legislation (whose absence has been the influencing factor for increased number of RTA among youths) are bound to have a more pronounced positive effect. Protection is needed for three main vulnerable groups—pedestrians, who in urban areas constitute up to 70% of the fatalities; passengers commuting on buses, trucks, and minibuses, who constitute the next largest population group affected; and cyclists. Addressing the risks of these three groups will require multiple policy initiatives\textsuperscript{22}.

**Conclusion**

This study thus analyses various aspects of RTA with head injury being the most common and and its various confounding factors which shows that there is clearly a need for road safety education and it should be directed towards road users, who are frequently involved and injured in RTAs (e.g. students). India’s Motor Vehicles Act lagging far behind the needs of a fast-motorizing society is painfully evident from its road safety record. the Bill for creation of a statutory National Road Safety and Traffic Management Board must be speeded up- such an agency is vital to set standards...
for road design, inspect existing roads, and investigate accidents scientifically. But strict implementation of traffic rules and stringent punishments alone will not solve the persisting crisis. Change in the mind set of riders and drivers and road users realizing their responsibilities alone will bring about a change. Further large number of prospective studies should be carried out that would assist various organizations to set various causative risk factors, circumstances, chain of events; and the preventive measures accordingly to bring down the incidence of not only RTA but all medicolegal cases and shaping the future generation and society more towards being more humane and reaching the goal of World Peace.

Conflict of Interest: No.

Source of Funding: Nil.

Ethical Clearance: Yes

References


Prevalence of Non-Strabismic Binocular Vision Dysfunction in A Hospital based Population

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Abstract

This study was aimed towards finding the prevalence of non strabismic binocular vision dysfunctions (NSBVD) in the Indian population presenting with different symptoms pertaining to binocular vision disorders. **Method:** This retrospective study included one hundred and sixty one patients who presented to the out- patient department with symptoms of binocular vision dysfunction, during a period of one year. Patients were in the age group of 18 ±6.93, with 71 males and 90 females. Their binocular vision dysfunction was assessed via several diagnostic modules/tools designed for binocular vision assessment. **Results:** Results indicate that the most common binocular vision anomalies in this studied population are fusional vergence dysfunction with accommodative infacility (40.38%), convergence insufficiency with accommodative infacility (24.36%), Fusional vergence dysfunction (7.05%). Convergence Insufficiency and Accommodative infacility showed the same prevalence of 7.7%. **Discussion:** Accommodative and non-strabismic binocular vision dysfunctions are commonly underdiagnosed/undiagnosed in clinical practice. These disorders affect academic performance, sports activities and general quality of life. An appropriate detailed orthoptic examination and accurate diagnosis is necessary to manage these binocular vision dysfunctions.

**Keywords:** Headache, Incidence, Non strabismic binocular vision disorders, Orthoptic evaluation, Focusing problem, accommodative insufficiency, fusional vergence dysfunction.

Introduction

Binocular vision anomalies are the most common visual disorders. Patient complaints include decreased vision, headache, eyestrain, watering, blurred vision while doing near tasks, double vision (diplopia), a lack of concentration, difficulty focusing at near to far or vice versa and poor reading comprehension. These symptoms have a negative impact on academic performance.¹²³

Purcell et al. established an indirect comparison figure for symptomatic binocular dysfunction. They reviewed the records of 120 patients at an optometry college clinic. The patients were between 25 to 35 years of age without strabismus, amblyopia, eye pathology or current contact lens wear. In addition to refractive error they found there were 30.8% patients were with the symptoms (ex: headache, eye strain, watering, redness, photophobia and double vision ) of NSBVD who needed vision therapy treatment with prism, bifocals, or near point lenses. Other studies have established the correlation of accommodative and non-strabismic binocular dysfunctions to learning difficulties.²³⁴⁵⁶ Successful treatment lead to a significant improvement in the quality of life of this group of patients.

These dysfunctions are generally missed out unless a complete orthoptic and binocular vision examination is performed. Vision therapy is a very useful treatment for these conditions with the help of lenses and prisms. In India, such epidemiologic studies on non-strabismic binocular dysfunction are lacking. We believe this is the first study in India providing valid epidemiologic information about the prevalence of non-strabismic binocular disorders in a clinic population.

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Methodology

It is a retrospective single centre study including patients presenting with symptoms of binocular vision anomaly at Karthik netralaya, Super-specialty Eye Hospital, Bangalore, India during the period of one year (January 2014 to January 2015). One hundred and sixty one (n=161) patients between the age group of 18 ±6.93 were screened. Exclusion criteria included strabismus, amblyopia, nystagmus, contact lens users, best corrected visual acuity < 6/6 in each eye, cataract, ocular pathologies, neurological and myogenic disorders, psychological disorders and previous ocular surgeries which could affect the accommodation-vergence relationship. All patients underwent comprehensive ocular examination and were enrolled for detailed orthoptic evaluation. Findings and diagnosis were documented into excel spreadsheet. Visual acuity assessment was done for near (at patient’s functional distance) and distance with Jaeger’s Chart and Snellen’s chart respectively. Objective refraction was done with the help of retinoscope (Welch allyn retinoscope) followed by subjective refraction with phoropter. Assessment of binocular vision disorder was performed by a standardized protocol which included detailed history of ocular symptoms, sensory evaluation of binocular vision for near distance with Worth 4 dot test at 40 cm and 6 meters respectively, Cover test with accommodative targets for near and distance, prism bar cover test, AC/A ratio, MEM retinoscopy, assessment of near point accommodation and near point of convergence, amplitude of accommodation, negative and positive fusional vergence and vergence and accommodative facility. The result of each of the tests were compared first with the population norms, derived from Morgan’s data.

Results

Only symptomatic subjects with abnormal clinical findings were included. Of the 161 subjects screened, 90 were females and 71 were males. Mean age was 18 ±6.93 years. 156 were diagnosed with Non strabismic binocular vision disorder.

Fig 1: Graphical presentation of total patients male vs. female.

The most prevalent symptoms were frontal headache or asthenopia after prolonged near work (50.31%), followed by blurring of vision and difficulty in focusing when looking from near to far (20.50%). 9.31% had skipping lines or words while reading followed by blurness of vision (6.21%). 3.72% showed eyestrain while reading. 6.21% were not comfortable with spectacles and the remaining 3.72% presented watering, intermittent diplopia and loss of concentration. (see figure 2)
The prevalence of non-strabismic binocular vision disorder detected in this age group was as follows:

Fusional vergence dysfunction with accommodative infacility (40.38%), convergence insufficiency with accommodative infacility (24.36%), fusional vergence dysfunction (7.05%). Convergence Insufficiency and accommodative infacility showed the same prevalence of 7.7%. Excluding these, other binocular dysfunctions have less prevalence, as shown in table no 1.

<table>
<thead>
<tr>
<th>Classification</th>
<th>No of subjects</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FVD with AInf</td>
<td>63</td>
<td>40.38</td>
</tr>
<tr>
<td>CI with AInf</td>
<td>38</td>
<td>24.35</td>
</tr>
<tr>
<td>Convergence insufficiency</td>
<td>12</td>
<td>7.70</td>
</tr>
<tr>
<td>Accommodative infacility</td>
<td>12</td>
<td>7.70</td>
</tr>
<tr>
<td>FVD</td>
<td>11</td>
<td>7.05</td>
</tr>
<tr>
<td>Accommodative insufficiency</td>
<td>5</td>
<td>3.20</td>
</tr>
<tr>
<td>AE with AInf</td>
<td>4</td>
<td>2.56</td>
</tr>
<tr>
<td>FVD with CI</td>
<td>2</td>
<td>1.28</td>
</tr>
<tr>
<td>AE with FVD</td>
<td>2</td>
<td>1.28</td>
</tr>
<tr>
<td>AI with CI</td>
<td>2</td>
<td>1.28</td>
</tr>
<tr>
<td>CE with AInf</td>
<td>2</td>
<td>1.28</td>
</tr>
<tr>
<td>Accommodative excess</td>
<td>1</td>
<td>0.64</td>
</tr>
<tr>
<td>Convergence excess</td>
<td>1</td>
<td>0.64</td>
</tr>
<tr>
<td>AI with FVD</td>
<td>1</td>
<td>0.64</td>
</tr>
</tbody>
</table>
Discussion

This retrospective study was done using standard diagnostic criteria according to the population norms derived from Morgan’s data. According to comprehensive optometric evaluation of the adult population in India, non strabismic binocular vision dysfunction was prevalent. Being a clinical population study, the prevalence of the dysfunction was expected to be higher than a general/normal population study, which was a limitation for this study. In this study fusional vergence dysfunction with accommodative infacility and convergence insufficiency with accommodative infacility had higher prevalence (40.38%). The ability of change of accommodation of eye at various distance with enough speed and accuracy to maintain normal visual function is called as accommodative facility.

This can be measured as monocularly or binocularly. To measure this usually the accommodative object (a small target depends on the best corrected visual acuity) fixate alternately through plus and minus lens, which are interchanged as soon as the target appears clear. The operation is repeated many times and results are commonly present in cycle per minute (one cycle indicates that both plus and minus lens have been cleared). This disorder is commonly associated with asthenopia. With accommodative infacility there is no over-action of accommodation, ciliary spasm, or spasm of the near reflex. There is normal amplitude of accommodation. However there is difficulty in clearing -2.00D and +2.00D with accommodative flipper, monocularly and binocularly. Positive and negative relative accommodation may be below normal value (PRA ≤1.25 D and NRA ≤1.50 D), as per results obtained in this study.

Convergence insufficiency can be described as a condition with near exophoria (greater than distance), receded near point of convergence with low AC/A ratio and reduced positive fusional vergence. In literature, the frequency of convergence insufficiency in pediatric clinical population differs greatly, with scheiman et al. reporting 4.6% Rouse et al. reporting 6.0%, shin et al. reported 28%, dwyer reporting 33%, though all these reports show significant prevalence. Our study shows similar data with 7.7% convergence insufficiency and 24.35% of convergence insufficiency with accommodative infacility. Our study also supports all these study by showing the prevalence of convergence insufficiency 7.7% and convergence insufficiency with accommodative infacility 24.35%. But all these above mention studies mainly focused on the pediatric age group while this study involved the young adult age group.
Prevalence of fusional vergence dysfunction was 7.05%. Fusional vergence dysfunction is a sensory motor disorder of the visual system characteristic by reduced PFV (positive fusional vergence) and NFV (negative fusional vergence) measured at near and distance for at least one of three –blur, break, and recovery. Minimum normative NFV is ≤9/17/8 for blur, break and recovery and minimum normative PFV is ≤12/15/4 for blur, break and recovery. As per textbook definition accommodative spasm or excess is a clinical state of excess accommodation (lens focusing); spasm of near reflex is the tired of excess accommodation, excess convergence and excess miosis. This condition often triggered by stress or prolonged reading.14 In a study Esteban Porcar et al. showed that accommodative and non-strabismic binocular vision problems were prevalent (32.3%) in a population of university students. Accommodative excess was the most common dysfunction detected (10.8%).15 But our study did not support this study result. In this study we got a lower prevalence of accommodative excess (2.56%). Accommodative and non-strabismic binocular vision dysfunctions are commonly under-diagnosed / undiagnosed in clinical practice. It is already proved that these disorders affect academic performance, sport activities and general quality of life. Findings of our study suggest that an appropriate detailed orthoptic examination and accurate diagnosis is necessary to manage these binocular vision dysfunctions.

Non strabismic binocular dysfunctions have a significant prevalence in society and have a bearing on the quality of life. Hence these disorders need detailed evaluation and appropriate management by clinicians. Data presented in this study has a relatively small sample size; and a large scale epidemiological study will further reflect the status of binocular dysfunctions in the Indian population.

No Funding

No Conflict of Interest

Institutional Ethical clearance obtained

References

Determination of Stature From Index and Ring Finger Lengths in South Indian Population

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Abstract

Introduction: Personal identification is an important role of forensic experts during mass disasters like earthquakes, tsunamis, and plane crash etc. Stature determination is an important factor in establishing identity in forensic practice. Forensic anthropometrists use various anthropometric techniques to determine stature from such dismembered body parts. These techniques aim to derive equations from various body measurements that could estimate stature in males and females.

Aim: The aim of present study is to correlate index and ring finger lengths and stature in both sexes and to derive linear regression equations to estimate stature.

Materials and Method: The study was conducted in the Department of Forensic Medicine & Toxicology, M.S. Ramaiah Medical College Bangalore in the year 2019. The material consisted of 150 young and healthy students (66 males and 84 females) in the age group of 20-21 years after taking informed consent to participate in the study. Subjects of south Indian origin were selected based on their mother tongue. The data obtained were computed and analysed using Statistical Package for Social Sciences (SPSS, version 25.0) computer software.

Results: In the present study, mean stature, index finger length and ring finger length were significantly higher in males than females. Statistically significant correlation was observed between stature, index finger length and ring finger length in right and left hands. Correlation coefficient was higher among males than females. Among males left ring finger length and in females right index finger length showed more correlation with the stature.

Conclusion: Sex specific linear regression formulae were derived for estimating stature from index finger length and ring finger length. Study concludes that stature can be estimated from the index finger length and ring finger length with a reasonable accuracy among South Indians.

Key Words: Forensic Science, Stature, Index finger length and Ring finger length, Identification, Anthropometry

Introduction

Establishment of the identity of the deceased is of the greatest significance to the forensic expert in situations where bodies are badly mutilated. Identification of victims from dismembered human remains has always been a challenging medico-legal investigation. Such a scenario is commonly encountered in mass disasters or in homicides where deceased bodies have been dismembered to suppress the identity of the murdered. Stature estimation from skeletal remains and body parts is based on the principle that height of an individual has a definite and linear relationship with various body parts and long bones of an individual.

Estimation of stature is more accurate and reliable using long bones than any other part of the body. Studies on the estimation of stature from finger length and phalanges are limited in literature when compared to studies for estimation of stature from upper and lower
extremities.

Dimensional relationship between body segments and the whole body has been the focus of scientist, anatomist and anthropologist for many years. For this purpose, many sets of regression equation have been developed, and the better known are Karl Pearson, Trotter and Glesser from western countries and Pan (1924), Singh and Sohal (1952), and Mehat and Thomas were from India. Multiple methods need to be applied in different scenarios for a positive identification.

The present study was carried out to correlate index and ring finger lengths with stature in both sexes specifically for population of South India.

**Material and Method**

The study was conducted in the Department of Forensic Medicine & Toxicology, M.S. Ramaiah Medical College Bangalore in the year 2019. The material consisted of 150 young and healthy students (66 males and 84 females) in the age group of 20-21 years after taking informed consent to participate in the study. Subjects of south Indian origin were selected based on their mother tongue.

Sliding calipers was used to measure both index and ring finger lengths. Measurements were taken from the midpoint of the proximal crease at the base of the fingers to their tips.

Stature is the vertical distance from vertex to the floor with the head of the subject held in the Frankfurt Horizontal plane. It was measured with the help of an anthropometer rod.

**Inclusion criteria**

1. Medical students above 20 years of age and less than 21 years of age studying in M.S. Ramaiah Medical College, Bangalore

2. Subjects of south Indian origin using mother tongue (Tamil, Telugu, Malayalam, and Kannada etc.) as a criteria for origin.

**Exclusion criteria**

1. Subjects having any skeletal deformity and other disorders which could have affected the general or bony growth.

**Statistical Analysis**

The data obtained were computed and analysed using Statistical Package for Social Sciences (SPSS, version 23.0) computer software. Correlation coefficient was calculated and the correlation between the stature and index and ring finger length was drawn. Regression formulae were derived for stature estimation from index finger length (IFL) and ring finger length (RFL) in males and females keeping stature as the dependent variable and index finger length and ring finger length as an independent variable. P-value of less than 0.05 was considered as significant.

**Results**

The stature ranged from 153.3-186.0 cm in males and from 136.5-177.8 cm in females. Mean stature was significantly larger in males (Table No. 1). Mean IFL on right and left sides respectively was 7.41 cm and 7.38 cm in males and 6.79 cm and 6.72 cm in females. RFL was greater than IFL in males and in females RFL was greater only on the left side. The mean RFL on right and left sides respectively was 7.52 cm and 7.61 cm in males and 6.77 cm and 6.83 cm in females. Finger length measurements (IFL, RFL) were significantly larger in males than females in both hands.

**Table No. 1: Statistical comparison of stature**

<table>
<thead>
<tr>
<th>Cases</th>
<th>Stature</th>
<th>Range (cm)</th>
<th>Mean (cm)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td></td>
<td>153.3-186.0</td>
<td>172.67</td>
<td>6.47</td>
</tr>
<tr>
<td>Females</td>
<td></td>
<td>136.5-177.8</td>
<td>158.39</td>
<td>7.00</td>
</tr>
</tbody>
</table>
Table No. 2: Statistical comparison of right and left sided finger lengths

<table>
<thead>
<tr>
<th>Cases</th>
<th>Parameters</th>
<th>Right</th>
<th></th>
<th></th>
<th>Left</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Range (cm)</td>
<td>Mean (cm)</td>
<td>SD</td>
<td>Range (cm)</td>
<td>Mean (cm)</td>
</tr>
<tr>
<td>Males</td>
<td>Index finger length</td>
<td>6.30-8.65</td>
<td>7.41</td>
<td>0.40</td>
<td>6.25-8.70</td>
<td>7.38</td>
</tr>
<tr>
<td></td>
<td>Ring finger length</td>
<td>6.11-8.50</td>
<td>7.52</td>
<td>0.44</td>
<td>6.30-8.70</td>
<td>7.61</td>
</tr>
<tr>
<td>Females</td>
<td>Index finger length</td>
<td>6.08-7.84</td>
<td>6.79</td>
<td>0.41</td>
<td>5.82-7.76</td>
<td>6.72</td>
</tr>
<tr>
<td></td>
<td>Ring finger length</td>
<td>5.85-7.62</td>
<td>6.77</td>
<td>0.43</td>
<td>5.90-7.85</td>
<td>6.83</td>
</tr>
</tbody>
</table>

Descriptive statistics of stature, IFL and RFL in both hands are shown in Table No. 1 and 2. Statistically significant correlation was observed between stature and finger lengths (IFL, RFL) in right and left hands (Table No. 3). Pearson correlation (r) for stature and finger lengths was higher among males (ranging between 0.384 for the right IFL and 0.538 for the left RFL) than females (ranging between 0.432 for the left IFL and 0.506 for the right IFL). Among males and females, correlation coefficient was higher for the ring finger length than the index finger length except for females on the right hand. In males the correlation was higher between left ring finger and stature (r=0.538) while in females the correlation was higher between right index finger and stature (r=0.506).

Table No. 3: Correlation coefficient between Stature and different finger measurements

<table>
<thead>
<tr>
<th>Variables</th>
<th>Males (r value)</th>
<th>Females (r value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stature vs. Right Index Finger</td>
<td>0.384</td>
<td>0.506</td>
</tr>
<tr>
<td>Stature vs. Right Ring Finger</td>
<td>0.511</td>
<td>0.483</td>
</tr>
<tr>
<td>Stature vs. Left Index Finger</td>
<td>0.437</td>
<td>0.432</td>
</tr>
<tr>
<td>Stature vs. Left Ring Finger</td>
<td>0.538</td>
<td>0.481</td>
</tr>
</tbody>
</table>

Table No. 4: Linear regression equations for finger length and stature

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Coefficient of Std. error</th>
<th>Female</th>
<th>Coefficient of Std. error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right Index</td>
<td>$S = 126.8 + 6.18$ (RI)</td>
<td>+/- 1.86</td>
<td>$S = 100 + 8.58$ (RI)</td>
<td>+/- 1.61</td>
</tr>
<tr>
<td>Right Ring</td>
<td>$S = 116.3 + 7.49$ (RR)</td>
<td>+/- 1.57</td>
<td>$S = 105 + 7.86$ (RR)</td>
<td>+/- 1.57</td>
</tr>
<tr>
<td>Left Index</td>
<td>$S = 121.9 + 6.87$ (LI)</td>
<td>+/- 1.77</td>
<td>$S = 108 + 7.39$ (LI)</td>
<td>+/- 1.70</td>
</tr>
<tr>
<td>Left Ring</td>
<td>$S = 112.1 + 7.95$ (LR)</td>
<td>+/- 1.56</td>
<td>$S = 101 + 8.29$ (LR)</td>
<td>+/- 1.67</td>
</tr>
</tbody>
</table>
Linear regression models derived for reconstruction of stature in males and females are shown in Table No. 4. Coefficient of Standard Error was determined to find the predictive accuracy of linear regression models for stature estimation from IFL and RFL. The Coefficient of Standard Error in stature estimation from IFL and IFL using linear regression models ranged between +/- 1.57 to +/- 1.7 among females and between +/- 1.56 to +/- 1.86 in males. IFL and RFL showed a significant correlation with the stature in males and females. Left RFL in males and right IFL in females appear to be the better predictors of stature.

**Discussion**

Stature is one of the primary characteristics of identification. Estimation of stature of an individual is an important aspect of medico legal examination. Ratio in size of different parts of the body to one another and to the stature varies considerably in different individuals as also in different races. Studies have shown that no two individuals are exactly alike genetically; even identical twins differ in some aspects, and the variability is strongly influenced by genetic and environmental factors. (5)

Studies where stature can be estimated from finger lengths are few. Hence the present study was conducted to correlate index and ring finger lengths (IFL & RFL) with stature in both sexes specifically for population of South India. Amongst the study sample, mean stature was significantly larger in males (172.67 cm) than in females (158.39 cm). The mean RFL on right and left sides respectively was 7.52 cm and 7.61 cm in males and 6.77 cm and 6.83 cm in females. Finger length measurements (IFL, RFL) were significantly larger in males than females in both hands.

Statistically significant correlation was observed between stature and finger lengths (IFL, RFL) in right and left hands. Pearson correlation (r) for stature and finger lengths was higher among males (ranging between 0.384 for the right IFL and 0.538 for the left RFL) than females (ranging between 0.432 for the left IFL and 0.506 for the right IFL). In males the correlation was higher between left ring finger and stature (r=0.538) while in females the correlation was higher between right index finger and stature (r=0.506).

Tyagi et al studied the subjects from Delhi and found positive correlation between stature and finger lengths and have suggested that index finger was best for the prediction of stature in both males and females. (6) Jasuja et al had studied the hand and four phalange lengths in 60 subjects belonging to Jat Sikhs community. The researchers had observed correlation coefficient that ranged from 0.215 to 0.681 and concluded that stature could be estimated from studied parameters. (7) Rastogi et al estimated stature from middle finger and noted a positive correlation that ranged from 0.504 to 0.696 between middle finger length and stature while studying the north and south Indian population. (8) Varghese et al studied in Mysore, India and found that best finger to predict the height in case of males was left thumb and in females it was right thumb. (9)

In a study by Manirul Islam, hand length showed a positive correlation with stature. (10) Habib and Kamal (11) and Jasuja and Singh (12) in their studies on reconstruction of stature with measurements of hand and phalange lengths have reported a similar observation. The correlation coefficients between stature and all the measurements of hands were found to be positive and statistically significant. (13)

Linear regression equations derived in the present study would help in estimation of stature with less error. The results of a study show that the extent of error of estimate inherent in estimation of stature by regression analysis is less than that of multiplication method. Hence, confirming that the stature estimation is more accurate and reliable with regression analysis method. (14)

**Conclusion**

The present study shows significant and positive correlation between stature and finger lengths (LIF, LRF, RIF and RRF) in males and females. Left RFL in males and right IFL in females appear to be the better predictors of stature. This study also shows that the stature can be predicted from the index and ring finger lengths with a reasonable accuracy.

**Conflict of Interest** - The authors declare that there is no conflict regarding this research and the manuscript.

**Funding** - NIL

**Ethical approval** - Taken
References

Determination of Sex From Adult Clavicle – An Autopsy based Regional Study

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Abstract

Background: Studies on “identification of the sex from clavicle bone alone” are carried out by various workers all over the world. But, it is well known fact that the racial and geographical differences exist in the metrical measurement of all the bones including clavicles, as the determination of sex is a population specific phenomenon. Materials and Methodology: This study was conducted on 100 male clavicles and 100 female clavicles collected from identified corpses brought for medicolegal autopsy at Department of Forensic Medicine Govt. Medical College Calicut. Measured the various parameters and compared with previous studies. RESULTS: In the present study, the length, midclavicular circumference and weight of male clavicles were more than female clavicles. The female clavicle has its length around 86% of male clavicle and mean MCC around 83% of the male clavicles. Robustness index also calculated, mean robustness index was 23.11, and could identify only 76% males and 64% females by this. CONCLUSION: In order to establish the anthropometric standards, and for the evaluation of the same from time to time, the continuance of such studies in defined geographical areas over a particular period of time is needed.

Key Words: clavicle, sex determination, midclavicular circumference, Robustness index and autopsy.

Background

Identification of an individual is based on various physical features and biological parameters, which are unique to an individual. Question of identification arises in everyday medico legal practice in both civil and criminal cases. The features such as birthmarks, scars, tattoo marks, malformations, assessment of age and sex determination, race, stature, anthropometric measurements, fingerprints etc. are usually taken for the same.

Since bone resist putrefaction and destruction by animals, they contribute to the determination of age, sex, race and stature of an individual. Sex being one of the cardinal features of establishing the identity, its estimation is of greater importance and requires special attention in cases, where bodies are found decomposed, mutilated or only fragmentary remains are discovered.

Determination of sex from the skeletal remains of an individual by the examination of a single bone (except hipbone) is considered to be almost an impossible task. Even in cases where entire human bony pelvis and skull are available, more than 95% of accuracy cannot be achieved (Krogman, 1962).

On the whole, the bones of male skeleton are heavier, larger and markings of muscular attachments are more pronounced than females. Human clavicle is a long bone (Troter&Peterson 1953); it extends horizontally with a double curve across the root of the neck, laterally towards the point of shoulder.

Studies on “identification of the sex from clavicle bone alone” are carried out by various workers all over the world. These studies include that of Peterson in England (1916), Terry in USA(1932) and in India study has been conducted by Jit I &Singh in Amritsar zone(1966), Singh and Gangrade in Varanasi zone(1968), Jit I &SahniD in...
Chandigarh zone (1983). However, major pioneer studies about the subject have been lacking from southern India.

But, it is well known fact that the racial and geographical differences exist in the metrical measurement of all the bones including clavicles, as the determination of sex is a population specific phenomenon.

**Objectives**

This study attempts to identify the sex of an individual from measurable characteristics of clavicle.

1. To assess the difference in measurements of various parameters and indices such as length, mid clavicular circumference, and Robustness index in male and female clavicles.
2. To compare the results with previous studies.
3. To establish standardised formula for determination of sex from clavicle.

**Materials and Method**

This is a descriptive study based on 100 clavicles from males and 100 clavicles from females collected from cadavers of Calicut Medical College mortuary, selected from cases in which the consent has been obtained.

**Selection Criteria:**

1. Left clavicle (for uniformity) of adult humans of known age (>25 years) and sex.

**Exclusion Criteria:**

1. Unidentified bodies, or wherever the exact age and sex could not be determined.
2. Cases showing any deformed, diseased or fractured (including old healed fracture) clavicles, and that showing any pathologic lesion, which may hamper the study.

**Measurements:**

1. Maximum length in millimetres; measured from the sternal end to the acromial end with the help of a Vernier caliper, ignoring the curves of the bone.

2. Circumference of the clavicle at the middle of the bone in millimetres; The middle point of the length of the clavicle is marked and taken as the point where the mid-shaft circumference was measured with the help of a measuring tape and recorded in millimetres.

After the measurements were taken, they were subjected to statistical analysis using SPSS software for windows. On applying ROC curve, decided the cut-off values for each parameter.

**Observations**

The present study includes a total of 100 adult clavicles from males and 100 clavicles from females of known age and sex.

**Length**

Table 1 shows that, the length of male clavicles ranges from 130 to 167.80 mm, with a mean of 147.97 mm and standard deviation 11.61 mm, and the length of female clavicles ranges from 116.22 to 143.20 mm, with a mean of 127.4 mm and standard deviation 6.9 mm.

<table>
<thead>
<tr>
<th>Sex</th>
<th>Range (mm)</th>
<th>Mean (mm)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>130-167.80</td>
<td>147.97</td>
<td>11.61</td>
</tr>
<tr>
<td>Female</td>
<td>116.22-143.20</td>
<td>127.4</td>
<td>6.9</td>
</tr>
</tbody>
</table>

**Table 2: Probable Sex determination using cut off values for clavicular length**

<table>
<thead>
<tr>
<th>Sex</th>
<th>&gt; Cut off</th>
<th>&lt; Cut off</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>88%</td>
<td>12%</td>
</tr>
<tr>
<td>Female</td>
<td>16%</td>
<td>84%</td>
</tr>
</tbody>
</table>

Table 2 shows that, for the male clavicles, the length >88% of them lies above the cut-off, that is 132 mm (on applying ROC curve), and only 12% of the length of male clavicles, falls below the cut-off. In the
case of length of female clavicles, only 16% of them falls above the cut-off and > 84% of the length of female clavicles falls below the cut-off point 132mm.

**Midclavicular circumference**

**Table 3: Statistical analysis of the male and female clavicles of both sexes in relation to MCC**

<table>
<thead>
<tr>
<th>Sex</th>
<th>Range(mm)</th>
<th>Mean(mm)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>30.8-45.8</td>
<td>36.37</td>
<td>4.3</td>
</tr>
<tr>
<td>Female</td>
<td>24.8-33.8</td>
<td>29.23</td>
<td>2.39</td>
</tr>
</tbody>
</table>

Table – 3 shows that, the MCC of male clavicles ranges from 30.8 to 45.8mm, with a mean of 36.37mm and standard deviation 4.13, and the MCC of female clavicles ranges from 24.8 to 33.8mm, with a mean of 29.23mm and standard deviation 2.39.

**Table 4: Probable Sex determination using cut off values for the clavicles with MCC**

<table>
<thead>
<tr>
<th>sex</th>
<th>&gt;Cut off</th>
<th>&lt;Cut off</th>
</tr>
</thead>
<tbody>
<tr>
<td>male</td>
<td>84%</td>
<td>16%</td>
</tr>
<tr>
<td>female</td>
<td>8%</td>
<td>92%</td>
</tr>
</tbody>
</table>

Table – 4 shows that, for the male clavicles, the MCC > 84% of them lies above the cut-off value (on applying ROC curve), that is 32, and only 16% of the male clavicular MCC falls below the cut-off. In the case of female clavicular MCC, only 8% of them falls above the cut-off and > 92% of the female clavicular MCC falls below the cut-off point.

**Table 5: Probable Sex determination using cut off values for the clavicles with Robustness index**

<table>
<thead>
<tr>
<th>sex</th>
<th>&gt;Cut off</th>
<th>&lt;Cut off</th>
</tr>
</thead>
<tbody>
<tr>
<td>male</td>
<td>76%</td>
<td>24%</td>
</tr>
<tr>
<td>female</td>
<td>36%</td>
<td>64%</td>
</tr>
</tbody>
</table>

Table – 5 shows that cut off value of robustness index for sex determination of clavicles as 23.11 (on applying ROC curve). Thus table – 11, shows that for the male clavicles, the robustness index > 76% of them lies above the cut-off, that is 23.11, and only 24% of the male clavicular index falls below the cut-off. In the case of female clavicular index, only 36% of them falls above the cut-off and > 64% falls below the cut-off point 23.11mm.

**Discussion**

In the present study, the clavicle has been compared in relation to its morphometric parameters with the studies in the past.

1. **LENGTH OF CLAVICLE**

In the present study, mean length of male clavicle is significantly higher than that of female clavicle. It is clear from table that, present study similar to studies of Padeyappanavar et al\(^2\) (2009), and Jit I and Sahni D\(^3\); thus the present study observed statistically significant difference between length of male and female clavicles (\(p<0.001\)). In the present study, mean length of male clavicle (147.97mm) is comparable with the studies of Jit I & Singh S\(^4\) (157.59), Singh and Gangrade\(^5\)(144.18mm) and Padeyappanavar KV et al\(^2\) (143.5mm), and Jit I & Sahni D\(^3\). But it is lower than the studies of Terry RJ\(^6\) for USA white (154.10mm) and Negroes (155.86mm) and Singh S\(^7\) for USA white (153.7mm) and Negroes (157.32mm).

The mean length of female clavicle in present study (127.4mm) is comparable with most of the studies except Jit I and Sahni D\(^3\) (134mm), Terry RJ\(^6\) for USA Negroes (141.8mm) and Singh S\(^7\) for USA Negroes (140.80mm) which are higher than the meanvalue of present study.

The fact that American Negroes and Whites and North Indians are taller and well-built than South Indian population, this difference in length is appreciated.
Sexual difference: According to Olivier (1951)\(^8\), the length of the female clavicle is 89.7% of that in a male clavicle, and other authors give the proportion varying from 88.2% to 93%. In the present study, the average North Malabar female clavicle is 86% of male clavicle. This is similar to the study results of Arvinder Pal Singh Batra, Anupama Mahajan, Seema 12 (2010), and Jit I and Singh S (1966)\(^4\). As there is overlap between the length measurements of male and female clavicles, the sex of the clavicle could not be determined in every case, 88% of male and 84% of female clavicle could only be sexed correctly. This result is also similar to the results of study done by Frutos and Rios L\(^9\) (2002), Kaur K, Sindhu SS, Kaushal S, Kaur B\(^10\) (1997). The prediction of correct sex can still be increased by including length in multivariate analysis along with mid-shaft circumference, weight and volume of the clavicle.

2. Mid-Shaft Circumference:

The mid-shaft circumference of the clavicle had been calculated in several races by different workers and this is the most popular clavicular parameter used for sex identification. Oliver G\(^8\) has provided a table giving finding of various workers in this regard.

Mid-shaft circumference in the present study is statistically highly significant (p<0.001) in differentiating the sex of male and female clavicles, which is similar to the studies of Padeyappanavar et al\(^2\), Jit I and Sahni D\(^3\).

Mean mid-shaft circumference in male (36.37mm) and in female (29.23mm) of present study is comparable with all the studies except with Terry RJ\(^6\), Oliver G\(^8\), Jit and Singh S\(^4\) and mean RI of female clavicle (23.03mm) is also comparable with other studies.

Sexual difference: It is agreed by most of the previous workers that female clavicle has a smaller circumference than male and this difference is statistically highly significant and varies from 3.7 to 7.8mm. Shamer Singh & Inder Jit\(^11\) found difference to be 8mm for males and 6mm for females. In the study by Terry RJ\(^6\) (1932), the circumference of Negro female bone was about 5mm shorter than that of Negro male.

Oliver G\(^8\) (1951) found the difference to be 6.8mm in French bones. Jit and Singh S\(^4\) (1966) found the difference to be 6mm - 7mm. In the present study, the difference is about 6.42–7.14mm. This shows that, mid-shaft circumference is an extremely useful data by which a fairly large number of clavicles can be sexed without any difficulty. The probable prediction of sex by mid-shaft circumference alone is 84% in male and 92% in female clavicles. These results are similar to results of Jit and Singh S (1966)\(^4\) and Padeyappanavar KV et.al\(^2\) (2009).

3. ROBUSTNESS INDEX:

In the present study, mean RI of male clavicle is more than that of female clavicle. This is in accordance with all other workers who agree that the robustness index is greater in males than in females. But their reliance to be put on this index as a parameter useful to identify the sex of clavicle has not been worked out. The figures in this study prove that this index is significantly greater in male compared to female and this difference is statistically significant (p<0.001). This is similar to the studies of Jit I and Singh S (1966)\(^4\) who also found that RI values are statistically significant for sex differentiation.

In the present study, mean RI of male clavicle (24.65mm) is comparable with the results of Terry RJ\(^6\), Oliver G\(^8\), Jit and Singh S\(^4\) and mean RI of female clavicle (23.03mm) is also comparable with other studies.

Sexual difference: Robustness index of male and female clavicles as given by other authors vary from 0.4 to 2.8mm, but in the present study, it is 1.62mm. As the values of robustness index of clavicle in both sexes show significant overlapping, the robustness index of clavicle alone is not sufficient to sex each clavicle. Thus, the prediction of sex of clavicles by robustness index alone is 76% male and 64% female, which is having much less prediction of sex as compared to taking individual characteristics like length, weight or mid-shaft circumference for sex estimation.

Conclusion

Present study on determination of sex of adult human clavicle by metric parameters showed some difference with respect to the same results of the studies done by various workers in the past.

In the present study, the length of male clavicles was more than female clavicles. The female clavicle has its
length around 86% of male clavicle. On applying ROC curve, in case of length, the clavicle could be sexed, with some probable predictions. For males could be sexed in 88% of the cases and females in 84 %, also the same prediction is applied with some overlapping.

The mean mid-shaft circumference of male clavicles was more than that in females, and the female clavicle has its mean MCC around 83% of the male clavicles. The probability of prediction of sex of clavicles by mid-shaft circumference alone was 84% for males and 92% for females, with some overlapping.

Robustness index also calculated, mean robustness index was 23.11, and could identify only 76 % males and 64% females by this. There was considerable overlap between male and female clavicular measurements and their indices. This overlap may be due to genetic, nutritional and socio economic difference in the individual or may be due to hypo-muscularity in the male clavicles and hyper-muscularity in the female clavicles. Hence it is not possible to determine the sex of each and every clavicle by any of the parameter alone.

The present study helps to know the changing trends in the metric measurements if any. In order to establish the anthropometric standards, and for the evaluation of the same from time to time, the continuance of such studies in defined geographical areas over a particular period of time is needed.

**Ethical Clearance** - Taken from Medical College Calicut, Institutional Ethics committee

**Source of Funding** - Self

**Conflict of Interest** – Nil.

**References**

Profile of Medico-legal Cases at JSS Hospital, Mysuru – a Two Year Prospective Study

S.Prasanth Kumaran¹, H.V.Chandrakanth², Arun.M³, Smitha Rani⁴

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Abstract

This Prospective study was conducted to do profiling and analysis of Medico-legal cases attending the JSS Medical College and Hospital, Mysuru for a period of two years. Total 2033 Medical-legal cases which were registered during the time period were analysed. Analysing the pattern of such unnatural events, would provide a vital data for healthcare professionals, civil administrators, investigating agencies of state and judiciary to devise and implement appropriate and adequate strategies so as to reduce such incidences from happening. Majority of the cases were RTA, followed by poisoning. Among all the admitted cases, majority of the cases recovered and discharged. The mortality rate is low among the admitted cases, only 9.9% of cases were hospital deaths.

Most of the cases occurred during the time period of 12.01pm to 6pm followed by 6.01pm to 12am.

The age group of 21-30 years are the most frequently affected. Majority of the victims were males.

Suicide by hanging is more frequent among females compared to males, despite of predominant male population among the MLCs.

Key Words: Medico-legal case, Medicolegal expert, pattern

Introduction

Medico-legal cases constitute a substantial proportion of workload in the casualty and such patients not only merit treatment, but their exhaustive documentation is mandatory.¹

Cases of Road Traffic Accidents (RTA), suicide by poisoning, burns, hanging, drowning, alleged history of assault, criminal abortions, industrial accidents, sexual offences, animal attacks, unnatural suspected deaths, custodial deaths, dowry deaths are considered as medico-legal cases. Among them RTA, suicide by poisoning constitute the majority of medico-legal cases. Injuries from RTA is the third most common cause of universal disability. The risk factors for RTA include speeding, alcohol impaired driving and violation of traffic rules. The spectrum of medico-legal cases presenting to the emergency medicine department would highlight the social, economic, educational aspects of the society and in broader sense highlights the value system, ethics and morality prevailing in that particular geographical habitat.

A medico-legal case is a case of injury or illness where attending doctor after eliciting, listing and examining patient is of opinion that some investigation by law enforce agencies is essential to establish and fix responsibility for the cases in accordance with the law of the land².

Injury is defined under section 44 IPC (Indian Penal Code) as any harm whatever illegally caused to
Medico-legal case is a medical case with legal implications or a legal case requiring medical expertise.

In recent days, medico legal cases are on the rise. This may be attributed to the following factors like: increased vehicular traffic density, un-employment, high income disparities, substance abuse, insurance compensations etc.

Inspite of recent advancement of technology in the field of medical sciences, death and deformities due to all causes, are yet to be controlled successfully, rather incidences of road traffic accidents has been increasing at an alarming rate throughout the world.

**Aims and Objectives**

1. To determine the socio-demographic profile of medico-legal cases reported to JSS Medical College and Hospital during the study period.
2. To determine the mortality rate
3. To study the profile of different medico-legal cases in the hospital.
4. To recommend this study as a standard for Medico-Legal work in casualty.

**Materials and Method**

This is a prospective study which is conducted in the casualty of Jagadguru Sri Shivarathreeshwara hospital from October 2016 to September 2018.

The medico-legal register of casualty department is the main source of this study which comprises of information regarding various parameters. The data was analysed and results were derived with the help of SPSS version22, Microsoft Excel and R software.

Inclusion criteria: all cases brought to the JSS Hospital casualty with known history of medico legal implications.

Exclusion criteria:

1. The cases with inadequate details or missing data-all the cases for which any of the details regarding age, sex, date and time of incident, was not mentioned, or unavailable in the records.
2. The cases referred from other hospitals or clinics.
3. The cases which have received treatment or first aid in other centres.

**Observations and Results**

A total of 2033 Medico-legal cases were registered during the time period according to the inclusion criteria. Only the medico-legal cases which reported first to Jagadguru Sri Shivarathreeshwara Medical college & Hospital, Mysore were included in the study. Referred cases and other cases which reported or received first aid in any other hospital or clinic were excluded. The analysis of the various parameters of the cases, revealed the following observations:

**Figure 1: Distribution of the cases with respect to age group:**
With regards to age, the cases are categorized into nine different age groups of ten years range. Majority of the cases (595 cases) belonged to the age group of 21-30 years which accounts to 29.3%.

**Sex wise distribution of cases:**

With regards to sex, male preponderance is observed: 1480(72.8%) cases were males and 553(27.2%) cases were females.

![Fig 2: Distribution of cases with respect to type of case](image)

Profiling with respect to type of case revealed that: RTA constituted majority of the cases(1242 cases, 61.1%) followed by poisoning(374, 18.4%), assault(116, 5.7%), brought dead with unknown history(64, 3.1%) respectively.

**Manner wise distribution of cases:**

The manner of injury for majority of the cases is accidental (1533 cases, 75.4%), followed by suicidal (316 cases, 15.5%) and homicidal (120 cases, 5.9%). The manner is unknown for 64 cases(3.1%), which were brought dead cases with unknown history.

**Table 1: Distribution of cases with respect to time of incidence:**

<table>
<thead>
<tr>
<th>Time of incidence of unnatural event</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.01am to 6.00am</td>
<td>120</td>
<td>5.9</td>
</tr>
<tr>
<td>6.01am to 12.00pm</td>
<td>470</td>
<td>23.1</td>
</tr>
<tr>
<td>12.01pm to 6.00pm</td>
<td>746</td>
<td>36.7</td>
</tr>
<tr>
<td>6.01pm to 12.00am</td>
<td>697</td>
<td>34.3</td>
</tr>
<tr>
<td>Total</td>
<td>2033</td>
<td>100.0</td>
</tr>
</tbody>
</table>
According to the time at which the unnatural event had occurred, the 24 hour time period in a day is divided into four different groups of 6 hour time intervals. Most of the cases occurred during the time period of 12.01pm to 6pm(746 cases, 36.7%) followed by 6.01pm to 12am (697 cases, 34.3%).

**Table 2: Distribution of the cases with respect to conscious condition when reporting to the hospital**

<table>
<thead>
<tr>
<th>Consciousness/ condition</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conscious</td>
<td>1820</td>
<td>89.5</td>
</tr>
<tr>
<td>Unconscious</td>
<td>105</td>
<td>5.2</td>
</tr>
<tr>
<td>Brought dead</td>
<td>108</td>
<td>5.3</td>
</tr>
<tr>
<td>Total</td>
<td>2033</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Majority of the cases (1820 cases, 89.5%) were conscious when reporting to the casualty. Only 105 cases (5.2%) were unconscious. 108 cases (5.3%) were brought dead to the casualty.

**Distribution of cases on outpatient/ inpatient (admission) basis:**

Profiling of cases on inpatient, outpatient basis revealed that: majority of the cases (1451 cases, 71.4%) were treated and managed on outpatient basis compared to only 582 cases (28.6%) which were treated on inpatient basis (admitted).

**Table 3: Distribution of the cases on the basis of final outcome:**

<table>
<thead>
<tr>
<th>Final outcome</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recovered and discharged</td>
<td>385</td>
<td>66.1512</td>
</tr>
<tr>
<td>Complications( morbid)</td>
<td>137</td>
<td>23.53952</td>
</tr>
<tr>
<td>Hospital death</td>
<td>58</td>
<td>9.965636</td>
</tr>
<tr>
<td>Referred out</td>
<td>2</td>
<td>0.343643</td>
</tr>
<tr>
<td>Total</td>
<td>582</td>
<td>100</td>
</tr>
</tbody>
</table>

The above table shows that, among all the admitted 582 cases, majority of the cases (385 cases, 66.1%) recovered and discharged, the second most frequency of cases (137 cases, 23.5%) developed complications, 58 cases (9.9%) were hospital deaths.

**Distribution of the admitted cases with respect to DAMA:**

Out of the total 582 admitted cases, 67 cases (11.6%) were DAMA.
### Table 4: Type of case in relation to gender:

<table>
<thead>
<tr>
<th>Type of case</th>
<th>Male Count</th>
<th>Male %</th>
<th>Female Count</th>
<th>Female %</th>
<th>Total Count</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTA</td>
<td>948</td>
<td>46.60%</td>
<td>294</td>
<td>14.50%</td>
<td>1242</td>
<td>61.10%</td>
</tr>
<tr>
<td>Poisoning</td>
<td>215</td>
<td>10.60%</td>
<td>159</td>
<td>7.80%</td>
<td>374</td>
<td>18.40%</td>
</tr>
<tr>
<td>Burns</td>
<td>20</td>
<td>1.00%</td>
<td>8</td>
<td>0.40%</td>
<td>28</td>
<td>1.40%</td>
</tr>
<tr>
<td>Assault</td>
<td>98</td>
<td>4.80%</td>
<td>18</td>
<td>0.90%</td>
<td>116</td>
<td>5.70%</td>
</tr>
<tr>
<td>Fall from height</td>
<td>50</td>
<td>2.50%</td>
<td>6</td>
<td>0.30%</td>
<td>56</td>
<td>2.80%</td>
</tr>
<tr>
<td>Snake bite</td>
<td>36</td>
<td>1.80%</td>
<td>10</td>
<td>0.50%</td>
<td>46</td>
<td>2.30%</td>
</tr>
<tr>
<td>Occupation injuries</td>
<td>20</td>
<td>1.00%</td>
<td>6</td>
<td>0.30%</td>
<td>26</td>
<td>1.30%</td>
</tr>
<tr>
<td>Hanging</td>
<td>7</td>
<td>0.30%</td>
<td>12</td>
<td>0.60%</td>
<td>19</td>
<td>0.90%</td>
</tr>
<tr>
<td>Strangulation</td>
<td>0</td>
<td>0.00%</td>
<td>2</td>
<td>0.10%</td>
<td>2</td>
<td>0.10%</td>
</tr>
<tr>
<td>Drowning</td>
<td>6</td>
<td>0.30%</td>
<td>0</td>
<td>0.00%</td>
<td>6</td>
<td>0.30%</td>
</tr>
<tr>
<td>Insect bite</td>
<td>10</td>
<td>0.50%</td>
<td>4</td>
<td>0.20%</td>
<td>14</td>
<td>0.70%</td>
</tr>
<tr>
<td>Animal attack</td>
<td>12</td>
<td>0.60%</td>
<td>4</td>
<td>0.20%</td>
<td>16</td>
<td>0.80%</td>
</tr>
<tr>
<td>Scorpion sting</td>
<td>4</td>
<td>0.20%</td>
<td>2</td>
<td>0.10%</td>
<td>6</td>
<td>0.30%</td>
</tr>
<tr>
<td>Electrical injuries</td>
<td>10</td>
<td>0.50%</td>
<td>4</td>
<td>0.20%</td>
<td>14</td>
<td>0.70%</td>
</tr>
<tr>
<td>Self inflicted</td>
<td>2</td>
<td>0.10%</td>
<td>2</td>
<td>0.10%</td>
<td>4</td>
<td>0.20%</td>
</tr>
<tr>
<td>Brought dead with</td>
<td>42</td>
<td>2.10%</td>
<td>22</td>
<td>1.10%</td>
<td>64</td>
<td>3.10%</td>
</tr>
<tr>
<td>unknown history</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1480</td>
<td>72.80%</td>
<td>553</td>
<td>27.20%</td>
<td>2033</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

The above table shows that, RTA and poisoning are 1st and 2nd most frequent cases among both males and females. The one peculiar finding in this study is that the number of hanging cases is significantly more among females when compared to males, despite of male predominance among the total cases.

### Distribution of the cases with respect to locality:

With regards to locality, majority of the cases were from urban background (1458 cases, 71.7%) compared to rural background (575 cases, 28.3%).

### Discussion

The results of our study were analysed and compared
In the present study, male preponderance was observed: 1480(72.8%) cases were males and 553(27.2%) cases were females. This finding is consistent with most of the other studies done by Atul Saxena et al, Yatoo GH et al, SN Hussaini et al. This could be due to greater involvement of males in outdoor activities like travelling on roads, working in construction areas, industries etc making them more prone to accidents and injuries.

Profiling with respect to type of case revealed that: RTA constituted majority of the cases which is consistent with other studies done by Atul Saxena et al, Mahesh M Trangadia et al and Garg Vishal et al. The predominant incidence and reporting of RTA cases could be attributed to rapid urbanization and increase in the number of vehicles, poor road conditions, ignoring the traffic rules and absence of safety policies. The one contrary finding in our study is that the number of hanging cases is significantly more among females when compared to males, despite of male predominance among the total cases. This is in contrast to studies done by Mathew J Martin et al, Derya Azmak et al where males were the predominant victims of hanging.

The second most frequent cases in this study were poisoning cases(18.4%).Only two cases of strangulation were recorded during this study period and both were accidental in manner, both were females. The third most common among the MLCs were assault cases accounting to 5.7% of the total cases.

It was observed in the present study that most of the cases belonged to the age group of 21 to 30 years of age. This could be due to the fact that individuals of this age group are more active, violent and are predominantly involved in activities.

In the present study most of the cases occurred during the time period of 12.01pm to 6pm (746 cases,36.7%) which is consistent with studies done by Mahesh M Trangadia et al and Vishal Garg et al. Because this is the peak time period during which most of the people are active in addition the other factors like peak transportation traffic density in the evening hours. This is closely followed by 6.01pm to 12.00am time period during which 34.3% of cases occurred.

The incidence of MLCs were least during the time period of 12.01 am to 6 am. This could be attributed to the profound inactivity as most of the people prefer to sleep during this time period.

Among the admitted cases, majority of the cases (385 cases, 66.1%) recovered and discharged. This is consistent with other previous studies done by Mahesh M et al and Garg Vishal et al. This can be attributed to the timely admission, effective treatment and management in the hospital. The second most frequency of cases (137 cases, 23.5%) developed complications like motor or sensory impairments or organ dysfunctions, 58 cases (9.9%) were hospital deaths and only 2 cases were referred out to other hospitals. Out of the total 582 admitted cases only 67cases (11.6%) were DAMA.

Majority of the cases were brought to the hospital by relatives or friends (1793 cases, 88.3%). This could be due to the presence of relatives or friends nearby the victim at the time of occurrence of unnatural event and due to the communication of information to the family members, relatives or friends about the injured victim. Self reporting was done by 134(6.6%) cases. This could be due to sustaining minor injuries which were not severe, that made the victims to report to the hospital on their own without any company from others. Very few cases(106 cases, 5.2%) were brought by strangers to the hospital. This could be due to sustaining serious or life threatening injuries by these victims rendering them unconscious or unable to seek first aid on their own, such that strangers had to help them by accompanying them or transporting those victims to hospital.

**Conclusion**

Majority of the cases belonged to the age group of 21-30 years. Male preponderance is observed.

With regards to demographic locality, majority of the cases were from urban background.

Profiling with respect to type of case revealed that: RTA constituted majority of the cases followed by poisoning.

Most of the cases occurred during the time period of 12.01pm to 6pm followed by 6.01pm to 12am.

Among all the admitted cases, majority of the
cases recovered and discharged. The mortality rate is low among the admitted cases, only 9.9% of cases were hospital deaths.

Majority of the cases were brought to the hospital or accompanied by relatives or friends.

Suicide by hanging is more frequent among females compared to males, despite of predominant male population among the MLCs.

The present study shows that the predominant cause of injuries are road traffic accidents and are accidental in nature. Public health officials should develop and implement preventive strategies with a comprehensive approach to reduce the incidence and deal with day to day morbidity and mortality. The basic principles to be followed to prevent injury are education, engineering, uniform enforcement of law & order, pre-hospital care and the evaluation. Proper education, training must be delivered for safety standards. Rules and regulations are to be strictly implemented in the community to prevent all kind of injuries. Further large number of prospective studies should be carried out that would facilitate various organizations to set various causative risk factors, circumstances, chain of events; and the preventive measures accordingly.

To prevent or reduce the incidence of suicides, regular awareness programs, counselling should be delivered to all the individuals who are prone to stress (especially students, medical professionals and individuals involved in professional jobs) from time to time. Proper counselling to manage and cope with stress and failures and for developing positive attitude should be facilitated and promoted especially among youths.

Due to the higher incidence of RTAs, poisoning and assault cases, hospitals should have availability of such medico-legal experts in sufficient number throughout day and night, 24/7 to deal effectively with such cases.

Medico-legal cases must be handled with proper attention. Timely intimation to police, proper documentation, thorough investigations and management are essential on the part of medical professionals, especially Casualty medical officers.

For the better handling and dealing of medico-legal cases, awareness programs, and adequate proper training regarding MLCs should be given to the undergraduate students, interns and medical officers. Also during internship, a brief period of posting in Forensic Medicine Department is essential for imparting better knowledge about MLCs and their management.

**Ethical Clearance:** Obtained from Institutional Ethical committee.

**Source of Funding:** Self

**Conflict of Interest:** nil

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A Qualitative Exploration of Substance Abuse among the Nursing Students of Coastal Karnataka

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Abstract

\textbf{Background:} To explore the various perceived causes and solutions for substance abuse among the nursing students in Mangalore, Karnataka, India.

\textbf{Methods:} Group of nursing students belonging to the second year participated in the study. A method of free listing and pile sorting was employed to discover the causes and solutions for substance abuse.

\textbf{Conclusion:} The primary cause of substance abuse was found to be peer pressure with a salience value of (0.945) followed by enjoyment (0.614), family problems (0.486). Cognitive mapping revealed the causes of being grouped under three major headings: psychological imbalance, adaptation to modern lifestyle, and unhealthy family environment. The solutions suggested by the students were counseling and rehabilitation with the highest salience value (0.751), awareness about the adverse effects at an early age (0.637). Cognitive mapping portrayed the solutions grouped into headings like therapies and treatment, external sources, family care, and support. Factors such as peer pressure, academic pressure, and easy availability of drugs can be looked into by external institutions to root out the evils of substance abuse

\textbf{Keywords:} drug abuse, nursing students, substance abuse

Introduction

Substance abuse disorder is one of the significant concerns globally. World health organisation (WHO) defines the term substance abuse as “Persistent or sporadic use of a drug inconsistent with or unrelated to acceptable medical practice” \textsuperscript{1}. Substance abuse indicates the use of dangerous psychoactive substances such as tobacco, alcohol, and other drugs like heroin, amphetamine, and cannabis \textsuperscript{2}. Use of substance has caused intolerable sufferings in terms of mortality and financial crisis causing menace to social life around the world \textsuperscript{3}. The initiation of drug abuse is observed in the period of adulthood, which significantly increases the probability of more severe drug problems later in life \textsuperscript{4}. Globalization, urbanization, deteriorating cultural values, conflicts, and violence force young adults to use substances \textsuperscript{5}. Studies conducted to determine the prevalence of substance abuse among the various streams, including the medical stream, were found

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Research shows that indulgence in substance abuse can be a result of exposure to violence and post-traumatic stress. The prevalence of substance use among health care students ranges from 5% to 67% with higher percentages (67%) being reported in developed countries like the United States. Among developing countries such as Iran, Ethiopia, Nepal, and India, substance use among health care students varies from 5% to 48%.

Taken together, there is a strong need to assess substance use among health care students as they hold greater responsibility in society. The present study was undertaken for the qualitative exploration of perceived causes of substance abuse and possible solutions for the same among nursing students from selected nursing colleges of Mangalore.

**Methodology**

The present qualitative study was done among 15 second-year students from selected nursing colleges of Mangalore, Karnataka. The sample size of 15 was reached after applying the rule of saturation for the qualitative study. Study was conducted after obtaining the ethical clearance from the institutional ethics committee. Permission was obtained from the heads of the nursing institutes, and consent was taken from the nursing students before the commencement of the study. A method of free listing and pile sorting were employed to discover the perceived causes for initiation of substance abuse and possible solutions to address these problems among students of nursing colleges in Mangalore.

Free listing: For the free listing, students were asked two probe questions:

1. In your opinion, what do you think are the causes for substance abuse among your age group of students in your field?
2. Suggest the possible solutions to eradicate the use of substance abuse among this age group of students in your field?

Students were asked to provide a list of various perceived causes and possible solutions for substance abuse individually. Statistical program ANTHROPAC was used to compute Smith’s Saliency Index and frequency for free list data. Smith’s saliency index refers to the “importance, representativeness, or prominence of items to individuals or the group. Twenty responses as causes and fifteen solutions were taken for pile sorting. Obtained results were subjected to analysis using Visual Anthropac.

**Pile sorting:** First, the identified salient items were written on cards with their respective numbers. Participants were then allowed to group; selected perceived reasons and solutions based on their own criteria. Participants were asked to explain the reason for piling. Successive pile sorting was done with similar causes and solutions, followed by items with less similarity. Process continues until all the groups are clustered into a single pile.

**Results & Discussion**

Table 1 shows the perceived causes of substance abuse among nursing students. The most predisposing factor for substance abuse is peer pressure with the highest salience value of 0.945, followed by just for temporary enjoyment with the salience value of 0.614.

<table>
<thead>
<tr>
<th>Perceived causes for substance abuse among the nursing students: TABLE 1</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Causes</td>
<td>Salience value</td>
</tr>
<tr>
<td>Peer pressure</td>
<td>0.945</td>
</tr>
<tr>
<td>Just for enjoyment</td>
<td>0.614</td>
</tr>
<tr>
<td>Family problems</td>
<td>0.486</td>
</tr>
<tr>
<td>Socio-economic status</td>
<td>0.334</td>
</tr>
<tr>
<td>Parental influence</td>
<td>0.254</td>
</tr>
<tr>
<td>Stress</td>
<td>0.224</td>
</tr>
<tr>
<td>Break-up</td>
<td>0.222</td>
</tr>
<tr>
<td>Loneliness</td>
<td>0.214</td>
</tr>
<tr>
<td>Curiosity</td>
<td>0.171</td>
</tr>
</tbody>
</table>
Cognitive mapping reveals the distribution of various reasons into three major categories. Figure 1 shows the cognitive mapping of the causes of substance abuse done by nursing students.

<table>
<thead>
<tr>
<th>Reason</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy accessibility</td>
<td>0.165</td>
</tr>
<tr>
<td>Anxiety</td>
<td>0.164</td>
</tr>
<tr>
<td>Emotional trauma</td>
<td>0.149</td>
</tr>
<tr>
<td>Ignorance</td>
<td>0.120</td>
</tr>
<tr>
<td>Social media influence</td>
<td>0.120</td>
</tr>
<tr>
<td>Temporary happiness - effect of substance abuse</td>
<td>0.118</td>
</tr>
<tr>
<td>Inadequate parental supervision and care</td>
<td>0.117</td>
</tr>
<tr>
<td>Adaptation to modern lifestyle</td>
<td>0.105</td>
</tr>
<tr>
<td>Social gatherings</td>
<td>0.102</td>
</tr>
<tr>
<td>Migration from rural to urban area</td>
<td>0.101</td>
</tr>
<tr>
<td>Depression</td>
<td>0.085</td>
</tr>
</tbody>
</table>

Figure 1: Cognitive map-causes of substance abuse among nursing students:

1 peer pressure, 2 just for enjoyment, 3 family problems, 4 socio-economic status, 5 parental influence, 6 stress, 7 breakup, 8 loneliness, 9 curiosity, 10 easy accessibility, 11 anxiety, 12 emotional trauma, 13 ignorance, 14 social media influence, 15 temporary happiness, 16 inadequate parental supervision and care, 17 adapting to modern lifestyle, 18 social gathering, 19 migration from rural to urban area, 20 depression
Pile 1 includes causes like anxiety, depression, emotional trauma, loneliness, breakup, stress, and curiosity, which were piled up under the title psychological imbalance.

Pile 2 - Students classified reasons such as peer pressure, temporary happiness, just for enjoyment, easy accessibility, media influence, social gathering, adapting to modern lifestyle, migration from rural to urban areas, and socioeconomic status as social factors tempting the students towards drug abuse.

The rest of the causes, such as ignorance, parental influence, family problems, inadequate parental care, and support were assorted under pile 3 with headings like family influence, lack of parental support, care, and unhealthy family environment.

From the assorted groups in figure 1, it is observed that the major reasons for substance abuse are psychological imbalance, curiosity, and environmental factors such as peer influence and other social factors.

<table>
<thead>
<tr>
<th>Solutions</th>
<th>Salience value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Counseling</td>
<td>0.751</td>
</tr>
<tr>
<td>Awareness about the side-effects at an early age</td>
<td>0.637</td>
</tr>
<tr>
<td>Rehabilitation centre</td>
<td>0.394</td>
</tr>
<tr>
<td>Parental support and care</td>
<td>0.369</td>
</tr>
<tr>
<td>Behavioral therapy</td>
<td>0.302</td>
</tr>
<tr>
<td>Extra-curricular activities</td>
<td>0.211</td>
</tr>
<tr>
<td>Limit the availability of drugs near college institutions</td>
<td>0.186</td>
</tr>
<tr>
<td>Identify the cause and treat accordingly</td>
<td>0.167</td>
</tr>
<tr>
<td>Diversional therapy</td>
<td>0.085</td>
</tr>
<tr>
<td>Proper treatment</td>
<td>0.067</td>
</tr>
<tr>
<td>Socializing with the right people</td>
<td>0.065</td>
</tr>
<tr>
<td>Choose the right friends</td>
<td>0.061</td>
</tr>
<tr>
<td>Emotional support</td>
<td>0.033</td>
</tr>
<tr>
<td>Set goals and work towards achieving them</td>
<td>0.019</td>
</tr>
<tr>
<td>Self-control</td>
<td>0.010</td>
</tr>
</tbody>
</table>

Solutions enumerated by nursing students are depicted in Table 2 in the order of decreasing salience value. It is observed from Table 2 that counselling, rehabilitation centres, awareness about the side-effects at an early age, parental support, and care were commonly suggested solutions. Students also stated that trying out therapies such as behavioural therapy, diversional therapy, and socializing with the right people will help in preventing the use of substances.

Cognitive map - solutions for substance abuse suggested by nursing students: Figure 2
Figure 2 portrays the cognitive mapping of the solutions given by the nursing students.

Nursing students assorted reasons such as diversional therapy, behavioral therapy, rehabilitation centre, counseling, proper treatment, extracurricular activities and identify the cause and treat accordingly into Pile 1 named therapies and treatment, diversion from substance abuse. Solutions like limiting the availability of drugs near college institutions, awareness about the side effects at an early age, socializing with the right people, self-control, and choosing the right friends were grouped into Pile 2 under the headings self-help best help, help from an external source and social remedies.

Pile 3 consists of two solutions, emotional support and parental care and support, which were grouped under the title family care and support.

From Figure 2 it is evident that recreational activities, surrounding yourself with right and positive people, parental care and supervision, and limiting the availability of drugs to students can emerge to be of immense aid to reduce the prevalence of drug abuse among the students.

The present study shows that the predominant perceived cause for substance abuse among nursing students is peer pressure. The present finding is consistent with the study conducted in Nepal by Bimala Panthee et al. (2017) among the health care students. Cognitive mapping depicts reasons such as peer pressure, social media influence as the current trend in the modern era. Few nursing students reported that they used substances for pleasurable purposes in a study conducted by Jashmid Ahamdi et al. (2004). It was also observed that parental influence and inadequate parental support and care were major governing factors in substance abuse initiation. The study conducted by Gouri Kumari Padhy et al. (2014) supports this reason. Family problem was found to be a determining reason for drug abuse. Study conducted by Mohan D (1980) reveals that students belonging to nuclear families had the least prevalence of drug abuse.

In addition to this, easy accessibility to drugs was found to be a major cause. It was reported that heavy alcohol drinking and cigarette smoking were the significant predictors of substance use among Nepalese health care students. In the present study, students opined that curiosity is also one of the factors to indulge in alcohol abuse. Peer pressure, academic stress, and
social media influence were also found to be the main reasons for initiating drug use in a few published studies. 98% of substance abusers were aware of the adverse effects of substance abuse but were continuing the same. This showed carelessness towards self-health and a lack of proper health education. Previously published studies show that the college environment favoured substance abuse since many have initiated the use of drugs after joining medical colleges. The most common reasons reported in the present study for using such substances were a relief from psychological stress, occasional celebration followed by to reduce tiredness, peer pressure, easy availability, experimental use and community acceptance.

The majority of the students believe indulging in extracurricular activities and exploring your hobbies alleviate stress levels and help them choose healthier options over drugs, which was consistent with the previously published study. The nursing students had suggested therapies such as diversional therapy and behavioural therapy. They also agreed that parental care and attention, healthier family relations would decrease the use of substance abuse, as reported in other studies. Other possible solutions suggested by the students were choosing the right friends circle and attending counselling sessions. Other predominantly stated solutions were limiting the availability of drugs near college institutions and spreading awareness about the toxic effects of substance abuse at an early age. Benegal. V et al. (1998) conducted a study that depicts the commonly reported solutions as similar to these.

Present qualitative study explores the causes of substance abuse among the health professional students. Psychological imbalance and stress due to various external factors forced the students to use various forms of drugs. In addition to this, easy accessibility to drugs was found to be an essential factor in substance abuse initiation. Solutions enumerated by the students include parental support and guidance, help from private organisations, having self-control, indulging in various co-curricular activities, and choosing the right friends. Limiting the availability of drugs near college institutions is a commonly reported solution.

**Conclusion**

The present qualitative study explores the causes and solutions for substance abuse among nursing students through a method of free listing and pile sorting. It is clearly evident that the most predisposing factor is peer pressure. Limiting the availability of drugs near college institutions was a commonly reported solution. In addition to this, students suggested therapies like diversional therapy and behavioral therapy.

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**Conflict of Interest:** Nil

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Assessment of Oral Health Related Quality of Life and Patient Satisfaction after Complete Denture Therapy- An Observational Study

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Abstract

Objective : To assess the oral health related quality of life (OHRQoL) and patient satisfaction after complete denture therapy.

Methodology : Participants in the study included 60 first time complete denture wearers. OHRQoL was assessed using Oral Health Impact Profile-Edentulous(OHIP-EDENT) questionnaire; denture quality and patient satisfaction was assessed using denture quality evaluation parameters and patient satisfaction questionnaire respectively. Paired t test was used to analyse pre and post change in OHRQoL and Pearson Correlation coefficient was used to assess the co-relation between various parameters.

Results: There was a statistically significant change in the mean OHIP score of patients before and after rehabilitation (p<0.001). Across the seven domains used for measuring the denture quality, stability and retention of mandibular denture showed statistically significant reduction after one month. Significant correlations were observed between the patient satisfaction parameters and the denture quality as well as OHRQoL (p= 0.001, p=0.001 and p= 0.01).

Conclusion: OHRQoL improved significantly in first time denture wearers.

Keywords: Complete denture, Quality of life, patient satisfaction, denture retention

Introduction

Oral health is an essential and integral part of systemic health.1 Edentulism considerably influences the OHRQoL in the elderly people as it leads to disability, impairment and handicap.2,3

Despite the various rehabilitation modalities, a considerable number of patients, out of necessity or choice, receive conventional complete dentures. Complete denture therapy has been the most accessible treatment for edentulism for many decades, owing to its cost effectiveness, esthetic appeal, and easy maintenance.4 Also, edentulousness and the wearing of complete dentures can affect the quality of life and patient satisfaction.5

The OHRQoL determines the degree to which oral health affects an individual’s daily life and social functioning.6,7,8 The most preferred tool to measure the patients OHRQoL is by using the OHIP questionnaires.7,9,10-13 The original OHIP comprises

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of 49 questions and a shortened version of this OHIP-EDENT specifically for the edentulous patients has been developed.

Patient satisfaction is one of the important objectives to achieve after complete denture treatment and is influenced by socioeconomic status, age, gender, number of post-delivery appointments, previous experience, oral condition and patient-dentist relationship. However, patients’ expectations can sway their satisfaction with the prostheses.

Further, little is known about the consequence of conventional complete dentures on OHRQoL and patient satisfaction in first time denture wearers. Thus, the current study was to planned to assess the impact of complete dentures on OHRQoL and patient satisfaction in first time denture wearers attending the Prosthodontic Department in a Dental School in India. Also, the correlation between denture quality parameters, patient satisfaction and OHRQoL was explored.

The null hypotheses of the study was complete denture therapy has no influence on the OHRQoL in first time denture wearers.

**Method**

The study involved 60 completely edentulous subjects, who were first time complete denture wearers. All study related procedures were approved by institutional ethics committee.

Participants included were edentulous patients who satisfied class I prosthodontic diagnostic index, no previous history of complete denture wear, no significant medical history, those who were able to respond to test questionnaires.

Old denture wearers, those who opted for tooth/implant supported overdentures, those with symptoms of temporomandibular disorders, xerostomia, orofacial motor disorders, severe oral manifestations of systemic diseases, psychological conditions, cognitive disturbance, neurological disorders and unwilling to participate in the study were excluded. Informed consent was obtained from all the participants.

The pre-treatment OHRQoL was evaluated using a shortened version of the OHIP questionnaire -OHIP-EDENT. The OHIP-EDENT consists of 19 questions belonging to the same seven conceptual domains i.e. functional limitation, physical pain, psychological discomfort, physical disability, psychological disability, social disability, handicap. All questions were responded on Likert scale: 0 = never, 1 = hardly ever, 2 = occasionally, 3 = fairly often, 4 = very often. Lower scores represented a better OHRQoL. The response codes for each of the items were calculated within each of the seven domains to give seven subscale scores. Higher OHIP-EDENT summary scores indicated OHRQoL impairment.

The rehabilitation of patients with conventional complete dentures was performed by post graduate students under the faculty supervision. During the denture insertion appointment, denture quality was evaluated by two prosthodontists using ‘denture quality evaluation parameters’ consisting of 7 criteria i.e esthetic lip support, esthetic lower lip, stability of maxillary denture, stability of mandibular denture, retention of maxillary denture, retention of mandibular denture, occlusion. All the clinical parameters were described precisely and evaluated on a dichotomous scale [satisfactory=1 and unsatisfactory=0]. Post-treatment review was scheduled one month later. At this visit, the subjects were asked to repeat the OHIP-EDENT instrument.

Patient satisfaction was assessed using patient satisfaction questionnaire with the use of 100mm Visual Analog Scale. General satisfaction, ability to masticate, ability to speak, ease of cleaning, stability, retention, esthetics and comfort were selected as evaluation items for the prosthesis. The satisfaction rate for each item were recorded by drawing a vertical line on a 100mm VAS for each item of the questionnaire. Each horizontal line in this questionnaire represented “very satisfied” (100) at the extreme right and “very dissatisfied” (0) at the extreme left. All the data were analysed using SPSS v.22 software package.

**Results**

A total of 60 edentulous subjects were included in the study with the mean age of 65.57 years.

A comparison was made between the OHIP scores for all subjects before and after treatment. Paired t test was used to analyse the change in OHRQoL in patients before and after complete denture therapy. The results
indicated that in all domains there were significant improvements in the OHIP scores with the new complete dentures (p<0.001) (Table 1).

Paired t test was used to analyse the change in denture quality parameters before and after complete denture therapy and the mean scores for the denture quality parameters were 0.926 and 0.892, respectively. However, there was no statistically significant difference (Table 2). Statistically significant reduction was seen in the stability and retention of mandibular denture (p<0.047 and p<0.07 respectively) after a month.

An improvement in the overall patient satisfaction level was observed post one month of the complete denture therapy, with mean total 84.75(Table 3). The mean values of the evaluation items such as comfort (90.88) and easiness to clean (90.85) was higher than the other items evaluated.

Pearson Correlation coefficient was used to assess the co relation between the technical quality of the denture and the general patient satisfaction. Statistical significance was set at p<0.05 and p<0.001. Significant correlations (Table 4) were observed between the patient satisfaction domains of denture stability, retention, easiness of clean and denture quality after one month (p=0.001, p=0.001 and p=0.01). There was a positive correlation between all the domains of patient satisfaction and OHRQoL (Table 4).

Table 1- Mean OHIP-EDENT scores

<table>
<thead>
<tr>
<th></th>
<th>BEFORE</th>
<th>POST ONE MONTH</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.697</td>
<td>0.192</td>
<td>0.0001*(t=9.45)</td>
</tr>
<tr>
<td>Sd</td>
<td>0.267</td>
<td>0.316</td>
<td></td>
</tr>
</tbody>
</table>

*P<0.05 statistically significant

Table 2- Denture quality parameters after complete denture insertion

<table>
<thead>
<tr>
<th></th>
<th>BEFORE MEAN</th>
<th>SD</th>
<th>POST 1 MONTH MEAN</th>
<th>SD</th>
<th>T TEST</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESTHETIC LIP SUPPORT</td>
<td>0.95</td>
<td>0.219</td>
<td>0.96</td>
<td>0.181</td>
<td>0.785*(t=0.276)</td>
</tr>
<tr>
<td>ESTHETIC LOWER LIP</td>
<td>0.96</td>
<td>0.181</td>
<td>0.98</td>
<td>0.129</td>
<td>0.785*(t=0.276)</td>
</tr>
<tr>
<td>STABILITY(MAXILLA)</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>---</td>
</tr>
<tr>
<td>STABILITY (MAND)</td>
<td>0.93</td>
<td>0.251</td>
<td>0.81</td>
<td>0.390</td>
<td>0.047*(2.001)</td>
</tr>
<tr>
<td>RETENTION(MAX)</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>---</td>
</tr>
<tr>
<td>RETENTION(MAND)</td>
<td>0.7</td>
<td>0.462</td>
<td>0.5</td>
<td>0.494</td>
<td>0.07*(t=2.736)</td>
</tr>
<tr>
<td>OCCLUSION</td>
<td>0.93</td>
<td>0.251</td>
<td>0.9</td>
<td>0.302</td>
<td>0.555*(t=0.591)</td>
</tr>
<tr>
<td>TOTAL</td>
<td>0.926</td>
<td>0.160</td>
<td>0.892</td>
<td>0.190</td>
<td>0.291*(t=1.06)</td>
</tr>
</tbody>
</table>

*P<0.05 statistically significant
Table 3: Patient satisfaction using Visual Analog Scale

<table>
<thead>
<tr>
<th></th>
<th>MEAN</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>General satisfaction</td>
<td>83.08</td>
<td>9.97</td>
</tr>
<tr>
<td>Mastication</td>
<td>85.85</td>
<td>7.23</td>
</tr>
<tr>
<td>Speech</td>
<td>87.33</td>
<td>5.72</td>
</tr>
<tr>
<td>Easiness to clean</td>
<td>90.85</td>
<td>4.63</td>
</tr>
<tr>
<td>Stability</td>
<td>82.18</td>
<td>5.36</td>
</tr>
<tr>
<td>Retention</td>
<td>73.98</td>
<td>7.77</td>
</tr>
<tr>
<td>Esthetics</td>
<td>88.03</td>
<td>5.22</td>
</tr>
<tr>
<td>Comfort</td>
<td>90.88</td>
<td>3.17</td>
</tr>
<tr>
<td>Total</td>
<td>84.75</td>
<td>2.11</td>
</tr>
</tbody>
</table>

Table 4: Correlation table- Patient satisfaction level vs OHIP and denture quality parameters.

<table>
<thead>
<tr>
<th>Patient satisfaction</th>
<th>OHIP-EDENT Before</th>
<th>OHIP-EDENT After</th>
<th>Denture quality after insertion</th>
<th>Denture quality post one month</th>
</tr>
</thead>
<tbody>
<tr>
<td>General satisfaction</td>
<td>r value</td>
<td>-0.01</td>
<td>0.20</td>
<td>-0.07</td>
</tr>
<tr>
<td></td>
<td>P value</td>
<td>0.97</td>
<td>0.51</td>
<td>0.82</td>
</tr>
<tr>
<td>Mastication</td>
<td>r value</td>
<td>0.12</td>
<td>0.11</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>P value</td>
<td>0.69</td>
<td>0.72</td>
<td>0.98</td>
</tr>
<tr>
<td>Speech</td>
<td>r value</td>
<td>0.13</td>
<td>0.14</td>
<td>-0.04</td>
</tr>
<tr>
<td></td>
<td>P value</td>
<td>0.67</td>
<td>0.64</td>
<td>0.98</td>
</tr>
<tr>
<td>Easiness to clean</td>
<td>r value</td>
<td>0.007</td>
<td>0.002</td>
<td>0.122</td>
</tr>
<tr>
<td></td>
<td>P value</td>
<td>0.84</td>
<td>0.89</td>
<td>0.54</td>
</tr>
<tr>
<td>Stability</td>
<td>r value</td>
<td>0.006</td>
<td>-0.04</td>
<td>0.303</td>
</tr>
<tr>
<td></td>
<td>P value</td>
<td>0.98</td>
<td>0.76</td>
<td>0.01*</td>
</tr>
<tr>
<td>Retention</td>
<td>r value</td>
<td>0.13</td>
<td>-0.04</td>
<td>0.168</td>
</tr>
<tr>
<td></td>
<td>P value</td>
<td>0.32</td>
<td>0.76</td>
<td>0.22</td>
</tr>
<tr>
<td>Esthetics</td>
<td>r value</td>
<td>0.06</td>
<td>0.24</td>
<td>-0.127</td>
</tr>
<tr>
<td></td>
<td>P value</td>
<td>0.64</td>
<td>0.06</td>
<td>0.51</td>
</tr>
<tr>
<td>Comfort</td>
<td>r value</td>
<td>-0.11</td>
<td>-0.11</td>
<td>-0.02</td>
</tr>
<tr>
<td></td>
<td>P value</td>
<td>0.40</td>
<td>0.40</td>
<td>0.84</td>
</tr>
</tbody>
</table>

*P<0.05 statistically significant
Discussion

The findings of the present study allowed the rejection of the null hypothesis. The OHIP-EDENT was used because it is a validated questionnaire specific for edentulous patients. High OHIP-EDENT scores were verified before the treatment. Usually, loss of all the teeth compromises the chewing, speech, sleep, emotional and social stability of patients. Oral health related quality of life improved significantly after the complete denture treatment probably due to the replacement of teeth which improved the function, esthetics, comfort and self-esteem of the person.

With regard to the general patient satisfaction, the patients reported improved satisfaction with the dentures. This indicates new complete dentures had good fit and adapted well to the oral tissues, reducing functional restrictions that happen as a consequence of pain.

There was a statistically significant co-relation between the denture quality parameters and patient satisfaction domains and the results agree with the previous studies.

There was a positive correlation between general patient satisfaction and the OHRQoL. Stable conventional complete dentures improve chewing capacity, thereby have a positive effect on their quality of life. Therefore, stability and retention takes precedence over other factors while fabricating the complete dentures. Biomechanical factors like muscle tonus, neuromuscular coordination, tongue, cheeks, lips, saliva may help to achieve adequate denture stability and retention in cases of severe residual ridge resorption.

In general, patient satisfaction and denture related OHRQoL depends more on acceptance of denture limitations than functional accuracy of their dentures. What is accepted as a normal level of discomfort or handicap to one patient, may be unbearable to another.

When conventional approach fails to achieve optimum retention and stability in cases of ridge resorption dental implants are an alternate option. Evidence also suggests that implant supported overdentures is a feasible and predictable treatment option that can result in high levels of patient satisfaction. However, this treatment modality may not be feasible as a result of morphological, psychological or socioeconomic factors.

The use of a validated denture quality evaluation parameter and denture satisfaction scale, the high inter-examiner and intra-examiner agreement, add to the scientific rigor and external validity of this research. However, long term follow up studies are needed to confirm these results.

Finally, patients’ perception regarding the experience with their complete dentures is inherently unique and highly subjective. Therefore, a certain level of discomfort or handicap may be acceptable to one patient and unbearable to another. Beyond the technical quality of the dentures, variables like oral health status, the patient’s personality and psychological state, and neuromuscular adaptation are to be considered. However, the available scientific literature does not provide conclusive evidence about this issue. Therefore, it is prudent for clinicians to establish good clinician-patient rapport.

Conclusion

There was a significant improvement in OHRQoL in first time denture wearers after rehabilitation with complete dentures. There was also a marked improvement in the general patient satisfaction.

Conflict of Interest : Nil

Source of support : Nil

References
5. Forgie AH, Scott BJ, Davis DM. A study to compare the oral health impact profile and satisfaction


10. Scott BJ, Forgie AH, Davis DM. A study to compare the oral health impact profile and satisfaction before and after having replacement complete dentures constructed by either the copy or the conventional technique. Gerodontology 2006;23:79–86.


Study of Death among Children Below Five Yearsof Age and Its Correlation with Health Care Utilization and Place of Residence. Using Verbal Autopsy as a Tool in Dehradun

Sushil Dalal1, Kiran Pande2, Neetu Pippet3, Vishal Modgil4

1 Professor dept of Community Medicine MMU Amballa, 2Assistant Professor dept of OBG MMU Mullana Ambala, 3Additional SMO State Headquarter Ayushman Bharat Panchkula, Haryana, 4Additional SMO state headquarter Ayushman Bharat Panchkula, Haryana

Abstract
Children, one of the most vulnerable part of the population, face unusually high health risks as they grow. Children are the promise and future of every nation and the core of development. But it has been observed that even after so many efforts by governments of developing countries we are far behind to achieve hundred percent health care utilization by under-five population. Keeping this in view, this study was conducted to find out any correlation in-between child mortality of under-five years of age with health care utilization and place of residence. using verbal autopsy as a tool in Dehradun.

Methodology: The survey was done on all the houses of the deceased children residing in our field practice areas by visiting their houses.

Results: Among the 83 deaths reported, 38 received no treatment, 10 were treated by quakes, 19 and 16 under five – children were treated in government and private hospital respectively.

Conclusion: Our study shows that by utilization of health care facilities we can remarkably reduce under five mortality.

Keywords: MDG-4, deceased children, mortality rate, health care, under-utilized

Background
India is one among the 60 LMICs where reduction of child mortality rate has not progressed steadily towards achieving MDG-4. In India, infant mortality rate (IMR) and under-five mortality rate (U5MR) were 50 and 64 respectively per 1000 births during the year 2009 according to sample registration system (SRS) in India. One of the reasons for slow decline in child mortality in India could be unequal distribution of healthcare resources and difficulties in access to health care. One of the reasons for slow progress in achieving MDG-4 in many LMICs is the socioeconomic inequities existing in these countries. These inequities may also affect access to and utilization of available health care services and time taken in seeking of medical care as well as selection of appropriate health care provider for acute childhood illnesses. Studies from various countries suggest that health care seeking is inappropriate and health services are often under-utilized during childhood illnesses. Studies have reported that high cost of treatment is a major deterrent to seek care. Mothers’ perceptions about symptoms and their severity, mother’s beliefs about childhood illnesses and mothers’ ability to recognize the danger signs are some important factors determining health care-seeking behavior or utilization of health care services. Studies on utilization
of health services during childhood illness have reported that a significant proportion of children are not taken for medical care\textsuperscript{16}.

**Material and Method**

The study was undertaken for one year in the field practice areas of department of community medicine HIHT Dehradun after taking approval of institutional ethical committee. The total population registered under Rural Health Training Centre (Rajeev Nagar) & Urban Health Training Centre was 12,588 and 12,930 respectively out of which under five children were 1297 at RHTC and 1325 at UHTC.

All deaths except still births registered with Rural and Urban Health Training Centre were included in the study. When a child died, the mother or the respondent was questioned in detail about the health care utilization and place of residence of children prior to death. A drafted questionnaire (English version) developed by WHO, was modified suitably, as well as certain variables were added to find out any relation in-between under five children death and health care facility utilization with place of residence\textsuperscript{17}. The information so collected, was first coded and then entered in the computer. The analysis was done by using SPSS software. Appropriate statistical methods (proportion and chi – square test) were applied as per requirement.

**Result**

**Table 1 distribution of deceased children by age, sex and place of residence (n=83)**

<table>
<thead>
<tr>
<th>Age of deceased children</th>
<th>Rural (%)</th>
<th>Urban (%)</th>
<th>Totaldeaths (%)</th>
<th>Chisquar value</th>
<th>Degree of freedom</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-28 days</td>
<td>17 (43.6)</td>
<td>15 (34.1)</td>
<td>32 (38.6)</td>
<td>3.219</td>
<td>2</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>29-&lt;365 days</td>
<td>12 (30.8)</td>
<td>10 (22.7)</td>
<td>22 (26.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>365 days-&lt; 5Yrs</td>
<td>10 (25.6)</td>
<td>19 (43.2)</td>
<td>29 (34.9)</td>
<td>3.219</td>
<td>2</td>
<td>&gt;0.05</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sex of deceased children</th>
<th>Rural (%)</th>
<th>Urban (%)</th>
<th>Totaldeaths (%)</th>
<th>Chisquar value</th>
<th>Degree of freedom</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>18 (46.2)</td>
<td>26 (59.1)</td>
<td>44 (53.0)</td>
<td>1.389</td>
<td>1</td>
<td>&gt;0.05</td>
</tr>
<tr>
<td>Female</td>
<td>21 (53.8)</td>
<td>18 (40.9)</td>
<td>39 (47.0)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2: Distribution of children by heath care utilization and place of residence (n=83).

<table>
<thead>
<tr>
<th>Health care utilization</th>
<th>Place of Residence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rural</td>
</tr>
<tr>
<td></td>
<td>No.</td>
</tr>
<tr>
<td>No treatment</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>48.7</td>
</tr>
<tr>
<td>Quack</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>12.8</td>
</tr>
<tr>
<td>Govt. hospital</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>23.1</td>
</tr>
<tr>
<td>Private practitioner /</td>
<td>6</td>
</tr>
<tr>
<td>Private hospital</td>
<td></td>
</tr>
<tr>
<td></td>
<td>15.4</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>100.0</td>
</tr>
</tbody>
</table>

(X^2 =0.754; df=3 ; p>0.05)

Present study shows that in rural area out of 39 deaths, 19(48.7 %) children were not treated for their illness whereas 5 (12.8 %) were shown to a quack,3(7.7%) children were seen by a private practitioner,9( 23.1 %) children were taken to government hospital while only 6 (15.4 %) children were taken to private hospital. Thus in the rural area, majority of children (48.7 %) received no treatment whereas only 15 (38.5%) children were taken to government hospital. In urban areas, 19 (43.2 %) children were not treated for their illness whereas 5 (11.4 %) were taken to a quack, 10 (22.7 %) were taken to government hospital and 12 (22.7 %) were taken to private hospital. Reasons for not seeking treatment were, either the illness was not considered serious in most of the cases, or there was financial constraints and lack of time or long waiting period. There is need for better health care delivery system and that too within reach of general population.

A Study done by Garg et al (1993) 18 on neonatal mortality in Meerut district found that 42.8 % of neonates who died did not receive treatment for an illness before their death. 11.9 % of neonates who died but received some treatment, were treated in hospital. A study done by Kumar et al (1982) 19 found that doctors (RMP) and qualified Doctor of Modern Medicine were consulted in 30.7 % babies. In 48.8 % both health workers and doctors were consulted for the treatment of terminal illness. No health worker was consulted in 19.7 % cases. Only in less than half of the cases a consultation was obtained from a health facility available close to home like sub center or a primary health center. Only 8.8 % of infants were taken to Tehsil, District or teaching hospital, so need to strengthen health care at home is greater during the neonatal period because 73.8 % of newborns were never shown in a health Centre or hospital. Study done by Awasthi and Panda (1996) 20 found that urban slums preferred those health care providers who so ever is the closest one available. Most often the parents take
the child to a non-governmental dispenser who may not be qualified Practitioner. Whereas Bhandari N et al (2002) 21 reported in his study that the first week deaths commonly (61 %) occurred within 24 hours of recognition of illness which might have been to a short time for effective interventions by care providers. Only six of 45 neonates were advised by primary health care providers for hospitalization. Similarly, 25 (41%) of 61 older infants who had severe malnutrition, sepsis, meningitis, diarrhoea or pneumonia or other illness were referred to hospital.

Conclusion

Our study as well as studies from different parts of globe especially developing countries came to this conclusion that maximum utilization of health care facilities can remarkably help in reducing under five children mortality and moreover, we should make our health facilities more efficient and patient friendly.

Conflict of Interest – none

Source of Funding- self

Ethical Clearance – taken from ethical committee

References


Study of Death among Children below five Years of Age and Its Relationship with Person Conducting Delivery and Place of Residence. Using Verbal Autopsy as a Tool in Dehradun

Sushil Dalal¹, Kiran Pande², Neetu Pippet³

¹Associate Professor dept of Community Medicine MMU Amballa, ²Assistant Professor dept of OBG MMU Mullana Ambala, ³Additional SMO State Headquarter Ayushman Bharat, Panchkula, Haryana

Abstract

Substantial reduction in child mortality has occurred in low income and middle income countries in the late 20th century but more than ten million children younger than five years still die every year, one of the important factor which has been observed in under five mortality is the person conducting the delivery. Keeping this in view, this study was conducted to find out relation in-between child mortality of under-five years of age and its relation with person conducting delivery and place of residence. using verbal autopsy as a tool in Dehradun.

Methodology: The survey was done on all the houses of the deceased children residing in our field practice areas by visiting their houses.

Results: Among the 83 deaths reported most of the deaths were conducted by daies and relatives.

Conclusion: Our study shows that delivery conducted by qualified personnel greatly help in reducing the under-five mortality rate.

Keywords: Qualified personnel, deceased children, mortality rate, Millennium development goal, untrained dai.

Background

In India about 2.1 million child deaths occur every year, which is the highest with in a single country worldwide¹. There has been a substantial decrease in child mortality in the past two decades in India. The reduction being more marked in the 1980’s than in 1990’s. despite these impressive gains. India compares poorly in the pace of child mortality reduction to several other countries in South and South-East Asia, including Bangladesh. More disturbing are the data which indicate that the decline in the child mortality rate is slowing in India². According to UNICEF estimates, child mortality rates have been reduced by around 12 percent over the period 1990 – 2002. Given the average annual rate of reduction of 1 percent, the pace of progress needs to be increased significantly to achieve millennium development goal MDG – 4³. Appropriate delivery care is crucial for both maternal and perinatal health and increasing skilled attendance at birth is a central goal of the safe motherhood and child survival movements. Skilled attendance at delivery is an important indicator in monitoring progress towards Millennium Development Goal 5 to reduce the maternal mortality ratio by three quarters between 1990 and 2015⁴. In addition to professional attention, it is important that mothers deliver their babies in an appropriate setting, where life saving equipments and hygienic conditions can also help reduce the risk of complications that may cause death or illness to mother and child (2006)⁵. One of the resent change which has been observed in government policies is emphasis on institutional deliveries in respect to home deliveries.

Material and Method

The study was undertaken for one year in the field practice areas of department of community medicine HIHT Dehradun after taking approval of institutional
ethical committee. The total population registered under Rural Health Training Centre (Rajeev Nagar) & Urban Health Training Centre was 12,588 and 12,930 respectively out of which under five children were 1297 at RHTC and 1325 at UHTC.

All deaths except still births registered with Rural and Urban Health Training Centre were included in the study. When a child died, the mother or the respondent was questioned in detail about the person conducting delivery and place of residence of children prior to death. A drafted questionnaire (English version) developed by WHO, was modified suitably, as well as certain variables were added to find out any correlation in-between under five children death and person conducted delivery with place of residence. The information so collected, was first coded and then entered in the computer. The analysis was done by using SPSS software. Appropriate statistical methods (proportion and chi – square test) were applied as per requirement.

Result: Table 1 distribution of deceased children by age, sex and place of residence (n=83)

<table>
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<tr>
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<th>P value</th>
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<tbody>
<tr>
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<td>19(43.2)</td>
<td>29(34.9)</td>
<td>3.219</td>
<td>2</td>
<td>&gt;0.05</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sex of deceased children</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural (%)</td>
<td>18(46.2)</td>
<td>21(53.8)</td>
</tr>
<tr>
<td>Urban (%)</td>
<td>26(59.1)</td>
<td>18(40.9)</td>
</tr>
<tr>
<td>Total (%)</td>
<td>44(53.0)</td>
<td>39(47.0)</td>
</tr>
</tbody>
</table>

1.389 1 >0.05

Table 2 : Distribution of children by person conducting delivery and place of residence. ( n = 83 ).

<table>
<thead>
<tr>
<th>Delivery Conducted by</th>
<th>Place of Residence</th>
<th>Rural</th>
<th>Urban</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Qualified doctor</td>
<td>6</td>
<td>26.1</td>
<td>17</td>
<td>73.9</td>
</tr>
<tr>
<td></td>
<td>15.4</td>
<td>38.6</td>
<td>27.7</td>
<td></td>
</tr>
<tr>
<td>Nurse</td>
<td>1</td>
<td>25.0</td>
<td>3</td>
<td>75.0</td>
</tr>
<tr>
<td></td>
<td>2.6</td>
<td>6.8</td>
<td>4.8</td>
<td></td>
</tr>
<tr>
<td>Trained die</td>
<td>9</td>
<td>56.3</td>
<td>7</td>
<td>43.8</td>
</tr>
<tr>
<td></td>
<td>23.1</td>
<td>15.9</td>
<td>19.3</td>
<td></td>
</tr>
<tr>
<td>Untrained die</td>
<td>18</td>
<td>58.1</td>
<td>13</td>
<td>41.9</td>
</tr>
<tr>
<td></td>
<td>46.2</td>
<td>29.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relative / others</td>
<td>5</td>
<td>55.6</td>
<td>4</td>
<td>44.4</td>
</tr>
<tr>
<td></td>
<td>12.8</td>
<td>9.1</td>
<td>10.8</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>47.0</td>
<td>44</td>
<td>53.0</td>
</tr>
<tr>
<td></td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
Discussion

In the present study most of the deliveries in rural area i.e. 59% was conducted by untrained dai or relatives while in the urban slum 39.7 % was conducted by untrained personnel. Overall 48.2 % of delivery in the study area was conducted by trained personnel. The delivery conducted by trained personnel and the delivery conducted by untrained personnel do presents risks to newborn. However the difference between delivery conducted by and place of residence was found to be statistically insignificant. According to NFHS – 3 survey done Uttarakhand 7, almost half 48 % of births was assisted by trained personnel in last 5 years and as per NFHS – 3 India, 47 % of birth in last 5 years were assisted by health personnel while 37 % was assisted by TBA. In a study done by Katz et al (2003) 8 while analyzing the risk factors for early infant mortality in Sarlahi, Nepal found that only 2.8 % women delivered in hospitals and 1.8 % were delivered by a doctor, most women delivered at home with the help of family or untrained birth attendant. Another study done by Garg et al (1993) 9 shows in their study on neonatal mortality in Meerut district, that 90.5 % of these were home deliveries, 45.3 % were delivered by an untrained birth attendant and 30.9 % were delivered by TBA. 11.9 % were delivered by a family member.

Haque A (1996) 10 also found in his study done in urban slum of Dhaka that over 75 % had deliveries performed by an untrained attendant. 8 % delivered the infant themselves. And 3% had a doctor assisted deliveries. Adamson PC (2012) 11 observed the increase in cesarean section rates suggests that more women are being identified with pregnancy complications through institutional delivery, the increase in community NMR indicates the continued delivery of high risk or complicated cases in home births. Caste disparities continue to exist, with women of lower castes continuing to have higher rates of home birth. Maternal complications during delivery have been reported as a key factor in neonatal mortality in India Kumar et al.(2014) 12. Titaley et al. (2012) 13 also concluded that in urban areas, infants of mothers with delivery complications who were delivered at health care facilities had a reduced risk of death. Study done by De Costa et al. (2014) 14 also stresses on the same approach as Gujarat government’s emphasis on promoting institutional delivery among BPL or ST mothers is a step in the right direction, not just for maternal death reduction but also for NMR reduction. Study done by Lawn (2005) 15 also came to this conclusion that maternal complications in labor carry a high risk of neonatal death. Recent study done by Fink (2015) 16 also states that Facility deliveries have the potential to reduce early neonatal mortality in developing countries.

Conclusion

Our study as well as studies from different parts of globe especially developing countries came to this conclusion that person conducting a delivery has a great role in decreasing under five mortality especially neonatal mortality. And if we go for institutional deliveries then both neonatal mortality as well as maternal mortality can be reduced extensively.

Conflict of Interest – None

Source of Funding- Self

Ethical Clearance – Taken From Ethical Committee.

References


Profile of Pediatric Deaths in Bellary District

Gururaj Biradar1, Pavanchand Shetty H2, B Suresh Kumar Shetty3, Haneil Larson Dsouza2, V Yogiraj4, Charan Kishor Shetty5

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Abstract

Study was conducted in VIMS bellary on cases brought for autopsy. The data was collected from the postmortem report of the body brought for autopsy. The study done on 607 pediatric deaths in retrospective manner. In this study it was found out that male mortality was higher in comparison to females. The vulnerable or susceptible age group among the studied sample was 12 to 18 years. Road traffic accident was found to be one of the major killers

Key words. Paediatric death, Autopsy, Road traffic accidents

Introduction

To improve maternal and child health it is important to find the cause of death and the quality of health services in that particular area. Infant and child mortality being a major concern in our country government is trying its best to take adequate measures. Initial 18 years of life is considered as childhood. The measures can only be effective if it is supported by adequate statistical data. To improve child health and get reforms in the health care sector proper static is required to know the scenario existing in the health system. Understanding of various causes of death in this age group will help in implementing various preventive methods and its effectiveness. The present study was a retrospective study numbered 607 which was studied and classified under various categories.

Materials and Method

In the present study the information was collected from the postmortem reports of the autopsy done in the VIMS bellary mortuary. The study is a retrospective study and the data collected was processed and analyzed. In this study 607 pediatric death cases were studied and various parameters were collected and analyzed.

Results

In the present study most of the victims were male in comparison to females. Male preponderance was found to be more in this study (Table 1). The age wise distribution of deaths showed that maximum deaths were seen in the age group of 12-18 years and minimum was less than 1 year( Table 2 ). Road traffic accident was found be one of the main cause of death followed by poisoning( Table 3 ).

Table no. 1. YEAR WISE

<table>
<thead>
<tr>
<th>Year</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>42</td>
<td>32</td>
</tr>
<tr>
<td>2014</td>
<td>66</td>
<td>26</td>
</tr>
<tr>
<td>2015</td>
<td>80</td>
<td>48</td>
</tr>
<tr>
<td>2016</td>
<td>78</td>
<td>50</td>
</tr>
<tr>
<td>2017</td>
<td>99</td>
<td>86</td>
</tr>
</tbody>
</table>

Sex distribution was 365 males and 242 were females. Mortality among males were slightly higher than females. The above table also depicts the year wise
mortality among gender which also shows that death among males are higher

**TABLE NO. 2. AGE WISE DISTRIBUTION.**

<table>
<thead>
<tr>
<th>YEARS</th>
<th>MALE</th>
<th>FEMALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFANT &lt; 1 YR</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>TODDLER 1-3 YRS</td>
<td>46</td>
<td>51</td>
</tr>
<tr>
<td>PRE SCHOOL 3-6 YRS</td>
<td>55</td>
<td>49</td>
</tr>
<tr>
<td>SCHOOL 6-12 YRS</td>
<td>60</td>
<td>58</td>
</tr>
<tr>
<td>ADOLESCENT 12-18 YRS</td>
<td>200</td>
<td>83</td>
</tr>
</tbody>
</table>

Profiling of age wise distribution showed that death was highest in the age group of 12Yrs to 18Yrs. Death numbers in the age group of 3Yrs to 6Yrs and 6 to 12Yrs was almost similar. In this study least death was in the age less than 1 years

**TABLE NO. 3. MODE OF DEATH.**

<table>
<thead>
<tr>
<th>MODE</th>
<th>MALE</th>
<th>FEMALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTA</td>
<td>176</td>
<td>90</td>
</tr>
<tr>
<td>POISONING</td>
<td>62</td>
<td>52</td>
</tr>
<tr>
<td>BURNS</td>
<td>47</td>
<td>40</td>
</tr>
<tr>
<td>DROWNING</td>
<td>50</td>
<td>48</td>
</tr>
<tr>
<td>FALL</td>
<td>30</td>
<td>12</td>
</tr>
</tbody>
</table>

Maximum number of people in both sex died due to road traffic accident. Road traffic accident was found to be one of the major killer.

**TABLE NO. 4. SEASONAL VARIATION.**

<table>
<thead>
<tr>
<th>SEASON</th>
<th>MALE</th>
<th>FEMALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUMMER</td>
<td>165</td>
<td>95</td>
</tr>
<tr>
<td>RAINY</td>
<td>140</td>
<td>69</td>
</tr>
<tr>
<td>WINTER</td>
<td>60</td>
<td>78</td>
</tr>
</tbody>
</table>

Deaths were more during summer season than other seasons.

**TABLE NO. 5. MANNER OF DEATH.**

<table>
<thead>
<tr>
<th>MANNER</th>
<th>MALE</th>
<th>FEMALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUICIDAL</td>
<td>93</td>
<td>63</td>
</tr>
<tr>
<td>ACCIDENTAL</td>
<td>288</td>
<td>163</td>
</tr>
<tr>
<td>HOMICIDAL</td>
<td>00</td>
<td>00</td>
</tr>
</tbody>
</table>
Accidental deaths were more common than other manner of death. Suicidal and accidental deaths were predominant in males in comparison to females.

**Discussion**

In this study mortality was more in the age group of 12 to 18 years. The most common mode of death being road traffic accident. This study gives an insight into the particular sex being more vulnerable and the problem of road traffic accident affecting the younger age groups. The male population being more vulnerable might be due to aggressive nature and risk taking behavior among male population. In this study it was found out that 12 to 18 years age group was most vulnerable. In the study conducted in Virginia state similar findings were seen. Males were more in number compared to females because of the risky activities and aggressive nature they are prone to causalities and similar findings were observed by Cekin et al. and Vali et al. Death due to drowning is due to activities of children’s in water bodies like swimming, bathing and other recreation activities which was also found in study by Ahmed et al.

**Conclusion**

This study gave an insight into the pattern of death in pediatric population. The study showed that male are affected more and most vulnerable age group is between 12 to 18 yrs. This study also brought into notice the road traffic accident affecting younger population. The study results bring into focus the various problems and dangers affecting younger population which can further guide us in taking some preventive strategies in preventing mortality.

**Research Funding** None

**Conflict of Interest** None

**Ethical Clearance** Taken from VIMS, Bellary

**References**

Prevalence of Knee Dysfunction in Mallakhamb Players in Karad

Arundhati V. Nimbalkar¹, S. Anandh²

¹Final Year, ²Professor, Department of Community Health sciences, Krishna college of Physiotherapy, Krishna Institute of medical sciences deemed to be university, Karad, Maharashtra

Abstract

Background: Mallakhamb is combination of Yoga, Gymnastics and Martial Arts. There is various types of mallakhamb such as pole, rope, hanging, niradhar(without support), on cane, on floating platform, mallakhamb with weapons etc. but at competitive level only pole, rope and hanging mallakhamb are being performed by mallakhamb player.In the sport, knee is common injury site. Knee dysfunction leads to long absence from sports and are one of the main causes of permanent sports disability. Common cause of musculoskeletal pain is hypermobility. In mallakhamb players knee dysfunction is diagnosed with the help of KOOS scale. Conservative management is important to correct knee dysfunctions in mallakhamb players. This study has been undertaken to check the prevalence of knee dysfunction in mallakhamb players.

Objective: To find out the prevalence of knee dysfunction in mallakhamb players.

Method: An observational study was carried out using a cross sectional study design. The study conducted in and around karad, Maharashtra. The samples were chosen using the simple random sampling method. The participants in this study were both males and females who were played state and national level mallakhamb game more than 6years. Subjects who played only national level mallakhamb game and subjects who were not willing to participate in mallakhamb were excluded from this study. Study was conducted using a sample size of 84 mallakhamb players (n= 4pq/L² ) for a period of 6 months. The materials was used in this study includes paper, pen, data collection sheet, consent form.

Results: On the basis of statistical analysis there was significant knee dysfunction in mallakhamb players.

Conclusion: After analyzing the data, it was concluded that there is a prevalence of knee dysfunction in mallakhamb players.

Keywords: Mallakhamb players, hypermobility, knee dysfunction, KOOS.

Introduction

Mallakhamb is combination of Yoga, Gymnastics and Martial Arts. There are various types of mallakhamb such as pole, rope, hanging, niradhar(without support), on cane, on floating platform, mallakhamb with weapons etc. but at competitive level only pole, rope and hanging mallakhamb are being performed by mallakhamb player¹. At competitive level, gymnast has to perform a set of elements transitional movement satisfying the requirement of ‘Code of Mallakhamb Federation of India².’

Mallakhamb is the game which is played against the gravity. It requires agility, quickness of reflexes, coordination of different muscles, strength, flexibility to execute turn and twist which stretch and maintain balance on the pole during practice or competition.
In the sport, knee is common injury site. Knee dysfunction leads to long absence from sports and are one of the main causes of permanent sports disability[4].

Most common factor during this practice is hypermobility which leads to musculoskeletal pain which further leads to knee injuries[9].

Being a traditional sport, the absence of proper physio and medical care results in increased incidence of knee dysfunction. Joint hypermobility is a feature of several disorders that results in joint laxity which can cause dislocations, subluxations and sprains[6].

Knee dysfunction was defined as any orthopedic conditions of the knee that contributed to a decreased level of function as perceived by the individual[11,12].

There are various outcome measures which are used to quantify knee injuries in athletes specifically in Mallakhamb players but KOOS is very easy to determine, with no any equipment or technology involved, and is validated for clinical and research use. A 2010 systematic review found that subjects categorized as hypermobile were at a significantly increased risk for sustaining knee injuries, but not ankle injuries, compared to their non-hypermobile peers[12].

This study has been undertaken to check the prevalence of knee dysfunction in mallakhamb players.

**Methodology**

An observational study was carried out using a cross sectional study design. The study conducted in and around Karad, Maharashtra. The samples were chosen using the simple random sampling method. The participants in this study were both males and females who were played state and national level mallakhamb game more than 6 years. Subjects who played only national level mallakhamb game and subjects who were not willing to participate in mallakhamb were excluded from this study. Study was conducted using a sample size of 84 mallakhamb players (n= 4pq/L²) for a period of 6 months. The materials used in this study includes paper, pen, data collection sheet, consent form.

**Procedure**

An approval for the study was obtained from the Protocol committee and Institutional Ethical committee of KIMSDU. Individuals were approached and those fulfilling the inclusion criteria were selected. The procedure was explained and written informed consent was taken.

Demographic information of the subjects was taken. Individuals were thoroughly explained about the procedure. If any word or terminology in the questionnaire was not familiar to them, it was explained to them. A thorough and necessary assessment were taken. The intensity of pain and knee dysfunction of each individual was noted. The score was calculated and data was recorded. Later statistical analysis was done.

**Findings**

**Table no.1 Pain at rest and on activity in pre-operative subjects**

<table>
<thead>
<tr>
<th></th>
<th>Mean ± SD</th>
<th>T Value</th>
<th>P Value</th>
<th>Interference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>18.5±4.2</td>
<td>23.6</td>
<td>&lt;0.0001</td>
<td>Extremely Significant</td>
</tr>
<tr>
<td>VAS – At Rest and On Activity</td>
<td>2.17±1.4</td>
<td>8.41</td>
<td>&lt;0.0001</td>
<td>Extremely Significant</td>
</tr>
<tr>
<td></td>
<td>5.28±1.6</td>
<td>17.06</td>
<td>&lt;0.001</td>
<td>extremely Significant</td>
</tr>
</tbody>
</table>

**Interpretation:** This table shows that mean of VAS score at rest is 2.17 and on activity is 5.2 in pre-operative subjects.
Table no.2 KOOS Score of pre-operative subjects

<table>
<thead>
<tr>
<th>KOOS Score</th>
<th>Mean ± SD</th>
<th>T Value</th>
<th>P Value</th>
<th>Interference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>49.1±16.2</td>
<td>16.5</td>
<td>&lt;0.0001</td>
<td>Extremely Significant</td>
</tr>
<tr>
<td>Sympt</td>
<td>59±18.1</td>
<td>17.7</td>
<td>&lt;0.001</td>
<td>Extremely Significant</td>
</tr>
<tr>
<td>ADL</td>
<td>64.9±13.5</td>
<td>26.2</td>
<td>&lt;0.001</td>
<td>Extremely Significant</td>
</tr>
<tr>
<td>S/R</td>
<td>42.1±12.1</td>
<td>18.9</td>
<td>&lt;0.001</td>
<td>Extremely Significant</td>
</tr>
<tr>
<td>QOL</td>
<td>43.5±10.6</td>
<td>22.3</td>
<td>&lt;0.001</td>
<td>Extremely Significant</td>
</tr>
</tbody>
</table>

**Interpretation:** This table shows that mean of pain is 49, symptom is 59, ADL is 59.7, S/R is 42.1 and QOL is 43.5 (KOOS Score) in pre-operative subjects.

Table no.3 Pain at rest and on activity in post-operative subjects

<table>
<thead>
<tr>
<th>Age</th>
<th>Mean ± SD</th>
<th>T Value</th>
<th>P Value</th>
<th>Interference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>22.6±3.5</td>
<td>35.0</td>
<td>&lt;0.0001</td>
<td>Extremely Significant</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VAS – At</th>
<th>Rest and On Ac-tivity</th>
<th>Mean ± SD</th>
<th>T Value</th>
<th>P Value</th>
<th>Interference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.83±1.2</td>
<td>7.9</td>
<td>4.10±1.6</td>
<td>13.3</td>
<td>&lt;0.001</td>
<td>extremely Significant</td>
</tr>
</tbody>
</table>

**Interpretation:** This table shows that mean of VAS score at rest is 1.8 and on activity is 4.33 in pre-operative subjects.

Table no.4 KOOS Score of post-operative subjects

<table>
<thead>
<tr>
<th>KOOS Score</th>
<th>Mean ± SD</th>
<th>T Value</th>
<th>P Value</th>
<th>Interference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>74.3±8.53</td>
<td>47.7</td>
<td>&lt;0.0001</td>
<td>Extremely Significant</td>
</tr>
<tr>
<td>Sympt</td>
<td>72.9±7.9</td>
<td>50.0</td>
<td>&lt;0.001</td>
<td>Extremely Significant</td>
</tr>
<tr>
<td>ADL</td>
<td>75.7±8.8</td>
<td>46.8</td>
<td>&lt;0.001</td>
<td>Extremely Significant</td>
</tr>
<tr>
<td>S/R</td>
<td>67.1±11.0</td>
<td>33.1</td>
<td>&lt;0.001</td>
<td>Extremely Significant</td>
</tr>
<tr>
<td>QOL</td>
<td>63.7±15.7</td>
<td>22.1</td>
<td>&lt;0.001</td>
<td>Extremely Significant</td>
</tr>
</tbody>
</table>

**Interpretation:** This table shows that mean of pain is 74, symptom is 72.9, ADL is 75.7, S/R is 67.1 and QOL is 63.7 (KOOS Score) in pre-operative subjects.
Discussion

Mallakhamb is the combination of yoga, gymnastics and martial arts. There is various types of mallakhamb but at competitive level only pole, rope and hangingmallakhamb are being performed by players. Gymnasts has to perform a set of elements transitional movements which is against gravity. The performers to execute turning and twisting, stretching movement and balance exercises on mallakhamb during training and competition. In this game, hypermobility is one of the factors which can cause musculoskeletal pain. Lack of proper physio and medical care results in increased incidence of knee dysfunction in this game. Therefore, consequent negative impact on players.

This is a prevalence study of knee dysfunction in mallakhamb players. There is generalised ligament laxity in this player which leads to joint hypermobility resulting in increased incidence of knee injuries such as pain, dislocation, subluxation and sprains. Movements in mallakhamb game such as turning, twisting, locking, jumping, sudden jerk and landing which also cause of risk of knee injuries.

This study was done in 6 months of duration with sample size 84 and age 12-28 years. Later this group were divided into pre-operative and post-operative subjects. Subjects were selected as per inclusion and exclusion criteria. Consent from was taken from subjects and assessment were done.

According to SAYALI DHURI, DR SAJEER USMAN, conducted a study on prevalence of hypermobility in traditional gymnasts and its comparison with normal population. This study shows that mallakhamb players have more generalized hypermobility than same age normal children. So due hypermobility increases the incidence of knee injuries in mallakhamb players.

After that pain assessment were done with the help of VAS score and then ask to fill KOOS questionnaire, which includes 5 dimensions were scored separately: pain(9 items), symptoms(7 items), ADL(17 items), S/R(5 items), QOL(4 items) and their total score were calculated.

Table no.1- shows that mean of VAS score at rest is 2.17 and on activity is 5.2 in pre-operative subjects.

Table no.2- shows that mean of pain is 49, symptom is 59, ADL is 59.7, S/R is 42.1 and QOL is 43.5 (KOOS Score) in pre-operative subjects.

Table no.3- shows that mean of VAS score at rest is 1.8 and on activity is 4.33 in post-operative subjects.

Table no.4- shows that mean of pain is 74, symptom is 72.9, ADL is 75.7, S/R is 67.1 and QOL is 63.7 (KOOS Score) in post-operative subjects.

According to articles and this study proved that there is increase incidence of knee dysfunction due to hypermobility in mallakhamb players which consequent negative impact on players and on knee joint. so the findings suggest that therapist should consider the factors that impact on plassyers and with the help of this study can concentrate on knee dysfunction in mallakhamb players for future training and red alerts.

Conclusion

On the basis of the results of the study, it was concluded that there is significant knee dysfunction in mallakhamb players. After analysing the KOOS score it was found that in pre operative patients KOOS score is less which means they have extreme knee problems while in post operative patients KOOS score is more which means they had less pain or knee dysfunction.

Acknowledgement: I sincerely thank the management of KIMSDU for allowing me to conduct this study by providing me the necessary requirement. I thank Dean and my guide Dr.S. Anandh for his support and helping me in my research. I take this opportunity all those who have been directly and indirectly involved for smooth conduction of this study.

Conflict of Interest: There were no conflicts of interest in my study.

Source of Funding: Funding is given by Krishna Institute of Medical Sciences, “ Deemed to be” University, Karad.

Ethical Clearance: The Institutional ethics committee has hereby given permission to initiate the research project titled, “PREVALENCE OF KNEE DYSFUNCTION IN MALLAKHAMB PLAYERS IN KARAD”.

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Bipolar Disorder: A Major Setback in Substance Abuse

Jeetendra Kumar Gupta
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Abstract

Substance abuse refers to harmful or precarious use of psychoactive substances, including alcohol, cannabis and illicit drugs. It is directly and indirectly responsible for millions of morbidities each year. It is a crucial snag of present generation. Illegitimate use of psychoactive drugs can lead to lunatic illnesses. The prevalence of psychotic disorders among patients with substance abuse has attended noticeable magnitude. This study indicates that bipolar disorder is more likely to occur in patients with substance abuse. Chronic substance abuse can lead to down-regulation of concerned receptors as well as erosion of gray matter in the prefrontal cortex of brain. Hence, it would be imperative to address bipolar disorder from the perspective of potential and progressive adverse effect of substance abuse. The observation of study indicates that bipolar disorder is more prevalent in cannabis, alcohol and cocaine abuse cases. Drug abuse disorders are associated with impaired outcome of manic depression maladies that brings severe high or low moods, thinking and behavior.

Key words: Bipolar, Mania, Hypomania, Depression, Substance abuse.

Introduction

Bipolar disorder is a mental condition that causes marked plunging of mood, energy and ability to think clearly. It is a state of mental illness in which mood reversals achieve emotional highs (mania or hypomania) as well as emotional lows (depression) at two distinct periods of time. It is observed that bipolar disorder is partly caused by an underlying complication with discrete brain circuits and the functioning of brain neurotransmitters. According to a scientific study, bipolar disorder is a severe and often chronic psychotic sickness touching almost 2% to 5% of population. It exists in two forms: bipolar I and bipolar II. The difference between these two subtypes lies in the severity of the manic episodes. In bipolar I disorder, the manic episode is full blown, while a person with bipolar II will experience hypomanic episode without any characteristic change in depressive phase. Factors that may influence the risk of developing bipolar disorder for the first episode include – consanguinity, drugs and alcohol abuse tendency and major life changes such as nervous breakdown. These factors may cause certain imbalance in the normal level of dopamine, norepinephrine and serotonin. These neurotransmitters have influential roles on mood swings (figure 1). Among the all factors, drug abuse and alcoholism are wide spread factors especially in adolescents and youth. It has been observed that bipolar disease is more facile in youth as compared to old individuals.

Substance abuse is habitual intake of illegal drug or substance for the purpose of psychostimulation or euphoria. Substance abuse can lead to drug-dependence. The term drug-dependence refers to a state arising from repeated intake of an abusive substance on regular basis. It is capable of altering mood and feelings. The person suffering from drug dependence has either psychological or physical dependence, addictions or habituation in order to acquire euphoria, retraction from reality or for the purpose of social adjustment. Drug addiction is complex condition, a brain disease which is characterized by compulsive substance use despite many

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Bipolar disorder is one of the serious upshots which is frequently observed in substance abuse cases. This article emphasizes on bipolar disorder as a major setback in substance abuse cases.

**Bipolar Disorder and Drug Abuse**

The cases of substance abuse are growing up day by day, especially in younger population due to the lack of knowledge and awareness. Teenagers are more susceptible to this vicious katzenjammer, since they are less cognizant with the pros and cons of those felonious substances. Drug abuse has become a significant public health issue of present time. Prior studies have suggested that psychotic illnesses and cognitive impairments are the most noxious adverse effects of this malign habit. There is an intense relation seen between drug abuse and bipolar disorder. Although it has not been seen that bipolar disorder makes people more likely to abuse drugs, but drugs such as cannabis and alcohol often make the symptoms of bipolar disorder worse. Imbalance of neurotransmission in brain as well as certain genetic complicity can also cause bipolar disorder. Traumatic brain injury is also a risk factor for this illness. People with bipolar disorder perceive drastic shifting of mood between intense emotional highs and depressive phase. There are four major ordeals that a person can experience with substance abuse linked bipolar disorder. Those are manic or hypomanic episodes with depression or mixed episodes. Manic episode is a state of emotion mainly characterized by elevated mood with exaggerated state of well-being. Hypomania is a lenient configuration of mania. Mania or hypomania can occur in bipolar disorder that ranges from depressive lows to manic highs.

Cannabis and cannabis products are highly lipid soluble substances. They contain plethora of chemicals. Tetrahydrocannabinol (THC) is one of them which indirectly triggers dopamine release in brain. Hence, it can affect brain’s reward system also. Similarly, alcoholism and other abusive substance like...
cocaine and amphetamine etc have also intense impact on dopaminergic system\textsuperscript{15}. The fervent reward sensation of drug abuse creates a strong feeling of pleasure. This experience instigates high and more frequent drug intake in order to get more pleasure of the reward response over and over. As a result, craving of the rewards linked with the drug abuse continue to occur, which leads to provocation of repetitive and compulsive use. On the other hand, long-term continued drug abuse results in reduction in the number of dopamine receptors in brain in order to maintain homeostasis for the elevated level of dopamine\textsuperscript{16}. This reduction in dopamine receptors leads to giant impact on addiction. Firstly, due to less dopamine receptors, a state of reduction in pleasure response is created which is known as ‘anhedonia’ and secondly, this depressive feeling of anhedonia drives the user to administer stronger dose of the substance which leads to acute toxicity\textsuperscript{17}. Long term substance abuse has diabolical impact on the user. Chronic use of abusive substance starts to erode gray matter in the prefrontal cortex of the recipient. This erosion in prefrontal cortex leads to organic damage. Drug abuse and addiction causes change in the brain that leads to bipolar disorder\textsuperscript{18}. Even the recipients who were mentally healthy before can develop bipolar disorder due to their substance abuse nature.

**BIPOLAR DISORDER TEST AND SCREENING**

Although there is no any specific blood test or brain scan technique to diagnose bipolar disorder, but certain tests such as thyroid function test and urine examinations can be carried out in order to identify the aggravating factors\textsuperscript{19}. These tests can help in diagnosing the problem if other factors such as drug abuse, habituation or addiction are laissez-faire in the pathogenesis. However, most of the cases of bipolar disorder have a close association with substance abuse (figure 2). Comorbid bipolar disorder with substance abuse is frequently observed and has highest rate of dejections including cardiovascular disorders, respiratory disorders and sleep apnea\textsuperscript{20}. People with substance abuse disorder have highest incidences of mania and hypomania amongst the total patients. The prevalence of substance abuse linked bipolar disorder was observed in the patients of Indian hospitals after scrutinizing the data of 6000 patients (from January to December, 2019), which was further segregated on the basis of radix amongst 243 patients of bipolar disorder. The occurrence of substance induced bipolar was noticed in 102 patients (42%). Amongst these, 56 patients (23%) were suffering from cannabis abuse and addiction, while 43 patients (18%) were observed with chronic alcoholism. There were only three patients who were affected with cocaine linked bipolar disorder. Out of the total cases of manic depression, 76 patients had family history of psychiatric illnesses, while 65 patients had no reason for this malady. Although the consumers of alcohol are very high in the population, but the incidences of substance abused disorders were not seen in those people who were occasional drinker and don’t violate the guidelines of safe drinking.

![Figure 2: Basal demographic and clinical perceptions of bipolar disease](image-url)
Conclusion

Drug abuse has become a significant public health concern of present time. Hassle of bipolar disorder and substance abuse are frequently related. The sufferer of substance abuse, addiction and habituation are more likely to have bipolar disorder. During the screening test, almost 243 patients were assessed and explored for bipolar which were approximately 4% of the entire cohort. It was found that the two subtypes of bipolar disorder have nearby similar prevalence in substance abuse cases. Cannabis linked bipolar disorder was in the largest subgroup, at 23%, followed by chronic alcoholism induced 18% and other drugs induced bipolar disorder at 1%. In chronic substance abused patients, the average age of onset of bipolar disorder was 21.2 years, while 26.5 years of mean age value was seen in those without substance abuse. Influential role of family history was also seen in about 31% of the total patients. The mechanism behind substance abused manic depression lies in the imbalancing of neurotransmitters such as dopamine, norepinephrine and serotonin. Long term continued drug abuse results in reduction of dopamine receptors as well as erosion of gray matter in the prefrontal cortex area of brain. In addition to illicit substances, several ‘over the counter’ drugs as well as prescription medicines have also been involved in the outbreak of bipolar disorder. The cardinal feature of drug or substance induced bipolar disorder is the onset of symptoms in context to abuse, intoxication or withdrawal.

Discussion

The co-occurrence of bipolar disorder is high with substance abuse cases, but the mechanism of pathogenesis has not been explored adequately till date. Evidences suggest that drug addiction has very tenacious consequences and a number of other complications have also been reported in the management and clinical therapeutics. Psychosis is an umbrella term that covers many mental illnesses, in which bipolar psychosis occupies an inclusive spectrum. It is a relapsing mood disorder characterized by mania as well as depression. Delusion may be associated in both depressive and manic phase. In mania, the person may be crabby, overactive or grandiose, while in depression the person may have symptoms like unipolar disorder.

Drug addiction has become a can of worms for youth and teenagers. People with substance abuse have higher percentage of mania and depression than normal population. Reduction in or curtailment of substance abuse sensitization is likely to increase therapeutic benefits in bipolar disorder and other concerned psychotic episodes. Certain environmental factors, such as stress or trauma may cause genetic changes that can propagate down through progeny and may come up with certain psychiatric illnesses or substance use disorder. Bipolar disorder is often labyrinthine by co-occurrence of substance use, and there has been very little studies available particularly targeting the co-morbid population. Thus, an effective as well as substantial focus is required targeting intensive therapeutic interventions so that the rogue ailment could be controlled in due course of time.

Ethical Clearance: This article has been routed through the anti-plagiarism cell of Institutional Review Board.

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References


Tunica Vaginalis Flap Versus Inner Preputial Dartos Flap as Waterproof Layer for Proximal Staged Hypospadias Repair: A Comparative Study

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Abstract

Background: Hypospadias is an abnormality of anterior urethral and penile development in which the urethral opening is ectopically located on the ventral aspect of the penis proximal to the tip of the glans penis, which, in this condition, is splayed open.¹ The urethral opening may be located as far down as in the scrotum or perineum. The penis is more likely to have associated ventral shortening and curvature, called chordee, with more proximal urethral defects.

Aim: To compare the outcome of using tunica vaginalis flap to dartos flap in proximal two stage hypospadias repair in reducing post-operative complication (dehiscence and fistula).

Materials and Methods: In the defined period of January 2015 to June 2018, 47 male patients with clinical diagnosis of penoscrotal hypospadias, The age of the patients range from 2 years to 10 years, All these cases were managed in 2 stages repair with buccal mucosal graft, with either tunica vaginalis flap (group A) (25 cases) , or preputial dartos flap (group B)(22 cases) as a second cover over new tubularized urethra. We compared between these two groups regarding complications rate.

Result: we observed that tunica vaginalis flap was better than dartos flap (although it was statistically non-significant p value 0.214 > 0.05) specifically in fistula formation.

Conclusion: we observed that tunica vaginalis flap had excellent outcome when used as a second layer over the neourethral suture line in term of decrease the fistula rate and wound dehiscence because of its good vascular features.

Keywords: Comparative study, preputial dartos flap, waterproof layer

Introduction

The word “hypospadias” is derived from the Greek words hypo, which means below, and spadon, which means rent or hole. Hypospadias is the most common congenital anomaly of the penis.¹ A spectrum of abnormalities, including ventral curvature of the penis (chordee), a hooded incomplete prepuce, and an abortive corpus spongiosum, are commonly associated with hypospadias. Surgery is indicated where deformity is severe, interferes with voiding, or is predicted to interfere with sexual function. [2,3] More than 150 methods of corrective surgery for hypospadias have been described. Currently, many urologists perform one-stage repairs with foreskin island flaps and incised urethral plate. It now appears that buccal mucosa grafts are more advantageous than others and should be considered the primary grafting technique when indicated. [4]

So we need five basic steps for successful; orthoplasty, urethroplasty, meatoplasty and glanuloplasty,scrotoplasty, and skin coverage. [4]

Diagnosis includes clinical description of the local findings; position; shape and width of the orifice,presence for the atretic urethra and division of corpus Spongiosum,appearance of preputial hood and scrotum, with determination size of the penis, and curvature of penis on erection. diagnostic evaluation also includes an
assessment for the associated anomalies, such as undescended testis and inguinal hernia.

The using of protective intermediate layer is still evolving, Durham Smith (1973) de-epithelialization, Snow (1986) described the use of Tunica vaginalis wrap, Retik (1988) was the first to use dorsal subcutaneous flap from the prepuce, Motiwala (1993) described the use of Dartos flap from the scrotum, and Yamataka (1998) reported the use of external spermatic fascia flap.

Aim of this Study

To compare the outcome of using tunica vaginalis flap to dartos flap in proximal two stage hypospadias repair in reducing post-operative complication (dehiscence and fistula).

Patients and Methods

In the defined period of January 2015 to June 2018 a total of 47 male patients of proximal hypospadias were operated on in ghazi alhariri surgical specialties, medical city hospital, Baghdad.

The age of the patients range from 2 years to 10 years. All these cases were planned to be managed in 2 stages repair with buccal mucosal graft, with either using preputial dartos flap or tunica vaginalis flap as a second cover over new tubularized urethra.

All patients and their family were given special formula included written informed consent for participation. The demographic data of all cases were recorded. Antenatal, postnatal and family history were taken. Local and general examination were done in all patients including examination of scrotum to exclude undescended testis. Penile anthropometry was documented in case sheet. Routine investigations were performed (CBC, RFT, virology, CXR) in addition to renal ultrasound, and karyotyping to exclude intersex, operative details (anesthesia check list, notes of the surgeon, time of surgery, any complications), early postoperative examination (wound infection, seroma formation, hematoma formation, penile skin necrosis, wound dehiscence) and follow up data at 1,3,6,12 months (fistula, meatal stenosis, urethral stricture or diverticulum, testicular ascent or atrophy, penile torque). All patients were kept fasting for 6 hours before surgery.

Inclusion criteria was penoscrotal hypospadias with good graft intake and successful chordoplasty. While exclusion criteria were previous circumcised patient, poor taking or retracted graft, unsuccessful chordoplasty, and bilateral orchiopexy.

In the 2nd stage which was usually happened 6-9 months from the 1st stage, after tubularization of new urethra, we divided the patients into two groups: Group A (25 cases) those who underwent tunica vaginalis flap as a second waterproof layer, and Group B (22 cases) for whom we used preputial dartos flap as a second waterproof layer.

Figure1: (A) dissection of testis and spermatic cord and mobilization to surgical field, (B) harvesting TVF, (C) fixation of TVF over neourethra, (D) penile skin closure.

Silicone catheter or stent were removed on average 7 days post operatively then we followed the patients sequentially for up to 6 months, Outcome was assessed at Day 7 after removal of the stent and at first follow up visit.

During follow up visit, we concentrated on any urine leak from the wound and examined the wound to ensure good healing. The maximum follow-up is up to 2 years for earlier operated patients.

Statistical Analyses

Statistical analyses were performed using SPSS statistical package for Social Sciences (version 20.0 for windows, SPSS, Chicago, IL, USA). Data are presented as mean ± SD, and number and percentage for qualitative
variables. Qualitative relations were evaluated using Chi-square test. P value of <0.05 was considered statistically significant.

**Results**

![Figure 2: the mean operative time in both groups](image)

**Table 1: the percentage of each complication in both group.**

<table>
<thead>
<tr>
<th>Complication</th>
<th>Tunica vaginalis flap (group A) (No.)(%)</th>
<th>Preputial dartos flap (group B) (no.)(%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scrotal swelling</td>
<td>1 (4%)</td>
<td>0 (0%)</td>
<td>0.343 NS</td>
</tr>
<tr>
<td>Superficial wound infection</td>
<td>1 (4%)</td>
<td>1 (4.5%)</td>
<td>0.926 NS</td>
</tr>
<tr>
<td>Deep wound infection</td>
<td>0 (0%)</td>
<td>2 (9%)</td>
<td>0.214 NS</td>
</tr>
<tr>
<td>Wound dehiscence</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td></td>
</tr>
<tr>
<td>Urethrocutaneous fistula</td>
<td>0 (0%)</td>
<td>2(9%)</td>
<td>0.214 NS</td>
</tr>
<tr>
<td>Meatal stenosis</td>
<td>0 (0%)</td>
<td>1 (4.5%)</td>
<td>0.926 NS</td>
</tr>
<tr>
<td>Penoscrotal tethering</td>
<td>1 (4%)</td>
<td>0 (0%)</td>
<td>0.343 NS</td>
</tr>
<tr>
<td>Testicular ascent</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>equal</td>
</tr>
<tr>
<td>Preputual skin necrosis</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>equal</td>
</tr>
<tr>
<td>Urethral diverticulum</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>equal</td>
</tr>
</tbody>
</table>
Discussion

The hypospadias surgery is permanently developing. Actually, the hypospadias field need good imagination, excessive delicateness.

In the present study, we enrolled 47 patients with mean age of 4.9 years most of them from 2-4 years, then we divided them in two 2 groups ; group (A )for whom we applied tunica vaginalis flap as a second waterproof layer and group (B) for whom we used preputial dartos flap as a second water proof layer . Regarding to the age and the number of the patients, our study was comparable to the jiwan et al. [5] Usually we deal with penoscrotal hypospadias as two stages procedure, which was well accepted in many literatures. [6,7,8] in the 1st stage our target to straight the penis by complete degloving with or without dorsal plication ( in our study 5/47 (10.63%) needed dorsal plication which is comparable to Castagnetti and co-worker study (5%), [9] as well as to Yogender and his co-worker study.[10] In our study we achieved 100% success result of graft intake, these results are similar to johal et al. [11] and Faure et al. [12] Snow et al [13]. in 1995, were the first to announce the use of tunica vaginalis flap, the fistula rate reported was 9%. In his recent experience, Snodgrass in his new series reduced the fistula rate to 0% with the use of tunica vaginalis flap. [14] we recorded rate of fistula (0%) in TVF group which is better than Yogender et al[10] who reported (9%) fistula rate and also better than Shankar et al.[15] and Handoo et al.[16] Both report same fistula rate of (11%),but its comparable to Chatterjee et al.,[17] who recorded (0%) fistula rate.

we recorded no testicular ascent, wound dehiscence or testicular abscess (0%) which were comparable to Yogender et al [10],in the tunica vaginalis flap group patients, no body develop meatal stenosis (0%) which is better than Kamyar et al.[18] who reported (14%) meatal stenosis. In TVF group scrotal swelling developed in one case (4%) which resolved spontaneously after one week and its less or comparable to Yogender et al[10] who reported (4%) scrotal hematoma ,by the way he put scrotal drain in all his patients ,unlike in our study the scrotal drain used only in one case. In group (A) one case developed acquired chordee which is by examination felt as a cord like structure at the penoscrotal junction which tethered the proximal penis causing (penile torque) (4%), it’s also recognized in many studies like Palabras et al.[19] which need reoperation for release of this tethered tissue.in group B, we used preputial dartos flap. This flap need meticulous separation of dartos from the skin and underlying bucks fascia with support of loupe magnification with avoidance of excessive cauterization to preserve minute blood supply in this
flap. Out of the 22 cases, 2 cases developed primary urethrocutaneous fistula which represented (9%) of total cases, this results was much less than most of the results of other similar studies about penoscrotal hypospadias repair like that which was done by Basavaraju et al (22%) [20], in Chatterjee et al. [17], (12%) in Dhua et al [20] while (66.67%) in Jiwan et al. [5] this high worldwide rate of fistula in dartos flap is due to Structural amendments of the hypospadiac patients. The prepuce is insufficient in most proximal hypospadias cases to provide enough waterproof layer added that Çağrı Savaş et al. [21] Examined microvascular intensity of prepuce in hypospadias cases and found it to be greatly less. Soyer et al [22] established that there is decrease in the level of vascular endothelial growth factor in prepuce of hypospadiac patients and this subsequently cause impairment in the wound healing and recurrent complications after reconstruction. Also Pichler et al. [23] did a quantitative measurements of androgen receptors in prepuce of hypospadias and found androgen receptors mRNA (P = 0.013), and androgen receptors protein (P = 0.014) was significantly elevated. All these evidence suggested that dartos flaps of prepuce might not be the perfect tissue due to vascular, neural, and immunological alterations. 1 out of 22 of dartos group developed meatal stenosis (4.5%). This was possibly due to relatively loss of favourable anatomical feature of glans and urethral plate, which may resulted in a relatively tight closure of the glans over the dartos flap. Jiwan et al [5] reported (16.6%) meatal stenosis in proximal hypospadias repair with dartos flap in both groups we didn’t report skin necrosis (0%), urethral diverticulum (0%) or wound dehiscence (0%), this result was better than Jiwan et al [5] who reported (30%) skin necrosis in dartos group and (0%) in tunica vaginalis flap group. In addition, he recorded (16%) urethral diverticulum in both groups, wound dehiscence (7%) in dartos group and (3%) in tunica vaginalis flap group. Although both tunica vaginal flap and dartos flap had excellent outcome and our results were in favor of in comparison with counterpart recent studies and we observed that tunica vaginalis flap was better than dartos flap.

**Recommendation**

Apply the procedure on larger patients groups. we need longer follow up time for urinary and sexual issues we recommend use the tunica vaginalis flap as a second layer in all cases of proximal hypospadias and in different age groups.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the ghazi alhariri surgical specialties, medical city hospital, Baghdad and all experiments were carried out in accordance with approved guidelines.

**References**


Association of HLA-DRB1 Gene Polymorphism in Rheumatoid Arthritis Patients in Babylon Province, Iraq

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Abstract

Background: The heritability of rheumatoid arthritis (RA) is approximately 40% to 65% for seropositive RA and 20% for seronegative RA. The risk of developing RA has been associated with human leukocyte antigen HLA-DRB1 alleles: HLA-DRB1*04, HLA-DRB1*01, and HLA-DRB1*010 in deferent ethnocentrism. These HLA-DRB1 alleles contain a stretch of conserved five amino acid sequence, the shared epitope (SE), in the third hypervariable region of their DRB1 chain, which has been associated with the risk of developing RA.

Aim of the study: to study the possible association of HLA-DRB1 gene polymorphism of Arabic ethnocentrism PA patients in Babylon Province, Iraq.

Patients and methods: The present case control study was conducted on sixty one patients (18 males and 43 females) of Arabic ethnocentrism RA patients admitted to Rheumatoid Unit in Merjan Teaching Medical City, Babylon Province, Iraq, as well as 127 apparently healthy control subjects (41 males, 86 females) as control group.

Results: The risk of HLA-DRB1*01 allele was assessed through calculation of odds ratio (OR) which was estimated to be 1.95 (95 % confidence interval of 1.03 to 3.70). The risk of HLA-DRB1*04 allele was assessed through calculation of odds ratio (OR) which was estimated to be 4.46 (95 % confidence interval of 2.32 to 8.55). The risk of HLA-DRB1*010 allele was assessed through calculation of odds ratio (OR) which was estimated to be 3.12 (95 % confidence interval of 1.39 -7.00).

Conclusion: The current study documented that RA is significantly associated with the locus HLA-DRB1* and allelic groups HLA-DRB1*01, HLA-DRB1*04 and HLA-DRB1*010 in Iraqi patients with RA.

Key words: HLA-DRB1 Gene Polymorphism, Rheumatoid Arthritis, Babylon

Introduction

Rheumatoid arthritis (RA) is a systemic autoimmune disease characterized by inflammatory arthritis and extra-articular involvement. RA with symptom duration of fewer than six months is defined as early, and when the symptoms have been present for more than six months, it is defined as established ¹⁻³. Twin studies have shown a concordance rate of 15% to 30% among monozygotic twins and 5% among dizygotic twins. The heritability of rheumatoid arthritis is approximately 40% to 65% for seropositive rheumatoid arthritis and 20% for seronegative rheumatoid arthritis. The risk of developing rheumatoid arthritis has been associated with HLA-DRB1 alleles: HLA-DRB1*04, HLA-DRB1*01, and HLA-DRB1*010. These HLA-DRB1 alleles contain a stretch of conserved five amino acid sequence, the shared epitope (SE), in the third hypervariable region of their DRB1 chain, which has been associated with the risk of developing RA ⁴⁻⁶.

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In several twin studies, the heritability of RA was estimated to be approximately 60%, pointing towards a substantial influence of genetic risk factors on the development of RA disease \(^7\). Recent genome-wide association studies (GWAS) have identified 101 single nucleotide polymorphism (SNPs) in total, showing the highest contribution of the \(HLA-DRB1\) gene to the development of RA \(^8^{-11}\). \(HLA-DRB1\)-encoded proteins are components of human leukocyte antigen-DR (HLA-DR) molecules and together with HLA-DQ and HLA-DP, they represent the major determinants in the induction of adaptive immune responses. They are expressed, amongst others, by antigen-presenting cells (APCs) and are able to present peptides to CD4\(^+\) T cells. In the 1970s, HLA-Dw4 was shown to be present in the majority of the RA patients which was confirmed by serological HLA-typing identifying HLA-DR4 and HLA-DR1 in association with RA \(^12\). Nowadays, the list of HLA alleles conferring increased risk for RA development is largely known albeit with altered nomenclature. The predisposing HLA-DR alleles were found to have a particular sequence in common, located in the beta chain (HLA-DRB1) at positions 70–74 \(^12\). This has later become known as the shared epitope sequence and as such, the HLA-DR alleles carrying this particular sequence were designated as ‘Shared Epitope alleles’ (SE-alleles). In 2005, it was discovered that the genetic contribution of the HLA locus did not apply to RA as such, but rather to ACPA-positive RA only \(^13\). These data are important as they indicate that ACPA-positive and ACPA-negative RA represent different disease entities with a different underlying pathophysiology. More recently, positions 11 and 13, which are also part of the peptide-binding groove, have been implicated in the association between HLA and RA \(^14\). However, as these positions are the most polymorphic in the HLA-region, these two positions most likely represent the best proxy for the predisposing HLA molecules explaining their association with RA in statistical terms. Because of significant controversy about HLA DRB1 gene polymorphism in association with RA and due to the rarity of Iraqi studies on people living in Babylon province with this regard, the current study was justified and conducted.

### Patients and Method

The present case control study was conducted in Department of Biochemistry, College of Medicine, University of Babylon, and Rheumatoid Unit, Merjan Teaching Medical City, Hilla City, Babylon Province, Iraq. The duration of current study was extended from September 2018 to July 2019. Sample size was determined according to sample size equation. Sixty one patients (18 male and 43 female) with RA clinically diagnosed by specialist physician attended to out clinic of Merjan Teaching Medical City, Hilla City with mean age of (47.43 ±11.34 years), as well as 127 apparently healthy control subjects (41 males, 86 females) with mean age of (48.94 ±12.36 years). Disease severity score of RA patients was determined by use DAS-28. DNA was isolated from white blood cells (WBCs) and (HLAD-RB1) gene promoter polymorphism was determined by Polymerase chain reaction with sequence-specific primers (PCR-SSP).

### Results

The genetic study in the current study involved the assessment of the frequency of HLA-DRB1 allelic frequency in patients with RA and contrasting the results to that of comparable healthy subjects serving as control group. These HLAD-RB1 alleles included HLAD-RB1*01, HLAD-RB1*04 and HLAD-RB1*10. HLAD-RB1*01 allele was identified in 26 (42.6 %) patients and in 35 (27.6 %) control subjects; the difference was statistically significant (\(P = 0.039\)); the allele frequency being higher in patients group. The risk of HLA-DRB1*01 allele was assessed through calculation of odds ratio (OR) which was estimated to be 1.95 (95 % confidence interval of 1.03 to 3.70). This indicates that persons with HLA-DRB1*01 allele are at approximately 2 times the chance to have RA that persons lacking this allele. The etiologic fraction (EF) of HLA-DRB1*01 allele in association with RA was 0.21, as shown in Table 1.

<table>
<thead>
<tr>
<th>HLA-RB1*01</th>
<th>Rheumatoid arthritis n = 61</th>
<th>Control n = 127</th>
<th>P ¥</th>
<th>OR</th>
<th>95 % CI</th>
<th>EF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>26 (42.6 %)</td>
<td>35 (27.6 %)</td>
<td>0.039</td>
<td>1.95</td>
<td>1.03 - 3.70</td>
<td>0.21</td>
</tr>
<tr>
<td>Negative</td>
<td>35 (57.4%)</td>
<td>92 (72.4 %)</td>
<td>S</td>
<td>1.03</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(n\): number of cases; ¥: chi-square test; OR: odds ratio, CI: confidence interval, EF: etiologic fraction; S: significant at \(P > 0.05\)
HLA-DRB1*04 allele was identified in 36 (59.0 %) patients and in 31 (24.4 %) control subjects; the difference was statistically highly significant ($P < 0.001$); the allele frequency being higher in patients group. The risk of HLA-DRB1*04 allele was assessed through calculation of odds ratio (OR) which was estimated to be 4.46 (95 % confidence interval of 2.32 to 8.55). This indicates that persons with HLA-DRB1*04 allele are at approximately 4.5 times the chance to have rheumatoid arthritis that persons lacking this allele. The etiologic fraction (EF) of HLA-DRB1*04 allele in association with rheumatoid arthritis was 0.42, as shown in Table 2.

Table 2: HLA-DRB1*04 allele frequency in patients and control groups

<table>
<thead>
<tr>
<th>HLA-DRB1*04</th>
<th>Rheumatoid arthritis n = 61</th>
<th>Control n = 127</th>
<th>P ¥</th>
<th>OR</th>
<th>95 % CI</th>
<th>EF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>36 (59.0 %)</td>
<td>31 (24.4 %)</td>
<td>&lt; 0.001 $\chi^2$</td>
<td>4.46</td>
<td>2.32 - 8.55</td>
<td>0.42</td>
</tr>
<tr>
<td>Negative</td>
<td>25 (41.0 %)</td>
<td>95 (74.8 %)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$n$: number of cases; $¥$: chi-square test; OR: odds ratio, CI: confidence interval, EF: etiologic fraction; S: significant at $P > 0.05$

HLA-DRB1*010 allele was identified in 16 (26.2 %) patients and in 13 (10.2 %) control subjects; the difference was statistically highly significant ($P = 0.004$); the allele frequency being higher in patients group. The risk of HLA-DRB1*010 allele was assessed through calculation of odds ratio (OR) which was estimated to be 3.12 (95 % confidence interval of 1.39 - 7.00). This indicates that persons with HLA-DRB1*010 allele are at approximately 4.5 times the chance to have rheumatoid arthritis that persons lacking this allele. The etiologic fraction (EF) of HLA-DRB1*010 allele in association with rheumatoid arthritis was 0.37, as shown in Table 3.

Table 3: HLA-DRB1*010 allele frequency in patients and control groups

<table>
<thead>
<tr>
<th>HLA-DRB1*010</th>
<th>Rheumatoid arthritis n = 61</th>
<th>Control n = 127</th>
<th>P ¥</th>
<th>OR</th>
<th>95 % CI</th>
<th>EF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>16 (26.2 %)</td>
<td>13 (10.2 %)</td>
<td>0.004 $\chi^2$</td>
<td>3.12</td>
<td>1.39 - 7.00</td>
<td>0.37</td>
</tr>
<tr>
<td>Negative</td>
<td>45 (73.8 %)</td>
<td>114 (89.8 %)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$n$: number of cases; $¥$: chi-square test; OR: odds ratio, CI: confidence interval, EF: etiologic fraction; S: significant at $P > 0.05$
Correlation of HLA-DRB1*01, HLA-DRB1*04 and HLA-DRB1*010 to disease characteristics in patients with rheumatoid arthritis were shown in Table 4. HLA-DRB1*01 was positively correlated to disease activity ($r = 0.016$); however, the correlation was insignificant ($P = 0.902$), Table 4. HLA-DRB1*01 was negatively correlated to ACCP ($r = -0.118$); however, the correlation was insignificant ($P = 0.365$), Table 3.16. HLA-DRB1*01 was positively correlated to RF ($r = 0.531$); and the correlation was highly significant ($P < 0.001$), Table 4.

HLA-DRB1*04 was negatively correlated to disease activity ($r = -0.098$); however, the correlation was insignificant ($P = 0.452$), Table 4. HLA-DRB1*04 was negatively correlated to ACCP ($r = -0.054$); however, the correlation was insignificant ($P = 0.681$), Table 4. HLA-DRB1*04 was positively correlated to RF ($r = 0.392$), Table 4.

HLA-DRB1*010 was positively correlated to disease activity ($r = 0.134$); however, the correlation was statistically insignificant ($P < 0.001$); the allele frequency being higher in patients group. The risk of HLA-DRB1*01 allele was assessed through calculation of odds ratio (OR) which was estimated to be 1.95 (95 % confidence interval of 1.03 to 3.70). This indicates that persons with HLA-DRB1*01 allele are at approximately 2 times the chance to have rheumatoid arthritis that persons lacking this allele. The etiologic fraction (EF) of HLA-DRB1*01 allele in association with rheumatoid arthritis was 0.21.

Table 4: Correlation of HLA-DRB1*01, HLA-DRB1*04 and HLA-DRB1*010 to disease characteristics in patients with rheumatoid arthritis

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>HLA-DRB1*01</th>
<th>HLA-DRB1*04</th>
<th>HLA-DRB1*010</th>
</tr>
</thead>
<tbody>
<tr>
<td>$r$</td>
<td>$P$</td>
<td>$r$</td>
<td>$P$</td>
</tr>
<tr>
<td>DAS-28</td>
<td>0.016</td>
<td>0.902</td>
<td>-0.098</td>
</tr>
<tr>
<td>ACCP</td>
<td>-0.118</td>
<td>0.365</td>
<td>-0.189</td>
</tr>
<tr>
<td>RF</td>
<td>0.531</td>
<td>&lt;0.001 **</td>
<td>0.112</td>
</tr>
</tbody>
</table>

$r$: Spearman correlation coefficient; DAS: disease activity score; MDA: malondialdehyde; ACCP: anti-cyclic citrullinated antibody; RF: rheumatoid factor; **: highly significant at $P \leq 0.01$

Discussion

In the current study, HLA-DRB1*01 allele was identified in 26 (42.6 %) patients and in 35 (27.6 %) control subjects; the difference was statistically significant ($P = 0.039$); the allele frequency being higher in patients group. The risk of HLA-DRB1*01 allele was assessed through calculation of odds ratio (OR) which was estimated to be 1.95 (95 % confidence interval of 1.03 to 3.70). This indicates that persons with HLA-DRB1*01 allele are at approximately 2 times the chance to have rheumatoid arthritis that persons lacking this allele. The etiologic fraction (EF) of HLA-DRB1*01 allele in association with rheumatoid arthritis was 0.21. In the current study also, HLA-DRB1*04 allele was identified in 36 (59.0 %) patients and in 31 (24.4 %) control subjects; the difference was statistically highly significant ($P < 0.001$); the allele frequency being higher in patients group. The risk of HLA-DRB1*04 allele was assessed through calculation of odds ratio (OR) which was estimated to be 4.46 (95 % confidence interval of 2.32 to 8.55). This indicates that persons with HLA-DRB1*04 allele are at approximately 4.5 times the chance to have rheumatoid arthritis that persons lacking this allele. The etiologic fraction (EF) of HLA-DRB1*04 allele in association with rheumatoid arthritis was 0.42. An association between RA and HLA-DRB1–shared
epitope (SE), including DRB1*04 and DRB1*01 alleles, has been reported. HLA molecules with specific shared epitopes (SEs) are considered to constitute about 30% to 40% of the genetic risk for RA. However, a positive trend was observed with this allele in RA subjects compared to the control group, implying that a survey on DRB1*04 in larger-population samples of both RA patients and healthy people can assist in arriving at a more reliable conclusion on this commonly noticed allele. Further, analysis of the sub-alleles of DRB1*04 can shed more light on the role of this allele with regard to RA association. In addition to a positive association between RA and the presence of HLA-DRB*01 (OR=3.5) and HLA-DRB1*04 (OR=4.0), there was also a positive association between RA and HLA-DRB1*10 (OR=4.4). In our patients, we have established the absence of the DRB1*10 allele group. In the population of Finland, the association between RA and presence of HLA-DRB1*04 was confirmed. Similar results for DRB1*04 were found in studies conducted in Slovakia and Hungary. Research on the distribution of HLA-DRB1 locus conducted in Turkey showed that HLA-DRB1*04 is present in high frequency (46.2%) in RA patients, in comparison to healthy subjects (20.9%); OR=3.24. Analysis of the population from the area of northern Italy showed a weaker correlation between RA and HLA-DRB1*04 and an increased frequency of HLA-DRB1*01 in RA patients (24%), and in the control group, respectively (16%), accompanied by a relative risk of 1.5.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Medicine, University of Babylon and all experiments were carried out in accordance with approved guidelines.

References

14. Raychaudhuri S. Five amino acids in three HLA proteins explain most of the association between


Parents’ Perception of Rehabilitation Services for their Children with Special Healthcare Needs in Helena Center in Erbil City

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Abstract

Objective: First, to determine the socio-demographic characteristics; second, to identify parents’ perception of rehabilitation services; and third, to find out the relationship between socio-demographic characteristics and parents’ perception of rehabilitation services.

Methods: A descriptive cross sectional study was carried out. The data were collected from May 2019 to September 2019. A non-probability convenience sampling was used, and sample size of 335 parents who attending to Helena center for rehabilitation and operation children with special needs in Erbil city was calculated.

Results: The majority (around 80% or more) of the parents had positive attitudes toward the rehabilitation services provided in the center.

Conclusion: Parents of children with special health care needs in Helena Center perceived services provided to their children as family-centered.

Keywords: Rehabilitation, Children, Special Healthcare

Introduction

The Maternal Child Health Bureau (MCHB) defines children with special health care needs (CSHCN) as “those who have or are at risk for a chronic physical, developmental, behavioral, or emotional condition and who also require health and related services of a type or amount beyond what is required by children generally”¹. Rehabilitation defined as “a set of measures that assist individuals who experience, or are likely to experience, disability to achieve and maintain optimal functioning in interaction with their environments”. The goal of rehabilitation is improvements in individual performance - for example, by improving the ability of a person’s to eat and drink independently. Rehabilitation therapy means improving performance by diagnosing and treating health conditions, reducing disabilities, and preventing complications ². The main focus of Tertiary prevention in health care is to limit or reduce the consequences an existing health condition, by rehabilitation services and interventions that aim to prevent activity limitations and to promote independence ³. Remedy is involved with restoring and compensating for the lack of functioning, and preventing or slowing deterioration in functioning in each area of a person’s existence. Therapists and rehabilitation workers encompass occupational therapists, orthotists, physiotherapists, prosthetists, psychologists, rehabilitation and technical assistants, social employees, and speech and language therapists. Therapy measures include exercises, and compensatory techniques, education, assist and counseling, changes to the environment, provision of resources and assistive technology. There are three main types of rehabilitation therapy are occupational, physical and speech. Each type of rehabilitation serves a unique purpose in helping the person to reach full recovery, but all have one goal is to help the patient to return to a healthy and active lifestyle ⁴. Family-centered care is the preferred service delivery model in pediatric physical therapy. Family-centered care approaches affirm the importance of parent involvement in their child’s health and rehabilitation
services. This service submission model promotes parent-provider partnerships to facilitate communication, care coordination, and access to services. The origin of the word “therapy” is the Hebrew word refua (healing) (Origin of English word therapy, 2015). Rehabilitation therapy, a main ingredient of the Physical Medicine and Rehabilitation curing process, has an extended history. Millenary of years ago the old Chinese utilize Cong Fu, a motion therapy, to reduce pain; the Greek physician Herodicus defined an particular system of gymnastic practice for the preventing and treatment of illness in the 5th century BCE, and the Roman physician Galen described interference to rehabilitate martial injuries in the 2nd century CE. through the midst ages, the philosopher-physician Maimonides confirmed Talmudic rules of sanitary exercising habits, in addition regimen, as preventive medication in Medical proverbs, posted between 1187-1190; and in 1569 the philologist-physician Mercurialis promoted gymnastics as each a preventive and a rehabilitative mode within the art of Gymnastics. In the eighteenth century, Niels Stenson discovered the biomechanics of human movement and Joseph Clement Tissot’s 1780 Medical and Surgical Gymnastics advanced the worth of movement as an alternate to bed rest for patients recuperating from operation, going through neurological situations, and recovering after strokes. In the 19th century, the idea of neuromuscular re-schooling was suggested by means of Fulgence Raymond (1844-1910).

Methods

Design of the study

A descriptive cross sectional study was carried out to identify parents’ perception of rehabilitation services for their Children with special healthcare needs in Helena center in Erbil city.

Setting of the study

The study was carried out in Helena center for rehabilitation and operation children with special needs in Erbil city which was established since 1992.

Time of the study

The study was conducted during the period March 2019 to the November 2019. The data were collected from May 2019 to August 2019.

Sample of the study

The sample size was calculated using Epi Info-7 computer program issue. These criteria were used for sample size calculation: Population 2613, significant level 95%, prevalence of perception and satisfaction 50%, absolute precision 5%. Accordingly the sample was 335 parents who attending to Helena center for rehabilitation and operation children with special needs in Erbil city. The study sample was chosen by non-probability convenience sampling.

Inclusion Criteria

1- Parents who agree to be involved in the study.
2- Both genders (male and female).

Exclusion Criteria

1- Parents who refused participation in the study.

The Study Instrument

In order to collect the proper information of study, a questionnaire was designed and modified depending on extensive review of relevant literature.

Rating Scales and Scores

In order to measure the previous items accurately and statistically in part two and three, each item has been scaled by five levels of Likert scales and scored respectively as follow:

The scale is out of 100 (20 questions X 5 scores = 100). So 1 = 20, 2 = 40, 3 = 60, 4 = 80, and 5 = 100, so the category of 1 and 2 (never and rarely less than 60), sometimes (60-79), and often or always => 80

Data collection method

The data collection process has been carried out from May 2019 to August 2019. An interview technique was used, it took about 25-30 minutes for each parents. All participants were informed that the information will be kept confidential and used just for a scientific purpose.

Results

It is evident in Table 1 that the majority (around 80% or more) of the parents had positive attitudes toward the rehabilitation services provided in the center. They felt that the health care providers cooperate with the parents and pay great attention to the children without discrimination between a child and another. They answer the questions of the parents and teach them what to do at home. The only weaknesses were unavailability
of health education booklets or videos, and the other thing is that the health care providers didn’t provide advice on how to contact other parents.

Table 1. Parents’ perception of rehabilitation services

<table>
<thead>
<tr>
<th>Q</th>
<th>Never</th>
<th>(%)</th>
<th>Rarely</th>
<th>(%)</th>
<th>Sometimes</th>
<th>(%)</th>
<th>Often</th>
<th>(%)</th>
<th>Always</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1</td>
<td>0</td>
<td>(0.0)</td>
<td>3</td>
<td>(0.9)</td>
<td>14</td>
<td>(4.2)</td>
<td>318</td>
<td>(94.9)</td>
<td>0</td>
<td>(0.0)</td>
</tr>
<tr>
<td>Q2</td>
<td>0</td>
<td>(0.0)</td>
<td>14</td>
<td>(4.2)</td>
<td>15</td>
<td>(4.5)</td>
<td>289</td>
<td>(86.3)</td>
<td>17</td>
<td>(5.1)</td>
</tr>
<tr>
<td>Q3</td>
<td>0</td>
<td>(0.0)</td>
<td>3</td>
<td>(0.9)</td>
<td>26</td>
<td>(7.8)</td>
<td>269</td>
<td>(80.3)</td>
<td>37</td>
<td>(11.0)</td>
</tr>
<tr>
<td>Q4</td>
<td>0</td>
<td>(0.0)</td>
<td>28</td>
<td>(8.4)</td>
<td>7</td>
<td>(2.1)</td>
<td>261</td>
<td>(77.9)</td>
<td>39</td>
<td>(11.6)</td>
</tr>
<tr>
<td>Q5</td>
<td>0</td>
<td>(0.0)</td>
<td>4</td>
<td>(1.2)</td>
<td>33</td>
<td>(9.9)</td>
<td>298</td>
<td>(89.0)</td>
<td>0</td>
<td>(0.0)</td>
</tr>
<tr>
<td>Q6</td>
<td>185</td>
<td>(55.2)</td>
<td>107</td>
<td>(31.9)</td>
<td>43</td>
<td>(12.8)</td>
<td>0</td>
<td>(0.0)</td>
<td>0</td>
<td>(0.0)</td>
</tr>
<tr>
<td>Q7</td>
<td>0</td>
<td>(0.0)</td>
<td>14</td>
<td>(4.2)</td>
<td>53</td>
<td>(15.8)</td>
<td>267</td>
<td>(79.7)</td>
<td>1</td>
<td>(0.3)</td>
</tr>
<tr>
<td>Q8</td>
<td>0</td>
<td>(0.0)</td>
<td>1</td>
<td>(0.3)</td>
<td>65</td>
<td>(19.4)</td>
<td>269</td>
<td>(80.3)</td>
<td>0</td>
<td>(0.0)</td>
</tr>
<tr>
<td>Q9</td>
<td>0</td>
<td>(0.0)</td>
<td>14</td>
<td>(4.2)</td>
<td>39</td>
<td>(11.6)</td>
<td>264</td>
<td>(78.8)</td>
<td>18</td>
<td>(5.4)</td>
</tr>
<tr>
<td>Q10</td>
<td>0</td>
<td>(0.0)</td>
<td>13</td>
<td>(3.9)</td>
<td>40</td>
<td>(11.9)</td>
<td>244</td>
<td>(72.8)</td>
<td>38</td>
<td>(11.3)</td>
</tr>
<tr>
<td>Q11</td>
<td>0</td>
<td>(0.0)</td>
<td>12</td>
<td>(3.6)</td>
<td>48</td>
<td>(14.3)</td>
<td>213</td>
<td>(63.6)</td>
<td>62</td>
<td>(18.5)</td>
</tr>
<tr>
<td>Q12</td>
<td>0</td>
<td>(0.0)</td>
<td>4</td>
<td>(1.2)</td>
<td>45</td>
<td>(13.4)</td>
<td>249</td>
<td>(74.3)</td>
<td>37</td>
<td>(11.0)</td>
</tr>
<tr>
<td>Q13</td>
<td>0</td>
<td>(0.0)</td>
<td>4</td>
<td>(1.2)</td>
<td>45</td>
<td>(13.4)</td>
<td>250</td>
<td>(74.6)</td>
<td>36</td>
<td>(10.7)</td>
</tr>
<tr>
<td>Q14</td>
<td>0</td>
<td>(0.0)</td>
<td>3</td>
<td>(0.9)</td>
<td>45</td>
<td>(13.4)</td>
<td>220</td>
<td>(65.7)</td>
<td>67</td>
<td>(20.0)</td>
</tr>
<tr>
<td>Q15</td>
<td>0</td>
<td>(0.0)</td>
<td>11</td>
<td>(3.3)</td>
<td>20</td>
<td>(6.0)</td>
<td>299</td>
<td>(89.3)</td>
<td>5</td>
<td>(1.5)</td>
</tr>
<tr>
<td>Q16</td>
<td>10</td>
<td>(3.0)</td>
<td>0</td>
<td>(0.0)</td>
<td>57</td>
<td>(17.0)</td>
<td>230</td>
<td>(68.7)</td>
<td>38</td>
<td>(11.3)</td>
</tr>
<tr>
<td>Q17</td>
<td>0</td>
<td>(0.0)</td>
<td>11</td>
<td>(3.3)</td>
<td>19</td>
<td>(5.7)</td>
<td>228</td>
<td>(68.1)</td>
<td>77</td>
<td>(23.0)</td>
</tr>
<tr>
<td>Q18</td>
<td>0</td>
<td>(0.0)</td>
<td>13</td>
<td>(3.9)</td>
<td>35</td>
<td>(10.4)</td>
<td>287</td>
<td>(85.7)</td>
<td>0</td>
<td>(0.0)</td>
</tr>
<tr>
<td>Q19</td>
<td>325</td>
<td>(97.0)</td>
<td>10</td>
<td>(3.0)</td>
<td>0</td>
<td>(0.0)</td>
<td>0</td>
<td>(0.0)</td>
<td>0</td>
<td>(0.0)</td>
</tr>
<tr>
<td>Q20</td>
<td>0</td>
<td>(0.0)</td>
<td>76</td>
<td>(22.7)</td>
<td>169</td>
<td>(50.4)</td>
<td>90</td>
<td>(26.9)</td>
<td>0</td>
<td>(0.0)</td>
</tr>
</tbody>
</table>
The questions of table 1:

<table>
<thead>
<tr>
<th></th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>To what extent do the people who work with your child make you feel as a parent you are doing a good job?</td>
</tr>
<tr>
<td>2</td>
<td>To what extent do the people who work with your child talk to you and tell what they are doing?</td>
</tr>
<tr>
<td>3</td>
<td>Do the service providers make you feel safe during a treatment session?</td>
</tr>
<tr>
<td>4</td>
<td>To what extent do the people who work with your child give you suggestions and ideas of things to do at home?</td>
</tr>
<tr>
<td>5</td>
<td>Do you feel that the service providers are supporting your child psychologically?</td>
</tr>
<tr>
<td>6</td>
<td>Do the service providers favor some children on others?</td>
</tr>
<tr>
<td>7</td>
<td>Do the service providers fully explain treatment choices to you?</td>
</tr>
<tr>
<td>8</td>
<td>Do the service providers give you the opportunity to participate in treatment decisions?</td>
</tr>
<tr>
<td>9</td>
<td>Do the service providers provide you with the opportunity to give your suggestions?</td>
</tr>
<tr>
<td>10</td>
<td>Do the service providers provide precise and skillful services?</td>
</tr>
<tr>
<td>11</td>
<td>Do the service providers treat you as an individual rather than just a parent of a patient?</td>
</tr>
<tr>
<td>12</td>
<td>Do the service providers listens and answers all your questions?</td>
</tr>
<tr>
<td>13</td>
<td>Do the service providers show an understanding of the problems that you face?</td>
</tr>
<tr>
<td>14</td>
<td>Do the service providers explain to you the rehabilitation plan?</td>
</tr>
<tr>
<td>15</td>
<td>I find cooperation from service providers.</td>
</tr>
<tr>
<td>16</td>
<td>Do the service providers provide information about the type of services offered at the center?</td>
</tr>
<tr>
<td>17</td>
<td>Do the service providers give enough information about your child condition?</td>
</tr>
<tr>
<td>18</td>
<td>Do the service providers explain things to you in a simple and clear way?</td>
</tr>
<tr>
<td>19</td>
<td>Were the information available to you in various forms, such as a booklet, video, etc.?</td>
</tr>
<tr>
<td>20</td>
<td>Do the service providers provide advice on how to contact other parents?</td>
</tr>
</tbody>
</table>

It is evident in Figure 1 that the largest proportion of the couples (78.8%) scored between 60-79 % in the total perception score, and only 16.1% scored ≥ 80%.

![Figure 1. Overall parents’ perception of rehabilitation services](image_url)
Table 2 shows no significant association between the parents’ perception with age of the child (p = 0.163), and presence of other child with special care need (p > 0.999). The table shows that the fathers and mothers of a female child had better perception scores than those with a male child (p = 0.025). Regarding the child disability, 25% of those with a child with food deformity had good perception, and 20.7% of those with a child with developmental dislocation of the hip had good perception while fewer rates were detected for the other types of deformities. It is evident in the table that 18.8% of the couples whose child was on physical therapy had higher perception scores compared with 12.6% when the child was on occupational therapy (p = 0.025).

Table 2. Parents’ perception by child characteristics

<table>
<thead>
<tr>
<th></th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. (%)</td>
<td>No. (%)</td>
<td>No. (%)</td>
<td></td>
</tr>
<tr>
<td>Child age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 3</td>
<td>6 (6.1)</td>
<td>69 (70.4)</td>
<td>23 (23.5)</td>
<td>0.163*</td>
</tr>
<tr>
<td>3-5</td>
<td>8 (7.0)</td>
<td>89 (78.1)</td>
<td>17 (14.9)</td>
<td></td>
</tr>
<tr>
<td>6-8</td>
<td>2 (2.5)</td>
<td>68 (85.0)</td>
<td>10 (12.5)</td>
<td></td>
</tr>
<tr>
<td>≥ 9</td>
<td>1 (2.3)</td>
<td>38 (88.4)</td>
<td>4 (9.3)</td>
<td></td>
</tr>
<tr>
<td>Child gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>12 (8.5)</td>
<td>112 (78.9)</td>
<td>18 (12.7)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>5 (2.6)</td>
<td>152 (78.8)</td>
<td>36 (18.7)</td>
<td>0.025</td>
</tr>
<tr>
<td>Child disability</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cerebral palsy</td>
<td>1 (1.2)</td>
<td>75 (88.2)</td>
<td>9 (10.6)</td>
<td></td>
</tr>
<tr>
<td>Spina bifida</td>
<td>9 (14.8)</td>
<td>45 (73.8)</td>
<td>7 (11.5)</td>
<td></td>
</tr>
<tr>
<td>Torticollis</td>
<td>3 (7.3)</td>
<td>31 (75.6)</td>
<td>7 (17.1)</td>
<td></td>
</tr>
<tr>
<td>Scoliosis</td>
<td>0 (0.0)</td>
<td>33 (82.5)</td>
<td>7 (17.1)</td>
<td></td>
</tr>
<tr>
<td>Developmental dislocation of the Hip</td>
<td>0 (0.0)</td>
<td>46 (79.3)</td>
<td>12 (20.7)</td>
<td></td>
</tr>
<tr>
<td>Foot Deformity</td>
<td>4 (8.3)</td>
<td>32 (66.7)</td>
<td>12 (25.0)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>0 (0.0)</td>
<td>2 (100.0)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td>Type of rehabilitation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical therapy</td>
<td>5 (2.6)</td>
<td>151 (78.6)</td>
<td>36 (18.8)</td>
<td></td>
</tr>
<tr>
<td>Occupational therapy</td>
<td>12 (8.4)</td>
<td>113 (79.0)</td>
<td>18 (12.6)</td>
<td>0.025</td>
</tr>
<tr>
<td>Other child with special care need</td>
<td>17 (5.1)</td>
<td>264 (78.8)</td>
<td>54 (16.1)</td>
<td></td>
</tr>
</tbody>
</table>

*By Fisher’s exact test.
†Insufficient computer memory to calculate the p value by Fisher’s exact test.
Discussion

One aspect of parent satisfaction is the perception of the processes of care, which is focused on the actions of health care providers and their interaction with clients rather than the specific techniques they perform King (2004). The aim of the study was to obtain the overall perceptions of parents attending therapy services at Helena center. The results of this study suggest that most parents perceive that aspects of care relating to respectful and supportive care, coordination of care occur frequently which is similar to previous research was done in western countries Van Schie (2004). Parents report a lack of information in various forms booklet, video, etc. Similar findings have been reported in other studies. Good information is necessary as a basis for FCC, provision must be sensitively tailored to parents’ individual needs and capabilities. Similar to previous research, parents in our project were satisfied with services. The result of present study reveals that there is no significant statistical relationship between the parents’ perception with socio-demographic regarding fathers and mothers, also there is no significant statistical relationship between the parents’ perception with age of the child which is consistent with the results of Arnadottir (2012)

Conclusion

The overall results obtained in this study are important in understanding the current status of services as seen by parents. As concluded from parents’ responses, there is some issues appear to be in need of improvement such as Provision of information where some parents expressed a desire for more child-specific and general information. The results also showed that parents need additional opportunities to interact with other parents. In general Parents’ perceived that the services provided to their children are family-centered.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Faculty of nursing and all experiments were carried out in accordance with approved guidelines.

References

13. Dyke P, Buttigieg P, Blackmore A. Use of the measures of process of care for families (MPOC-56) and service providers (MPOC-SP) to evaluate family-centred services in a paediatric disability


Assessment of Patient’s Knowledge Regarding Hemodialysis Therapy at Imam Hussein Medical City in Holly Karbala Governorate

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Abstract

Background: Descriptive and analytical study in which evaluation approach applied in order to achieve the objectives of the study mentioned at the beginning of the search. The study began in 2 April 2016 to 21 June 2017. The research was conducted in order to identify hemodialysis patients knowledge regarding hemodialysis therapy at Imam Hussein medical city in holly Karbala Governorate.

Objectives: to assess hemodialysis patients knowledge about hemodialysis therapy, To find out the relationship between hemodialysis knowledge and some variables such as: age, gender, level of education.

Methods: This Descriptive and analytical study was conducted at Imam Hussein medical city in the province of Karbala, Iraq, from 1 October 2017 to 1 April 2018, use to to identify hemodialysis patients knowledge regarding hemodialysis therapy. SPSS 21 was used for statistical analysis.

Results: shown on Results of the study that Highest percent of the study samples was samples age (50 or more) years old, According to the gender, the study sample were male and female, equal percent and number was (50-50%), Most of the study sample low educational levels, Most of them had married, Finally the general knowledge level of Imam Hussein medical city regarding hemodialysis therapy is High.

Conclusion: Highest percent of the study samples was samples age (50 or more) years old, According to the gender, the study sample were male and female, equal percent and number was (50-50%), Finally the general knowledge level of Imam Hussein medical city regarding hemodialysis therapy is High.

Keywords: hemodialysis patients knowledge, hemodialysis.

Introduction

Kidney failure, also known as renal failure or renal insufficiency, is a medical condition in which the kidneys fail to adequately filter waste products from the blood. The two main forms are acute kidney injury, which is often reversible with adequate treatment, and chronic kidney disease, which is often not reversible. Kidney failure is mainly determined by a decrease in glomerular filtration rate, which is the rate at which blood is filtered in the glomeruli of the kidney. The condition is detected by a decrease in or absence of urine production or determination of waste products (creatinine or urea) in the blood. Depending on the cause (National Institute of Diabetes and Digestive and Kidney Diseases, 2013). Dialysis is the artificial process of eliminating waste (diffusion) and unwanted water (ultrafiltration) from the blood. Healthy kidneys do this naturally. Some people, however, may have failed or damaged kidneys which cannot carry out the function properly - they may need dialysis. Dialysis is the artificial replacement for lost kidney function (renal replacement therapy). Dialysis may be used for patients who have become ill and have acute kidney failure (temporary loss of kidney function), or for fairly stable patients who have permanently lost kidney function (stage 5 chronic kidney disease) (Medical News Today, 2015). If kidneys are damaged the waste product is removed from the human body by hemodialysis procedure. Without dialysis the amount of waste products in the blood would increase and eventually reach levels that would cause coma and death.
Methodology

A descriptive analytic study was designed to identify hemodialysis patients' knowledge regarding hemodialysis therapy at Imam Hussein medical city in holy Karbala, Iraq. The study has been conducted on hemodialysis patients at Imam Hussein medical city in the province of Karbala, Iraq. The data were collected through the use of questions put in the questionnaire and data collection done through used the self-administration techniques. Study population was using purposive selection sample technique, 100 samples from hemodialysis unit at Imam Hussein medical city in the province of Karbala, Iraq.

Instrument

Measure which was built by researchers, who used contain 34 question divided into two sections: Demographic knowledge, Patients’ knowledge of kidney failure and hemodialysis: Knowledge relate to kidney failure, Knowledge relate to causes kidney failure, Kidney and hem dialysis, Problem happen through hem dialysis process, Knowledge must be done after hem dialysis process. The first section of the questionnaire was the participants background; (age, gender , educational level, marital status, duration of kidney failure.

Second section: Patients’ knowledge of kidney failure and hemodialysis.

Rating and scoring

Some question consists of (2) alternative responses, and only one of these alternative responses was considered a correct response. To achieve the purpose of the present study, the responses of emotional distress questionnaire were scored as (3) never and (2) sometimes and(1) always.

(Cut of point) x100 / (No. of scale).

Low = (less than 75), Moderate = (75.1-87.5), High = (87.6-100), these calculated according to the following formula (100-75) /2 =12.5, then this score was added to (75+ 12.5=87.5) moderate level, (87.5+12.5=100) high level (Al-maliky, 2010).

The instrument was validity by a panel of (9) expert from the Karbala university, college of nursing, and (1) from hemodialysis unit at Imam Hussein medical city.

Pilot study:

A pilot study was conducted on a purposive sample of (10) patients which was selected from hemodialysis unit from the period 25 December 2018 to 26 December, 2018. The pilot study sample was excluded from the original sample of the study.

Reliability assessments according to the internal consistency of the studied questionnaire was (75.5%) by using Cronbach Alpha test.

Data analysis:

Statistical analyzes were conducting by using the statistical package for social science (SPSS) version 23. Data analysis was employed through the application of descriptive and inferential statistical approaches which were performed through the computation of the following:(Frequencies(F),Percentage(%),Cumulative percentage ,Means of score(M.S),Standard deviations(SD) and Relative sufficient.

Results of the Study

This chapter present results of the study with correspondence to the study objectives.

Table (1) Statistical Distribution of the Study Sample by their Demographic Data:

<table>
<thead>
<tr>
<th>No</th>
<th>Frequency</th>
<th>Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
</table>

...
in the Table (1) represented the sociodemographic characteristics of the sample patients that the most sample was (36%) of the samples age (50 or more) years old, while the lowest percent (12%) were at group (20 or less) years old. According to the gender, the study sample were male and female, equal percent and number was (50-50%), the educational levels, most of the studied sample had low educational levels, since 20 number and percent(40%) of them were primary school graduates and, while the lowest percent (12%) were University or more in percent (4%). With respect to the marital status most of the studied sample was married in percent (66%), The last section of demographic Characteristics is medical history or duration of renal failure, that the (2-4 yrs) was the most sample present (48%).

| 1 | Age | 20 or less | 6 | 12.0 | 12.0 |
| 1 | Age | 21-30 | 6 | 12.0 | 24.0 |
| 1 | Age | 31-40 | 9 | 18.0 | 42.0 |
| 1 | Age | 41-50 | 11 | 22.0 | 64.0 |
| 1 | Age | 51 or more | 18 | 36.0 | 100.0 |
| 2 | Gender | Male | 25 | 50.0 | 50.0 |
| 2 | Gender | Female | 25 | 50.0 | 100.0 |
| 3 | Education | Illiterate | 6 | 12.0 | 12.0 |
| 3 | Education | Read & Write | 4 | 8.0 | 20.0 |
| 3 | Education | Primary school | 20 | 40.0 | 60.0 |
| 3 | Education | Secondary school | 10 | 20.0 | 80.0 |
| 3 | Education | high school | 5 | 10.0 | 90.0 |
| 3 | Education | Institute | 3 | 6.0 | 96.0 |
| 3 | Education | University or more | 2 | 4.0 | 100.0 |
| 4 | Marital status | Single | 17 | 34.0 | 34.0 |
| 4 | Marital status | Married | 33 | 66.0 | 100.0 |
| 5 | History of renal failure | 1 or less | 15 | 30.0 | 30.0 |
| 5 | History of renal failure | 2-4 | 24 | 48.0 | 78.0 |
| 5 | History of renal failure | 5-7 | 6 | 12.0 | 90.0 |
| 5 | History of renal failure | 8 or more | 5 | 10.0 | 100.0 |
| 5 | History of renal failure | Total | 50 | 100.0 | 100.0 |

Cont... Table (1) Statistical Distribution of the Study Sample by their Demographic Data:
### Table (2): Knowledge relate to kidney failure:

<table>
<thead>
<tr>
<th>No</th>
<th>ITEM</th>
<th>Response</th>
<th>Frequency</th>
<th>Percent</th>
<th>M.S.</th>
<th>R.S.</th>
<th>Level of knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>kidney failure is a shortage in kidney function</td>
<td>don’t know</td>
<td>19</td>
<td>38.0</td>
<td>1.62</td>
<td>81</td>
<td>moderate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>31</td>
<td>62.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>kidney failure leads to morbidity in the human body</td>
<td>don’t know</td>
<td>11</td>
<td>22.0</td>
<td>1.78</td>
<td>89</td>
<td>high</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>39</td>
<td>78.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>kidney failure is two type Acute &amp; Chronic</td>
<td>don’t know</td>
<td>22</td>
<td>44.0</td>
<td>1.56</td>
<td>78</td>
<td>moderate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>28</td>
<td>56.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>kidney failure can be treated after transplants</td>
<td>don’t know</td>
<td>12</td>
<td>24.0</td>
<td>1.76</td>
<td>88</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>38</td>
<td>76.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Knowledge relate to kidney failure. The results showed that hemodialysis patients had average high knowledge, where knowledge was high in questions (2,4) and their average was moderate responses to questions (1,3).

### Table (3): Knowledge relate to causes kidney failure

<table>
<thead>
<tr>
<th>No</th>
<th>ITEM</th>
<th>Response</th>
<th>Frequency</th>
<th>Percent</th>
<th>M.S.</th>
<th>R.S.</th>
<th>Level of knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Unknown causes</td>
<td>don’t know</td>
<td>33</td>
<td>66.0</td>
<td>1.34</td>
<td>67</td>
<td>low</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>17</td>
<td>34.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Genetic factors</td>
<td>don’t know</td>
<td>18</td>
<td>36.0</td>
<td>1.64</td>
<td>82</td>
<td>moderate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>32</td>
<td>64.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Blockage of the urinary tract</td>
<td>don’t know</td>
<td>13</td>
<td>26.0</td>
<td>1.74</td>
<td>87</td>
<td>moderate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>37</td>
<td>74.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Suffering from chronic disease (hypertension &amp; diabetes)</td>
<td>don’t know</td>
<td>4</td>
<td>8.0</td>
<td>1.92</td>
<td>96</td>
<td>high</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>46</td>
<td>92.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Excessive use of drugs (sedations)</td>
<td>don’t know</td>
<td>14</td>
<td>28.0</td>
<td>1.72</td>
<td>86</td>
<td>moderate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>36</td>
<td>72.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Smoking</td>
<td>don’t know</td>
<td>10</td>
<td>20.0</td>
<td>1.80</td>
<td>90</td>
<td>high</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>40</td>
<td>80.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Knowledge relate to causes kidney failure. The results showed that hemodialysis patients had average moderate knowledge, where knowledge was moderate in questions (2,3,5) and their average was high responses to questions (6,4), and their average was low responses to (1) questions.
<table>
<thead>
<tr>
<th>No</th>
<th>ITEM</th>
<th>Response</th>
<th>Answer</th>
<th>Frequency</th>
<th>Percent</th>
<th>M.S.</th>
<th>R.S.</th>
<th>Level of knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Human needs the dialysis when it reaches end stage K.F</td>
<td>don’t know</td>
<td>4</td>
<td>8.0</td>
<td>1.92</td>
<td>96</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>46</td>
<td>92.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Dialysis rid the human body of waste and fluids</td>
<td>don’t know</td>
<td>3</td>
<td>6.0</td>
<td>1.94</td>
<td>97</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>47</td>
<td>94.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Maintain a safe level of minerals and electrolytes</td>
<td>don’t know</td>
<td>33</td>
<td>66.0</td>
<td>1.34</td>
<td>67</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>17</td>
<td>34.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Control on the blood pressure</td>
<td>don’t know</td>
<td>29</td>
<td>58.0</td>
<td>1.42</td>
<td>71</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>21</td>
<td>42.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Knowledge relate to Kidney and hemodialysis, The results showed that hemodialysis patient had average moderate knowledge, where knowledge was high in questions (1,2) And their average was low responses to questions (3,4).

Table (5): Problem happen through hemodialysis process

<table>
<thead>
<tr>
<th>No</th>
<th>ITEM</th>
<th>Response</th>
<th>Answer</th>
<th>Frequency</th>
<th>Percent</th>
<th>M.S.</th>
<th>R.S.</th>
<th>Level of knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bleeding from fistula</td>
<td>don’t know</td>
<td>21</td>
<td>42.0</td>
<td>1.58</td>
<td>79</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>29</td>
<td>58.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Hypotension(Elevated B.P)</td>
<td>don’t know</td>
<td>7</td>
<td>14.0</td>
<td>1.86</td>
<td>93</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>43</td>
<td>86.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Bacterial and viral infection</td>
<td>don’t know</td>
<td>20</td>
<td>40.0</td>
<td>1.60</td>
<td>80</td>
<td>Moderate</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>30</td>
<td>60.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Nausea and vomiting</td>
<td>don’t know</td>
<td>8</td>
<td>16.0</td>
<td>1.84</td>
<td>92</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>42</td>
<td>84.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Chest pain, backache and muscles pain</td>
<td>don’t know</td>
<td>6</td>
<td>12.0</td>
<td>1.88</td>
<td>94</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>44</td>
<td>88.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Fatigue</td>
<td>don’t know</td>
<td>2</td>
<td>4.0</td>
<td>1.96</td>
<td>98</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>48</td>
<td>96.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Itching</td>
<td>don’t know</td>
<td>29</td>
<td>58.0</td>
<td>1.42</td>
<td>71</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>21</td>
<td>42.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 5: Problem happen through hem dialysis process, The results showed that hemodialysis patient had average high knowledge, where knowledge was high in questions (2,4,5,6) And their average was moderate responses to questions (1,3), And their average was low responses to(7) questions

Table (6): Knowledge must be done after hemodialysis process

<table>
<thead>
<tr>
<th>No</th>
<th>ITEM</th>
<th>Response</th>
<th>Answer</th>
<th>Frequency</th>
<th>Percent</th>
<th>M.S.</th>
<th>R.S.</th>
<th>Level of knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Limitation fluid intake</td>
<td>don’t know</td>
<td>8</td>
<td>16.0</td>
<td></td>
<td>1.84</td>
<td>92</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>42</td>
<td>84.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Avoid fruits that is rich in potassium</td>
<td>don’t know</td>
<td>10</td>
<td>20.0</td>
<td></td>
<td>1.80</td>
<td>90</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>40</td>
<td>80.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Avoid vegetables that is high sodium content</td>
<td>don’t know</td>
<td>20</td>
<td>40.0</td>
<td></td>
<td>1.60</td>
<td>80</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>30</td>
<td>60.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Cook food without adding salt</td>
<td>don’t know</td>
<td>9</td>
<td>18.0</td>
<td></td>
<td>1.82</td>
<td>91</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>41</td>
<td>82.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Avoid eating nuts and legumes</td>
<td>don’t know</td>
<td>12</td>
<td>24.0</td>
<td></td>
<td>1.76</td>
<td>88</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>38</td>
<td>76.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Encourage eating high quality proteins</td>
<td>don’t know</td>
<td>2</td>
<td>4.0</td>
<td></td>
<td>1.96</td>
<td>98</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>48</td>
<td>96.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Timeliness of dialysis within specific deadlines</td>
<td>don’t know</td>
<td>1</td>
<td>2.0</td>
<td></td>
<td>1.98</td>
<td>99</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>49</td>
<td>98.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Continuing care shunt area to prevent infections</td>
<td>don’t know</td>
<td>13</td>
<td>26.0</td>
<td></td>
<td>1.74</td>
<td>87</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Know</td>
<td>37</td>
<td>74.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6: Knowledge must be done after hemodialysis process, The results showed that hemodialysis patient had average high knowledge, where knowledge was high in questions (1,2,4,5,6,7) And their average was moderate responses to questions (3,8).

Discussion

This chapter presents a systematically, organized, interpretation and reasonably derived discussion of the results with a support of the available literatures and related studies.

Part one: Discussion of the patients’ demographic characteristics:

In this study, we assessed the knowledge hemodialysis patients knowledge regarding hemodialysis therapy at Imam Hussein medical city in holy Karbala, Iraq, as a results we found in the table (1) represented the sociodemographic characteristics of the sample patients that the most sample was (36%) of the samples age (50 or more) years old, while the lowest percent (12%) were at group (20 or less) years old. this result was agreement
with studies done by (Sharman et al.,2006) and (Levey, et al., 2005).

According to the gender, the study sample were male and female, equal percent and number was (50-50%), this result was disagreement with study done by Nasrin (2014).

According to the educational levels, most of the studied sample had low educational levels, since 20 number and percent(40%) of them were primary school graduates and, while the lowest percent (12%) were University or more in percent (4%), this result was agreement with study done by Tawfiq (2006).

With respect to the marital status most of the studied sample was married in percent (66%), this result was agreement with study done by nurten (2015).

The last section of demographic Characteristics is medical history or duration of renal failure, that the (2-4 yrs) was the most sample present (48%), this result was agreement with study done by 4. In Table (2,3,4,5,6) shown the mean of score, standard Deviation and the relative sufficiency of participant’s in assessment of the level of knowledge regarding hemodialysis therapy that was High.

**Conclusion**

In conclusion, According to the present study finding the researcher has been able to conclude the following: Highest percent of the study samples was samples age (50 or more) years old, According to the gender, the study sample were male and female, equal percent and number was (50-50%), Most of the study sample low educational levels, Most of them had married, Finally the general knowledge level of Imam Hussein medical city regarding hemodialysis therapy is High.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the College of Nursing and all experiments were carried out in accordance with approved guidelines.

**References**

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Nurses Competence with Regard Congenital Heart Diseases in Cardiac Care Unit of Pediatric Hospital in Sulaimani City

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1 Assistant Lecturer University of Sulaimani College of Nursing, Iraq, 2 MBchB, DCH, FIBMS, Higher diploma (pediatric cardiology), Assistant Professor University of Sulaimani College of Medicine, Iraq

Abstract

The activities of the nurse performing duties at a haemodynamic facility is characterized by the need to be able to field a high degree of specialisation. It is absolutely essential that he/she has bases of knowledge and skills also in the field of intensive care and cardiac resuscitation that are adequate for the high complexity of the diseases and procedures that are treated.

Method: Quantitative design with descriptive study was carried out with assessment approach and it was conducted on nurses in cardiac care unit of pediatric hospital in Sulaimani city/Kurdistan region from 1st July 2017-1st May 2018. Non-probability sampling was performed, a purposive sample of (35) nurses, all males and females. Data were shown and tabled in frequencies and percentage, and mean of scores was calculated from ordinal data in five level (5, 4, 3, 2, 1). In the present study the highest mean of score indicates the highest level of practice regarding nursing management. The P-value at 0.05 level indicates the degree of significance. Independent T-test and ANOVA have been utilized to find out the significant relationship of nursing care management with socio-demographic characteristics, and nurse’s skill and experiences.

Result: socio-demographic profile of participants presented. Out of 35 participants studied 21 (60%) were from age group 20 – 30 years, with mean age of 30.4 years. Majority of participants studied 77.1 % were female. Majority of the nurses were graduated for institute 16 (45.7%) and 10 (28.6%) were hold university certificate. According to working experience and skills. Out of 35 participants studied, only 19 (54.29%) attended training session regarding Pediatric Intensive Care Unit (PICU). Around 74.29% of participants were not familiar with PICU drugs. Around 74.29% of participants were not familiar with PICU drugs however, 88.6% of participants were familiar to PICU doses. 80% of the total participants did not attend the periodic educational program and conference/symposium. 97.14% of the participants did not study the books regarding CHD. The right to practice in manner that is suitable for fulfilling the obligations was reported as never by 48.6% of nurses. Regarding perception of ethical practice in work environment major participants 88.6% reported sometime.

Keywords: Congenital heart diseases, Nurses competence, cardiac care unit

Introduction

Competence is defined as knowledge and performance combined with psychomotor and clinical problem-solving skills and a responsive attitude.

Competence of nurses is a complex combination of knowledge, function, skills, attitudes, and values. Delivering care for patients in the Intensive Cardiac Care Unit (ICCU) requires nurses’ competences. The concept of competence has been described by many authors, Meretoja et al. (2004) defined nursing competence in terms of three dimensions, i.e., the nurse’s ability to function professionally, knowledge and skills for collaborating within real-world practices with a degree of understanding, affection, and psychomotor skills, and professional development and the willingness to acquire...
more skills. The activities of the nurse performing duties at a haemodynamic facility is characterized by the need to be able to field a high degree of specialisation. It is absolutely essential that he/she has bases of knowledge and skills also in the field of intensive care and cardiac resuscitation that are adequate for the high complexity of the diseases and procedures that are treated. The set of skills should therefore also include good knowledge of anatomy and cardiovascular pathophysiology, working knowledge of electro-medical equipment, technical skills and knowledge of electrocardiogram monitoring and other highly specialized techniques. In addition, the nurse must know how to relate to others and have the skills needed for performing the process of care, capacity of observation, planning, judgment and decision-taking. Neither should he/she lack the ability to properly interpret information and communicate in a comprehensive way. Continuous updating of the nursing staff is very important in order to constantly increase their professionalism, obviously including constant participation in courses and conferences in order to facilitate cultural and experiential exchange with other situations and at international level.

Method and Materials

Design of the study:
Quantitative design with descriptive study was carried out with assessment approach and it was conducted on nurses in cardiac care unit of pediatric hospital in Sulaimani city from 1st July 2017-1st May 2018. The study carried out to evaluate nursing management regarding children with congenital heart diseases.

Setting of the study:
Pediatric Intensive Care Unit selected as setting of the study which located at Kurdistan region/Sulaimani/Iraq. Most of serious pediatric patient admitting in this unit in order to performing better caring and services. The most critical cases includes: Congenital heart diseases, Pneumonia, Nephrotic syndrome, Sever dehydration, Bleeding, Sepsis, Convulsion, Croop, live fail, and encephalitis.

The sample of the study:
Non-probability sampling was performed, a purposive sample of (35) nurses who were employed in pediatric intensive care unit, and were performed nursing management for (105) pediatric patient with congenital heart diseases.

The inclusion criteria for sample selection:
All nurses who work at cardiac care unit, with both gender (male and female) and all nurses who work at both shifts (morning and evening).

Tools:
The study tool include two parts. First are three section. Section one regarding nurses socio-demographic data (age, gender, years of employment, experience, Level of education, and marital status). Section two consist of information related to pediatric intensive care unit which include supportive activities like training session, educational programs, conference and symposium. Also in section two Self-education and learning is an other item which consist of availability of books and references, time for reading and nurses information regarding scientific web cite and articles, and availability of PICU equipment is also involved in section two, consist of information regarding nurses familiarity with drugs, drug doses, the ways of O2 supply, and equipment like (monitor, ventilator, ECG).

Regarding part two is the observational check list scale includes (40) items concerning practice and activities that should be provided from the nurses to the children with CHD in Pediatric Intensive Care Unit.

Method of data collection:
Data collection method were throw the using of adopted and constructed questionnaire, interviewing technique, and observational technique. Data were collected from (1st July 2017 - 1st April 2018).

Rating scales and scores:
In this study using 3 types of rating scales:

Two points likert scale (Yes and NO)

Three points likert scale (Always, Some time, and Never) is used in the section three of part one.

Five point likert scale:
Poor (1), Fair (2), Good (3), Very good (4), Excellent (5)
Five is the highest score regarding nursing management in the (observational check list part) performed to the children with congenital heart disease in Pediatric Intensive Care Unit.

To make understanding scoring system more clearly, mean of nursing care management were calculate for each subscale, then the score of each subscales have been unified in (0-100).

Statistical analysis:

Descriptive statistics:-

Data were shown and tabled in frequencies and percentage, and mean of scores was calculated from ordinal data in five level (5, 4, 3, 2, 1). In the present study the highest mean of score indicates the highest level of practice regarding nursing management. The P-value at 0.05 level indicates the degree of significance.

Inferential statistics:-

Independent T-test and ANOVA have been utilized to find out the significant relationship of nursing care management with socio-demographic characteristics, and nurse’s skill and experiences.

Results

Table 1: Distribution of nurses according to academic supportive activities and self learning:

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training session regarding PICU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>16</td>
<td>45.7</td>
</tr>
<tr>
<td>No</td>
<td>19</td>
<td>54.3</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>100.0</td>
</tr>
<tr>
<td>Familiarity with posters/guidelines in PICU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>8</td>
<td>22.9</td>
</tr>
<tr>
<td>No</td>
<td>27</td>
<td>77.1</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>100.0</td>
</tr>
<tr>
<td>Attending to periodic educational program</td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>7</td>
<td>20.0</td>
</tr>
<tr>
<td>No</td>
<td>28</td>
<td>80.0</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>100.0</td>
</tr>
<tr>
<td>Attending to conference/symposium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>7</td>
<td>20.0</td>
</tr>
<tr>
<td>No</td>
<td>28</td>
<td>80.0</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>100.0</td>
</tr>
<tr>
<td>Having books regarding CHD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
<td>2.9</td>
</tr>
<tr>
<td>No</td>
<td>34</td>
<td>97.1</td>
</tr>
<tr>
<td>Nursing Rights</td>
<td>Always N(%)</td>
<td>Sometime N(%)</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
<td>-------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Do you have your right to practice in manner that is suitable for fulfilling your obligations?</td>
<td>3 (8.6)</td>
<td>15(42.9)</td>
</tr>
<tr>
<td>Do you have your right to practice in an environment that allow you to act in accordance with professional standards ?</td>
<td>2(5.7)</td>
<td>24(68.6)</td>
</tr>
<tr>
<td>Do you feel you work in an environment supports ethical practice ?</td>
<td>1(2.9)</td>
<td>31(88.6)</td>
</tr>
<tr>
<td>Are you feel free to advocate for your selves and your patients without fear ?</td>
<td>2(5.7)</td>
<td>25(71.4)</td>
</tr>
<tr>
<td>Are you satisfy with the compensation for your work and consistency with your knowledge ?</td>
<td>3(2.9)</td>
<td>7(6.7)</td>
</tr>
<tr>
<td>Are you feel safe in the environment you work as well as your patient ?</td>
<td>1(2.9)</td>
<td>20(57.1)</td>
</tr>
<tr>
<td>Do you have the right to negotiation in the conditions for your employment in all practice setting?</td>
<td>2(1.9)</td>
<td>25(71.4)</td>
</tr>
<tr>
<td>Academic activities</td>
<td>Assessment Mean ±SD</td>
<td>Intervention Mean ±SD</td>
</tr>
<tr>
<td>---------------------------------------------------------</td>
<td>----------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Training session regarding CHD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>49.58±4.38</td>
<td>56.49±5.18</td>
</tr>
<tr>
<td>No</td>
<td>49.33±5.54</td>
<td>55.48±7.01</td>
</tr>
<tr>
<td>Total</td>
<td>49.44±5.02</td>
<td>55.94±6.23</td>
</tr>
<tr>
<td>T</td>
<td>0.067</td>
<td>0.685</td>
</tr>
<tr>
<td>Sig</td>
<td>0.796</td>
<td>0.410</td>
</tr>
<tr>
<td>Attending to periodic educational program regarding PICU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>48.81±5.06</td>
<td>57.14±4.19</td>
</tr>
<tr>
<td>No</td>
<td>49.60±5.03</td>
<td>55.64±6.63</td>
</tr>
<tr>
<td>Total</td>
<td>49.44±5.02</td>
<td>55.94±6.23</td>
</tr>
<tr>
<td>T</td>
<td>0.417</td>
<td>0.980</td>
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<tr>
<td>Sig</td>
<td>0.520</td>
<td>0.324</td>
</tr>
<tr>
<td>Attending to conference/symposium</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>48.97±6.02</td>
<td>55.95±3.80</td>
</tr>
<tr>
<td>No</td>
<td>49.56±4.78</td>
<td>55.94±6.72</td>
</tr>
<tr>
<td>Total</td>
<td>49.44±5.02</td>
<td>55.94±6.23</td>
</tr>
<tr>
<td>T</td>
<td>0.234</td>
<td>0.000</td>
</tr>
<tr>
<td>Sig</td>
<td>.630</td>
<td>.991</td>
</tr>
<tr>
<td>Have books regarding CHD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>47.78±2.55</td>
<td>56.19±2.70</td>
</tr>
<tr>
<td>No</td>
<td>49.49±5.08</td>
<td>55.93±6.31</td>
</tr>
<tr>
<td>Total</td>
<td>49.44±5.02</td>
<td>55.94±6.23</td>
</tr>
<tr>
<td>T</td>
<td>0.338</td>
<td>0.005</td>
</tr>
<tr>
<td>Sig</td>
<td>0.562</td>
<td>0.944</td>
</tr>
<tr>
<td>Know about scientific website regard CHD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>49.11±5.36</td>
<td>56.45±5.58</td>
</tr>
<tr>
<td>No</td>
<td>49.58±4.92</td>
<td>55.73±6.49</td>
</tr>
<tr>
<td>Total</td>
<td>49.44±5.02</td>
<td>55.94±6.23</td>
</tr>
<tr>
<td>T</td>
<td>0.183</td>
<td>0.284</td>
</tr>
<tr>
<td>Sig</td>
<td>0.669</td>
<td>0.596</td>
</tr>
</tbody>
</table>
Table 4: Mean of nursing care management for each of assessment and intervention dimensions according to observational check list scale:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurse’s assessment for patients (12 items)</td>
<td>49.44</td>
<td>5.02</td>
</tr>
<tr>
<td>Nurse’s intervention for nutritional intake to promote children’s growth and development (5 items)</td>
<td>55.62</td>
<td>8.58</td>
</tr>
<tr>
<td>Nurse’s intervention to prevent infections (5 items)</td>
<td>91.39</td>
<td>12.30</td>
</tr>
<tr>
<td>Nurse’s intervention to reduce child’s heart load (5 items)</td>
<td>37.48</td>
<td>9.06</td>
</tr>
<tr>
<td>Nurse’s intervention to reduce pulmonary distress (10 items)</td>
<td>49.60</td>
<td>8.24</td>
</tr>
<tr>
<td>Nurse’s intervention to providing education for child and family (3 items)</td>
<td>49.26</td>
<td>13.05</td>
</tr>
<tr>
<td>Intervention Total</td>
<td>55.93</td>
<td>6.23</td>
</tr>
<tr>
<td>Management Total</td>
<td>53.99</td>
<td>4.66</td>
</tr>
</tbody>
</table>

Table 5: Correlations among nurses’ assessment, intervention, total management and period of hospitalization

<table>
<thead>
<tr>
<th>Correlations</th>
<th>Assessment</th>
<th>Intervention</th>
<th>Management</th>
<th>Child period of hospitalization</th>
</tr>
</thead>
<tbody>
<tr>
<td>r</td>
<td>1</td>
<td>0.033</td>
<td>0.355**</td>
<td>-0.063</td>
</tr>
<tr>
<td>p</td>
<td>0.736</td>
<td>0.000</td>
<td>0.946**</td>
<td>0.526</td>
</tr>
<tr>
<td>r</td>
<td>1</td>
<td>0.000</td>
<td>-0.158</td>
<td>0.107</td>
</tr>
<tr>
<td>p</td>
<td>0.000</td>
<td>-0.168</td>
<td>0.086</td>
<td></td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed). r: Pearson Correlation,
Nurse’s satisfaction with the nursing rights were taken as the indicators of nursing care management in this study. This study has found that nurses who lesser perceived to work in environmental support and ethical practice had significant high practice in nursing care management. This finding could is considered to be a negative out-come. while, in contrast to that nurses who more perceived to advocate for themselves and their patient, and those who feel to right to safe environment to nurses and patient practice were provide better nursing care management. This finding was observed in other study, it was observed that, the nurse’s right they would improve patient experiences of the quality of nursing care, clinically competent nurses. And the collaborative working relationships, autonomous nursing practice, adequate staffing, control over nursing practice was addressed as the reasons for better practice of nursing care (Kieft et al. 2014). There is many promotion courses for nurturing nursing skill and for providing better nursing performance. Nurses attending academic activities and training course are considered to provide good nursing care management. For instance, in developing countries low academic and educational program for staff lead to poor providing care for patients with CHD and it becomes a substantial challenge for health care. Several patients, who have initial heart conditions, have ended up with secondary irreversible damage or death (Jivanji, 2019). In this study attending academic activities and training were taken as one determinate for nursing care management. The current study has shown that there was not a significant association between attending academic activities and nursing care management. However, those nurses who attend the training, educational program, and search website regarding CHD had provide better nursing care management. Education program in developing countries have significant effect on nursing care management, quality of health care, and impact of the CHD. Different kinds of certificate had made impact on quality of nursing care management, and patient’s out-come. In this concerning, many kinds of certification, courses and training are introduced in the US. The courses such as Cardiac-designated ICUs, Mixed PICUs Academic teaching hospital, American Nursing Certification Center Magnet Recognition, American Association of Critical Care Nurses Beacon Designation have a significant relationship with the nursing care qualities and patient out-come. From another side this study found the relationship between nursing care management (nursing assessment and nursing intervention), and nursing care management with and child period hospitalization. There was a positive weak association of nursing assessment and nursing intervention. And the weak negative relationship of nursing care management was found with child period hospitalization. In some study, the reasons for long hospitalization have been determined, while the relationship of long hospitalization and the nursing care practices have not been studied. According to those study, the cases which stay long in hospital have need to more nursing care and advance skill for clinical assessment and intervention. And it has mentioned that the complexity and complication of CHD such as tetralogy of fallot and respiratory infection (due to respiratory syncytial virus) mostly are determined as the reasons for long hospitalization.

Conclusions

The nurse’s academic background and experience were not good qualified. Most of the nurses had more working experience while working experience in the ICU was less. The nurse’s education background was considerably less by considering developed countries, since only few of them were college graduated nurse. Regarding to training, only (54 %) nurses attended training session regarding Paediatric Intensive Care Unit (PICU). Most of the cases were male, and diagnostic with cyanotic congenital heart.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Sulaimani and all experiments were carried out in accordance with approved guidelines.

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Assessment of Mother’s Practice among Using Oral Rehydration Solution for their Children with Diarrhea in Babylon City

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Assistant prof, Ph.D., pediatric & Mental Health Nursing, College of Nursing, Babylon University

Abstract

Objectives: A descriptive study that aimed to find out demographic characteristics of mothers like age, level of education, occupation and resident area, to find out demographic characteristics of child regarding age, sex and birth order of the child and kind of feeding breast feeding and to assess the mother practices among using oral rehydration solution.

Methodology: The study was carried out at Child and Maternal Babylon Hospital, study period extended from December(2016) to end of the February(2017). Anon-probability sample was selected from Child and Maternal Babylon Hospital and al-Hashemia Hospital, the sample consisted (100) mothers.

Results: showed that (64%) of mothers their age between (20-30) years. also results reveal that (56%) of mothers graduate from primary school, and show that (93%) of mothers were unemployed.

Keyword: mothers, rehydration, child, diarrhea.

Introduction

Diarrhea is a clinical manifestation of a variety disorders of infants and young children and is one of the main causes of morbidity among them in most parts of the world, were crowding and lack of sanitary facilities present a major public health problem, as many infectious agent have been known to cause diarrhea such as bacteria, parasites and viruses. Also diarrhea can readily be produced through physiological and nutritional disorders in the complete absence of any enter pathogens, it is classified according to its severity into three degree, Mild, Moderate and sever. Diarrhea leads to dehydration which cause death in children that before the application of Oral Rehydration Therapy, all children with diarrhea were admitted to hospital for the replacement of fluid by intravenous rout, but no a days after the application of Oral Rehydration therapy the number of admitted cases in hospitals are reduced. ORT is considered as an effective tool in controlling dehydration in children as a result of diarrhea and many Mild diarrheal become moderate or sever due to improper mothers knowledge and practices to treat diarrhea, Oral Rehydration Therapy administration of dextrolytes by mouth to prevent or correct the dehydration that is a consequence of diarrhea it consists of the following sodium chloride 3.5 gram/liters, potassium chloride 1.5 gram/liters, Trisodium citrate dehydrate 2.9 grams/liters and glucose 20 grams/liter. Oral Rehydration Solution(ORS) represents the clinical application of some of the most basic concepts of cellular physiology. It offers a therapy that is inexpensive and simple with very few potential complications. In Iraq diarrhea is considered to be an important cause for infant morbidity and rates bacterial diarrhea contributes to about one third of the total cases of diarrhea in infancy and early childhood. So, we choose the study about this problem because during our practice in the hospital and we found that most of children attending in the hospital with the gastroenteritis (D.V.D) when we spoke with the mothers about how they can manage it at home we found that they have less practices about the ORS, so we interesting to do this research.

Methodology

1. Design of study: descriptive study

2. Setting of study: the study was carried out at Child and Maternal Babylon Hospital.
3. **Time of the study**: the study period extended from December (2016) to end of February (2017).

4. **Ethical Consideration**: Data collection is done by researchers, who kept the confidentiality and anonymity of the data. The form for data collection was applied without mentioning the name of mothers, their address, and taking a verbal agreement were obtained from participants in the study.

5. **The sample of study**: Anon-probability sample was selected from Child and Maternal Babylon Hospital and al-kawthar Health Center, the sample consisted (100) mothers. The questionnaire was used as a mean of data collection, questionnaire concerning mothers’ practice regarding oral rehydration therapy.

6. **Validity**: Validity of the study instrument was determined initially through the panel of experts’ responses were positive toward the study questionnaire, changes and modification were made in respect to experts’ suggestions and recommendations.

7. **Statistical analysis**: Data were analyzed through frequency, percentage, the item were rated according to point type rating scale Yes (1) and No (0).

### Table 1: Assessment of mother practice among Oral Rehydration Therapy for their child with diarrhea.

<table>
<thead>
<tr>
<th>Items</th>
<th>Frequency</th>
<th>Percentage%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Oral Rehydration Salt Solution Is Prepared By:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A ) 1 Litter Of Boiled Cooled Water</td>
<td>62</td>
<td>62%</td>
</tr>
<tr>
<td>B ) 1 Glass Of Boiled Cooled Water</td>
<td>22</td>
<td>22%</td>
</tr>
<tr>
<td>C ) 2 Glass Of Boiled Cooled Water</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>D ) Do Not Know</td>
<td>15</td>
<td>15%</td>
</tr>
<tr>
<td>2) Oral Rehydration Salt Solution Should Be Used With In:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A ) 6 Hours</td>
<td>45</td>
<td>45%</td>
</tr>
<tr>
<td>B ) 12 Hours</td>
<td>25</td>
<td>25%</td>
</tr>
<tr>
<td>C ) 24 Hours</td>
<td>15</td>
<td>15%</td>
</tr>
<tr>
<td>D ) Do Not Known</td>
<td>15</td>
<td>15%</td>
</tr>
<tr>
<td>3) The Frequency Of Giving Oral Rehydration Salt Solution Are:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A ) After Each Stool Pass</td>
<td>48</td>
<td>48%</td>
</tr>
<tr>
<td>B ) Quarter To Half Glass After Each Stool Pass For Child Below 2 Years</td>
<td>30</td>
<td>30%</td>
</tr>
<tr>
<td>C ) 1 Glass After Each Defecation For Children Above 2 Years Of Age</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td>D ) Do Not Know</td>
<td>19</td>
<td>19%</td>
</tr>
</tbody>
</table>
4) The Advantage Of Using Oral Rehydration Solution Is:

<table>
<thead>
<tr>
<th>Option</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A) Readily Available As Powder In 1 Pocket</td>
<td>11</td>
<td>11%</td>
</tr>
<tr>
<td>B) Continued When There Is Vomiting</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>C) Replaced Electrolytes And Water Lost From Body</td>
<td>66</td>
<td>66%</td>
</tr>
<tr>
<td>D) Do Not Know</td>
<td>21</td>
<td>21%</td>
</tr>
</tbody>
</table>

Table 1: Assessment of mother practice among Oral Rehydration Therapy for their child with diarrhea.

<table>
<thead>
<tr>
<th>Items</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Items Frequency Percentage%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5) Oral Rehydration Salt Packets Are Available At:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A) Health Center</td>
<td>49</td>
<td>49%</td>
</tr>
<tr>
<td>B) Hospital</td>
<td>14</td>
<td>14%</td>
</tr>
<tr>
<td>C) Medical Shop Pharmacological</td>
<td>26</td>
<td>26%</td>
</tr>
<tr>
<td>D) Do Not Know</td>
<td>11</td>
<td>11%</td>
</tr>
<tr>
<td>6) Precaution To Be Taken While Using ORS :</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A) Store It In A Cool Dry Place In A Closed Conditioner</td>
<td>29</td>
<td>29%</td>
</tr>
<tr>
<td>B) Prepare Fresh Solution Each Time</td>
<td>44</td>
<td>44%</td>
</tr>
<tr>
<td>C) Avoid Soft Drinks And Sweetened</td>
<td>11</td>
<td>11%</td>
</tr>
<tr>
<td>D) Do Not Know</td>
<td>16</td>
<td>16%</td>
</tr>
<tr>
<td>7) The Oral Fluid Intake While Using ORS :</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A) Restricted</td>
<td>6</td>
<td>6%</td>
</tr>
<tr>
<td>B) Increased</td>
<td>26</td>
<td>26%</td>
</tr>
<tr>
<td>C) Stopped Completely</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>D) Usual Amounts</td>
<td>45</td>
<td>45%</td>
</tr>
<tr>
<td>8) The Available Fluid That Can Be Given During Diarrhea Are :</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A) Rice Water With Salt</td>
<td>56</td>
<td>56%</td>
</tr>
<tr>
<td>B) Tea</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>C) Soups</td>
<td>30</td>
<td>30%</td>
</tr>
<tr>
<td>D) Boiled Cooled Water</td>
<td>8</td>
<td>8%</td>
</tr>
<tr>
<td>9) Fluid given during ORS :</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A) Home Available Fluid</td>
<td>21%</td>
<td>21%</td>
</tr>
<tr>
<td>B) Oral Rehydration Salt Solution</td>
<td>26%</td>
<td>26%</td>
</tr>
<tr>
<td>C) Sugar Salt Solution</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>D) Only Drugs</td>
<td>14%</td>
<td>14%</td>
</tr>
</tbody>
</table>
Table (1) The table stated that majority of mothers (62%) they prepared 1 liter of boiled cooled water, while (22%) of them prepared by 1 glass of boiled cooled water and (15%) of them they do not known, shows that (45%) of mothers they knew that Oral Rehydration Salt should be used within 6 hours, while (15%) of 1 them they knew with 24 hours, and (25%) of mother used within 12 hour, Regarding the frequency of giving Oral Rehydration Salt (48%) of mothers giving after each stool pass, while (19%) of them they do not known. Also the table show that (66%) of mothers knew that Oral rehydration Salt replaced electrolytes and water lost from the body, and (21%) they do not known. Regarding Oral Rehydration Salt available (49%) of mothers knew are available at Health center. And (11%) they do not known. Also the table shows that (29%) of mothers store it in a cool dry place in closed conditioner and (16%) they do not known. Also the table shows that (45%) of mothers using usual amounts of fluid, while using ORS. Also the table shows that (26%) of mothers given during ORS. The table shows that (56%) of mothers giving to the child Rice water with salt, while (30%) of them giving soups, only (21%) of them given Home available fluid. Table (1) shows that (64%) of mothers their age between (20-30) years, while (1%) of mothers their age between (41-50) years, this result is similar to the finding of (Makkia, 2004) who found that (70%) of mothers their age between (20-30) years. Also table (1) shows that (56%) of mothers graduate from primary school and (5%) of them graduate from institution and university, this result disagree with the study done by (United Nations Children’s(2002)) who found that the high percentage of mothers their level of education read and write. Also the table (1) according to the occupation that (93%) of mothers were unemployed, this result disagree with the study done by (Makkia, 2004) who found that (45%) of mothers unemployed. Table (2) shows that (48%) of child their age less than one year, this results agree with the study done by (Enzley (1997)) who found that in his study regarding diarrhea the majority of the child their age less than one year. also the table (2) shows that (65%) of child male and (35%) of them female this result opposite of the study done by (WHO (2002)) who found in this study (60%) of them female, regarding birth order of the child (34%) of child their birth order second and (24%) of them order are first. also the table shows that (52%) of child artificial feeding this result agree with the study done by (WHO (2002)) who found that in this study (70%) of child have diarrhea they on artificial feeding. Table (3) show that (62%) of mothers prepared ORT by 1 liter of boiled cooler; water this result disagree with the study done by (Snyder, Merson(2000)) who found that majority of mothers do not known who to prepared ORT, and the table shows that (46%) mothers they knew that oral rehydration salt should be used with 6 hours this result disagree with the study done by (WHO (2002)) who found that (60%) of mothers prepared with the 24 hours. Regarding the frequency of giving oral rehydration salt (48%) of mothers giving after each stool pass, this result agree with the study done by (Snyder, Merson(2000)) who that (< 55%) of mothers giving oral rehydration salt after each stool pass. Also the table shows that (66%) of mothers knew that ORT replaced electrolytes and water lost from the body this study agree with the study done (Claeson (2006)) who stated that in their study the majority of mothers knew that ORT replace fluid in child body Also table (3) shows that (49%) of mothers knew that ORT are available at health center, this result disagree with the study done (Santosham (2002)) who found that in their study the majority of mothers knew that ORT are available at hearth center. Also the table shows that (29%) of mothers store it in a cool dry place in dosed conditioner this result agree with the study done by (Bern (2000)) who found that most of mothers store ORT in a cool dry place. Also our results shows that (45%) of mothers using usual amount of fluid while using ORS and (26%) of them increased fluid this study disagree with the study done by (Martines(2000)) who found that the majority of mothers they give ORT only without any others kind of fluid Also our results shows that (56%) of mothers giving to the child Rice water with salt, while (30%) of them giving soups, this results agree with the study done by (United Nations Children’s(2002)) who found that (60%) of them giving Rice water with salt.

Conclusion

According to Interpretation and discussion of the study finding the following conclusion were driven:

- (64%) of mothers their age between (20-30) years.
- (56%) of mothers graduate from primary school.
- (93%) of mother were unemployed.
- (48%) of child their age less than one year.
(52%) of child were artificial feeding.

(62%) of mothers prepared ORT in 1 liter of boiled water.

(48%) of mothers giving ORS after each stool pass.

(29%) of them store it in a cool dry place.

**Recommendations:** Based on the results of present study, the researchers recommended the following:

1. health education should be done regarding preparing of oral rehydration therapy.

2. mass media should play a role in educating the family.

3. further study should be done in a large group.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the F College of Nursing and all experiments were carried out in accordance with approved guidelines.

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3. Sftcharin R. principles of Pediatric Nursing churci!


Isolation and Identification Bacteria Species and Study Epidemiological Features to Burns Patients in Al- Yarmook Teaching Hospital

Faraj, H. Johni 1, Abdulla L. Jiad2

1Ph.D. Physiology, Technical medical institutes/Baghdad, 2Assist. prof., Technical medical institutes/Baghdad

Abstract

The present study was conducted to identify the correlation between some epidemiological and bacterial characteristics of burn patients and their complications for the period from October to March 2018 for patients who were visiting or staying at AL- Yarmook hospital. One hundred patients were randomly selected after being examined and diagnosed by a specialist. The pre-prepared questionnaire for the epidemiological features of each patients, which included sex, age, marital or economic status, location of residence and the nature of the work of the patients was filled. While the bacterial side included the collection of skin swabs from areas exposed to burns (skin) and to all patients under sterile conditions and under the supervisions of the doctor supervisor the treatment of infected cases. Samples were transferred to the laboratory to complete bacterial laboratory test. Samples were planted on the special and general culture, and bacterial growth was observed followed by final diagnosis of isolates. The results showed that the rate of infection was high in females compare males (63% to 37%) respectively. While the incidence of burns was high in patients aged (16-30) 52%. The rate of infections was also high in patients with poor families (54%) while those living in rural areas had high rates of infection (41%).

The results of primary bacterial transplantation gave a high positive result (78%). The total isolates obtained from all initial transplant samples were 92% isolates and a percentage (117.9%), a high and satisfactory rate. Gram negative bacteria isolates showed a higher frequency than gram positive (73.9) and (26.06%) respectively.

It was noted that Pseudomonas spp was very high (48.9%) compared with rest of the positive or negative bacteria isolates, where the frequency presence of Klebsiella spp, Staphylococcus spp, Streptococcus SPP (25%), (18.4%), (7.6%) respectively. The results of the present study include the importance of epidemiological aspects in the cases of burns, whether as factors that assist or are ready to be injured or accelerated in the healing of the infected cases, in addition to the importance of early bacterial diagnosis of infection to control the complications of secondary infection of bacteria in cases of burns and thus easy medical treatment.

Keywords: bacteria, epidemiological features, burns, patients

Introduction

The most common burns and damage to body tissue which causes the immune system inhibition of the injured body, making it vulnerable to the various complications that causes various types of pathogens 1. High mortality was noted in cases of burns and associated bacterial infections 2. Burns destroy skin tissue responsible for protecting the body from the pathogenic and bacterial pathogens, which become an important and appropriate medium for the growth and reproduction of pathogenic bacteria, leading to various diseases 3. Burns occur for different reasons as well as different ways and means. Burns in children under the age of eight year are often burns, hot water or boiling water vapor 4. Burns caused by direct burning fire are the second most common cause of burns after water, liquids or hot steam 5. Other types of burns occur as a result of exposure to heat centrally and for a very short period such as burns caused by
incendiary gases such as propane, butane, oil purification gases, alcohols and other combustible liquids. Burns also occur as a result of direct contact with hot metals, liquids plastics, hot gases. Chemical burns are known to be burns caused by the exposure of the human body to chemical solution concentrated or containing chemical composition of burning materials such as caustic side, it has been observed that most of these burns are very influential on the tissues of the body of the patient, leading to the formation of thrombocytopenia of the skin and epithelial tissues and muscles lining and very quickly before removal. The burning skin tissue attacks several types of bacterial pathogens due to the severe damage caused by burns to the body tissues or to the self-immunity of the patient with burns, leading localized infections which increase with time, local sepsis, and septicemia cases which complicate burns and delay treatment or recovery which sometimes lead to death of the patient. It was noted that Pseudomonas and Klebsiella are among the most important bacterial pathogens that are contaminated or associated with burns which cause significant damage to the infected cases, some of which may lead to death, while studies indicate that Staphylococcus bacteria and Streptococcus are also Gram positive bacteria responsible for injuries associated with burns which have somewhat lower effect than the factors first mentioned in the severity of the impact or damage.

Aims

The present study aims at identifying some of the epidemiological characteristics of cases of burns related to patients such as sex, age, marital or economic status, location or place of residence, as well as the nature of the work of the person suffering from burns. The study also isolates and diagnosis some of the most common pathogenic bacterial pathogens (usually secondary infections or burns) to burn patients at Al- Yarmook teaching hospital and during six months research period only.

Patients and Methods

1- Patients : the study examined 100 randomly selected patients (males and females), between the age of (4-45) years who were visiting or staying at Al-Yarmook teaching hospital (burns division) for the period 10 October to 30 March 2019. where they examined and diagnosis clinically by the specialist doctor as all of them cases of burns due to various causes and the various degree of disease and the quantity and quality of burns (whether flame or burning with warm water) and range or intensity degree burns between 15-75%.

2- Epidemiological aspects: A questionnaire was developed in the research to identify some characteristics or epidemiological profile of burn cases, which include information on patients with burns. It was filled by the researchers and supervised by the treating physician for each case. The questionnaire included sex, age, marital or economic status, place of residence (place, nature of work of the injured person).

The study sample was divided by age into three groups:

<table>
<thead>
<tr>
<th>First age group</th>
<th>The age of patients with burns range 5-15 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second age group</td>
<td>The age of patients with burns range 16-30 years</td>
</tr>
<tr>
<td>Third age group</td>
<td>The age of patients with burns range 31-45 years</td>
</tr>
</tbody>
</table>

The study classified the living or economic situation into three categories of agencies:

* Good quality: the families whose average monthly income exceeds above five hundred thousand dinars

** Average class: for families whose average monthly income ranges from two hundred and fifty thousand to five hundred thousand dinars.

*** Poor category: for families whose average monthly income less than two hundred and fifty thousand dinars.

While the studied cases of burns according to the location of housing by distance from the city of Baghdad to:

1- Rural housing: for families living in the countryside surrounding the city of Baghdad which are often cases of the arrival of Baghdad.

2- Civil housing: for the families who living in the city of Baghdad and nearby cities of the civilian nature of housing.

3- Rural housing –civil: for families living in areas...
that mix the rural civil character of living.

While the nature of the work of the patients was mainly male, which is often free work irregular in the state departments, in addition to some cases of disease for females, which was explained in the results, which were also due to the work of females outside the home, which is almost limited.

4- Bacterial side: for the purpose of identifying some of the bacterial cases associated with burns, swabs were taken for burns from the patients and they were removed from the burns and administrated by medical staff supervising the treatment in the hospital. The cotton swabs where the placed in sterile test tube containing a buffer solution to maintain intact bacterial pathogens. Test tube were transferred steriley to the laboratory (11).

in vitro samples were cultured on blood agar, Mac Conkey agar and nutrient agar, and incubated for 24-48 hours at 37 c., (12). The isolates as follows:

1- Macroscopic appearance: the examination included identification of the shape, size, color, nature of the outer edges of the colony as well as its texture.

2- Microscopic appearance: the isolates were examined after staining by gram stain.

3- Biochemical tests: several tests were used to diagnosis or differentiation to arrive at the final diagnosis (13).

Results and Discussion

The present study indicates that the number of cases diagnosis as burns was 37 cases in males while 63 cases were in females. All cases studied (100) were the same percentage of cases as shown in table (1). The number of infection and their percentage in females is 63% compared to 37% in females respectively. The nature of house work and their preoccupation with household matters, especially with regard to cooking or near sources of burns such as direct fire, hot steam during the day (14). The results of this study agree with the findings of, Mayhall, 2003, (15) that the incidence of burns affects females more than males because of the nature of work of females work in cooking and direct contact with the source of fire. Table (1) showed distribution of burns according to age group of (16-30) years had a high incidence of infection at 52% while the age group (5-15) years with a lower accidence of burns, 30%. The infection rate in the age group (31-45) years was the lowest in the infection which reached 18%. The results indicate that the third group had the lowest rate of infection, which may be due to the effect of age in the injury in which the person at this age is more mature and aware and experience to enable it keep away or reduce the chance of burns. The injuries were very high (52%) in the middle age group (16-36) which may be due to this age is working in various household or work matters, wither male or female (16), while the injuries in the first group (5-15) years were 30%, and this percentage reflect the relationship between burn and age. Especially children they are more susceptible to burns for different reasons (12). The results of the current study indicated in the table (2) that the cases of burns diagnosed clinically were distributed in varying degrees in terms of the living or economic situation where the incidence of burns in the family members of the vulnerable category was 54% while the rate of infection in individuals or families of the middle class 29%, while at a slightly lower rate was 17% in the good category. It is noted from the proportions of the distributions of status that the living conditions associated with the general income families play an important role in the creation of the means of or tools, devices or equipment that may ensure the individual to move away or reduce the sources of exposure to burns and this conclusion is consistent with the findings of many researchers (17).

Table (1): Percentage of distribution of burns cases according to the sex and age group.

<table>
<thead>
<tr>
<th>Age group</th>
<th>Infected cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5-15)</td>
<td>30(30%)</td>
</tr>
<tr>
<td>(16-30)</td>
<td>52(52%)</td>
</tr>
<tr>
<td>(31-45)</td>
<td>18(18%)</td>
</tr>
<tr>
<td>Total</td>
<td>100(100%)</td>
</tr>
</tbody>
</table>
Table (2); Percentage of distribution of burns status according to the marital or economic situation and location of residence.

<table>
<thead>
<tr>
<th>Living situation</th>
<th>Infected cases</th>
<th>Location of residence</th>
<th>% for infected cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good quality</td>
<td>17(17%)</td>
<td>Rural accommodation</td>
<td>36(36%)</td>
</tr>
<tr>
<td>Middle quality</td>
<td>29(29%)</td>
<td>Civil housing</td>
<td>23(23%)</td>
</tr>
<tr>
<td>Bad class</td>
<td>54(54%)</td>
<td>Rural housing – civil</td>
<td>41(41%)</td>
</tr>
<tr>
<td>Total</td>
<td>100(100%)</td>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table (3); First bacterial transplantation and distribution of positive and negative cases of cultivation

<table>
<thead>
<tr>
<th>Total no. of smears</th>
<th>Positive smears</th>
<th>Negative smears</th>
<th>Dingle growth</th>
<th>Mixed growth</th>
<th>Total numbers of isolated</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>78(78%)</td>
<td>22(22%)</td>
<td>14(14%)</td>
<td>53(53%)</td>
<td>92(117.9%)</td>
</tr>
</tbody>
</table>

Table (4); Results of distribution of bacterial isolates

<table>
<thead>
<tr>
<th>Total no. of isolates</th>
<th>G+ isolates</th>
<th>Staphylococcus</th>
<th>Streptococcus</th>
<th>G- isolates</th>
<th>Pseudomonas</th>
<th>Klebsiella</th>
</tr>
</thead>
<tbody>
<tr>
<td>92</td>
<td>24(26%)</td>
<td>17(18.4%)</td>
<td>7(7.6%)</td>
<td>68(73.9%)</td>
<td>45(48.9%)</td>
<td>23(25%)</td>
</tr>
</tbody>
</table>

Table (5); Results of laboratory tests for isolation and diagnosis of isolates (92 bacterial isolation)

<table>
<thead>
<tr>
<th>Bacterial isolates</th>
<th>Catalase</th>
<th>Oxidase</th>
<th>Coagulase</th>
<th>Movement</th>
<th>Gram’s stain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staphylococcus spp.</td>
<td>+</td>
<td>_</td>
<td>+</td>
<td>_</td>
<td>G+cluster</td>
</tr>
<tr>
<td>Streptococcus spp.</td>
<td>_</td>
<td>_</td>
<td>_</td>
<td>_</td>
<td>G+long chains</td>
</tr>
<tr>
<td>Pseudomonas spp.</td>
<td>+</td>
<td>+</td>
<td>_</td>
<td>_</td>
<td>G-rod shape</td>
</tr>
<tr>
<td>Klebsiella</td>
<td>+</td>
<td>_</td>
<td>+</td>
<td>_</td>
<td>G-rod shape</td>
</tr>
</tbody>
</table>

The results of the first implantation of the skin lesions samples from burned skin areas which occurred more than 24 hours and less than ten day ago, showed that the number of cases of bacterial transplantation (containing bacterial growth) was 78 cases out of a total of 100 studied cases (78%) while 22 did not give positive results for the first bacterial transplant. These results are consistent with the (19) incidence of skin lesions of burns with a recurrence rate of 86.5% for the first bacterial transplant, as well as for (20) of the number of skin
lesions that give a negative result of bacterial cultures in his research was 18% (table 3). Bacterial growth rate (78%), which gave 14 single bacterial growth (bacterial isolates of one bacterial species) was 17.9% while the combined bacterial growth (each containing more than one bacterial strain) was positive 53% and 67.9% respectively. The bacterial isolates obtained from all Petri dishes showed 92 bacterial isolation and 177.9% (table 3). After bacterial isolating observed that the primary cultures media and carrying out isolation and identification of bacteria, frequency of gram positive bacteria isolates was 24(26.06%) while the frequency or recurrence of Gram negative bacteria isolates 68 (73.9%) which confirm that we have indicated that Gram negative bacteria is highly susceptible to infection and invasion of tissues exposed to burns, and occupied Pseudomonas spp. The highest incidence was 45(48.9) while the presence of Klebsiella spp. At a lower rate than the previous 23 (25%) table (4), while types of Gram positive bacteria were 17 (18.4%) and 7(7.6%) for Staphylococcus aureus and Streptococcus pyogenes. The results of isolation and diagnosis agree with, Muir, 1987, he was found Gram negative bacteria is more presence or recurrence in cases of burns for their ability to produce large amounts of factors and enzymes in infected tissues in addition to toxins that affect on skin tissues which helps in the poisoning of the body (generalized septicemia). The present study also agreed with its findings, Maitra, 2003 that pseudomonas spp the most frequent cases of burns because they are opportunistic bacteria which find tissues infected burns a good medium for growth and reproduction, as well as being one of the most important bacterial species that causes nosocomial infection which transmitted easily. Klebsiella spp is one of the Gram negative bacteria which is infected burns and existed 23 (25%) and this percentage agreed with, Bowler, 2001.

The results of isolation and diagnosis showed that the positive bacterial species were found somewhat lower than those of Gram negative bacterial according to nature and requirement of this type of bacteria. Presence of Staphylococcus ssp more than Streptococcus ssp (18.4%) and (7.6%) respectively, and these results are agreed with, Emmerson, 1994. Staphylococcus aureus is still one of the most of Gram positive bacteria contaminated for hospitals and causes sever skin sores damage. With regard to streptococcus infection is similar to Staphylococcus for nutritional requirement and reproduction, which is often attributed to 20% of septic episodes of skin burns in patients.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Technical medical institutes and all experiments were carried out in accordance with approved guidelines.

**References**


6- Yarbrough DR. Burns due to aerosol can explotions . Burns. 1998; 24: 270.


Critical Care Nurses’ Knowledge about Pulmonary embolism in Respiratory Care Unit in Baghdad Teaching Hospitals

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Abstract:

Aim of the study: To assess the nurses’ knowledge about pulmonary embolism

Methodology: A descriptive design study was carried out for the period of November 18th 2018 up to the 20th of April 2019. Anon-probability (purposive) samples of (60) a nurse work at respiratory care unit in Baghdad Teaching Hospitals from different educational levels, both sexes (males and females), were selected. The instrument questionnaire tool consists of two parts, First part consist of (6) items included, age, gender, level of education, number of years of employment in hospital, number of experience in the respiratory care unit and training course about pulmonary embolism. & second part consist of (4) domains which included Nurses knowledge concerning definition and causes of disease, signs and symptoms, diagnostic test, treatment of pulmonary embolism. The data have been analyzed through the application of: descriptive and the inferential analysis, and the researcher used the SPSS version 20 to analysis of data.

Conclusion: The study recommend that the critical care nurse have moderate level of knowledge and there were significant association between level of education and the nurse knowledge at p > 0.05 level.

Keywords: Nurses’ Knowledge, Pulmonary embolism, Baghdad Teaching Hospitals.

Introduction

Pulmonary embolism is a common complication of hospitalization and contributes to 5 to 10 percent of deaths in hospitalized patients, making it one of the leading causes of preventable hospital deaths ¹,². Despite it being an enormous health problem, the true incidence of pulmonary embolism is uncertain. The diagnosis of cyst venous thrombi and pulmonary emboli can be difficult and requires specialized imaging techniques that are not available in all hospitals or healthcare settings ². The diagnosis of pulmonary embolism (PE) is missed more often than it is made, because PE often causes only vague and nonspecific symptoms. pulmonary Embolism is an extremely common and highly lethal condition and that is why it is a leading cause of death in all age groups. Risk factors for venous thromboembolic disease include increasing age, prolonged immobility, surgery, trauma, malignancy, pregnancy, congestive heart failure, and diseases that alter blood viscosity⁴. Pulmonary embolism (PE) is a life threatening condition with the potential to masquerade as a variety of common disorders, and no single test exists for its definitive diagnosis. Clinically, PE is categorized into acute massive PE, acute medium / small PE, & chronic PE. It is the third most common acute cardiovascular disease, after myocardial infarction & stroke ⁵.
diagnostic test, treatment of pulmonary embolism. The instrument develop constricted by researcher through reading textbox and review of literature. The content validity of the instrument format is established through a panel of (8) experts. They are (9) faculty members from the College of Nursing /University of Baghdad. These experts have more than 10 years of experience in their specialist with a mean (18) year, and (SD=11.4). They were asked to review the questionnaire whether they multiple choice questions (items). Data were collected through using a constructed questionnaire and Self reporting through an interview technique with the nurses as means of data collection. The self-report of the questionnaire and interview took approximately 10–15 minutes for each nurse. The 0.5 the level of significance was used as a standard to determine if there was a significant difference in the nurses’ knowledge according to (age, gender, level of education and years of employed in hospital) Each items students knowledge was ranked according to the following scale as follow: know = 3, uncertain= 2, do not know=1. Data are analyzed through the use of the statistical package of social sciences (SPSS) version 20.0.

Results and Discussion

The analysis of socio-demographic characteristics in table (1) The findings show the majority of the study were male who accounted for (63.3%) of the total participants. The results supported by6, they noticed that the (54%) of nurses in sample study were male. Most of the study participants (55%) were ages between 20 and 26 years old. These findings agreed with study done by7, stated That the majority of the sample in their study was college and post educational graduated. A high percentage of them were most of them (34.3%) were for (1-5) years were employment in nursing, majority of them (58.3%) were for (1-5) years, have experiences in RCU and finally majority of nurses (58.3%) have no training session in Respiratory care unit. These results similar with study done by, who reported that (27%) of participants hasn’t taking any training session (71%) of the study sample have experiences in (1-5) years in EM. It is supported by8, study done by9, who reported Majority of the respondents (41.2%) were of age group 25-29 years. Nearly half of them (45.9%) had completed certificate nursing and were working as staff nurse (87.1%). Majority (22.4%) were working in ICU. About 39% of them had been working for less than 5 years in the institution. Table 2.A,B,C,D depicted that nurses had a low level in Nurses knowledge concerning definition and causes of disease in (8) and,(13) items, nurses had a low level in Nurses knowledge concerning signs and symptoms of pulmonary embolism in item (3 and 8) items and, diagnostic test in item(6) and, concerning treatment of pulmonary embolism in item (1 5 and, 8) item(drink plenty of fluids in the traveling for a long time, to prevent formation of pulmonary clots. These results agree with supported by study done in Rwanda by10, who found that nurses working in ICU had poor knowledge and bad attitudes towards pain assessment and management. Table 3 demonstrates the association between sociodemographic and nurses knowledge score was explored. There are association between level of education and studied sample knowledge at p value 0.05 and also illustrate that no relationship found with rest of studied variables which are (age groups, gender and years of employment in RCU at p value 0.05. These finding is supported by 11, who that founds the majority of the respondents were black, married, from the Free state province only 38 (11.0%) knew the three main clinical manifestations associated with chronic disease. Level of school education, race and language were statistically significantly associated with knowledge level where as age and marital status were not. The findings of present study shows that there were not significant differences between gender and nurses knowledge about PE at P ≤0.05 value.

Table (1) assessment of nurses knowledge toward definition and causes of disease.

<table>
<thead>
<tr>
<th>NO.</th>
<th>Items</th>
<th>Know</th>
<th>Do not know</th>
<th>Uncertain</th>
<th>MS</th>
<th>Levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Domain I: Nurses knowledge concerning definition and causes of disease:</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Pulmonary embolism is a blockage of a central blood vessel in the arteries of the lungs.</td>
<td>45</td>
<td>6</td>
<td>9</td>
<td>2.65</td>
<td>M</td>
</tr>
</tbody>
</table>
Pulmonary embolism occurs due to circulate blood clots to the lungs from the legs.

Pulmonary embolism is a dangerous condition that can cause permanent damage to the lungs. The causes of pulmonary embolism are accurately not known. Cancer tumors is not a cause of pulmonary embolism. Air bubbles are one of the factors contributing to pulmonary embolism. Fatty deposits that enter the blood vessels when a fracture occurs in the bones are one of the factors contributing to pulmonary embolism. Amniotic fluid embolism is one of the causes of pulmonary embolism. Smoking cannot cause pulmonary embolism. The genetic factor is one of the factors contributing to pulmonary embolism.

<table>
<thead>
<tr>
<th>No.</th>
<th>Statement</th>
<th>Score</th>
<th>Accuracy</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Pulmonary embolism occurs due to circulate blood clots to the lungs from the legs.</td>
<td>38</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>Pulmonary embolism is a dangerous condition that can cause permanent damage to the lungs.</td>
<td>39</td>
<td>4</td>
<td>17</td>
</tr>
<tr>
<td>4</td>
<td>The causes of pulmonary embolism are accurately not known.</td>
<td>14</td>
<td>19</td>
<td>27</td>
</tr>
<tr>
<td>5</td>
<td>Cancer tumors is not a cause of pulmonary embolism.</td>
<td>3</td>
<td>36</td>
<td>21</td>
</tr>
<tr>
<td>6</td>
<td>Air bubbles are one of the factors contributing to pulmonary embolism.</td>
<td>38</td>
<td>13</td>
<td>9</td>
</tr>
<tr>
<td>7</td>
<td>Fatty deposits that enter the blood vessels when a fracture occurs in the bones are one of the factors contributing to pulmonary embolism.</td>
<td>30</td>
<td>9</td>
<td>21</td>
</tr>
<tr>
<td>8</td>
<td>Amniotic fluid embolism is one of the causes of pulmonary embolism.</td>
<td>0</td>
<td>42</td>
<td>18</td>
</tr>
<tr>
<td>9</td>
<td>Smoking cannot cause pulmonary embolism.</td>
<td>25</td>
<td>14</td>
<td>21</td>
</tr>
<tr>
<td>10</td>
<td>The genetic factor is one of the factors contributing to pulmonary embolism.</td>
<td>31</td>
<td>11</td>
<td>18</td>
</tr>
<tr>
<td>11</td>
<td>Surgery is not one of the main causes of pulmonary embolism.</td>
<td>4</td>
<td>36</td>
<td>20</td>
</tr>
<tr>
<td>12</td>
<td>Cardiovascular diseases increase the risk of disease.</td>
<td>28</td>
<td>13</td>
<td>19</td>
</tr>
<tr>
<td>13</td>
<td>Sleeping in bed for a long time increases the risk of infection.</td>
<td>0</td>
<td>39</td>
<td>21</td>
</tr>
<tr>
<td>14</td>
<td>Pregnancy increases the risk of disease.</td>
<td>24</td>
<td>11</td>
<td>25</td>
</tr>
<tr>
<td>15</td>
<td>Contraceptive can increase the risk of disease.</td>
<td>27</td>
<td>19</td>
<td>14</td>
</tr>
<tr>
<td>16</td>
<td>Obesity may be increase the risk of disease.</td>
<td>34</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>17</td>
<td>Frequent travel may be increases the risk of pulmonary embolism.</td>
<td>31</td>
<td>11</td>
<td>18</td>
</tr>
<tr>
<td>18</td>
<td>Pulmonary embolism can be life-threatening.</td>
<td>46</td>
<td>6</td>
<td>8</td>
</tr>
</tbody>
</table>
Table 2: Assessment of nurses’ knowledge toward signs and symptoms of disease:

<table>
<thead>
<tr>
<th>Items</th>
<th>Know</th>
<th>Do not know</th>
<th>Uncertain</th>
<th>Level(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO. 1: Domain II: Nurses knowledge concerning signs and symptoms of pulmonary embolism</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>1 Sudden shortness of breath is a symptom of pulmonary embolism and not relieved by the rest</td>
<td>39</td>
<td>9</td>
<td>12</td>
<td>2.50</td>
</tr>
<tr>
<td>2 The presence of acute pain in the chest increases with coughing, is a symptom of the disease</td>
<td>46</td>
<td>3</td>
<td>11</td>
<td>2.71</td>
</tr>
<tr>
<td>3 Fever is not a symptom of the disease</td>
<td>0</td>
<td>40</td>
<td>20</td>
<td>1.33</td>
</tr>
<tr>
<td>4 Presence of pain, swollen or both in the leg is a symptom of pulmonary embolism</td>
<td>23</td>
<td>6</td>
<td>31</td>
<td>2.28</td>
</tr>
<tr>
<td>5 Pallor is a symptom of pulmonary embolism</td>
<td>26</td>
<td>7</td>
<td>27</td>
<td>2.31</td>
</tr>
<tr>
<td>6 Dizzy is not a symptom of pulmonary embolism</td>
<td>2</td>
<td>33</td>
<td>25</td>
<td>1.48</td>
</tr>
<tr>
<td>7 Cough with sputum is a symptom of pulmonary embolism.</td>
<td>26</td>
<td>10</td>
<td>24</td>
<td>2.26</td>
</tr>
<tr>
<td>8 Excessive sweating is a symptom of pulmonary embolism.</td>
<td>2</td>
<td>44</td>
<td>14</td>
<td>1.30</td>
</tr>
<tr>
<td>9 Irregular or rapid heartbeat is not a symptom of pulmonary embolism</td>
<td>6</td>
<td>27</td>
<td>27</td>
<td>1.65</td>
</tr>
<tr>
<td>10 Pulmonary hypertension is a symptom of pulmonary embolism.</td>
<td>31</td>
<td>11</td>
<td>18</td>
<td>2.33</td>
</tr>
</tbody>
</table>

M.s=mean of score, Levels: Low(L) (1-1.33), moderate(M) (1.34-2.65), high(H) (2.66-3)

This table demonstrates nurses’ knowledge toward pulmonary embolism in respiratory care units. Which clearly depicted that nurses had a low level in Nurses knowledge concerning signs and symptoms of pulmonary embolism in item (3) (Fever is not a symptom of the disease) and item (8) excessive sweating is a symptom of pulmonary embolism.
Table (3) assessment of nurse knowledge toward diagnostic test of disease.

<table>
<thead>
<tr>
<th>Items</th>
<th>Know</th>
<th>Do not know</th>
<th>Uncertain</th>
<th>MS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO. Domain III: Nurses knowledge concerning diagnostic test of pulmonary embolism</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>1 Clinical examination is the first diagnostic test for pulmonary embolism</td>
<td>23</td>
<td>14</td>
<td>23</td>
<td>2.15 M</td>
</tr>
<tr>
<td>2 Complete blood count necessary to diagnose the pulmonary embolism</td>
<td>30</td>
<td>7</td>
<td>23</td>
<td>2.38 M</td>
</tr>
<tr>
<td>3 Chest X-ray is a test to diagnose pulmonary embolism</td>
<td>37</td>
<td>5</td>
<td>18</td>
<td>2.53 M</td>
</tr>
<tr>
<td>4 Magnetic resonance imaging is not a test for pulmonary embolism</td>
<td>8</td>
<td>31</td>
<td>21</td>
<td>1.61 M</td>
</tr>
<tr>
<td>5 Ultrasound waves are tests for pulmonary embolism</td>
<td>28</td>
<td>6</td>
<td>26</td>
<td>2.36 M</td>
</tr>
<tr>
<td>6 Computed tomography (CT) is not a test for pulmonary embolism</td>
<td>0</td>
<td>44</td>
<td>16</td>
<td>1.26 L</td>
</tr>
<tr>
<td>7 Electrocardiographs is a test required for pulmonary embolism</td>
<td>37</td>
<td>5</td>
<td>18</td>
<td>2.53 M</td>
</tr>
<tr>
<td>8 Pulmonary nuclear radiation is diagnostic of the disease</td>
<td>25</td>
<td>17</td>
<td>18</td>
<td>2.13 M</td>
</tr>
<tr>
<td>9 Doppler of veins are required test for pulmonary embolism</td>
<td>26</td>
<td>11</td>
<td>23</td>
<td>2.25 M</td>
</tr>
<tr>
<td>10 Angiography helps to diagnose pulmonary embolism</td>
<td>29</td>
<td>14</td>
<td>17</td>
<td>2.25 M</td>
</tr>
</tbody>
</table>

This table demonstrates nurses knowledge toward pulmonary embolism in respiratory care units. Which clearly depicted that nurses had a low level in Nurses knowledge concerning diagnostic test in item(6). (Computed tomography (CT) is not a test for pulmonary embolism).

Table (4) assessment of nurse knowledge toward diagnostic test of disease.

<table>
<thead>
<tr>
<th>Items</th>
<th>Know</th>
<th>Do not know</th>
<th>Uncertain</th>
<th>MS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO. Domain IV: Nurses knowledge concerning treatment of pulmonary embolism</td>
<td>F</td>
<td>F</td>
<td>F</td>
<td></td>
</tr>
<tr>
<td>1 Regularity of taking anticoagulants drugs is not important to reduce the formation of new blood clots</td>
<td>2</td>
<td>44</td>
<td>14</td>
<td>1.30 L</td>
</tr>
<tr>
<td>2 Minimizing the continuous sitting for a long time is not necessary to prevent blood clot.</td>
<td>22</td>
<td>14</td>
<td>24</td>
<td>2.13 M</td>
</tr>
<tr>
<td>3 Wear support socks to enhance blood circulation.</td>
<td>31</td>
<td>7</td>
<td>22</td>
<td>2.40 M</td>
</tr>
<tr>
<td>4 Trembling in the seat and flexing the ankles every 15 or 30 minutes helps reduce the risk of blood clots</td>
<td>37</td>
<td>8</td>
<td>15</td>
<td>2.48 M</td>
</tr>
<tr>
<td>5 Limit the intake of caffeine or alcoholic as they contribute to the loss of fluids.</td>
<td>0</td>
<td>44</td>
<td>16</td>
<td>1.26 L</td>
</tr>
</tbody>
</table>
Cont... Table (4) assessment of nurses knowledge toward diagnostic test of disease.

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Stand on the feet after surgery as possible to reduce the risk of blood clots.</td>
<td>34</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>7</td>
<td>Inserting a temporarily or permanently filter into a vena cava to prevent formation of blood clots.</td>
<td>31</td>
<td>10</td>
<td>19</td>
</tr>
<tr>
<td>8</td>
<td>Drink plenty of fluids in the traveling for a long time, to prevent formation of pulmonary clots</td>
<td>0</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>9</td>
<td>Air compression in the upper thigh or upper abdomen, which is enhance the blood flow</td>
<td>28</td>
<td>6</td>
<td>26</td>
</tr>
<tr>
<td>10</td>
<td>Non-adherent clothes in the waist area and legs does not prevent the formation of blood clots.</td>
<td>27</td>
<td>11</td>
<td>22</td>
</tr>
</tbody>
</table>

* M.s=mean of score, Levels: Low(L) (1-1.33), moderate(M) (1.34-2.65), high(H) (2.66-3)

Table (5): Analysis of variance for the differences between demographic characters of the study sample and nurses knowledge.

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Between Groups</td>
<td>.710</td>
<td>4</td>
<td>.812</td>
<td>.431</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>14.05</td>
<td>20</td>
<td>.652</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>14.76</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of education</td>
<td>Between Groups</td>
<td>7.69</td>
<td>4</td>
<td>.015</td>
<td>.006</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>9.35</td>
<td>20</td>
<td>.668</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>17.04</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>Between Groups</td>
<td>.150</td>
<td>1</td>
<td>.741</td>
<td>.352</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>16.61</td>
<td>23</td>
<td>.194</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>16.76</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Years of experiences</td>
<td>Between Groups</td>
<td>.140</td>
<td>2</td>
<td>.641</td>
<td>.452</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>15.61</td>
<td>23</td>
<td>.215</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>15.75</td>
<td>25</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

df. =degree of freedom, F=frequency, Sig. =significance

This table indicate that there is a significant differences between level of education and nurses knowledge, and no significant association between age , gender, years of experience and nurses knowledge.
Conclusion

Results revealed that the majority of the study were male who accounted for (63.3%) of the total participants while female constituted (36.7%). Most of the study participants (55%) were ages between (20-26) years old. A high percentage of them were having Nursing college and above (46.7%). Majority of them (58.3%) were employee (1-5) years in respiratory care unit. Majority of nurses’ (58.3%) have not training session about PE in RCU. Nurses’ knowledge concerning PE in RCU had moderate knowledge level, with respect to the total mean of score (MS) which was (50). There is a significant association between level of education and studied sample knowledge at p value 0.05.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Adult Nursing, College of Nursing, University of Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

References
Assessment of Calprotectin Protein in H. Pylori Positive Persons

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Abstract

Background: Helicobacter pylori (H. pylori) is amongst the most infectious and almost half of the country’s population is affected by a chronic bacterial infection. H. pylori evoke an inflammatory reaction of the host epithelium, leading to induction of immune cells which exhibit as gastritis. There is little knowledge of how H. pylori remain in the host’s antimicrobial agents, such as calprotectin (CP), which is found through an immune response. Objective: The purpose of this study was to evaluate the role of fecal calprotectin (FC) in subjects with gastric ulcer and correlation of it with H. pylori.

Methods: 25 patients with gastric ulcer and 25 healthy controls were included in a prospective study. Samples of blood are taken IgG antibody H pylori and stool specimen for measured of calprotectin level.

Results: All gastric ulcer patients infected with H pylori. From a total of 25 patients participating in this study 8 were man and 17 women with the mean age 40.6±15.8. There was a statistically meaningful difference between the groups analyzed (p=0.0001) dependent on the calprotectin level. Also found significant association between sex and calprotectin level according to the positivity of H pylori.

Conclusion: There’s a significant statistical between fecal calprotectin level and H. pylori infection in gastric ulcer patients.

Key words: Gastric Ulcer, H. pylori, Fecal Calprotectin.

Introduction

Gastric ulcer is one of the most frequent chronic gastrointestinal diseases characterized by a serious mucosal barrier defect. The gastrointestinal mucosa is covered by a single layer of epithelial cells accompanied by precarious elements of loose connective tissue laid under a thin layer of smooth muscle fibers. The gastric epithelium is not only exposed to its own acidic and enzymatic secretions in many people, but also to duodenal bile, highly prevalent Helicobacter pylori (H. pylori), frequently used non-steroidal anti-inflammatory drugs (NSAIDs) and alcohol intake. Gastric ulcers grow as a consequence of an inconsistency between harmful factors and gastric mucosa defense mechanisms. A stomach ulcer is a localized deep necrotic lesion affecting the entire thickness of the mucosa and the muscle is mucosa. Therefore, gastric mucosal damage is very common and can arise in so many patients as gastric ulcers. H. pylori are a widespread bacterial pathogen in the worldwide responsible for significant gastrointestinal morbidity. Helicobacter pylori is optimal for living in the stomach’s harsh, acidic environment. These bacteria have the ability to change their environment and reduce their acidity so they can survive. Whereas infections usually have no symptoms, they can proceed to other diseases, such as peptic ulcers and gastritis. Helicobacter pylori gastritis induces a combined acute and chronic inflammatory reaction that activates neutrophils and eosinophils, mast and dendritic cells. Calprotectin is a protein produced from endothelial cells following neutrophil inflammation and activation or attachment of the monocytes to endothelial cells. Calprotectin is an essential antimicrobial inflammatory factor, which is also an element of the host innate immune system. Calprotectin accounts for about 50% of the cytoplasmic protein content of the neutrophil and is a critical component of the host nutrient. Calprotectin plasma level is an important marker of inflammation. This protein is responsive to bacterial enzymes and
intestinal protease and can be used as a marker of inflammation of the gastrointestinal tract \(^5\). Calprotectin is bacterial deterioration resistant and stable in fecal samples for up to one week \(^11\). In the gastrointestinal tract, some inflammation improves the mucosal permeability, resulting in large amounts of calprotectin being released into the stool. There is a significant correlation between fecal calprotectin levels and inflammation or infection severity \(^5\), therefore this research was just to determine calprotectin levels in patients with gastric ulcer infected with Helicobacter pylori.

**Method and Patients**

This case-control study applied on (50 subjects was divided in to 25 patients complain from gastric ulcer and 25 healthy control). Totally, 25 individual had gastric ulcer infected with H. pylori were diagnosed by specialists’ physicians in the Imam Hussein Medical City in Karbala. Two ml of blood sample has been taken from gastric ulcer patients and healthy control for examined the H pylori antibody. H pylori antibody was performed by rapid chromatographic method according to leaflet that provides with kit (CTK) Company. Stool samples collected from study group participants to assess the calprotectin level. Fecal calprotectin was evaluated by using a commercially available rapid chromatographic method according to the procedure that provided with kit (CerTes Biotec Spain) Company. Obtained data of present research were analyzed statistically by using the SPSS version 18. The chi-square test was used for calculated mean, standard deviation and p value at 0.05 levels of data and compared between the studied groups.

**Results:**

The study population included 21 males and 29 females (gastric ulcer 8 males and 17 females, while males were 13 and females12 for the healthy group) with the age range15-71 years for the gastric ulcer patients, whilst healthy controls were 18-70 years. Statistically, there was no significant difference between patients and healthy control groups according to the sex and age as illustrated in table (1), also no found any association between positivity of calprotectin level and age group of patients, whereas there was significant difference in patients according to positivity of calprotectin level and gender (P value= 0.0001) as in table (2).

Interestingly, in patients with gastric ulcer, the value of fecal calprotectin was increased compression with healthy control group. Likewise, the present study was revealed the level of calprotectin was positive in 15 cases infected with H. pylori and the remainder had negative results for calprotectin. There was a highly significant correlation between patients and healthy dependent on the levels of fecal calprotectin (P- value= 0.01) see in table (1).

**Table 1: Fecal Calprotectin concentrations in healthy control and gastric ulcer patients with H pylori infection**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Case</th>
<th>Control</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>8 (32%)</td>
<td>13 (52%)</td>
<td>0.1</td>
</tr>
<tr>
<td>Female</td>
<td>17 (68%)</td>
<td>12 (48%)</td>
<td></td>
</tr>
<tr>
<td>Age group:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;25</td>
<td>5 (20%)</td>
<td>2 (8%)</td>
<td>0.4</td>
</tr>
<tr>
<td>25-50</td>
<td>13 (52%)</td>
<td>16 (64%)</td>
<td></td>
</tr>
<tr>
<td>&lt;50</td>
<td>7 (28%)</td>
<td>7 (28%)</td>
<td></td>
</tr>
<tr>
<td>M±Sd</td>
<td>40.6±15.8</td>
<td>42.3±14.7</td>
<td></td>
</tr>
<tr>
<td>Calprotectin Level:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>15 (60%)</td>
<td>0 (0%)</td>
<td>0.0001*</td>
</tr>
<tr>
<td>Negative</td>
<td>10 (40%)</td>
<td>25 (100%)</td>
<td></td>
</tr>
</tbody>
</table>
Table 2: Comparison of Fecal Calprotectin in both age and sex groups in gastric ulcer patients.

<table>
<thead>
<tr>
<th>Age group</th>
<th>Calprotectin Level</th>
<th>P- value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>&gt;25</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>25-50</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>&lt;50</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Female</td>
<td>13</td>
<td>4</td>
</tr>
</tbody>
</table>

Discussion

There are few studies in patients with gastric ulcer that assess the relationship between calprotectin and H pylori infection. The current study examined the level of calprotectin and determination the relationship between level of it and H pylori infection in patients suffering from gastric ulcer. Calprotectin is a calcium-binding neutrophil granulocyte protein that, when measured in feces, is well correlated with neutrophil infiltration of the intestinal mucosa, has antimicrobial activity and is resistant to both in vivo and in vitro enzyme degradation (Jellema P.et al, 2009) Calprotectin is an important regulatory protein in inflammatory reactions (Wang L.et al,2013 ; Eva Källberg. et al,2012)

Many Studies were performed on pediatric and adult patients with different gastrointestinal disorders have demonstrated a relation between fecal calprotectin concentrations and the severity of mucosal inflammation (Schoepfer AM. et al, 2009; Kolho KL. et al ,2006). Recently, Several studies found that FC levels in gastrointestinal disorders are statistically significantly higher compared to control (including gastritis, gastric ulcer, gastric carcinoma, duodenitis, ulcerative colitis, Crohn’s disease, colorectal carcinoma, colorectal polyps and another bowel diseases) (Shaodong Wang.et al,2013 ; Burak ÖzGeker.et al,2016). This study correspond with recent work done by Pedram (Pedram Ataee .et al, 2017) who found that the fecal calprotectin level higher in patients with colonization of H. pylori were compared in those without colonization. On the other hand, there was one study carried out by Montalto et al in 2010 (Montalto M.et al,2010). The current study concluded that the infection of H. pylori bacteria leads to increases in the fecal Calprotectin level. In addition, we believe the Calprotectin level can be useful for monitoring patients with H. pylori after its extirpation.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Community Health Department, Iraq and all experiments were carried out in accordance with approved guidelines.

References

2- Ayla D, Han R. Future perspective for potential Helicobacter pylori eradication therapies . Published Online. 2018; 13(6).


Knowledge and Awareness among Mothers Regarding Exclusive Breastfeeding in Holy Karbala City / Iraq

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1 Lecturer, 2 Assist lecturer, Community Health Department, Technical Institute of Karbala, AL-Furat Al-Awsat Technical University, Karbala/Iraq

Abstract

Background: World Health Organization (WHO) and United Nations Children’s Fund (UNICEF) “Exclusive breastfeeding (EBF)” is explained as “the infant receives only breast milk, no other liquids or solids. Its recommended for the first 6 months of life, and then complementary feeding should be started. EBF helps to reduce child morbidity and mortality from several diseases such as diarrhea, respiratory and / or ear infections and other infectious diseases, shielding lactation women from breast and ovarian cancer. In addition to offers societal economic and environmental benefits, The objective of this study was to assess the knowledge and awareness of exclusive breast feeding among mothers with a child < 2 years of age.

Method: A descriptive cross-sectional study was carried out in Health Directorate of Holy Karbala city. The study consist of (487) mothers how attendant to six Primary Health Care center (PHC). The collected data was done by direct interview with mothers and using a questionnaire form that designed based on the study objectives according to WHO criteria. Data were analyzed by SPSS “ Statistical Package for the Social Sciences”, the descriptive statistics included numbers (N) and percentage (%), and the inferential statistical test was done by using Chi-Square test ($\chi^2$), P-value (Probability of chance ) was equal or less than 0.05 considered as statistically significant to find for any association between the results variables.

Result: A total of 487 participants were included in the study and the rate of response was 92.7%. The highest percentage (66.3%) of study sample were full in the age group (21-30) years, and more than three quarters were lived in urban area. Nearly half of the study sample 47% had primary education and 60% those housewives, and the main source of information being family and friends (84.4%). As an overall assessment, 61.8% of the study sample had good knowledge and awareness about exclusive breastfeeding, with highly significant differences to education level, occupation residence of the mother.

Conclusion: Over half of the subjects had good knowledge and awareness of exclusive Breastfeeding. And, on the other hand, there was a very significant difference between education level, occupation and mother’s residence with a level of knowledge.

Keywords: knowledge, Awareness, Exclusive breastfeeding, Karbala city.

Background

Breast milk has the full nutritional requirements for health advancement that a baby needs. Additionally, it is safe and contains antibodies that help protect infants and boost immunity (1). Consequently, breastfeeding contributes to reduced infant morbidity and mortality due to diarrhea, respiratory or ear infections and other infectious diseases(2-4), and for mothers, breast and ovarian cancer risk is reduced (5). In addition, breastfeeding offers societal economic and environmental benefits (6). WHO recommends that children be exclusively breastfed for the first six months of life to achieve optimum growth, development, and health. Children should then obtain complementary foods that are nutritionally adequate and healthy when continuing to the breast for up to two years or more (6). According to WHO and UNICEF “exclusive breastfeeding” is explained as “the infant receives only breast milk, no other liquids or solids are given – not even water – with the exception of oral rehydration...
solution, or drops/syrups of vitamins, minerals or medicines”. Its recommended for the first 6 months of life, and then complementary feeding should be started. Whereas, breastfeeding should continue for 2 years age or beyond (7,8).

The aim of this study was to assess the knowledge and awareness towards exclusive breast feeding among mothers had a child aged < 2 years and find out any association between mothers and knowledge and awareness and some demographic characteristics.

Methods

We obtained the ethical and administrative approval on study from the research ethics committee in Karbala Health Directorate. After that, a verbal consent was taken from each mother prior to interview. A cross-sectional study was conducted to achieve the aim of the study. A total of 487 mothers of infants aged (1-24 months) was selected by simple random sampling and direct interviewed during the Period of the study with a response rate of 92.7%. The sample consist of, the mothers who attended six of primary health care (PHC) from Karbala City. Data collected by direct interview with mothers and using a questionnaire form that designed based on the study objectives. The collected data were analyzed by SPSS. The descriptive statistics included numbers (N) and percentage (%) and the inferential statistical test was done by Chi-Square test, P-value was equal or less than 0.05 considered as statistically significant used to test for any relationship between variables with the results.

Results

Table (1) displayed mother age distribution, the highest percentage (66.3%) was in the age group (21-30) years. Regard to the distribution the type of delivery, this table shows that (80 %) of the study sample was vaginal delivery; on the other hand, the distribution of residence, education level and the occupation of the respondents, the majority of readings were (76 %), (47 %) and (63 %) in the urban area, primary school and housewife respectively.

<table>
<thead>
<tr>
<th>The demographic characteristic</th>
<th>Total (N=487)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of mother</td>
<td>%</td>
</tr>
<tr>
<td>&lt;=20</td>
<td>76</td>
</tr>
<tr>
<td>21-30</td>
<td>323</td>
</tr>
<tr>
<td>31-40</td>
<td>82</td>
</tr>
<tr>
<td>&gt;40</td>
<td>6</td>
</tr>
<tr>
<td>Type of delivery</td>
<td></td>
</tr>
<tr>
<td>Vaginal delivery</td>
<td>386</td>
</tr>
<tr>
<td>caesarean section</td>
<td>101</td>
</tr>
<tr>
<td>Residence</td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>370</td>
</tr>
<tr>
<td>Rural</td>
<td>117</td>
</tr>
<tr>
<td>Primary school</td>
<td>229</td>
</tr>
<tr>
<td>Education level of mother</td>
<td></td>
</tr>
<tr>
<td>Secondary school</td>
<td>92</td>
</tr>
<tr>
<td>Institute</td>
<td>109</td>
</tr>
<tr>
<td>Collage or more</td>
<td>57</td>
</tr>
<tr>
<td>Occupation of Mother</td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>309</td>
</tr>
<tr>
<td>Other occupation’s</td>
<td>178</td>
</tr>
</tbody>
</table>
As in the field of the knowledge domain, table 2 showed (94%) of mother answered correctly about definition of (EBF), concerning the time of initiation the breastfeeding (92%) of study sample had correct answer, while over (80%) of the participates answered correctly about EBF can be reduce diarrheal, respiratory diseases, decrease hemorrhagic after delivery and helps mothers to get back to their weight before pregnancy quicker. (78.9%), (67.1) and (41.7%) of studied sample answered correctly about exclusive breastfeeding prevent pregnancy for at least one year after delivery, colostrum is the first vaccine for newborn and reduce incidence of ( breast and ovarian cancer for mothers), respectively.

### Table (2): knowledge Domain of study sample.

<table>
<thead>
<tr>
<th>Knowledge Domain about EBF</th>
<th>Yes</th>
<th>NO</th>
<th>I Don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NO.</td>
<td>%</td>
<td>NO.</td>
</tr>
<tr>
<td>EBF is giving breast milk for a minimum of 6 months.</td>
<td>458</td>
<td>94</td>
<td>14</td>
</tr>
<tr>
<td>Must be initiation of breastfeeding immediately at first hour after delivery.</td>
<td>448</td>
<td>92</td>
<td>18</td>
</tr>
<tr>
<td>EBF reduce diarrheal and respiratory diseases.</td>
<td>419</td>
<td>86</td>
<td>15</td>
</tr>
<tr>
<td>EBF decrease hemorrhagic after delivery.</td>
<td>409</td>
<td>84</td>
<td>27</td>
</tr>
<tr>
<td>BF Helps mothers return more rapidly to their pre-pregnancy weight.</td>
<td>404</td>
<td>83</td>
<td>23</td>
</tr>
<tr>
<td>EBF prevent pregnancy for at least one year after delivery.</td>
<td>384</td>
<td>78.9</td>
<td>13</td>
</tr>
<tr>
<td>Colostrum (breast milk for first 3 days) is considers the first vaccine for newborn.</td>
<td>327</td>
<td>67.1</td>
<td>36</td>
</tr>
<tr>
<td>EBF reduce incidence of breast and ovarian cancer for mothers.</td>
<td>203</td>
<td>41.7</td>
<td>177</td>
</tr>
</tbody>
</table>

Figure (1) illustrates the knowledge score toward exclusive breastfeeding, more than half of participants (61.8%) had a good and acceptable knowledge score and the rest (40 %) had a poor score.
According to the relationship of knowledge among lactating mothers and the demographic characteristic, not significant with the age of mother (P.value > 0.05), while the association was found to be statistically significant for each of (Type of delivery, Residence, Education level of mother and Mothers occupation) (P.value < 0.05) as shown in table (3).

Table (3): The distribution of studied samples according to association of the demographic characteristics with knowledge score.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Knowledge of mother</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Poor</td>
<td>Good &amp; Accepted</td>
</tr>
<tr>
<td>No.</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Age groups</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;=20</td>
<td>34</td>
<td>18.3</td>
</tr>
<tr>
<td>21-30</td>
<td>125</td>
<td>67.2</td>
</tr>
<tr>
<td>31-40</td>
<td>24</td>
<td>12.9</td>
</tr>
<tr>
<td>&gt;40</td>
<td>3</td>
<td>1.6</td>
</tr>
<tr>
<td>Type of delivery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal delivery</td>
<td>137</td>
<td>73.7</td>
</tr>
<tr>
<td>Caesarean section</td>
<td>49</td>
<td>26.3</td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary school</td>
<td>48</td>
<td>25.8</td>
</tr>
<tr>
<td>Secondary school</td>
<td>39</td>
<td>21</td>
</tr>
<tr>
<td>Institute</td>
<td>61</td>
<td>32.8</td>
</tr>
<tr>
<td>Collage or more</td>
<td>38</td>
<td>20.4</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>97</td>
<td>52.2</td>
</tr>
<tr>
<td>Other occupation’s</td>
<td>89</td>
<td>47.8</td>
</tr>
<tr>
<td>Total</td>
<td>186</td>
<td>100</td>
</tr>
</tbody>
</table>
Figure (2), show the main source of information about EBF. The most efficient source of information was family and friends (84.4%), while the internet, posters and booklets, workshops, local satellite channels, and school curriculum were less than (50%).

Figure (2): Distribution the sources of information of study sample.

Discussion

It is very important for all members of the community to understand the importance of EBF for every mother and her baby, for that we assess the knowledge and awareness towards exclusive breast feeding among mothers had a child aged <2 years in Karbala city.

In table (1) that illustrate the distribution the mother demographic characteristics, 66.3% were in the age group (21-30) years, it’s the same percentage in age group by Adrawa, A. P et al in Adjumani district 89.9% and Alamirew, M.W. et al in Ethiopia 66.9% (8,9).

Regarding the distribution the type of delivery, more than three quarters of the sample 79.3% had vaginal delivery “ Normal delivery “ that similar to AL-Abedi, N. et al in AL-Najaf City 74% (10), on the other hands regarding residency, education level and occupation of the participates, most of the results 76%, 47%, and 63% were from urban area, had primary school and housewife, respectively, that also agreed with AL-Abedi, N. et al (2016) and Joshi, S. in Navi Mumbai, Where they recorded their results as 28.7%, 30% and 94%, 70% for primary school and housewife (10,11).

Concerning to knowledge of mother about exclusive breastfeeding, table 2 showed that differences of answered as correctly about the questions, 94% of mothers answered correctly about the definition breast milk and 92% having good awareness towards initiation of exclusive breastfeeding this was similar to other reported study in Navi Mumbai (11) and Sana’a City (2018) by Dallak, A. et al (12). This table also indicates that more than three-quarters of participants were fully aware of exclusive breastfeeding through, decrease hemorrhagic after delivery, helps mothers return to their pre-pregnancy weight and prevent pregnancy for at least one year after delivery. While there was defect ( incorrect answers 58.3 %) of study sample knowledge towards reducing the death rate from the breast and ovarian cancer. As overall assessment, figure (2) reveal 61.8% of the objects had good knowledge, its agreement with the study done by AL-Abedi, N. et al 71% (2016) and Mbada, et al., (2013) “ they reported that overall assessment was good “ (13).

Result in (Table3) refers to an important relationship between mother’s awareness and occupational status that is could be due to, housewives are more committed
to breastfeeding than female employees, its disagrees with Maryam, et al.,(2014); Mahmud, (2011); Al-Asadi, (2011), all of them stated that a non-significant difference among mother’s occupations and the knowledge level (14),(15),(16).

For the educational level, there was a highly significant relationship with EBF, its match with the study done by Al-Hially (17), (2010), who reported that there is a significant relationship between mother’s education and awareness for breastfeeding , this might be that the “educated mother has better knowledge about breastfeeding more than an uneducated mother”.

Mentions that there was a significant correlation between knowledge and delivery type, this can be because natural births are more likely to produce breast milk than cesareans, this result was similar to AL-Abedi, N. et al (10). On the other hand, there was a non-significant relationship with Age groups, its disagree with AL-Azzawi, etal.,(2010), who stated that was a significant indicator between age of the mother and knowledge about EBF (18).

Finally, figure (2) reveals the source of information of the study sample about EBF, the study indicates that the highest percentage 84.4% of participates in this study were received education about exclusive breastfeeding was from family and friends, “Since the majority of participated mothers had primary education, these low educational levels make them incapable to understand and comprehend the educational information in pamphlets, posters, and advanced media. So, they need to be educated about breastfeeding directly from family, friends or health workers, this means that the family plays an important role in successful breastfeeding”; its approved with the result do it by Dallak, etal.,(2016), who reported that “the majority of the study sample educated by family and friends for exclusive breastfeeding” (12).

Conclusions

There is an urgent necessity to provide accurate prenatal education that focuses on methods and long-term benefits for breastfeeding because mothers don’t have inadequate awareness of exclusive breastfeeding from where (initiation, colostrum benefits, and breast and ovarian cancer incidence reduction). The study found a highly significant relationship between mother’s knowledge and that residence, education level and occupation.

Recommendation: In spite of good mother Knowledge toward of EBF, but health education programs for breastfeeding promotion should be well planned and address the factors which reinforce and enable breastfeeding and health team members should be properly trained in breastfeeding essentials and communication skills with the mothers especially in this critical period (child aged < 2 years ) in Karbala city.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Community Health Department and all experiments were carried out in accordance with approved guidelines.

References


Effectiveness of an educational program on Nurses’ Knowledge towards Nursing Management of Patients with Transurethral Resection of the Bladder Tumor at Hilla Teaching Hospitals

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Abstract

Bladder cancer is the fourth most prevalent tumor in men and eighth in women. Approximately 50,000 new cases are diagnosed annually in around the world. The study aims at: assess nurse’s knowledge regarding management of patients who undergo the transurethral resection of the bladder tumor. A descriptive study is conducted during the periods of July 29th 2018 to December 25th 2019. The study conducted in Hilla Teaching Hospital and Al’imam Alsadiq Teaching Hospital were the designated site for data collection. By non-probability “purposive sample” of (51) nurses, data were collected for pre-post test and analyzed a descriptive and inferential statistical data analysis approach. Results of the study depicts that age of the nurses ranged from 20- 43 years, (60%) of nurses in the control group, there were somewhat less female nurses (45.2%) than male nurses (54.8%) in the study group and (32%) were female and (68%) nurses male in the control group, (80.6%) were married in the study group and (22) (88%) were married in the control group, education was from a secondary nursing school and institute degree (35.5%) for each degree in the study group, and (48%) institute degree in the control group, (1-5) years was (67.7%) in the study group and (68%) in the control group. Nurses knowledge in the study group has increased from (M.S. 1.3026) in the pretest time to (M.S. 1.6787) in post test time for the control group, this score has slightly increase from pre test (M.S. 1.2985) to post tests (M.S. 1.3343). There were concluded improving in nurses’ knowledge after post-test for study group for educational program concerning management of patients with transurethral resection of the bladder tumor. While control group did not present any improvement in their knowledge concerning management of patients with transurethral resection of the bladder tumor at pre and post-test. It is need to be encouraging nurses to be enrolled in training sessions to improve their knowledge to keep them up to date toward management of patients with transurethral resection of the bladder tumor.

Key words: Effectiveness, Knowledge, Transurethral Resection.

Introduction

Cancer is the main cause of death worldwide and is creating a significant burden on society as a result of population growth and aging. Accurate information regarding cancer incidence is important for clinical decision making and appropriate cancer control [1]. Bladder cancer is the most common malignancy of the urinary tract[2]. Bladder cancer is the fourth most common noncutaneous malignancy in men and the incidence of bladder tumors is increasing in industrialized and developed countries [3]. In men, it is the fourth most common cancer after prostate, lung, and colorectal cancers, accounting for 6.2% of all cancer cases. In women, it is the eighth most common cancer, accounting for 2.5% of all cancers [4]. Its occurrence is strongly associated with cigarette smoking and the use of certain chemicals [5]. Symptoms are relatively specific, and what is more important are very obvious, haematuria is the presenting symptom in 85-90% of the patients with bladder cancer gross or microscopic,
Irritative voiding symptoms seem to be more common in patients with CIS [6]. Transurethral Resection of the Bladder Tumor under regional or general anesthesia is the initial treatment for visible lesions and is performed to remove all visible tumors and to provide specimens for pathological examination to determine stage and grade [7]. According to the American Cancer Society, bladder cancer will be responsible for 5% of all cancer diagnosed in the United States in 2017, with 79,030 patients expected to be diagnosed with the disease and 16,870 expected patient deaths from bladder cancer [8,9]. The majority of newly diagnosed patients with bladder cancer are male, which is thought to be related to an increased rate of smoking and occupational exposure [8].

Methodology

The study has been conducted in order to assess nurse’s knowledge regarding management of patients who undergo the transurethral resection of the bladder tumor.

Study design: A descriptive study is conducted during the periods of July 29th 2018 to December 25th 2019. The study conducted in Hilla Teaching Hospital and Al’imam Alsadiq Teaching Hospital were the designated site for data collection.

Study Sample: A non-probability “purposive sample” of (51) nurses who are working at surgical wards. The total number of nurses working in surgical department in Hilla Teaching Hospital and Al’imam Alsadiq Teaching Hospital were (76) nurses. (41) nurses in Hilla Teaching Hospital and (35) nurses in Al’imam Alsadiq Teaching Hospital.

Study Instrument: To evaluate the effectiveness of education program on nurses knowledge toward management patient with TURBT, the researcher constructed a questionnaire format in order to reach the aims of the study, consisted of (2) parts

Part I: Self-administered questionnaire sheet related to demographic characteristics of the nurses.

Part II: Self-administered questionnaire sheet related to nurses knowledge toward management patients with TURBT.

Statistical analysis: The statistical data analysis approach by using (SPSS-ver.20) is used in order to analyze and evaluate the data of the study. A descriptive statistical data analysis approach used to describe the study variables: Frequencies, Percentages, standard deviation, and mean of score. Inferential statistical data analysis approach: used by application of the analysis of variance (ANOVA).

Results

Table (1): Nurses their Demographic Characteristics

<table>
<thead>
<tr>
<th>Demographic Data</th>
<th>Groups</th>
<th>Study Group</th>
<th>Control Group</th>
<th>Sig Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Freq. %</td>
<td>Freq. %</td>
<td>T-Value</td>
</tr>
<tr>
<td>Age / Years</td>
<td>20 to 25</td>
<td>11 35.5</td>
<td>6 24.0</td>
<td>-0.993</td>
</tr>
<tr>
<td></td>
<td>26 to 31</td>
<td>17 54.8</td>
<td>15 60.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>32 to 37</td>
<td>3 9.7</td>
<td>3 12.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>38 to 43</td>
<td>0 0</td>
<td>1 4.0</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>17 54.8</td>
<td>17 68.0</td>
<td>0.993</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>14 45.2</td>
<td>8 32.0</td>
<td></td>
</tr>
</tbody>
</table>
### Table (1): Nurses their Demographic Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Study Group</th>
<th>Control Group</th>
<th><strong>P Value</strong></th>
<th><strong>Significance</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
<td>-0.735</td>
<td>0.465 NS</td>
</tr>
<tr>
<td>Single</td>
<td>6</td>
<td>19.4</td>
<td>3</td>
<td>12.0</td>
</tr>
<tr>
<td>Marriage</td>
<td>25</td>
<td>80.6</td>
<td>22</td>
<td>88.0</td>
</tr>
<tr>
<td><strong>Education level</strong></td>
<td></td>
<td></td>
<td>0.656</td>
<td>0.515 NS</td>
</tr>
<tr>
<td>Secondary</td>
<td>11</td>
<td>35.5</td>
<td>9</td>
<td>36.0</td>
</tr>
<tr>
<td>Institute</td>
<td>11</td>
<td>35.5</td>
<td>12</td>
<td>48.0</td>
</tr>
<tr>
<td>College</td>
<td>9</td>
<td>29.0</td>
<td>4</td>
<td>16.0</td>
</tr>
<tr>
<td><strong>Years of experience</strong></td>
<td></td>
<td></td>
<td>-0.242</td>
<td>0.810 NS</td>
</tr>
<tr>
<td>1 to 5</td>
<td>21</td>
<td>67.7</td>
<td>17</td>
<td>68.0</td>
</tr>
<tr>
<td>6 to 11</td>
<td>8</td>
<td>25.8</td>
<td>5</td>
<td>20.0</td>
</tr>
<tr>
<td>12 to 17</td>
<td>2</td>
<td>6.5</td>
<td>3</td>
<td>12.0</td>
</tr>
<tr>
<td><strong>Years of experience in surgery wards</strong></td>
<td></td>
<td></td>
<td>0.509</td>
<td>0.613 NS</td>
</tr>
<tr>
<td>1 to 5</td>
<td>27</td>
<td>87.1</td>
<td>20</td>
<td>80.0</td>
</tr>
<tr>
<td>6 to 11</td>
<td>4</td>
<td>12.9</td>
<td>5</td>
<td>20.0</td>
</tr>
<tr>
<td><strong>Training session in nursing in Iraq</strong></td>
<td></td>
<td></td>
<td>-0.212</td>
<td>0.833 NS</td>
</tr>
<tr>
<td>No</td>
<td>17</td>
<td>54.8</td>
<td>14</td>
<td>56.0</td>
</tr>
<tr>
<td>One</td>
<td>8</td>
<td>25.8</td>
<td>4</td>
<td>16.0</td>
</tr>
<tr>
<td>Two</td>
<td>3</td>
<td>9.6</td>
<td>5</td>
<td>20.0</td>
</tr>
<tr>
<td>three</td>
<td>3</td>
<td>9.6</td>
<td>2</td>
<td>8.0</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td></td>
<td></td>
<td>-0.930</td>
<td>0.357 NS</td>
</tr>
<tr>
<td>No</td>
<td>17</td>
<td>54.8</td>
<td>14</td>
<td>56.0</td>
</tr>
<tr>
<td>1 to 15</td>
<td>11</td>
<td>35.4</td>
<td>7</td>
<td>28.0</td>
</tr>
<tr>
<td>16 to 30</td>
<td>3</td>
<td>9.6</td>
<td>4</td>
<td>16.0</td>
</tr>
</tbody>
</table>

This table represents the distribution of the nurses their demographic characteristics in terms of frequencies and percentage (control versus study). Age of the nurses ranged from 20-43 years, revealed that the majority 17 (54.8%) of nurses in the study group are within the age (26-31), while 15 (60%) of nurses in the control group, there were somewhat less female nurses (45.2%) than male nurses (54.8%) in the study group and (32%) were female and (68%) nurses male in the control group. The majority of nurses 25 (80.6%) were married in the study group and 22 (88%) were married in the control group. The most common educational education was from a secondary nursing school and institute degree (35.5%) for each degree in the study group, and (48%) institute degree in the control group. In relation of years of experience in nursing ranged from (1-5) years was 21 (67.7%) in the study group and 17 (68%) in the control group. Most common showed that he years of experience in surgical wards ranged from (1-5) years was 27 (87.1%) in the study group and 20 (80%) in the control group. Concerning training course in nursing in Iraq 17 (54.8%) of nurses in the study group and 14 (56%) of nurses in control group hadn’t training courses in nursing. Most common showed that the duration of training in the study group between (1-15) days was (35.4%), and (28%) in the control group. Statistically, there is no significant difference between study and control groups related age,
gender, educational level, years of experience in nursing, years of experience in surgical wards, and training course in nursing.

Reveal that score of participants knowledge in the study group has increased from (M.S. 1.3026) in the pretest time to (M.S. 1.6787) in post test time for the control group, this score has slightly increase from pre test (M.S. 1.2985) to post tests (M.S. 1.3343).

**Discussion**

**Nurses Demographic Data**

The sample consists of 51 nurses who were purposive allocated to either a control group (n=25) and a study group (n=31). Our findings reveal that the most of nurses in the study and control groups are male, it constituted (54.8% and 68.0%) respectively. As well as, both of study and control groups share a highly range of ages group (26-31) years old, due to the nature of the nursing profession, male nurses were accounted for most of the nursing staff, and all nurses who work in surgical word need to be young to cover all duties in this units. Also, this may be due to the fact that males cover night duties while females does not.

This results come in the same line with study has been conducted in AL-Jamhuree Teaching Hospital and AL-Salam Teaching Hospital in Nineveh Governorate during the period from 10th September 2013 up to 10th March 2014.. Their results reported that the age of nurses who work in surgical wards and participated in this study ranged from 20 -29 years was (43.4%) in study group and (46.7%) in the control group. and concerning gender of nurses in study most common male nurses in both study and control group was (56.7%) [10].

**Nurses Knowledge**

Nurse’s knowledge questionnaire items towards management of patients with transurethral resection of the bladder tumor, which classified in four axis (main domains), such that “ anatomy and physiology of urinary bladder, general information about bladder tumor, TURBT, and complication of TURBT”, using MCQ questionnaire’s items technique which were classify in to two categories responses, such as “ False, and True” along studied (Pre, and Post) periods due to application an educational program for study group, as well as controlled group are chooses for comparisons significant. Results of testing significant with reference of questionnaire’s items are reported mostly highly significant differences at P-value <0.01, which assigned effectiveness of the studied educational program through raising knowledge grades regarding nurse staff in study group, and that be enable to confirms importance or
successfulness of applying the suggested program.

The deficit knowledge pretest in both study and control groups regarding transurethral resection of the bladder tumor might be due to several reasons; the nurses do not develop and update their knowledge continuously, most of nurses who work in health institutions quit book reading so they do not follow up and only indulge in nursing practices, consequently they became unable to remember some information particularly the knowledge that related to transurethral resection.

Our findings come in the same line with effectiveness of educational program on nurses’ knowledge regarding pre and post-operative nursing management. Measurement of effectiveness for educational program carried out through the use of knowledge test that include (40) items test-retest. The results of the study show that the effectiveness of educational program about nurses’ knowledge regarding pre and post-operative nursing management is positive and evident. It also shows that there is a good development with highly significant differences in study group between pre and post-test in all items related to pre and post-operative nursing management [11].

It is important to note the importance of the nurses’ knowledge in the workplace which is confirmed study deals with nursing implications from the operating room to discharge: therapy following transurethral resection of bladder tumors. It’s confirmed that oncology nurses, who have a unique knowledge of safe handling and patient care, can improve staff safety and patient outcomes in several areas of healthcare organizations, as well as reduce the mortality and morbidity of urinary bladder cancer by learning more about the disease and intravesical antineoplastic therapy [12].

Also, a narrative review in caring for patients with prostate cancer, they emphasized that nursing knowledge in care procedures for men with prostate cancer should begin at the time of diagnosis, when patients should participate in determining the best course of treatment. During the period of prostatectomy, care includes preoperative preparation, which is essential to achieve healing and adaptation to postoperative sequelae. Its concludes that the role of a clinical nursing specialist in the care of men with prostate cancer is broad and necessary, but new interventions and strategies for care need to be knowledge development assessment in a continuously through well-designed clinical studies [13].

In another manual, a cross-sectional study has been aimed at identification of nursing actions in the preoperative period and in preparing prostatectomy patients. Has been identified weaknesses in care delivery for prostatectomy patients, particularly in nurses education, nurses knowledge or education in those area very important [14].

Moreover, a descriptive cross sectional study was conducted among nurses in private tertiary care hospital Peshawar. The study result was alarming to know that the nurses had low knowledge, and poor practices about infection control in the use of urethral catheter. This indicates that nurses need to be educated and trained more on infection control in the use of urethral catheter [15].

Conclusions

There were improving in nurses’ knowledge after post-test for study group for educational program concerning management of patients with transurethral resection of the bladder tumor. While control group did not present any improvement in their knowledge concerning management of patients with transurethral resection of the bladder tumor at pre and post-test. It is need to be encouraging nurses to be enrolled in training sessions to improve their knowledge to keep them up to date toward management of patients with transurethral resection of the bladder tumor.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Baghdad University- Iraq and all experiments were carried out in accordance with approved guidelines.

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12. Donna, J.: Intravesical Antineoplastic Therapy Following Transurethral Resection of Bladder Tumors: Nursing Implications From the Operating Room to Discharge. CJON 2007, 11(4): 553-559


The Children with Attention-Deficit/Hyperactivity Disorder (ADHD) More Likely Creates to Irritable Bowel Syndrome

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College of Health and Medical Technologies/Baghdad

Abstract

The research aimed study the children with attention-deficit/hyperactivity disorder (ADHD) more likely Creates to irritable bowel syndrome at Ibn-Rushd Psychiatric Teaching Hospital in Baghdad city, find out the relationship between demographic characteristic, irritable bowel syndrome and Attention-Deficit/Hyperactivity disorder patients. A purposive (non-probability), the sample included (100) patients, from (3-11) years old. A descriptive study carried out from December 10th 2018 to the February 25th 2019, from family Attention-Deficit/Hyperactivity Disorder outpatients of Ibn-Rushd Psychiatric Teaching Hospital in Baghdad city. A questionnaire was constructed for the purpose of the study, which was a consisted of (2) part. The 1st part included the demographic characteristics and the 2nd part included the items related with irritable bowel syndrome. Data were analyzed through descriptive statistical approach (frequency and percentage) and inferential statistical approach (correlation coefficient). Scores, Perpson, lycart scale analysis that include, t-test, and stepwise multiple regression. The result of the study confirmed that the mean of score for the age of sample was (7.1) year, most of them male urban, low score for socio-economic status, strong positive to irritable bowel syndrome.

Key Words: Attention-Deficit/Hyperactivity Disorder (Adhd) And Irritable Bowel Syndrome

Introduction

The children with attention-deficit/hyperactivity disorder (ADHD), which is a brain disorder marked by an ongoing pattern of inattention and/or hyperactivity-impulsivity that interferes with functioning or development, neurodevelopmental disorder characterized by impaired social interaction, verbal and non-verbal communication, and restricted and repetitive behavior [1]. Attention-deficit/hyperactivity disorder is a widespread chronic disorder affecting children’s well-being and success in life. The historical understanding of ADHD has changed over the years [2]. ADHD was defined in the Diagnostic and Statistical Manual of Mental Disorders (DSM)-III-R in 1987 as a disorder with a specific diagnostic checklist and three subtypes primarily inattentive, primarily hyperactive, and combined. According to the American Psychiatric Association in the DSM-V, to be considered ADHD, a child must have symptoms before the age of 12, for at least six months, and affecting two domains of life. The prevalence of the three subtypes of ADHD are primarily inattentive (20–30% of diagnosed population), primarily hyperactive-impulsive (less than 15%), and combined subtype (50–75%) [3]. The prevalence of ADHD in the US among children is estimated at 11%. ADHD is very common among children and adolescents, consisting of about 50% of children psychiatric diagnoses [4]. One of the most significant contributing factors in the children with Attention-Deficit/Hyperactivity Disorder (ADHD) appears to be undesirable foods and chemicals that come from parents who’ve noticed vast improvements in their children after changing their diets [5]. The strongest direct evidence of foods linked to attention-deficit/hyperactivity disorder involves wheat and dairy, and the specific proteins they contain namely, gluten and casein. These are difficult to digest and, especially if introduced too early in life, may result in an allergy. Fragments of these proteins, called peptides, can have big impacts in the brain.

Methods and Patients

A purposive (non-probability) sample of (100) patients with a diagnosis of ADHD, from (3-11) years old, who were selected from Ibn-Rushd Psychiatric Teaching Hospital in Baghdad city, had been chosen.
The study was conducted in order to correlation between ADHD patients and irritable bowel syndrome through the period from December 10\textsuperscript{th} 2018 to the February 25\textsuperscript{th} 2019, from family ADHD outpatients of Ibn-Rushd Psychiatric Teaching Hospital in Baghdad city. For the purpose of the present study, a questionnaire was constructed by the researcher to study the variable for ADHD patients and irritable bowel syndrome. Data were analyzed through descriptive statistical approach (frequency and percentage) and inferential statistical approach (correlation coefficient) Scores, Pereson, likert scale analysis that include, t-test, and stepwise multiple regression.

A questionnaire was constructed for the purpose of the study. It was composed of (2) major parts, and overall items, which were included in the questionnaire, were (29) items. Part I consist of (10) items related with demographic data for ADHD children which consisted of age, gender, body mass index, the age of child during diagnosis/year, the number of children in his family, and demographic data for ADHD children family which consisted of age of parents, gender, residential area, the age of mother during labor and socio-economic status. Part II consist of (19) items which included the symptoms of irritable bowel syndrome for child with ADHD. Reliability was determined through a pilot study. The data was analyzed through the application of the descriptive statistical, (Frequency and Percentage) and the inferential statistical data analysis approach Chi-square, Person correlation coefficient, all the patients under treatment and diagnosis by psychiatrist.

**Results**

**Table (1): Mean of scores for items of the irritable bowel syndrome, and the association between irritable bowel syndrome and attention-deficit/hyperactivity disorder.**

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>3</th>
<th>2</th>
<th>1</th>
<th>M.S.</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The child suffer from</td>
<td></td>
<td>Always</td>
<td>Some time</td>
<td>Never</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>abdominal pain: a child may not be able to express his pain this pain appears in the form of tantrums and self-harm.</td>
<td>72</td>
<td>20</td>
<td>8</td>
<td>2.64</td>
<td>H.S.</td>
</tr>
<tr>
<td>2.</td>
<td>obvious bulge in the abdomen.</td>
<td>71</td>
<td>21</td>
<td>8</td>
<td>2.63</td>
<td>H.S.</td>
</tr>
<tr>
<td>3.</td>
<td>gaseousness/bloating sensation.</td>
<td>84</td>
<td>13</td>
<td>3</td>
<td>2.81</td>
<td>H.S.</td>
</tr>
<tr>
<td>4.</td>
<td>bad odor in the mouth.</td>
<td>50</td>
<td>35</td>
<td>15</td>
<td>2.35</td>
<td>S.</td>
</tr>
<tr>
<td>5.</td>
<td>strange smell out and overly bad.</td>
<td>80</td>
<td>7</td>
<td>13</td>
<td>2.67</td>
<td>H.S.</td>
</tr>
<tr>
<td>6.</td>
<td>undigested food presence in the stool.</td>
<td>58</td>
<td>27</td>
<td>15</td>
<td>2.43</td>
<td>S.</td>
</tr>
<tr>
<td>7.</td>
<td>some behaviors that the child shows a great desire to reclining on his stomach.</td>
<td>79</td>
<td>13</td>
<td>8</td>
<td>2.71</td>
<td>H.S.</td>
</tr>
<tr>
<td>8.</td>
<td>whether sleeping on the stomach or abdominal pressure on the edges of the tables.</td>
<td>73</td>
<td>19</td>
<td>8</td>
<td>2.65</td>
<td>H.S.</td>
</tr>
<tr>
<td>9.</td>
<td>weakness or delayed of physical growth.</td>
<td>81</td>
<td>8</td>
<td>11</td>
<td>2.70</td>
<td>H.S.</td>
</tr>
<tr>
<td>10.</td>
<td>Difficulty sleeping, as result of presence of excess acidity in the stomach.</td>
<td>78</td>
<td>14</td>
<td>8</td>
<td>2.70</td>
<td>H.S.</td>
</tr>
<tr>
<td>11.</td>
<td>more frequency and under order of defecation.</td>
<td>71</td>
<td>19</td>
<td>10</td>
<td>2.61</td>
<td>H.S.</td>
</tr>
<tr>
<td>12.</td>
<td>constipation.</td>
<td>7</td>
<td>21</td>
<td>72</td>
<td>1.45</td>
<td>N.S.</td>
</tr>
<tr>
<td>13.</td>
<td>diarrhea.</td>
<td>73</td>
<td>11</td>
<td>16</td>
<td>2.57</td>
<td>H.S.</td>
</tr>
<tr>
<td>14.</td>
<td>defecation on himself.</td>
<td>81</td>
<td>6</td>
<td>13</td>
<td>2.68</td>
<td>H.S.</td>
</tr>
<tr>
<td>15.</td>
<td>pain on stooling.</td>
<td>69</td>
<td>17</td>
<td>14</td>
<td>2.55</td>
<td>H.S.</td>
</tr>
<tr>
<td>16.</td>
<td>vomiting.</td>
<td>52</td>
<td>23</td>
<td>25</td>
<td>2.27</td>
<td>S.</td>
</tr>
<tr>
<td>17.</td>
<td>sensitivity to foods.</td>
<td>70</td>
<td>18</td>
<td>12</td>
<td>2.58</td>
<td>H.S.</td>
</tr>
<tr>
<td>18.</td>
<td>blood in stools.</td>
<td>8</td>
<td>19</td>
<td>73</td>
<td>1.35</td>
<td>N.S.</td>
</tr>
<tr>
<td>19.</td>
<td>food inauspiciousness</td>
<td>81</td>
<td>10</td>
<td>9</td>
<td>2.72</td>
<td>H.S.</td>
</tr>
<tr>
<td>Total</td>
<td>1238</td>
<td>321</td>
<td>341</td>
<td>2.47</td>
<td>S.</td>
<td></td>
</tr>
</tbody>
</table>

$X^2$ obs. =45.160 df = 11 $X^2$ crit. = 18.307 P < 0.050
This table shows that the mean of scores is highly significant in items (1, 2, 3, 5, 7, 8, 9, 10, 11, 13, 14, 15, 17, 19), significant on items (4, 6, 16), no significant on item (12, 18) and attention-deficit/hyperactivity disorder. The table also shows that there was significant association between irritable bowel syndrome, and attention-deficit/hyperactivity disorder.

Table (2): Pearson correlation between age of child, gender, body mass index, age child during diagnosis, number of child in his family, age of parents, gender, residual area, age of mother during labor, socio-economic status, irritable bowel syndrome and attention-deficit/hyperactivity disorder.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Age of child</th>
<th>Gender</th>
<th>Body Mass Index</th>
<th>ADHD diagnosis</th>
<th>No. of child family</th>
<th>Irritable bowel syndrome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of child</td>
<td>Co.</td>
<td>Sig.</td>
<td>.597**</td>
<td>.459**</td>
<td>.790**</td>
<td>.671**</td>
</tr>
<tr>
<td></td>
<td>No.</td>
<td></td>
<td>C1 .000 100</td>
<td>C2 .001 100</td>
<td>C3 .000 100</td>
<td>C4 .000 100</td>
</tr>
<tr>
<td>Gender</td>
<td>Co.</td>
<td>Sig.</td>
<td>.368**</td>
<td>.641**</td>
<td>.538**</td>
<td>.719**</td>
</tr>
<tr>
<td></td>
<td>No.</td>
<td></td>
<td>C6 .000 100</td>
<td>C7 .000 100</td>
<td>C8 .000 100</td>
<td>C9 .000 100</td>
</tr>
<tr>
<td>Body Mass Index</td>
<td>Co.</td>
<td>Sig.</td>
<td></td>
<td>.510**</td>
<td>.684**</td>
<td>.706**</td>
</tr>
<tr>
<td></td>
<td>No.</td>
<td></td>
<td></td>
<td>C10 .000 100</td>
<td>C11 .000 100</td>
<td>C12 .000 100</td>
</tr>
<tr>
<td>ADHD diagnosis</td>
<td>Co.</td>
<td>Sig.</td>
<td></td>
<td></td>
<td>.649**</td>
<td>.685**</td>
</tr>
<tr>
<td></td>
<td>No.</td>
<td></td>
<td></td>
<td></td>
<td>C13 .000 100</td>
<td>C14 .000 100</td>
</tr>
<tr>
<td>Age of parents</td>
<td>Co.</td>
<td>Sig.</td>
<td>.795**</td>
<td>.764**</td>
<td>.595**</td>
<td>.707**</td>
</tr>
<tr>
<td></td>
<td>No.</td>
<td></td>
<td>C15 .000 100</td>
<td>C16 .000 100</td>
<td>C17 .000 100</td>
<td>C18 .000 100</td>
</tr>
<tr>
<td>Irritable bowel syndrome</td>
<td>Co.</td>
<td>Sig.</td>
<td>.657**</td>
<td>.719**</td>
<td>.706**</td>
<td>.830**</td>
</tr>
<tr>
<td></td>
<td>No.</td>
<td></td>
<td>C21 .000 100</td>
<td>C22 .000 100</td>
<td>C23 .000 100</td>
<td>C25 .000 100</td>
</tr>
<tr>
<td>Residual area</td>
<td>Co.</td>
<td>Sig.</td>
<td>.701**</td>
<td>.636**</td>
<td>.579**</td>
<td>.846**</td>
</tr>
<tr>
<td></td>
<td>No.</td>
<td></td>
<td>C27 .000 100</td>
<td>C28 .000 100</td>
<td>C29 .000 100</td>
<td>C31 .000 100</td>
</tr>
<tr>
<td>Age of mother during labor</td>
<td>Co.</td>
<td>Sig.</td>
<td>.853**</td>
<td>.458**</td>
<td>.587**</td>
<td>.482**</td>
</tr>
<tr>
<td></td>
<td>No.</td>
<td></td>
<td>C33 .000 100</td>
<td>C34 .000 100</td>
<td>C35 .000 100</td>
<td>C37 .247</td>
</tr>
<tr>
<td>Socio-economic status</td>
<td>Co.</td>
<td>Sig.</td>
<td>.764**</td>
<td>.339**</td>
<td>.125</td>
<td>.561**</td>
</tr>
<tr>
<td></td>
<td>No.</td>
<td></td>
<td>C39 .000 100</td>
<td>C40 .000 100</td>
<td>C41 .000 100</td>
<td>C42 .000 100</td>
</tr>
</tbody>
</table>
C = Cell, Co. = Correlation coefficient, Sig. = Significant (2-tailed), N. = Number of sample.

This table shows that the relationship in the all of the cells.

(C1 It means relationship between age and gender, C13 It means relationship between age of parents and …etc.).

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Discussion

Table (3) shows that the mean of scores for irritable bowel syndrome is a highly significant in all items expected itemes (4, 6 and 16) was significant, and the items (12, 18) was non significant. The table also shows the association between dietary pattern and attention-deficit/hyperactivity disorder. The table shows that there was a significant association between irritable bowel syndrome and attention-deficit/hyperactivity disorder. Recent research shows that more than 50% of children with attention-deficit/hyperactivity disorder have GI symptoms, food allergies, and maligestion or malabsorption issues. It’s obvious from talking to parents that GI problems are a major concern in children with attention-deficit/hyperactivity disorder. Listservs dealing with attention-deficit/hyperactivity disorder have discussions on GI issues all the time. Antifungal use, both prescription and alternative remedies, is a common topic. Parents have tried “anti-yeast” diets, prescription drugs and natural remedies, but nothing seems to be “the answer” to the chronic microbial problems these kids face \[19\]. Altered intestinal permeability was found in 43% of attention-deficit/hyperactivity disorder patients, but not found in any of the controls (Harvard University). Intestinal permeability, commonly called “leaky gut”, means that there are larger than normal spaces present between the cells of the gut wall. When these large spaces exist in the small intestine, it allows undigested food and other toxins to enter the blood stream. When incompletely broken down foods enter the body, the immune system mounts an attack against the “foreigner” resulting in food allergies and sensitivities. The release of antibodies triggers inflammatory reactions when the foods are eaten again. The chronic inflammation lowers IgA levels. Sufficient levels of IgA are needed to protect the intestinal tract from clostridia and yeast. The decreasing IgA levels allow for even further microbe proliferation in the intestinal tract. Vitamin and mineral deficiencies are also found due to the leaky gut problem \[20\]. Table (4) indicated that there was strong positive relationship in cell (20, 25, 26, 31, 33, 41, 3, 9, 12, 15, 16, 18, 19, 22, 23, 27, 32, 36, 39, 4, 5, 7, 11, 13, 14, 21, 24, 28, 30, 1, 8, 10, 17, 35, 38 and 42), positive relationship in cell (4, 2, 34, 37, 6, 40, 44 and 43). Unusual eating behavior occurs in about three-quarters of children with attention-deficit/hyperactivity disorder (ADHD), to the extent that it was formerly a diagnostic indicator. Selectivity is the most common problem, although eating rituals and food refusal also occur, this is appear to result in malnutrition, although some children with attention-deficit/hyperactivity disorder also have gastrointestinal (GI) symptoms \[21\]. In a healthy intestinal tract the small intestine and stomach are not inhabited by bacteria. When the flora balance in the colon is lost, the microbes can migrate into the small intestine and stomach, which hampers digestion. The microbes compete for nutrients and their waste products overrun the intestinal tract. One of the toxins produced by yeast is actually an enzyme that allows the yeast to bore into the intestinal wall. The yeast also produces other toxins such as organic acids, which can also damage the intestinal wall \[22\]. Bacterial growth in the small intestine destroys enzymes on the intestinal cell surface, which prevents carbohydrate digestion and absorption. The last stage of carbohydrate digestion takes place at the minute projections called microvilli. Complex carbohydrates that have been broken down by the enzymes embedded in the microvilli can be absorbed properly and enter the blood stream. But when the microvilli are damaged, the last stage of digestion cannot take place. At this point only monosaccharides can be absorbed because of their single molecule structure. In the small intestine, the body should absorb the nutrients needed from what is eaten. But in the case of malabsorption, the undigested carbohydrates left in the small intestine cause the body to draw water into the intestinal tract. This pushes the undigested carbohydrates into the colon where the microbes can feast on it. This allows for even more proliferation of the unwanted microbes and continued increase in malabsorption problems. Some parents of children with attention-deficit/hyperactivity disorder believe their children are allergic or sensitive to the components found in these foods. Some seek allergy testing for confirmation. Yet, even when no allergy is confirmed, many parents of attention-deficit/hyperactivity disorder children still...
choose to offer the gluten-free/casein-free (GFCF) diet. Among the benefits they report are changes in speech and behavior. A gluten-free/casein-free (GFCF) diet is also known as the GFCF diet. It is one of several alternative treatments for children with attention-deficit/hyperactivity disorder. When following this strict elimination diet, all foods containing gluten and casein (found in milk and dairy products) are removed from the child’s daily food intake. The benefit of a gluten-free/casein-free diet is based on the theory that children with attention-deficit/hyperactivity disorder may have an allergy or high sensitivity to foods containing gluten or casein. Children with attention-deficit/hyperactivity disorder, according to the theory, process peptides and proteins in foods containing gluten and casein differently than other people do. Hypothetically, this difference in processing may exacerbate attention-deficit/hyperactivity disorder symptoms. Some believe that the brain treats these proteins like false opiate-like chemicals. The reaction to these chemicals, they say, leads a child to act in a certain way.

Conclusions

Results indicate greater prevalence of irritable bowel syndrome symptoms among children with ADHD. Identified studies involved high methodological variability and lack of comprehensive data prohibited analysis of GI pathophysiologies typically associated with organic etiologies, limiting conclusions about the underpinnings of the observed association. Future research must address critical questions about the causes and long-term impact of GI symptoms in ADHD.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Health and Medical Technologies and all experiments were carried out in accordance with approved guidelines.

References

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Estimation of Parameters (Serum Glucose, Urea, Creatinine And C-Peptide) in Diabetic Nephropathy

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¹High Diploma, College of Medicine Al Nahrain University, Iraq,
²Ph.D., College of Medicine Al Nahrain University, Iraq

Abstract

Diabetes mellitus is a metabolic disorder of multiple aetiology. Destruction of pancreatic beta cells, hyperglycaemia, and insulin deficiency cause type 1 diabetes mellitus. Diabetic nephropathy is the damage to kidneys because of diabetes. It is predominantly seen in patients with type 1 diabetes (insulin-dependent type) and type 2 diabetes (non-insulin-dependent type). An active peptide hormone, C-peptide has the likelihood of causing major physiological effects. C-peptide is the best indication of endogenous insulin secretion occurring in patients with diabetes. In this regard, the current study undertakes a comprehensive study of C-peptide and kidney (renal) failure in patients with diabetes mellitus type 1, in order to assess their association. The subjects for this study were (70) patients with type 1 DM and (65) patients with diabetic nephropathy in different age and both sex, Laboratory tests such as (serum creatinine, urea, glucose, albumin, total protein and fasting serum C-peptide, are conducted. Data was compare the values between different category patients.

Keywords: parameters, Estimation, diabetic nephropathy.

Introduction

Diabetes mellitus

is a metabolic disorder of multiple aetiology ¹ destruction of pancreatic beta cells, and insulin deficiency cause type 1, diabetes mellitus can cause long–term damage which includes dysfunction or failure of various organ.

Diabetic nephropathy (DN)

also know as (diabetic kidney disease) is the chronic loss of kidney function occurring in those with diabetes mellitus¹, protein loss in the urine due to damage to the glomeruli may become massive and cause a low serum with resulting generalized body swelling (edema) and result in the nephrotic syndrome (Medline Plus Medical Encyclopedia (2015) likewise, the estimated glomerular filtration rate (eGFR) may progressively fall from a normal of over 90 ml/min/1.73 m² to less than 15, at which point the patient have end stage kidney disease (ESKD) it usually is slowly progressive over year.

C-peptide as a marker for diabetic nephropathy

The connecting peptide, or c-peptide is a short (31- amino-acide polypeptide) that connects A- chain its B- C-chain in the proinsulin molecule, in the insulin synthesis pathway, first preproinsulin is translocated into the endoplasmic reticulum of beta cells of the pancreas with an A-chain, a C-peptide, a B-chain, and a signal sequence, the signal sequence is cleaved from the N-terminus of the peptide by a signal peptidase, leaving proinsulin after proinsulin is packaged into vesicles in the Golgi apparatus (beta-granules) the C-peptide is removed, leaving the A-chain and B-chain bound together by disulfide bonds that constitute the insulin molecule ²-⁴ an active peptide hormone, c-peptide has the likelihood of causing major physiological effects, C-peptide and insulin are produced in equal amounts, it has the capacity to weaken glomerular hyperfiltration and bring down urinary albumin excretion in experimental as well as human type 1 diabetes ⁵-⁷.

C-peptide is the best indication of endogenous insulin secretion occurring in patients with diabetes, the amount of C-peptide in the blood indicates the amount of insulin produced by the pancreas, blood sugar level in the body is not affected by C-peptide, the purpose of performing C-peptide test done after the initial diagnosis of DM, is to ascertain whether it is type 1 or type 2.
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Diabetes, in the individual whose pancreas does not produce insulin (type 1 diabetes) has a reduced level of insulin and C-peptide, determination of C-peptide levels is preferred to determination of insulin levels as insulin concentration in the portal veins is (2-10) times greater than in the peripheral circulation. About half the amount of insulin that reaches liver plasma, is observed by the liver, however, this varies with the nutritional state, in type 1 DM there is a reduced level of insulin production by the pancreas, and in this case, the patients will also have a reduced level of C-peptide, whereas in type 2 DM the C-peptide levels in patients are more than the normal levels.

**Materials and Methods**

This study was performed in (The Iraqi center of dialysis). The present study was carried out to evaluate some chemicals in sera collected of (54) Iraqi patients affected with renal failure and type-1 Diabetic Mellitus involved both sexes with age between (20—40) years. In addition to (54) case healthy control. Most of patients were of age group between (20—40) years. Laboratory tests were performed, using enzymatic methods for (Blood glucose, urea, creatinine and C-peptide).

**Results**

Comparison of baseline characteristics among different categories of patients C-peptide level

In the table (1) A & B showed distribution of C-peptide levels with (70) diabetics and (65) diabetic nephropathy with different age and both sex.

<table>
<thead>
<tr>
<th>Table 1: Distribution of C-peptide levels between diabetics and diabetic nephropathy patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>characteristics</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>D.M nephropathy</td>
</tr>
<tr>
<td>D.M</td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>R.B.S</td>
</tr>
<tr>
<td>HbA1c</td>
</tr>
<tr>
<td>Urea</td>
</tr>
<tr>
<td>Creatinine</td>
</tr>
<tr>
<td>Albumin</td>
</tr>
<tr>
<td>Total protein</td>
</tr>
</tbody>
</table>
Table 2: Correlation of serum C-peptide level with other parameters

<table>
<thead>
<tr>
<th>C-peptide</th>
<th>Correlation coefficient (r values)</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>R.B.S</td>
<td>0.095</td>
<td>0.272</td>
</tr>
<tr>
<td>HbA1c</td>
<td>-0.061</td>
<td>0.481</td>
</tr>
<tr>
<td>Urea</td>
<td>0.069</td>
<td>0.427</td>
</tr>
<tr>
<td>Creatinine</td>
<td>0.020</td>
<td>0.815</td>
</tr>
<tr>
<td>Albumin</td>
<td>-0.062</td>
<td>0.477</td>
</tr>
<tr>
<td>Total protein</td>
<td>-0.065</td>
<td>0.453</td>
</tr>
</tbody>
</table>

Table 3: Demographic characteristics of the patients

<table>
<thead>
<tr>
<th>characteristics</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>D.M nephropathy</td>
<td>65 (48.1%)</td>
</tr>
<tr>
<td>D.M</td>
<td>70 (51.9%)</td>
</tr>
<tr>
<td>Age</td>
<td>34.93 (± 1.814)</td>
</tr>
<tr>
<td>Male</td>
<td>50 (37%)</td>
</tr>
<tr>
<td>Female</td>
<td>85 (63%)</td>
</tr>
<tr>
<td>R.B.S</td>
<td>204.85 (± 2.35)</td>
</tr>
<tr>
<td>HbA1c</td>
<td>9.056 (± 0.83)</td>
</tr>
<tr>
<td>Urea</td>
<td>56.96 (± 1.98)</td>
</tr>
<tr>
<td>Creatinine</td>
<td>2.80 (± 0.17)</td>
</tr>
<tr>
<td>Albumin</td>
<td>5.24 (± 0.09)</td>
</tr>
<tr>
<td>Total protein</td>
<td>7.68 (± 0.11)</td>
</tr>
</tbody>
</table>
Discussions

The following tables and figures involved the results for many parameters: -

(1) C-peptide: the determination of serum C-peptide levels can be considered in diabetes clinical practice for patients under insulin treatment, C-peptide measurement is particularly useful when there is uncertainty about the treatment (Kitabchi AE (1977) With the discovery of the method of insulin biosynthesis, many initial studies focused on the possible physiological effects of C-peptide. Efforts to find insulin-like effects on blood glucose levels, glucose disposal after glucose loading were in vain.

(2) In the recent times, new data that have been presented confirms a specific binding of C-peptide cells to cell surfaces that indicate G-protein coupled membrane receptors. Therefore, it can be stated that C-peptide can induce certain intracellular processes and thereby influence nerve and renal function in C-peptide deficient type diabetes patients. With the increasingly common clinical context, C-peptide can be highly useful in disease classification and in providing appropriate treatment. The current (Jones AG, Hattersley AT (2013) in table (1) note that C-peptide levels was normal (category 1) in (55) patients among them (20) male (36.4%) and (35) female (63.6%), C-peptide was elevated (category 2) in 20 patients from female only, C-peptide below normal (category 3) 60 patients 30 male (50.0%) and 30 female (50.0%) and high levels of sugar (206.75 ± 7.18) was P value (0.827) and high levels for each (blood urea (62.25± 5.28), creatinine (3.47 ± 0.42), albumin (5.57 ± 0.18) and total protein 8.20 ± 0.26).

(3) In this study show the prevalence of diabetes was 63% higher among females than males. Differences in lifestyle, tradition and culture were presumed to be the possible reasons for higher prevalence of obesity and diabetes among female. Comparison of baseline characteristics among different categories note low C-peptide in patients with diabetes but high in diabetics nephropathy this result from hypersecretion of B-cells, a decreased degradation or secretion. (5) note hyperglycemia in patients with diabetic nephropathy (217.69± 3.55) more than patients with diabetes (129.93± 2.36) and high level for each blood urea (78.38± 1.68), creatinine (4.72 ± 0.15), albumin (6.22 ± 0.074) and total protein (8.91 ± 0.06).

(6) note the low of (c-peptide) in the diabetic of high type which is used to know the amount of insulin Secreted from the body where it is produced equally to produce normal insulin from the pancreas and it is not affected by any external insulin. Low (c.peptide)level relationship with low produce insulin hormone and can this happen when not produce enough from insulin by B.cell in case diabetic mellitus. In addition allows us to determine what is the pancreatic reserve a mount, ie how much insulin the pancreas is still able to secrete in diabetic. It helps to determine the type of diabetes that the patient is concerned with. When the peptide levels are low and the body does not produce insulin, the diagnosis is almost certain for type 1 diabetes and beta cells are almost destructive.

Each kidney is made up of hundreds of thousands of small units called Nevron, which units task to carry out blood filtering and remove harmful chemicals from the body control of fluid balance in the body and people with diabetes slowly changes the composition of the unit of nephrons, especially the thickening of its components and show small scars of fibrous tissue over time and then start nephrons in the leakage of albumin protein in the blood to get out with urine.

Conclusion

1- In early stages of renal failure, insulin secretion and resistance in peripheral tissues, primarily skeletal muscle, is reduced.

2- in advanced stages of renal failure, renal clearance is reduced.

3- These facts are clinically important in the treatment of diabetes,

Although insulin resistance increases the insulin requirement.

4- decreased insulin degradation reduces the need for administration of insulin in diabetic patients with advanced corticotrophin-releasing factor, which increases the risk of hypoglycemia.

5- Severe hyperglycemia in oliguric or anuric ESRD patients is not associated with features of osmotic diuresis, which is seen in patients without renal failure, but it can cause hyponatremia, hyperkalemia, and acute increase in the intravascular volume.
In several large studies on ESRD patients, there was no correlation between increased survival and tight blood glucose control of patients.

7- It is suggested that the incidence of hypoglycemia was significantly higher in patients receiving strict glycemic control.

8- It is recommended that blood sugar control be considered an important goal in the treatment of ESRD diabetic patients to prevent additional damage to other organs including the eyes, kidneys, and heart

**Recommendations**

1- adjust the blood sugar level and maintain its natural rates because the high level of sugar for a long time causes rough internal internal wall for arteries this causes platelet deposition, which can lead to a mild stroke. When these clots grow, they close the arteries and hinder blood from reaching the tissues leading to impaired kidney.

2- analyze every three months with the periodic follow-up with the specialist doctor to ensure that there are no complications.

3- adjust the blood pressure especially if they are accompanied by a diabetes.

4- the work of the urine analysis and kidney functions periodically.

5- physical exercise in the case of uncontrolled blood sugar level.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved and all experiments were carried out in accordance with approved guidelines.

**References**

2. Diabetes and kidney disease; Medline plus Medical Encyclopedia.2015.
A Chronic Toxicity Study of Oral Administration of Collagen-α® Supplement using Pregnant Rabbits

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Abstract

Since collagen derived products are highly used in food supplements due to its bioactive properties by influencing cellular and tissue health, flexibility with high effect of repairing and adaptation. It is necessary to carry out safety requirement of an oral chronic toxicity assessment. This study investigated the adverse effect of long term oral administration of collagen-α® in pregnant rabbits. We have conducted a thirty days randomized controlled trial in pregnant rabbits. Rabbits were randomized into two groups; Group 1 (control group) were administrated with 1 ml of normal saline PO, SID while Group 2 (collagen-α group) were administered with 1 ml of collagen-α® PO, SID for one month. Bodyweight gain, viscera weight and histopathological evaluation of the individual rabbit were recorded. The results revealed that the body weight gain and visceral tissues weight in the collagen-α group were significantly lower than the control group. Moreover, various histopathological changes were recorded in heart, lungs, liver and kidneys of the collagen-α group when compared with the non-significant changes that noticed in the control group. Under the conditions of the current study, a high risk of chronic toxic effect was observed in pregnant rabbits inoculated with 1 ml of oral dose of collagen alpha supplement. This result suggests that the adverse effect of collagen derived supplements is overbalancing the benefits.

Key words: Collagen-α, Rabbits, Food Supplements, Weight Gain,

Introduction

Collagen is considered as the most plenteous structural protein of living organism including vertebrates and invertebrates that constituting approximately 30% of total animal’s proteins [1]. It’s a complex alloy of the extracellular matrix of variable members of diverse families of protein exhibiting various physiological functions and structural integrity. Fundamental cell biology such as proliferation, migration cytoskeletal organization, apoptosis and differentiation are essentially regulated by collagens [2]: Moreover, collagen is the major structural element of all the connective tissues, and presents in the interstitial tissue of parenchymal organs. Thus as a results of its fibrillar structure, collagen is contributing the extracellular scaffolding which subsequently safeground the stability of tissues and organs and maintain their structural integrity [3,4].

Around 28 types of collagen have been yet identified, which is composed of 46 distinct polypeptide chains [5]. The collagen has triple helix characteristic polypeptide chains. It probably formed by three identical homotrimer chains represented as collagens II, III, VII, VIII, X and others; or heterotrimer as in types of collagen I, IV, V, VI, IX, and XI [6,7]. Permanent processes of collagens exchange take place in the body during human life; replaced of the old fibrils by new one. In the young, production of the collagen and its degradation takes place in dynamic balance, while during tissues maturation, degradation is occurring more intensive [8,9,10]. Smoking cigarettes, stress, UV radiation and unhealthy diet lead to the degradation of natural structure of collagen and to earlier senility [11].

The sources of collagen mostly came from wild animals (mainly porcine and bovine) and birds [5]: Due to their functional and nutritional properties, the collagens and “collagen-derived” products are recently widely used as food supplements, in pharmaceutical, and cosmetic industries [1]. However, collagen supplements have clinically given their beneficial functions, especially maintaining and improving the connective tissues for instance of; joints, skin dermis, ligaments, tendons, and...
blood vessels\cite{3,5,12}.

The exploration of the functions of the different collagen types is contributes to a better understanding the progress of the diseases as well as the embryonic and fetal development processes \cite{3}. Little is knowledge’s about the role of collagen defect as a source of abanants diseases/conditions among both human and animals in Iraq that threatening its utilization in daily life food-supplement as well as the chronic toxicity effects of these products. Therefore, the current study was designed to evaluate the effects of collagen-α as a food supplement on clinical and cellular changes using pregnant rabbits as a useful group study model.

**Material & Method**

**Animals and Experimental Design**

This study was conducted as a thirty-day prospective blinded assessment trail on female laboratory rabbits during November 2018. Twelve pregnant rabbits weighting between 960-1100 grams were housed in controlled environmental conditions at Animal House, College of Veterinary Medicine, Basrah University, Iraq (temperature of 25-28 °C). The rabbits were divided randomly into two equal groups; Group 1 and 2. The group 1 (control group) were orally administrated with 1 ml of normal saline while group 2 (collagen-α group) were inoculated orally by 1 ml of collagen-α\textsuperscript{®} (CH-Alpha\textsuperscript{®}, GELITA Thailand) SID for 30 days. Our experiment was approved following the roles and the guidelines of the Scientific and Researches Committee of the College of Veterinary Medicine, University of Basra, Iraq.

The body weight (BW) of each rabbit was recorded separately at the onset and at the end of the experiment. Weight gain was calculated following the formula (BW gain=Final BW-initial BW).

At the end of the study, all rabbits of both groups were euthanized. Organs such as the heart, liver and kidneys were immediately severed and weighted and fixed in 10% formalin buffer at for 24 hrs. The Specimens were dehydrated through a graded series of ethanol and xylene prior to paraffin embedding and staining with hematoxylin and eosin (Harris H&E) finally mount with DPX \cite{13}.

Statistical analysis was performed using SPSS version 22.0 for Windows. Independent “T” test analysis of variance with Tukey test was used to evaluate the differences among the two groups with regard to the study variables. Measuring of body and visceral weight are expressed as mean ± standard deviation (SD). A value of P < 0.05 was considered statistically significant.

**Results**

The weight of the pregnant rabbits of the treated group (collagen-α group (was significantly lower than in control group. However, a significant (P < 0.05) decreases in the weight of the kidneys, heart, lungs and liver were recorded in the treated group as comparasion with the control group (Table 1).

The most predominant changes of the renal tissues of the treated group are closure renal tubules that could be due to degeneration hemorrhage, and the vacuolation of the renal tubules when compared with the control group (Figures 1, A and B). Moreover, the vacuolation of the cardiocyte, hyperatrophy and spaces hemocedrosis were observed at the heart treated group (Figures 2, A and B) in contrast of control group. Thickening of alveolar wall, dilated of bronchiole and serous exudates at the lumen are most common cellular changes in the lungs tissues of the treated group comparing to normal lungs of control group (Figures 3, A and B). Finally, investigation of the tissue sections of the liver of the treated group showed moderate to severe congestion in central vein and fibrosis and swelling of hepatocyte) in comparation with control group (Figures 4, A and B).
Table (1): The effect of collagen-α on body weight, gain and relative weights of pregnant rabbits internal organs

<table>
<thead>
<tr>
<th>Criteria Groups</th>
<th>Initial BW (g) ±</th>
<th>Final BWt(g) ±</th>
<th>Weight gain (g) ±</th>
<th>Liver Weight (g) ±</th>
<th>Kidneys Weight (g) ±</th>
<th>Heart Weight (g) ±</th>
<th>Lungs Weight (g) ±</th>
</tr>
</thead>
<tbody>
<tr>
<td>G 1 Control (n=6)</td>
<td>1045.00 ±96.78</td>
<td>1365.00* ±62.34</td>
<td>250.00* ±28.28</td>
<td>67.75* ±1.89</td>
<td>9.24* ±0.24</td>
<td>54.50* ±3.15</td>
<td>84.50* ±5.06</td>
</tr>
<tr>
<td>G2 (collagen-α) (n=6)</td>
<td>990.00 ±30.43</td>
<td>1127.75 ±48.44</td>
<td>157.75 ±36.88</td>
<td>60.75 ±2.21</td>
<td>8.35 ±0.31</td>
<td>45.50 ±3.10</td>
<td>74.00 ±6.05</td>
</tr>
</tbody>
</table>

*Significant differences (p<0.05). BW: Body weight

Figure 1: Cross section of kidney: A, in control group showing normal tissue, B. Treated group showing degeneration hemorrhage (DH) and Vacuolation (V).
H&E 400X

Figure 3: Across section of lung  A. control group showing normal bronchirole and normal alveolar sac, B. Treated group showing dilated of bronchirole (DB) and exudates (E) into the lumen
H&E 100 X
Discussion

With the numerous bioactive properties, collagen derived products have long been used in food supplements and also in pharmaceutical products for maintaining the connective tissues. One of its clinical applications is for treatment the disorders of cartilages and skin [14]. Moreover, collagen and gelatin supplements could influence cellular and tissue health, flexibility with high effect of repairing and adaptation [15]. Commercial collagen products have been generally recognized as “saved” and approved for human consumption by the US FDA (16). Despite the collagen supplements appear to be with low risk, little data are available; recovery from injury, functional benefits, and the negative effect in athletes are also not known [15]. However, little literature exists that demonstrates the adverse effect of collagen supplements on visceral organs. In the current study, we have reported that the long term oral supplementation of collagen (collagen-α®) reduces weight gain companied with occurrence of cytopathic changes in heart, liver, lungs and kidneys of pregnant rabbits. To the best of our knowledge, this is the first chronic-toxicity study of collagen supplements using pregnant rabbit in Iraq.

The results of our study have suggest that the using of collagen-α® as a supplement consequently led to decrease weight gain as a results of its “Anti-Obesity” effect through regulation the metabolism of lipids [17]. Additionally, post mortem examinations of liver, lungs, kidneys and heart were also correlated to the results of the body weight gain findings. In contrast, Schauss et al., have conducted an acute and subchronic toxicity studies in rats that orally administrated by type II collagen derived from hydrolyzed chicken sternal cartilage. Regarding to acute and subchronic toxicity, all the rats were exhibit normal body weight with no significant histopathological changes throughout the study [18]. Collagen with hyaluronic acid and elastin have key role in providing elasticity and integrity to the organ. Collagen represents a family of 28 different proteins [19] which account for 30% of the total protein mass in the human body and play a pivotal role in the structure of several tissues, such as skin and bones, providing rigidity and integrity [3].

Despite the fact that there are no previous reports available on the hepato-toxicity induced by oral inoculation of food-derived collagen [20], our records have demonstrated histopathological alterations in liver after 30 days of collagen feeding. Similarly, Woo et al., have been mentioned that the collagen-fed mice had a lower level of hepatic Triglyceride; which was consistent with liver histological results. The Triglyceride lowering effect of collagen suppressed adipose tissue differentiation leading to diminish the adipocytes of collagen-fed mice [17]. These findings were in accordance with those of a previous related study, in which the intake of collagen peptide has decreased fatty acid synthesis and increased β-oxidation in the liver of mice [21].
The most dominant histopathological changes in kidneys were found in closure of renal tubules of collagen-α®-group; degeneration hemorrhage and vacuolation were observed. This cyto-nephrotoxicity is closely associated with the chronic effect of high protein renal filtration [22, 23]. Nevertheless, rats cold exhibit a renal hypertrophy at a dose rate of hundred times of the recommended daily collagen intake [24]. Regarding to the renal toxicity impact of collagen peptide, renal hypertrophy could be induced in growing rats following administration of porcine skin derived collagen peptide [25].

In the present study, we report that the oral supplementation with specific alpha collagen has adverse effects if be taken unnecessarily, it caused the vacuolation of the cardiocyte, hypertrophy and spaces hemocedrosis in heart as a result of high concentration of collagen (high protein diet). However, cardiac arrhythmias [26], myocarditis and cardiac atrophy [27] have been observed in individuals who after prolong receiving a low calorie and high protein (collagen) diet as a treatment of obesity.

In the present study, histopathological evaluation of lungs in collagen-α®-group showing thickening of alveolar wall, dilated of bronchiole and serous exudates into the lumen that could be due to accumulation of fluids as a result of circulatory impairs or as a sequel of heart damage. Moreover, inflammatory cell foci and emphysema were the most dominant lesions in lunges of rate after a 24-month feeding with marine collagen peptides [20]. Thus, no marked deleterious effects of collagen from bovine skin have seen in various animal studies except for local irritation when parenteral administrations are applied [28].

**CONCLUSION**

We provide a clinical trial of the oral chronic toxicity of specific collagen (collagen-α®) on pregnant rabbits for the first time in Iraq. Our data demonstrates that the prolonged oral administration of the specific collagen supplements can induce harmful cellular effects in the target organs and reduce weight gain. Despite the study’s size and limitation, the results suggest that the high risk of adverse effect of collagen derived supplements is outweighing the benefits. Further investigations are needed to clarify the role of collagen-α® in other organs such as muscles, bones and cartilages as well as evaluate the related biochemical parameters. It will be interesting to compare different collagen sources regarding to their metabolic and adaptation effects.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the College of Veterinary Medicine, University of Basrah and all experiments were carried out in accordance with approved guidelines.

**References**

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Nurses’ Knowledge Concerning the Management of Bleeding in Patients with Leukemia

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Abstract

To achieve the objectives of the study, a non-probability (purposive) sample of (50) nurses were selected those were working at the oncology wards at the above listed hospitals. The data selected according to the criteria of the study sample. The validity of the questionnaire was determined through an expert panel consists of (11) specialist expert and its reliability was determined through a pilot study by test – retest which was estimated as averages (R=0.89). Data was collected by direct interview technique using the questionnaire formal and data was analyzed by application of descriptive & inferential statistical methods (frequency, percentage, mean of score and Chi-Square). The results of the study indicated that most of the study sample were male (60%), (78%) within age group (20-29 years), (70%) were nursing college graduates and (62 %) has 1-3 years of experience at oncology wards. The results of the study indicated that the majority of the study sample had a low significance in items concerning nurses’ knowledge about managements taken by nurse to avoid bleeding, and the majority of them had a moderate significant relationship between nurses’ knowledge and the years of experience and training sessions inside and outside Iraq.

Keywords: Nurse, Knowledge, Bleeding, Leukemia.

Introduction

The patient with leukemia is at risk for many problems, including fatigue, bleeding, infection, and other complications of the disease and its treatment.\textsuperscript{1}

In 2016, the estimated number of leukemia cases in the United States was about 16,430.\textsuperscript{2} while in Iraq the estimated cases for leukemia were about 22,568 for the year 2017.\textsuperscript{3}

The most dangerous complications of leukemia are bleeding and infection, those considered the major causes of death. The risk of bleeding correlates with the level of platelet deficiency (thrombocytopenia).\textsuperscript{4}

The major goals for the nurse may include absence of complications and pain, ability to provide self-care and to cope with the diagnosis and prognosis, and an understanding of the disease process and its treatment.\textsuperscript{5}

Nurses should follow a set of practices concerning the management of bleeding in patients with leukemia at all times and use critical thinking and problem solving in managing clinical situation.\textsuperscript{6}

The first precaution of intended bleeding is following a good personal protective equipment measures including ; hand washing, gloves, masks cover the mouth and nose, gown, face and eye protection.\textsuperscript{7}

For this reason the researcher do this study to assess the nurses’ knowledge about management of bleeding in patients with leukemia.

Material and Methods

A descriptive study carried out at three teaching hospitals at Medical City Complex (Baghdad teaching hospital, consultation clinic at Baghdad teaching hospital and oncology teaching hospital) starting from September 4\textsuperscript{th}, 2019 up to December 10\textsuperscript{th}, 2019.

A simple random sample of (50) nurses who were working at the oncology wards according to the following criteria (adult nurse age (20-49 years) with at least one year of experience).
The questionnaire that used to collect the data and measure the variables, it consisted of two parts; the first part concerned with the nurses’ demographic characteristics of (7) items (age, gender, residency, marital status, educational level, years of experience, and specialized courses taken inside and outside Iraq). The second part concerned with nurses’ knowledge concerning management of bleeding which consists of (2) domains which include (20) items. The first domain is for the measures taken by the nurses to prevent bleeding, the second domain involves the advices which provided by the nurse to prevent bleeding. These items are measured, scored and rated on a 3 level type Likert scale (3) for always, (2) for sometimes and (1) for never.

Content validity of the questionnaire is determined through a panel of (11) experts they are faculty members of nursing college, university of Baghdad. A pilot study was carried out on the 6th, September, to the 10th September, 2019. Determination of the reliability of the questionnaire was based upon the (test-retest) which has been (0.89) for (10) nurses. Data was collected from (13th, September to 25th October, 2019 by utilization of the study instrument and interviewing with the nurses.

**Data Analysis**

Data were analyzed through application of descriptive and inferential statistical data analysis approaches. This approach used for determining the following measurements:

1. Frequency (F).
2. Percentage ( % ).
3. Arithmetic Mean.

$$x = \frac{\sum x}{n}$$

$$\sum xi = \text{sum of the (3x always + 2x sometimes + 1x never) for items. n = number of the sample}$$

4. Mean of score (MS): A mean of score equal to (1.67- 2.33) was considered moderate MS, greater than (2.34) was considered high MS, less than (1.67) was considered low MS.

5. Pearson Correlation Coefficient

It was used to estimate the scale (test & retest ) reliability through the application of the following formula :

$$r = \frac{n \sum x y - (\sum x)(\sum y)}{\sqrt{n(\sum x^2) - (\sum x)^2} \sqrt{n(\sum y^2) - (\sum y)^2}}$$

6. Chi – square: it was applied for the confirmation of association between the nurse’s knowledge about infection control and his/ her demographic characteristics such as years of experience and specialized courses taken inside and outside Iraq. This was computed using this formula :

$$X^2 = \sum \frac{(O_i - E_i)^2}{E_i}$$

**Results**

The analysis of the data after being processed and tabulated. Such presentation is systematically oriented relative to nurses and their demographic characteristic.

**Table (1): Mean of Score for Items Concerning Nurses’ Knowledge about Managements Taken by Nurse to Avoid Bleeding.**

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Always</th>
<th>Sometimes</th>
<th>Never</th>
<th>M.S.</th>
<th>Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1</td>
<td>Wash hands before any nursing procedure</td>
<td>45</td>
<td>5</td>
<td>0</td>
<td>1.10</td>
<td>LS</td>
</tr>
<tr>
<td>1.2</td>
<td>Taking temperature through anal</td>
<td>1</td>
<td>26</td>
<td>23</td>
<td>2.44</td>
<td>LS</td>
</tr>
</tbody>
</table>
### Table (2): Mean of Score for Items Concerning Nurses’ Knowledge about Managements Taken by Nurse to Avoid Bleeding.

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Always</th>
<th>Sometimes</th>
<th>Never</th>
<th>M.S.</th>
<th>Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3</td>
<td>Taking temperature through mouth</td>
<td>14</td>
<td>29</td>
<td>7</td>
<td>1.86</td>
<td>MS</td>
</tr>
<tr>
<td>1.4</td>
<td>Taking temperature through axilla</td>
<td>30</td>
<td>19</td>
<td>1</td>
<td>1.42</td>
<td>LS</td>
</tr>
<tr>
<td>1.5</td>
<td>Avoid intramuscular injection</td>
<td>16</td>
<td>30</td>
<td>4</td>
<td>1.76</td>
<td>MS</td>
</tr>
<tr>
<td>1.6</td>
<td>Taking precaution during intravascular injection</td>
<td>37</td>
<td>13</td>
<td>0</td>
<td>1.26</td>
<td>LS</td>
</tr>
<tr>
<td>1.7</td>
<td>Pressure on injection site for a while</td>
<td>37</td>
<td>12</td>
<td>1</td>
<td>1.28</td>
<td>LS</td>
</tr>
<tr>
<td>1.8</td>
<td>Measure blood pressure in the non-invasive hand</td>
<td>41</td>
<td>8</td>
<td>1</td>
<td>1.20</td>
<td>LS</td>
</tr>
<tr>
<td>1.9</td>
<td>Avoid giving anticoagulant medications</td>
<td>36</td>
<td>14</td>
<td>0</td>
<td>1.28</td>
<td>LS</td>
</tr>
<tr>
<td>1.10</td>
<td>Avoid using sharp objects during wound caring</td>
<td>42</td>
<td>7</td>
<td>1</td>
<td>1.18</td>
<td>LS</td>
</tr>
</tbody>
</table>

No. = Number, M.S. = Mean of score, LS = Low severity, MS = Moderate severity, 

HS= High severity. Rating of severity (LS = 1- 1.66, MS = 1.67- 2.32, HS= 2.33- 3).

This table shows that the majority of sample reflect a low significance in items concerning nurses’ knowledge about managements taken by nurse to avoid bleeding.

### Table (1): Mean of Score for Items Concerning Nurses’ Knowledge about Advices Given by Nurse Concerning Management of Bleeding.

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Always</th>
<th>Sometimes</th>
<th>Never</th>
<th>M.S.</th>
<th>Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Using electric razor</td>
<td>23</td>
<td>17</td>
<td>10</td>
<td>1.74</td>
<td>MS</td>
</tr>
<tr>
<td>2.2</td>
<td>Using soft tooth brush</td>
<td>38</td>
<td>11</td>
<td>1</td>
<td>1.26</td>
<td>LS</td>
</tr>
<tr>
<td>2.3</td>
<td>Using flossing in cleaning teeth</td>
<td>20</td>
<td>17</td>
<td>13</td>
<td>1.86</td>
<td>MS</td>
</tr>
<tr>
<td>2.4</td>
<td>Avoid crowded places</td>
<td>26</td>
<td>22</td>
<td>2</td>
<td>1.52</td>
<td>LS</td>
</tr>
<tr>
<td>2.5</td>
<td>Wearing shoes during waling to avoid any injury</td>
<td>41</td>
<td>9</td>
<td>0</td>
<td>1.18</td>
<td>LS</td>
</tr>
<tr>
<td>2.6</td>
<td>Cutting nails carefully</td>
<td>42</td>
<td>8</td>
<td>0</td>
<td>1.16</td>
<td>LS</td>
</tr>
<tr>
<td>2.7</td>
<td>Washing wounds with warm water and using detergents</td>
<td>42</td>
<td>7</td>
<td>1</td>
<td>1.18</td>
<td>LS</td>
</tr>
<tr>
<td>2.8</td>
<td>Avoid uncooked meals and fruits</td>
<td>40</td>
<td>10</td>
<td>0</td>
<td>1.20</td>
<td>LS</td>
</tr>
<tr>
<td>2.9</td>
<td>Take precaution while using sharp or contaminated equipment</td>
<td>45</td>
<td>4</td>
<td>1</td>
<td>1.12</td>
<td>LS</td>
</tr>
<tr>
<td>2.10</td>
<td>Reporting Nurse / Physician when feeling sudden signs or symptoms of bleeding</td>
<td>45</td>
<td>5</td>
<td>0</td>
<td>1.10</td>
<td>LS</td>
</tr>
</tbody>
</table>

No. = Number, M.S. = Mean of score, LS = Low severity, MS = Moderate severity,
HS= High severity. Rating of severity (LS = 1- 1.66, MS = 1.67- 2.32, HS= 2.33- 3).

This table reflects that the majority of sample shows a low significance in items concerning nurses’ knowledge about advices given by nurse concerning management of bleeding.

**Table (3): Association between Nurse’s Knowledge about Managements Taken by Nurse to Avoid Bleeding and Their Years of Experience**

<table>
<thead>
<tr>
<th>Nurses’ Knowledge</th>
<th>High</th>
<th>Moderate</th>
<th>Low</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Years of Experience</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-3 years</td>
<td>0</td>
<td>18</td>
<td>2</td>
<td>20</td>
</tr>
<tr>
<td>4-6 years</td>
<td>2</td>
<td>10</td>
<td>7</td>
<td>19</td>
</tr>
<tr>
<td>7-9 years</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>10 years and more</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>5</td>
<td>32</td>
<td>13</td>
<td>50</td>
</tr>
</tbody>
</table>

$\chi^2$ Obs. = 32.357 , df = 13 , P ≤ 0.05 , $\chi^2$ Crit. = 23.362

This table shows that there is a moderate significant relationship between years of experience and nurses’ knowledge.

**Table (4): Association between Nurse’s Knowledge about Advices Given by Nurse Concerning Management of Bleeding and Training Courses Inside and Outside Iraq.**

<table>
<thead>
<tr>
<th>Nurses’ Knowledge</th>
<th>High</th>
<th>Moderate</th>
<th>Low</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training Courses</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Training Inside Iraq: Yes</td>
<td>22</td>
<td>6</td>
<td>3</td>
<td>31</td>
</tr>
<tr>
<td>No</td>
<td>13</td>
<td>4</td>
<td>2</td>
<td>19</td>
</tr>
<tr>
<td>TOTAL</td>
<td>35</td>
<td>10</td>
<td>5</td>
<td>50</td>
</tr>
<tr>
<td>2. Training Outside Iraq: Yes</td>
<td>4</td>
<td>7</td>
<td>1</td>
<td>12</td>
</tr>
<tr>
<td>No</td>
<td>7</td>
<td>22</td>
<td>9</td>
<td>38</td>
</tr>
<tr>
<td>TOTAL</td>
<td>11</td>
<td>29</td>
<td>10</td>
<td>30</td>
</tr>
</tbody>
</table>

$\chi^2$ Obs. = 18.951 , df = 13 , P ≤ 0.05 , $\chi^2$ Crit. = 23.362

This table shows that there is a high significant relationship between nurse’s knowledge and courses taken inside Iraq, while there is a moderate significance in having courses outside Iraq.
Discussion

Regarding the management taken by the nurse to avoid bleeding (table 1) showed that the study sample reflect a moderate significance in items concerning with taking temperature through mouth and avoiding intramuscular injection. This result agrees with Weightman et al., (2009) who discussed the first line of preventing bleeding during injections and taking temperature through axilla rather than rectal and oral methods. But, this result is disagree with Jafari et al., (2008) and Shinde and Mohita, (2014) who listed that the nurses’ knowledge must be at highest as possible to achieve better prevention of bleeding.

The results of the present study (table 2) showed that the majority of study sample reflect a low significance in items concerned with advices given by nurse concerning management of bleeding. These results disagree with Mehtar and Marais, (2011) who studied the policy to practice education in dealing with bleeding prevention and infection control.

These results are similar to a study done by Kumbargere, (2015) who analyzed that shortage of nursing staff and the decrease in the specialized training courses was the main causes. In addition to the huge numbers of patients with leukemia admitted to the medical wards at Baghdad teaching hospitals.

Table (3) showed that there is a moderate significant positive relationship between years of experience and nurses’ knowledge about management of bleeding. These results supported by Saini et al., (2011) who had done a study on infection control among health care assistants and he found that there is a positive relationship between nurses’ knowledge and their years of experience. In addition, the commitment of standard precautions for all nursing staff in selected Egyptian cancer hospitals even those with less years of experience may improve the nurses’ skills in dealing with bleeding as discussed by Eskander et al., (2013).

Table (4) showed that there is a high significant positive relationship between nurses’ knowledge about management of bleeding and specialized training courses taken inside Iraq, while there is a moderate significance in having courses outside Iraq. These results supported by Joshi et al., (2014) in the study results that reflected a positive significant relationship between nurses and health care staffs’ knowledge and training. A similar study done by Farmer et al., (2010) confirmed the existence of that relationship.

Conclusions

The study indicated that the majority of the study sample had a low significance in items concerning nurses’ knowledge about managements taken by nurse to avoid bleeding with the presence of moderate significant relationship between years of experience and nurses’ knowledge. In addition, there is moderate to high significance in participating in training courses inside and outside Iraq.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Adults Nursing Department, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Histological Alteration of Proximal Part of Aorta Exposed to (MSG) and Protective Effect of α Lipoic Acid (ALA) in Male Rabbits

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Abstract

Background. Monosodium Glutamate is one of the most world’s most widely used food additives. Its toxic effect have been shown in numerous animal studies, in which study MSG effects on cardiovascular system, therefore, This study was aimed to investigate the effect of alpha lipoic acid(ALA) on the damage in the large blood vessels induce by Mono sodium glutamate. Thirty two male rabbits was divided equally and randomly into four groups as following. Control group in which rabbits where fed with normal diet without supplementation, second group was gived MSG orally (8mg/kg.BW), While animals of third group were given ALA orally (60mg/kg.BW) while animal in fourth group were given orally (MSG 8mg/kg.bw and ALA 60mg/kg.bw), all treatment are extended to 8 weeks. The outcomes of research revealed a significant increased (p<0.05) in aortic medial layer thickness in animals administration of MSG in a comparesion with control and groups treated and distortion structure of laminar fibers, endothelial cells lost normal squamous. In addition, there is a significant decreased (p<0.05) in medial tunica thicken in animals used ALA combination with MSG, so we noted return the disarranged of architecture tissue near.

Keywords: aorta, MSG, protective effect, α lipoic acid

Introduction

Cardiovascular diseases (CVD) considered one of the main causes of death all the world and more developing countries, CVD, is the most common form of heart disease, CAD is a disease infecting the arterial blood vessel and is generally referred to as hardening or furring” of the arteries. It is caused by configuration of multiple plaques within the arteries 1, 2, 3, 4. Atherosclerosis derives from a Greek word, Atheros meaning gruel 4,Fatty streaks evolve to formation atherosclerotic plaques which is consisted of three components called of inflammatory cell, smooth muscle cell, a fibrous component of connective tissue, a Fat component of lipids 5. Monosodium glutamate (MSG) is the sodium salt of the non-essential amino acid glutamic acid. Glutamic acid is one of the most abundant amino acids presented in nature and found both as free glutamate and bound with more amino acids into protein.

Animal proteins may involve about 11 to 22% by weight of glutamic acid, with plant proteins including as much as 40% glutamate6. Glutamate is thus presented in a wide variety of foods, and in its free form, where it has been demonstrated to have a flavour enhancing effect, is also exist in relatively high concentrations in some foods such as tomatoes, mushrooms, peas and cheeses. ALA represent as a defensive agent versus hazard factors of cardiovascular disease. ALA may impact the CVD risk via the beneficial action on LDL oxidation, blood lipid profiles(LDL,VLDL,HDL) , plaque formation , hypertension7. ALA is a natural antioxidant created in the mitochondria of the liver and more tissues, so it has anti-inflammatory characteristics, ability to scavenge ROS, metal chelating, regenerate glutathione, vitamins (E, C) and diminished the atherosclerotic plaque by it can mending vascular function 8, 9. The dearth information about role protective to alpha lipoic acid on the distortions in large red artery induce by Mono Sodium Glutamate for this reason, the experimented was determent.

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Materials and Method

Experimental design

In June–July month’s adult eight male rabbit’s per group, weight 1300-1500 g/kg which captured from the Karbala conserve were used in this study. First group gives diet without supplementation. Second group was administrated of MSG dissolved by water by orally at dose 8mg/kg B.W, for eight weeks. While rabbits included in third group were gives Alpha lipoic acid dissolved by DMSO orally at dose 60 mg/kg B.W for eight weeks. The experimental rabbits of euthanized by intra muscular administration of diazepam (1mg/1kg) combined with ketamine HCL (30Mg, 1Kg). After thoracic incision, the large artery (aorta) is obtaining and fixed in the 10% neutral buffer formalin. Cross sections was prepared histologically. Routine heamatoxylin and eosin stains were used to general structure study, in addition to other special stain (Massson’s trichrom stain) to give more histological details. The parameter that thickness medial tunic was measured.

Statistical Analysis

The collected data were represented by mean ± standard deviation. Comparisons were done between rabbits group. The mean of differences between data were estimated.

Results and Discussions

All histological stains were used in control group of our study appear the structure of elastic artery was consist of three layers, tunic intima which contain endothelium, basal lamina, and sub endothelial connective tissue, smooth muscle cells, internal elastic lamina that represent first layer but, the tunic media composed from greater fenestrated elastic laminae with lesser amount of smooth muscle with collagen fibers second layer thicker evaluated (588.4±52.8), fig.(1) table(1) while, the third layer connective tissue concentrate collagen with scatter of elastic fibers and vaso vasorum this structure named tunic adventitia fig.(2,A,B). These results superposes many authors’ who reported during your researches in differ model animals. The many studies were to evaluate the effect induced by monosodium glutamate(MSG) on systems body include cardiovascular system in a rodent, fowls and rats animals these have shown irregular structure of the laminae fibers, thinning and fragmentation of elastic laminae, proliferation of medial smooth muscle, thickened of the aortic artery greatly in tunica intimal these similar under line of the histomorphological study in our research of the aortic artery in supplementation rabbits group with MSG revealed the nuclei of endothelial cells in intimal surface were irregular and lost squamous cells specialty with foam cell existences and increased aortic medial thickness measured (1054.3±39.9),fig. (1)table(1) and deterioration architectural of elastic fibers in tunica media when compared with control rabbit groups figs.(2,C,D; 3, E,F) in addison greater of adipocytes penetrated connective tissue of adventitial layer fig.(4, A,B).

The diabetic and hypertension rats treated with ALA the endothelial cells of intimal layer having squamous property and appear smoother with fewer defect so the smooth muscles don’t reactively proliferation and organization of the lamina fibers of tunica media these results of author similar of our investigation research. In microscopic section examined of the MSG &ALA supplementation rabbits group that shows histomorphological architectural near from the control groups the endothelial cells of intimal layer squamous characteristic so that, when we image analysis observed, decreased aortic media layer thickness, was (660.12 ±81),fig.(1) table (1) compared with the treated MSG rabbits group and appear more regulars’, more organized structure of lamina fibers and reduced proliferate smooth muscles in tunica media figs. (2, E; 3, G, H).

Thioctic acid (ALA) was easily converts dihydrolipoic acid represented reduced form, so it was neutralizes free radicals in both the fatty and watery regions of cells,. Our outcomes of research, three layers of the aorta in ALA treated rabbit groups (intima, media and serosa) had of normal microscopical details structures and decreased thickened in aortic media evaluated was ( 615.8 ± 77.5) fig (1) table(1) when compere with MSG treated rabbits group these revealed micrograph (2,G,H;3,C,D) this described assembly who reported author.
Table (1): measured thickness tunica media of aortic control and treated rabbits group. Values represent means±SD. Different letters were means significantly (P<0.05) different.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Control</th>
<th>Msg</th>
<th>Msg &amp; ALA</th>
<th>ALA</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>values</td>
<td>588.4±52.8</td>
<td>1054.3±39.9</td>
<td>660.1±81</td>
<td>615.8±77.5</td>
<td>0.04</td>
</tr>
<tr>
<td>A</td>
<td>B</td>
<td>A</td>
<td>A</td>
<td></td>
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</tbody>
</table>

The different mean of all three (treatments or parameters) were significantly different from mean of the control group (P<0.05; one-way ANOVA with Turkeys’ method)

Figure (1): The thickness of tunica media of aortic artery in both control and treated male rabbits group. Values represent means±SD. Different letters means significantly (P<0.05) different. Where,

Control male group (C.); monosodium glutamate treated male group (Msg); alpha lipoic acid treated male group (ALA); accompanied monosodium glutamate and alpha lipoic acid treated male group (Msg & ALA).
Figure (2): A-B. Sections belonging to the control rabbits group, C-D. Belonging to the MSG treated rabbits group revealed thickened in aortic media with disarranged laminae fibers in addition endothelial cells lost squamous structure, E-F. Belonging to the MSG & ALA treated rabbits group, which shows return the normal histological organized, G-H. Belonging to the ALA treated rabbits group, that appear assembly control structure, and Stained with H&E, A, C, E&G stained with MTKB, D,F&H Scale bar 200 µm
Figure (3): A-B. Sections belonging to the control rabbits group, C-D. Belonging to the ALA treated rabbits group that appear assembly control structure, E-F. Belonging to the MSG treated rabbits group revealed nucleus dis-normal poison so endothelial cells lost squamous structure, with foam cell, G-H. Belonging to the MSG & ALA treated rabbits group, which shows return the normal histological organized, and Stained with MTKR: A, C, E&G stained with H&E: B, D,F&H Scale bar 1000 μm
**Conclusion**

Study Demonstrated the (ALA) cause improvement the negative changes in the aortic artery.

Key word: ALA, Histological alteration, MSG, Aortic

**Financial disclosure:** There is no financial disclosure.

**References**


Effect of Pioneer Aeromedical Evacuation Program on Flight Medics’ Practices toward Emergency Casualties at Army Aviation Bases in Iraq

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²Ph.D. Professor, Adult Nursing Department, College of Nursing, University of Baghdad, Iraq

Abstract

Objective(s): The study aims to determination the effect of aeromedical evacuation program on flight medics’ practices.

Method: A pre-experimental design is carried in army aviation bases in Iraq, for the period of February 1st 2019 to September 25th 2019. Non-probability “purposive” sample of (30) flight medics are selected from army aviation bases. Non-probability “purposive” sample of (30) flight medics are selected from army aviation bases. The questionnaire is composed of two main parts (demographic characteristics of the flight medics, and the second part involves five domains which as (67) items concerning flight medics’ practices regarding first aid of emergency casualties format, the researcher used SPSS version 20 to analyze the data. The reliability of the participant responses was estimated by alpha correlation (r) practice test was (r= 0.94), and content validity of the instrument was determined through a panel of (twenty-five) experts. Data was analyzed through the use of descriptive and inferential statistical analysis.

Results: The results of the pretest for flight medics revealed that flight medics’ practices about five domains of aeromedical evacuation program toward emergency casualties was moderate, while the posttest I and II results shows that flight medics’ practices was improved to high level because of the positive impact of the instruction program, and there were significant association between the effectiveness of present program on flight medics’ practices and there level of education at P≤0.05.

Conclusion: The study concluded that the present program was effective on flight medics’ practices.

Recommendation: The study recommended to increase the training courses for flight medics inside and outside Iraq, and included the present program on their plan of training.

Keywords: Pioneer, Aeromedical evacuation, flight medic, practices, Emergency Casualties.

Introduction

Aero- medical services are a comprehensive term covering the use of air transportation, airplane or helicopter, to transport patients to and from healthcare facilities and accident scenes. Air medical services have a particular advantage for major trauma injuries. The well-established theory of the golden hour suggests that major trauma patients should be transported as quickly as possible to a specialist trauma center.⁽¹⁾⁽²⁾ Helicopter emergency medical services has its origins in military evacuation by air transport during the war, its use in civilian situations was initiated in the 1960s in the United States, since then, it has played an important role in pre hospital emergency medical systems, rapid transport of major trauma patients to a definitive care center is a cornerstone of modern trauma systems, and delay in this element of care is a widely known cause of mortality.⁽³⁾ Key to success is evenly built medical support with strong, balanced system of medical evacuation.
The evacuation of sick and wounded during military operations is influenced by many factors as are operational environment, weather, length and quality of medical evacuation routes and number and type of suitable medical evacuation means in time of need. (4)

The highest percent of trauma deaths occurs in the prehospital setting of the traumatic incident. Mortality and morbidity can be reduced by effective identification, field triage, the intervention of ambulance caregivers to give pre-hospital trauma care and transport of severely trauma casualty to hospital. (5)

Pre-hospital trauma triage standards ordinarily acquire a blend combo of physiological, anatomical, and mechanisms of trauma constriction made to meet casualties’ trauma system needs. (6)

**Method**

A pre-experimental design is carried in army aviation bases in Iraq, the present study started from February 1\textsuperscript{st} 2019 to September 25\textsuperscript{th} 2019, which carried out in the Al Taji Air Base clinic; Al Habbaniyah Air Base clinic; Al Shuaiba Air Base clinic; Al Kout Air Base clinic; and Kirkuk Air Base clinic, Army aviation college. A non-probability (purposive) sample included was (35) flight medic, the researcher constructed a questionnaire format based on program in order to reach the objectives of the study, which consists of two parts; first part deals with of demographic characteristics of the flight medics which as age, gender, level of education, years of experiences in first aid, years of experiences in aeromedical evacuation, number of training courses in medical category, and Place of the courses. The second part refers to flight medics’ checklist items related to practices. the content validity of the present program and instruments was established through a panel of twenty-five (25) experts. The reliability of the participant responses was estimated by alpha correlation (r) practice test was (r= 0.94), The data of the present study are analyzed through the use of the Statistical Package of Social Sciences (SPSS) version 20. through descriptive statistics (frequency, percentage, mean, standard deviation, and graphical presentation) and statistical inferential (t-test, person correlation coefficient, and analysis of variance ANOVA).

**Result**

**Table 1: Distribution of the flight medics by their characteristics.**

<table>
<thead>
<tr>
<th>Variable</th>
<th>classifications</th>
<th>Freq.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age groups</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26-30</td>
<td></td>
<td>9</td>
<td>30.3</td>
</tr>
<tr>
<td>31-35</td>
<td></td>
<td>12</td>
<td>40.0</td>
</tr>
<tr>
<td>36-40</td>
<td></td>
<td>7</td>
<td>23.3</td>
</tr>
<tr>
<td>41-45</td>
<td></td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>46 and more</td>
<td></td>
<td>2</td>
<td>6.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>30</td>
<td>100.0%</td>
</tr>
<tr>
<td>X±S.D</td>
<td></td>
<td>2.13 ± 1.07</td>
<td></td>
</tr>
<tr>
<td><strong>Level of education</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>middle school</td>
<td></td>
<td>46.7</td>
<td>14</td>
</tr>
<tr>
<td>Preparatory study</td>
<td></td>
<td>30.0</td>
<td>9</td>
</tr>
<tr>
<td>Diploma</td>
<td></td>
<td>10.0</td>
<td>3</td>
</tr>
<tr>
<td>B.Sc.</td>
<td></td>
<td>13.3</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>100.0%</td>
<td>30</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>male</td>
<td></td>
<td>96.7</td>
<td>29</td>
</tr>
<tr>
<td>female</td>
<td></td>
<td>3.3</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>100.0%</td>
<td>30</td>
</tr>
</tbody>
</table>
### Table 1: Distribution of the flight medics by their characteristics.

<table>
<thead>
<tr>
<th></th>
<th>1-5 year</th>
<th>6-10 year</th>
<th>11-15 year</th>
<th>Total</th>
<th>X ± S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of years in first aid</td>
<td>30</td>
<td>46.6</td>
<td>23.3</td>
<td>100.0</td>
<td>7.76 ± 3.44</td>
</tr>
<tr>
<td>Number of years in AE</td>
<td>60</td>
<td>36.6</td>
<td>3.3</td>
<td>100.6</td>
<td>5.26 ± 2.79</td>
</tr>
<tr>
<td>Number of courses completed in the medical category</td>
<td>66.6</td>
<td>20</td>
<td>4</td>
<td>100%</td>
<td>2.13 ± 1.43</td>
</tr>
<tr>
<td>Did you complete the advanced course of first aid?</td>
<td>Yes</td>
<td>26.6</td>
<td>8</td>
<td>100%</td>
<td>30</td>
</tr>
<tr>
<td>Place of the course</td>
<td>Inside Iraq</td>
<td>96.7%</td>
<td>29</td>
<td>100%</td>
<td>30</td>
</tr>
</tbody>
</table>

**Freq.**=Frequencies, **%**=Percentages, \( \bar{x} \) ± S.D = Arithmetic Mean and Standard Deviation

Table (1): shows that (40%) of flight medics at 31-35 years, high percent of them graduated from middle school, (46.7%), (36.6%) of them have (6-10) years of experience in first aid, and experience in AE respectively, high percent (66.6%) including training course, 60% of the study sample have experience in AE for 1-5 year, 66.6% of their completed the medical category was (66.6%) in the class 1-2 year of the study group, 96.7% of courses was in Iraq.

**Table (2): Comparison of flight medic’ practices between pretest and posttest I**

<table>
<thead>
<tr>
<th>NO.</th>
<th>practices domains</th>
<th>periods</th>
<th>(Mean ± S.D)</th>
<th>Ass.</th>
<th>t</th>
<th>P.</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Care according to the priority of care</td>
<td>pre-test</td>
<td>1.22 ± 0.41</td>
<td>NAP</td>
<td>-9.24</td>
<td>0.00</td>
<td>H.S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-test</td>
<td>1.78±0.41</td>
<td>APP</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Cont... Table (2): Comparison of flight medic’ practices between pretest and posttest I

<table>
<thead>
<tr>
<th>NO.</th>
<th>practices domains</th>
<th>periods</th>
<th>( $\bar{x} \pm S.D.$ )</th>
<th>Ass.</th>
<th>t</th>
<th>P</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Care according to the priority of care</td>
<td>pre-test</td>
<td>1.22±0.41</td>
<td>NAP</td>
<td>-6.72</td>
<td>0.00</td>
<td>H.S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-test</td>
<td>1.70±0.46</td>
<td>NAP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Practices regarding open air way (A)</td>
<td>pre-test</td>
<td>1.28±0.45</td>
<td>NAP</td>
<td>-10.05</td>
<td>0.00</td>
<td>H.S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-test</td>
<td>1.65±0.47</td>
<td>NAP</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3</td>
<td>Practices regarding breathing (B)</td>
<td>pre-test</td>
<td>1.39±0.49</td>
<td>APS</td>
<td>-5.80</td>
<td>0.01</td>
<td>S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-test</td>
<td>1.66±0.47</td>
<td>NAP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Practices regarding (CPR)</td>
<td>pre-test</td>
<td>1.33±0.47</td>
<td>NAP</td>
<td>-15.77</td>
<td>0.00</td>
<td>H.S</td>
</tr>
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<td></td>
<td></td>
<td>Post-test</td>
<td>1.78±0.41</td>
<td>NAP</td>
<td></td>
<td></td>
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<tr>
<td>5</td>
<td>Practices regarding circulation (C)</td>
<td>Pre-test</td>
<td>1.33±0.47</td>
<td>NAP</td>
<td>-13.45</td>
<td>0.00</td>
<td>H.S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Post-test</td>
<td>1.76±0.42</td>
<td>NAP</td>
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</tr>
</tbody>
</table>

$\bar{x} \pm S.D = $ Arithmetic Mean and Standard Deviation, NAP= not applied practice (1-1.33), APS = Applied practice somewhere (1.34-1.67), APP. =Applied practice perfectly (1.68-2), t= t-test P= probability $P \geq 0.05$, sig.=significance

Table (2): this table showed the comparison of flight medic’ practices in present study of the present program between the pre-test and the post-test I, where the results indicated the level of practices is (not applied practice) while the results confirmed the high level of practices in the post-test I is (Applied practice perfectly), and there is a highly statistical significant difference between each group.

Table (2): Comparison of flight medic’ practices between pretest and posttest II.
Table (2): Comparison of flight medic’s practices between pretest and posttest II.

<table>
<thead>
<tr>
<th></th>
<th>Practices regarding disability (D)</th>
<th>Pre-test</th>
<th>APS</th>
<th>13.19</th>
<th>0.00</th>
<th>H.S</th>
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<tbody>
<tr>
<td>6</td>
<td></td>
<td>1.39±0.48</td>
<td>APS</td>
<td></td>
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<tr>
<td></td>
<td>Post-test</td>
<td>1.79±0.40</td>
<td>NAP</td>
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</tr>
<tr>
<td></td>
<td>Practices regarding environment (E)</td>
<td>Pre-test</td>
<td>NAP</td>
<td>-7.13</td>
<td>0.00</td>
<td>H.S</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>1.30±0.44</td>
<td>NAP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post-test</td>
<td>1.69±0.46</td>
<td>NAP</td>
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</tbody>
</table>

\[ \bar{X} \pm S.D = \text{Arithmetic Mean and Standard Deviation}, \text{NAP} = \text{not applied practice (1-1.33)}, \text{APS} = \text{Applied practice somewhere (1.34-1.67)}, \text{APP}= \text{Applied practice perfectly (1.68-2)}, t= \text{t-test} \ P= \text{probability} \ P\geq0.05, \ \text{sig.}= \text{significance} \]

Table (3): this table demonstrate Comparison of flight medic’s practices in present study of the present program between the pre-test and the post-test II, where the results indicated the level of practices is (not applied practice) while the results confirmed the high level of practices in the post-test II is (Applied practice perfectly), and there is a highly statistical significant difference between each group.

Figure (1): Pretest, posttest I, and posttest II responses for educational program concerning practices of flight medics.

Figure (1): show the pretest, posttest I, and posttest II responses of flight medic’s practices which revealed that the mean at pretest was 9.24, and the result was improved at posttest I and II of present program.

Table (4): Association between the effectiveness of program and flight medic’s level of education, years in first aid, years in aeromedical evacuation, courses completed in the medical category, Training of advanced first aid course, Place of the courses.
<table>
<thead>
<tr>
<th>Variables</th>
<th>practices Score of the study group post education (n = 30)</th>
<th>Mean± Std.</th>
<th>d. f</th>
<th>F</th>
<th>P. ≤0.05</th>
<th>Sig.</th>
</tr>
</thead>
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<tr>
<td>Middle school</td>
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<td></td>
<td></td>
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<tr>
<td>Preparatory study</td>
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<tr>
<td>Diploma</td>
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<td>B.Sc.</td>
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<td></td>
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<tr>
<td>Number of years in first aid</td>
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<td></td>
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<tr>
<td>1-5</td>
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<td>6-10</td>
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<tr>
<td>11-15</td>
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<td></td>
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<tr>
<td>(Mean ± S.D) 7.76 ± 3.44</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Number of years in AE</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>1-5</td>
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<td>6-10</td>
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<td>11-15</td>
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<tr>
<td>(X ± S.D) 5.26 ± 2.79</td>
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<tr>
<td>Number of courses completed in the medical category</td>
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<tr>
<td>1-2</td>
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<td>3-4</td>
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<td>5</td>
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<tr>
<td>(X ± S.D) 2.13 ± 1.43</td>
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<tr>
<td>Training of advanced first aid course</td>
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<td>Yes</td>
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<tr>
<td>Place of the courses</td>
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<tr>
<td>Inside</td>
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<td>Outside</td>
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<tr>
<td>Total</td>
<td></td>
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</tr>
</tbody>
</table>

n= Number of sample,

\[ \bar{X} \pm S.D = \text{Arithmetic Mean and Standard Deviation}, \ d. f= \text{degree of freedom}, \ F= \text{fisher}, \ p.= \text{probability} \]

P. ≤0.05, sig. = significance
Table (4): This table expression no statistical significant differences have been found between mean of the age, level of education, Number of years in first aid, Number of years in the present program, Number of courses completed in the medical, training of advanced first aid course, and the Place of the courses.

Discussion

Aeromedical evacuation played a key role in the battles that occurred in Iraq after 2003 by rescuing the injured immediately from the battlefield by competent flight medics, as well as in the current study concerned with training air paramedics to aid the wounded through ambulances towards Emergency injuries. A purposive sample which included 30 flight medics distributed to various air bases, including Taji, Habbaniyah, Kut, Basra.

The discussion focuses on interpreting the results of the distribution of the study sample by their characteristics, responses of flight medic toward practices of aeromedical evacuation of emergency casualties (pretest and posttest I), responses of flight medic toward practices of present program of emergency casualties (pretest and posttest I), and association between the effectiveness of program and flight medic’s variables.

Data analysis had revealed that the implementation of the present program had a positive effect on flight medics’ practices through measurement of practice concerning adult pre-hospital trauma care as defined by Care according to seven domains.

Frank et al., (2014) concluded in their research to study PHTLS pre-hospital sessions in Germany and demonstrate the assumption that the level of training for pre-hospital health and care providers was deficient. Where the researchers confirmed that the majority of paramedics had received adequate training regarding pre-hospital care, and mentioned after the session’s confidence increased significantly and it reached higher rates than before the course. (7)

Kumar et al., (2008) revealed that mean performance score of participants regarding prehospital and emergency care was below average. (8)

Deakin et al, (2009) they added that pre-training medical assistants are not acceptable at using advanced airway skills to keep endotracheal intubation skills at a good level. they emphasized that the educational program presented to them has improved a lot of endotracheal intubation skills in inserting tracheal tubes, and more continuous training is obtained through clinical practice. (9)

Bayraktar (2009) It was mentioned that paramedics practicing first aid before training on the smart puppets were not ambitious. Later, they were given more scenarios of first aid, and most drivers became impeccable worse or approached an ideal point in assessing first aid. (10)

The American Heart Association (2015) It is mentioned that many of the results make us think about publishing first aid training courses for the entire ambulance team. (11)

The present study Agree with the study of Romundstad, Sundnes, Pillgram, et al, (2004) (2004) they explained that a large percentage of people who are exposed to natural disasters in remote places with multiple scenes, and limited access to them, remains the medical air evacuation is the best solution to save such emergency injuries. (12) Assa, Landau, Barenboim, et al, (2009) revealed that the airomedical evacuation played an important role in the event as reflected from the severity of injuries of the patients transported. of most casualties defined as urgent or severely wounded, life-threatening injuries are evacuated by air.

Conclusion

The study concluded that the present program was effective on flight medics’ practices.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Ministry of Defense and all experiments were carried out in accordance with approved guidelines.

References

3. Kim O, Young R, Hyung K, Yong S, Kyoung C,


Anatomical, Histological and Histochemical Investigation of Soft Palate in Cat (Felis Catus Domesticus.L)

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1 Lecturer, Department of Anatomy and Histology\College of Medicine\Misan University, 2 Assist. Prof., Department of Anatomy and Histology\College of Veterinary Medicine\University of Kerbala, 3 Lecturer, Department of Anatomy and Histology\College of Veterinary Medicine\University of Kerbala

Abstract

Objectives: The aim of this study was to evaluate the normal structure and provide distribution for palatine glands in cranial and caudal part of soft palate. Also, afford information to be useful for both surgical interventions and pathological disease. Method: Sixth healthy cats were caught in Iraq farms. All experimental animals euthanized by intramuscular injection of ketamine (0.5 cc) and xylazine (0.5 cc). Sections were stained by H&E and combined AB+PAS stain 2.5 pH. Results: The soft palate was triangular in shape, the dimensions was (2.8, 2) cm in length and width respectively. Also, had two surface; nasopharyngeal surface lined by pseudostratified columnar epithelial ciliated and oropharyngeal surface lined by stratified squamous epithelia. The palatine glands appeared magenta in color during staining by AB+PAS combined stain due to neutral secretion. Conclusion: The palatine glands variance in distribution between dorsal and ventral surface of soft palate, most of these glands constricted in oropharyngeal surface.

Keyword: Histological, Soft palate, Cat.

Introduction

Usually, the normal of anatomical characteristic supports in diagnosis and successful treatment of many intricate cases. Apart from evaluation of clefs, diversity in radiographic appearance of soft palate has remained unrecognized. Enumerates of studies 1,2 have been done in past towards the dimensional analysis of the soft palate and its surrounding structures, but there are not many studies regarding normal variants of soft palate morphology and configuration3. The dimensional analysis of the soft palate and its surrounding structures, especially the velar length and width has been studied; on the other hand, the variety of velar morphology which is the most logical cause of different dimensions on the soft palate has been frequently overlooked 4. The soft palate is one from main structures in oral cavity, musculo-membranous part, separating the digestive tract and respiratory system. It extends caudally to the hard. The two system’s working is extremely important because it requires both swallowing and breathing. In fact, soft palate disorder is involved in the pathogenesis by well-recognized respiratory syndromes, including such obstructive sleep apnea disease in human patients and intermittent soft palate displacement in farm animals 5,6. The morphological incongruity of the soft palate plays a vital anatomic role in functional rehabilitation of speech, breathing, hearing, and managing patients with cleft lip-palate, obstructive sleep apnea, skeletal craniofacial malocclusion and oral submucosa fibrosis7. The aim of this study to provide date for normal structure of soft palate for supported other sciences as histopathology, surgical study and clinical examination.

Materials and Method

Specimens of soft palate taken from (6) adult cats. The average weight of the animals was (1.8) kg. Anaesthetized with an intramuscular injection of ketamine (0.5 cc) and xylazine (0.5 cc)8. The Anatomical study of the soft palate included shape, length, and width. These measurements were recorded in centimeter (mm) using a calibrated scale. The weight was recorded in gram (g) using the sensitive electronic balance. For histological dedications the samples were fixed in 10%
neutral buffered formaldehyde and sectioned serially at 5 µm. Sections were stained with H &E and combined AB+ PAS, 2.5 pH 19.

**Result & Discussion**

**Morphologically,** the soft palate in domestic cats was appeared as triangular- shape, base of this triangular located cranially but pointed part caudally toward epiglottis. There are two surface of soft palate; dorsal surface or (naso-pharyngeal part) and ventral surface (oro-pharyngeal part), the ventral surface was smoothly and don’t have any papillae, most of oral papillae located in hard palate (Fig, 1, 2). The dimensions of soft palate was (2.8) cm in length, width in base of palate was (2) cm (Fig, 3). This result disagreement with 9 who stated that the soft palate have well-developed papillae in oral pharyngeal part.

**Histologically:** the nasopharyngeal surface lined by psuedostratified columnar ciliated epithelia without goblet cells (Fig,5), rested on the thick layer of collagen fibers, with numerous of infiltrated lymphatic cells. Also, continuous between lamina propria and submucosa, lacking a lamina muscularis. The palatine salivary glands in nasopharyngeal side fewer in numbers, located close to basement membrane (Fig,6). These results akin partially with 10 who stated that the soft palate in dogs have two side; oral and nasopharyngeal, the later side lined by psuedostratified columnar ciliated epithelia but there are no glands underneath mucosa.

The oropharyngeal surface lined by thicker stratified squamous epithelial non-keratinized, wavy in shape, rested on the thick layer of collagen fibers. The submucosa was loose connective tissue, undistinguished line between lamina propria and submucosa. The palatine salivary glands in this part was crowded, intermingled as groups or aggregated in many lobes, each lobe had numerous of branch mucous glands, separated from others by collagen fibers. 11 Whoever describe the palatine salivary glands in the oropharyngeal surface as being heavy for mucosal coat lubrication is necessary to prevent injury during consumption of food. The caudal part of soft palate or muscular part consists of numerous of glands intermingled between longitudinal skeletal fibers, lacking to epithelial layer this part. This is the thickest layer of the soft palate. The mucous acini are of the usual pattern, separated by thin connective tissue septa. These results disagree with 12 who stated that the deep of soft palate of albino rat had a dense collagen layer, there is a lack of skeletal muscle other than at the caudal part. In addition these results disagreement with 13 who describe that the thick glandular layer gradually becomes thinner towards the posterior part of the soft palate.

The epithelial lining of the interlober glandular ducts duct lined by simple squamous epithelia while main duct located near to the basement membrane and lined by stratified cuboidal epithelia. These finding variance partially with 14 who stated that the glandular epithelial of main duct lined by stratified cuboidal while the interlober duct lined by simple cuboidal epithelia.

Histochemical study of soft palate in cats during staining with combined with (AB+PAS at pH 2.5) appeared strong reaction, the acini of glands was seemed magenta in color due to secreted neutral type (Fig, 9, 10). These results akin with 15 who stated that the histochemical affinity of the palatine glands was homogeneous, independent of their localization and positive reaction with combined with AB+PAS stain.

![Figure 1: Oral cavity showing, hard palate (green arrow) and soft palate (blue arrow).](image-url)
Figure 2: Soft palate in cat appeared as triangular in shape consist of cranial part (yellow arrow) and caudal part (green arrow).

Figure 3: Nasopharyngeal part of soft palate showing A- Mucosa and B- Submucosa had loose connective tissue. Salivary glands were little amounts and close with nasopharyngeal part (blue arrow). H&E stain.40X.

Figure 4: Soft palate in cat showing nasopharyngeal part lined by psuedostratified columnar ciliated. H&E stain.400X.
Figure 5: Soft palate of cat showing oropharyngeal part lined by stratified squamous epithelial non keratinized (A) rested on thick layer of submucosa (B) with heavy layer of salivary glands (Blue arrow). H&E stain. 100X.

Figure 6: Caudal part of soft palate showing the salivary gland separated by striated muscle fibers (blue arrow). H&E stain. 400X.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the College of Medicine and all experiments were carried out in accordance with approved guidelines.
References


15. Pichetto M, Arrighi, S. The anatomy of the dog soft palate. II. Histological evaluation of the caudal soft palate in brachycephalic breeds with grade I brachycephalic airway obstructive syndrome. The Anatomical Record: Advances in Integrative Anatomy and Evolutionary Biology. 2011; 294(7): 1267-1272.
Molecular Detection blaOXA50 gene of \textit{P.aerginosae} Isolated from Otitis Media

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\textsuperscript{1}Department of Medical Laboratory Techniques, Faculty of Medical and Health Techniques, University of AlKafeel, Najaf, Iraq, \textsuperscript{2}Clinical Pharmacy and Laboratory Science, College of pharmacy, University of AlKafeel, Najaf, Iraq

Abstract

\textit{Pseudomonas aeruginosa} is a gram negative rod shape bacterium belonging to the family Pseudomonadaceae. \textit{Pseudomonas aeruginosa} is a major uropathogen in a hospital. It can tolerate a wide kind of physical conditions and many antibiotics via several mechanisms resistance. The study included genetic study blaOXA50 gene utilizing technique PCR by specific forward and reverse primers to common bacteria that causes otitis media, 40 isolated from otitis media patients (ear swab). Primary identification was depended on Gram stain, biochemical tests and vitek 2 system was done. The results demonstrate 30 isolate of them were \textit{P.aerginosae}. The result appear \textit{P.aerginosae} contain on 25(19\%) blaOXA50 gene.

Keyword: \textit{P.aerginosae}, blaOXA50 gene, Resistance antibiotic

Introduction

Otitis media (OM) refers to a group of compound contagious and diseases in inflammatory effecting the ear middle. general the Otitis media is very rife, the study appear that about 82 \% of children need to experience at lower one episode via their birthday third. Otitis media have 2 kinds, chronic, acute. (A.O.M) is characterized via the fast onset of signs of infection, specially bulging and promising perforation of the tympanic membrane, fullness, erythema as well as symptoms associated with inflammation for example fever, irritability, otalgia. In spite of suitable therapy of the antibiotic, AOM may progress to (C.S.O.M) characterized via continual drainage from the ear middle related with perforated ear drum. \textit{Pseudomonas aeruginosa} is one of the most ecologically significant species among the genus Pseudomonas. \textit{P. aeruginosa} is of extreme importance because of the widespread distribution of its strains in nature, its high intrinsic anti-bacterial resistance and its virulence. Many antibiotic resistance mechanisms report in \textit{P. aeruginosa} counting: 1) Reduced expression or loss of Op rD porin causing reduced antibiotic permeability 2) Over-expression of Mex AB Op r M pump which increases antibiotic efflux 3) Production of \textit{β}-lactams and aminoglycosides inactivating enzymes 4) Mutations of gyrases and topoisomerases which causes resistance fluoroquenolone. The mechanisms in combination lead to multiple drug resistance. \textit{β}-lactamases are hydrolytic enzymes that are responsible for the resistance to \textit{β}-lactam antibiotics. \textit{β}-lactamases have many types containing (E.S.BLs), AmpC \textit{β}-lactamases, carbenicillin hydrolysing \textit{β}-lactamase, \textit{Pseudomonas} specific enzyme (PSE) and (M.\textit{β}.Ls). ESBLs are encoded by different genes in P. aeruginosa including VEB gene. M\textit{β}Ls are encoded by different genes involved V.I.M and I.M.P.

Bacterial pumps efflux greatly included in the intrinsic resistance of Gram-negative bacteria. When overexpressed, pumps efflux can accord raise resistance to already effective antibiotics. Many pumps efflux conveyance enormous range of unrelated drugs known as multidrug resistance (MDR) pumps efflux. Four antibiotic efflux method has been reported in P. aerugenosa. Mex AB-Op r M is the efflux method that is responsible of ejaculation of quinolones and \textit{β}-lactams. The evolution of isolates M.D.R.P.A through therapy report in 27\% to 72\% of patients by primarily susceptible P. aerugenosa isolates. Patients by MDRPA different infections have to treated thru therapy combination, involving of an antipsaudomonal...
β-lactam fluoroquinolone oraminoglycoside, to some extent fluoroquinolone and aminoglycoside group, tool up convenient therapy and get better patient outcomes.

Methodology

Samples collection

collected (40) clinical samples from patients suffering otitis media signs through the period from 2019 January to October, 2019) from patients present to AL-Hakem General Hospital and AL-Sadder Medical City. All the samples cultured onto MacConkey, Blood and Mannitol agar plates then protected at 37°C for 18 to 24 hr.

Detection blaOXA50 gene

DNA extraction

Table (1): Product size and Sequences of each primers.

<table>
<thead>
<tr>
<th>Primer type</th>
<th>Primer (5’-3’)</th>
<th>Product size(bp)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>blaOXA50</td>
<td>F 3′-GAAAGGCACCTTCGTCCTCTAC-5′</td>
<td>400</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>R 5′-CAGAAAGTGGGTCTGTTCCATC-3′</td>
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</tbody>
</table>

Table (2): PCR conditions of blaOXA50 gene detection

<table>
<thead>
<tr>
<th>Name of Gene</th>
<th>Temperature (°C) / Time</th>
<th>Cycling Conditions</th>
<th>Final Extension</th>
<th>Cycles Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Initial Denaturation</td>
<td>Denaturation</td>
<td>Annealing</td>
<td>Extension</td>
</tr>
<tr>
<td></td>
<td></td>
<td>94 C° for 5 min.</td>
<td>53°C/62 for 1 min</td>
<td>72 C° for 1 min.</td>
</tr>
</tbody>
</table>

Results and discussion

Pseudomonas aeruginosa Isolation and Identification

Identification the primarily of specimens bacterial relied of some criteria which like biochemical tests, cultural, morphology. concurrence the last complete with the automated vitek-2 compact method utilizing GNID cards include 64 tests biochemical and 1 negative control. accentuation of aeruginos Pseudomonas showed utilized P.C.R method. deferent physiological, biochemical and morphological, tests was made to identify isolates bacterial.

Results appeared the Pseudomonas aeruginosa counted 30 isolates (30%), and another isolates bacterial was Proteus, Kleabiseslla pneumoneae, S.aureus and Enterobecter aerogenes. Bacterial isolates was specified give to the cultural, biochemical and microscopical physical appearance that approval. aeruginosa Pseudomonas was products pyocyenin and
granting positive strongly oxidase, grant indole (Indole test is utilized the capability of an organism to split tryptophan amino acid to form compound indole, methyl red (test reveal the product the acid sufficient through the form of glucose, the result concur 8.

Isolates Pseudomonas aeruginosa give tests biochemical; result positive oxidase, and capable toward used citrate by way of sole source of carbon, in Kliegler Fe agar give alkaline slant and not alteration the bottom, negative H2S without production gas payable to fact the aerobic strictly 9.

Detection of the blaOXA50 gene

All isolates was investigated to discover genes blaOXA50 utilizing technique PCR with specified forward and invert primers. results appear in fig. (1) present the study to blaOXA50 gene tested isolates represented 25(19%) in bacterial isolated, all the resistant carbepenem isolates P. aeruginosa was found to harbor the gene blaOXA50. Oxacilleinase is ambler kind D β-lactamases by hydrolytic action against the penicillins, spectrum extended cephalosporins, aztreonam and methicillin. determination β-lactamases of group B and group D, like OXA and genes IMP, at the same order, was found to harbor the gene blaOXA50.

The mechanisms catalytic, has been established two group; the group B enzymes are metaello-β-lactamases that demand Zn of the activity, the group A, C, and D β-lactamases include groups serine at active site. Oxacillinases are Ambler group D β-lactamases with against penicillins that active hydrolytic, spectrum extended methicillin, cephalosporins, aztreonam 10.

Ethical Clearance: The ethical approval belong environmental and health ministries in Iraq

Conflict of Interest: Non.

Funding: Non.

References


Effects of Alcoholic Extracts of *Cinnamomum zeylanicum* and *Origanum Majorana* on Expression of *Hly* Gene in *Escherichia coli*

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¹Lecturer/Professor, ²Professor/Biology Department, College of Science, University of Baghdad/Iraq

Abstract

*Escherichia coli* isolates isolated from urinary tract infection identified by biochemical test and confirmed by Vitek 2 compact system. Minimum inhibitory concentrations of *Cinnamomum zeylanicum* and *Origanum majorana* alcoholic extracts determined by broth macrodilution assay, it range (12.5-25) mg/ml for *C. zeylanicum* and 100mg/ml for *O. majorana* leaves. The expression of *hly* gene studied in presence of 16sRNA as reference gene, four isolates of *E. coli* (A1 ,A2,A5 and A6) used to detect the expression of *hly* gene by using Quantitative reverse transcription-PCR (1-StepqRT-PCR) before and after treatment with plants extracts calibrated with 16sRNA. There was inhibition in *hly* gene expression with *O. majorana*, the fold changes were 1.23 and 2 in isolates A5 and A6 respectively while there were induction in *hly* gene expression with *C. zeylanicum*, the fold changes were 137 and 73.5 for isolates A1 and A2 respectively.

**Keywords:** *Escherichia coli*, hemolysin, urinary tract infection, gene expression

Introduction

Urinary tract infections (UTIs), the most common bacterial infections affecting high percent of people per year worldwide and more common in women than men.¹ *E. coli* is the most frequent bacteria followed by Klebsiella and Proteus species to cause UTI, and other predominant species include Enterococcus, Klebsiella, group B Streptococcus, group B Staphylococcus Citrobacter, Acinetobacter and Pseudomonas species.² High resistance to antimicrobial agents and the recent emergence of the resistant made UTI control high costly and difficult.³ Uropathogenic *E. coli* (UPEC) is the major cause of UTI.⁴ A study on UPEC showed 100% resistance percentage of bacteria against antibiotics like cefazidime ciprofloxacin, kanamycin and others.⁵ Virulence factors of recognized importance in the pathogenesis of UTI contain adhesions, hemolysin, capsule, and a cytotoxic pore forming toxin.⁶

*Origanum vulgare* contain essential oil with high percentages of phenolic compounds which gave the antimicrobial properties.⁷

*Origanum* has anti inflammatory effects, anti microbial action, decreasing cardiovascular disease, boosting cognitive function and reducing danger of colon cancer.⁸ *Cinnamomum zeylanicum* essential oil has antibacterial activity against bacteria and its main components against *Paenibacillus larvae*.⁹

Materials and Method

**Bacterial isolates:**

*Eight* *E. coli* isolates from patients suffering from UTIs were identified by biochemical test and confirmed by Vitek2 compact system.

**Plants extracts:**

Alcoholic bark extract *C. zeylanicum* and *O. Majorana* alcoholic leaves extract were prepared.¹¹

**Determination of Minimum Inhibitory Concentrations (MIC) of plants extracts:**

Broth macro dilution assay used to determined the MIC of Alcoholic extracts against *E. coli* according to "..."
**HLY expression in E.coli isolates in presence of alcoholic extracts of O. majorana and C. zeylanicum**

hly expression was studied in E.coli in presence of sub MIC concentrations of C. zeylanicum and for O. majorana

**RNA Extraction from bacteria:**

The RNA was extracted from the bacteria by using ZR Fungal/Bacterial RNA MiniPrep™ kit, according to the kit protocol as manufactured company

**Extermination of RNA Concentration:**

1. 200 µl from Tris EDTA (TE) was added to 3,800 from D. water the mix 4000 µl,pull 10 µl ignore it and add 10 µl from dye (RNA Dye).

2. 200 µl of the mix for each sample was Pulled.

3. The series of the following tubes are prepared as follows:

4. The mixture was shacked by vortex for second to mix and then leave on a rank at room temperature.

5. The value was extracted from the device immediately.

**Quantitative reverse transcription-PCR**

Step 1: Preparation of qPCR master mix

qPCR was prepared, the volume of components was calculated based on the following table 1 and kept on ice during use, and assembled reactions on ice to avoid premature cDNA synthesis. The specific primer of 16srRNA and hly genes showed in table 2.

**Table (1): Master mix components for 1step-qPCR**

<table>
<thead>
<tr>
<th>Component</th>
<th>20 µL (Final volume)</th>
<th>Final concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sybr green kappa master mix</td>
<td>10 µl</td>
<td></td>
</tr>
<tr>
<td>Forward primer</td>
<td>0.4 µl</td>
<td>0.2 µM</td>
</tr>
<tr>
<td>Reverse primer</td>
<td>0.4 µl</td>
<td>0.2 µM</td>
</tr>
<tr>
<td>50 X KAPA RT Mix</td>
<td>0.4 µl</td>
<td>1 X</td>
</tr>
<tr>
<td>Nuclease free water</td>
<td>4.2 µl</td>
<td></td>
</tr>
<tr>
<td>RNA sample volume</td>
<td>5 µL</td>
<td>1 pg-100 ng</td>
</tr>
</tbody>
</table>

**Table (2): The specific primer of 16s RNA and hly genes**

<table>
<thead>
<tr>
<th>Primer</th>
<th>Sequence</th>
<th>Tm (°C)</th>
<th>GC (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forward (16s RNA)</td>
<td>5'- AGAGTTTGATCCTGGCTCAG- 3’</td>
<td>54.3</td>
<td>50.0</td>
</tr>
<tr>
<td>Reverse (16s RNA)</td>
<td>5'- GGTTACCTTGTTACGACTT- 3’</td>
<td>49.4</td>
<td>42.1</td>
</tr>
<tr>
<td>Forward (hly)</td>
<td>5'-ACCTTGTCAGGACGGCAGAT - 3’</td>
<td>58.6</td>
<td>55</td>
</tr>
<tr>
<td>Reverse (hly)</td>
<td>5'-CCGTGCCATTTTTTCATCA - 3’</td>
<td>53.5</td>
<td>45</td>
</tr>
</tbody>
</table>

The reaction condition for 16srRNA and hly genes showed in table 3:
Table (3): Reaction condition for qPCR of 16s RNA and hly gene

<table>
<thead>
<tr>
<th>Step</th>
<th>Temp. (°C)</th>
<th>Time</th>
<th>Cycle</th>
<th>Scanning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reverse transcription</td>
<td>42 ° CC</td>
<td>10 min</td>
<td>Holdd</td>
<td></td>
</tr>
<tr>
<td>Enzyme activation</td>
<td>95 ° CC</td>
<td>3 min</td>
<td>Holdd</td>
<td></td>
</tr>
<tr>
<td>Denaturation</td>
<td>95.0 ° CC</td>
<td>15 sec</td>
<td></td>
<td>40</td>
</tr>
<tr>
<td>Annealing/Extension</td>
<td>55.0 ° CC</td>
<td>15 sec</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Results and Discussion

Isolation:

Six E. coli isolates from urine samples were identified by biochemical test and confirmed by Vitek2 compact system.

MIC of alcoholic plants extracts:

The MIC of Alcoholic extracts against E. coli was determined by broth macro dilution assay. MIC value of bark extract of C. zeylanicum was (12.5-25) mg/ml for isolates. MIC value of O. majorana leaves extract was 100 mg/ml. The result of this study demonstrated that the plant extracts had inhibition activity on E. coli isolates and varied in their effect. Evaluate the antibacterial properties of medicinal plants like Ocimum sanctum (Tulsi), Origanum majorana (Ram Tulsi), Cinnamomum zeylanicum (Dalchini), and Xanthoxylum armatum (Timur), for potential antibacterial activity against bacterial strains. The antibacterial activity of ethanol extracts was determined by agar well diffusion method. The plant extracts were more active against Gram-positive bacteria than against Gram-negative bacteria. E.coli were the high resistant bacteria followed by Shigella dysenteriae, Klebsiella pneumoniae and Salmonella typhi. Antibacterial effects of O.majorana essential oil on E.coli may be related to thymol which has phenolic compound distinguish by GC/MS.

RNA Concentration (ng/ µl):

RNA was extracted from 6 isolates of E. coli to study the expression of hly gene, the results showed that the RNA concentrations for E.coli isolates were 71.1 ng/µl, 70.3 ng/µl, 6.5 ng/µl, 5 ng/µl, 87.4 ng/µl and 96.5 ng/µl for isolates A1 to A6 respectively.

Effect of C.zeylanicum and O.majorana alcoholic extracts in expression of hly gene in E.coli

The expression of gene was detected successfully by using new molecular technique which is Real time PCR (qRT-PCR) with used specific primer (house keeping gene of 16srRNA). The amplification accuracy of gene product was noticed by the value of cycle threshold (Ct) for the triplicate reactions as show figure 1 and 2.

Figure (1): Ct value of hly after treated with O.majorana in E.coli
Effect of *C.zeylanicum* and *O.majorana* alcoholic extracts in expression of hly gene in *E.coli*

The result showed that there were slightly induction of *hly* expression in *E.coli* isolates in presence of *O.majorana*in sub MIC concentration (50 mg/ml) according to fold change values which were 1.23 and 2 for *E.coli* isolates 5 and 6 respectively , while there were high expression of *hly* gene in presence of *C.zeylanicum* in sub MIC concentration (6mg/ml) , the fold change values were 137 and 73.5 for *E.coli* isolates 1 and 2 respectively (table 4) , this mean that *O.majorana* had an inhibitory effect on *hly* gene in *E.coli* isolates in contrast to *C.zeylanicum* which induced the expression of this gene in isolates.

Table (4):Fold changes in expression of *hly* after treated with *O.majorana* and *C.zeylanicum* in *E.coli* isolates , isolates A5 and A6 treated with *O.majorana*, isolates A1 and A2 treated with *C.zeylanicum*

<table>
<thead>
<tr>
<th>Calibrator</th>
<th>O.majorana</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isolates</td>
<td>Cthly (mean)</td>
</tr>
<tr>
<td>A5</td>
<td>24.9</td>
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<tr>
<td>A6</td>
<td>24.4</td>
</tr>
<tr>
<td>A1</td>
<td>24.6</td>
</tr>
<tr>
<td>A2</td>
<td>24.4</td>
</tr>
</tbody>
</table>

Haemolysin is important virulence factor of *Salmonella*, *E.coli* and other enteric bacteria .Haemolytic activities of cell extracts of *S.typhi* and *E.coli* grown under stress conditions like oxygen or glucose starvation, either separately or together, were found to be considerably normal growth conditions .

The therapeutic plants, for example, cinnamon, timur, tulsi and origanum are being utilized normally in treatment of irritation and a few diseases. The antimicrobial action has been related to the presence of some important components . Studies refered to the antimicrobial activity of cinnamon was due to their main factors , cinnamaldehyde, which is a natural antioxidant and the animal studies indicate that an extract of cinnamon bark taken orally to diminish stomach ulcer, because Cinnamaldehyde inhibit strains of *Helicobacter pylori*. A significant property of plant extracts and their contituent is their hydrophobicity, which enable them to split membrane lipids and mitochondria of bacterial cell, disturbing the cell composition and increase the permeability.

The antimicrobial activity of many plant extracts can be as a result of different mechanisms, like destruction...
of membrane, increase its permeability and polarity, decrease pH of cytoplasm and ATP concentration.19

The activity of extracts of *Lippiagraveolens* and *Haematoxylonbrassiletto*, and carvacrol, brazilin tested by an microdilution method using citral and rifaximin as controls. All products showed bactericidal activity with minimal bactericidal concentrations ranging from 0.08 to 8.1 mg/ml. These extracts influence *E. coli* growth, motility swarming and expression of virulence gene, sub lethal concentrations had various effects on phenotypic and genotypic character, and expression of virulence gene.20

**Conclusions**

The use of natural compounds afford a good way to control the growth of microorganisms. Results obtained in the present study on the antimicrobial effect with *C. zeylanicum* and *O. majorana* denote a down regulation and up regulation of hly gene.

**Conflict of Interest:** The authors declare that they have no conflicts of interest.

**Acknowledgement:** This work was supported by Biology department, College of Science, University of Baghdad.

**Ethical Clearance:** The work was approved by the ethics committee of Biology Department/College of Science / Baghdad University , Reference No.:BEC/0918/0011

**References**


Assessment of Systemic Lupus Erythematosus in Term of Serum Anti-nucleosome and Interleukin 12 Markers in Relation to Epstein–Barr virus and Cytomegalovirus

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Abstract

Background: Systemic lupus erythematosus (SLE) is a chronic autoimmune disease, more dominant in female, associated with high risk of life threatening complication and increase morbidity and mortality. the exact cause of SLE is not yet known with many suggestions about a possible role of viral infection in the development of the disease. Epstein –Barr virus is the most commonly studied virus in an attempt to prove its presumed association with development of SLE. The objectives of this study are the measurement of the effect of CMV and EBV seropositivity in the autoimmune status and severity of disease SLE measured by estimating the level of immunological markers anti-nucleosome and IL-12 with viral marker.

Materials and Method: Forty newly diagnosed female with SLE were randomly selected from patient attended rheumatology clinic at medical city in Baghdad during the period between December 2018 to May 2019. In addition, with 40 apparently healthy females, as, a control groups. Both group were investigated for IL12, anti-nucleosome, EA, VCA, EBNA and CMV by ELISA and the results were statistically evaluated.

Results: The studied viral markers in the current study which included EBV markers EA, VCA, EBNA, have shown significantly higher level compared to the control group. Similarly, anti-nucleosome and IL12 have shown significantly higher level compared to the control group.

Conclusions: The possible defect in controlling viral infection and increased number of latent infected cell in SLE may enhance production of auto-antibodies

Keywords: SLE, EBV, VCA, IL-12; Erythematosus

Introduction

SLE represents an autoimmune disease with chronic clinical course that is associated with a wide range of clinical features and variable types of autoantibodies including anti-double strand DNA (dsDNA) and antinuclear antibodies (ANA) involving multiple organs in the body such as joints, skin, respiratory system. As most of the body organs are affected by SLE, the clinical features sound extremely variable and involve the affected organs, of course, the most commonly encountered clinical features include photosensitivity, recurrent oral ulcers, malar rash, discoid lesions, arthritis, serositis, hemolytic anemia, neuropsychiatric and poor vascularization. Different infectious agents are implicated in SLE, and were shown by serology to be more prevalent in SLE patients(1).

Because SLE is a multisystem disease, there is no obviously validated or standardized “gold standard” biomarker that can cover the whole aspects and the variable phenotypes of the disease. The many traditional laboratory assays commonly used for diagnosis and monitoring of SLE, such as complement Factors in serum, anti-double-stranded DNA (Anti dsDNA) and anti-nuclear antibodies (ANA) have never been validated or standardized themselves (14).

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Despite that anti-dsDNA antibodies are significantly specific for SLE, the high majority of patients might be negative for anti-dsDNA for these antibodies during the disease course. These are present in 70% to 100% of SLE patients and have a very high specificity (around 97%) for the disease. Amongst SLE patients, the anti-nucleosome antibodies are significantly more prevalent in patients with lupus nephritis and can serve as an important biomarker for the diagnosis of patients with active lupus nephritis, at the same time it has a significant correlation with disease activity in general (2).

EBV is a lymph tropic double stranded DNA virus. It is one of a human herpes virus belongs to the gamma herpes family and infects more than 95% of the adult population worldwide.(3)

EBV infect B-cell, and persist in latent form in memory cell, and the virus used many mechanisms that lead to developed SLE like (molecular mimicry, epitope spreading, Infection and Immortalization of Autoreactive B-cells).(4) So when the virus infection occurs, EBV invade the B cells reprogramming them, and control of their functions. A limited number of studies have implicated another herpes virus, cytomegalovirus (CMV), in SLE, although the effects of CMV on SLE development and autoantibody production remain unclear (5).

Materials and Methods

The current study has included 40 young female patients with SLE on no specific treatment for SLE with at least four of the American College of Rheumatology (ACR) criteria for the diagnosis of SLE. Patients other chronic autoimmune diseases were excluded. Patients were recruited between December 2018 to May 2019 as they consulted at the Departments of rheumatology clinic of Baghdad Teaching Hospital at medical city. The control subjects were apparently healthy and age-, sex- matched volunteers; written informed consents were obtained from subjects.

Venus blood was drawn from patients and control to measurement EBV protein EA, VCA, EBNA, CMV IgG, IL12 and Antinucleosome by enzyme linked immunosorbent assay and the results were statistically evaluated using SPSS software version 23.

Results

The results of the current study have shown that the titer of IL-12, was increased in 40 (100%) of patients group while it was increased in only 13 (32.5%) of control group and the difference was statistically significant (p<0.001). The titer of anti-nucleosome, was increase in (62.5%) of patients group while it was increased in (2.5%) the control group, this difference was statistically significant (p<0.001).

In respect to EBV, the findings have shown that the titer of VCA was increased in ___ (92.5%) of patients group while it was increased in only (55.0%) of control group which was significant statistically (p<0.002). In addition, mean titer of EA was increased in (90.0%) of patients group while it was increased in (22.5%) of control group, a difference that was statistically significant (p<0.001). Regarding EBNA level, the current study has shown that the mean titer of EBNA was elevated in (75.0%) of patients group while it was elevated in (22.5%) of control group which was statistically significant as well (p<0.002).

Regarding CMV IgG, the current study has shown that the mean titer of CMV IgG, was increased in (97.5%) of patients group while it was increased in (27.5%) of control group (p<0.002).

Discussion

The role of immunological markers in the development of SLE has been thoroughly studied. The current study revealed that IL-12 was significantly higher in SLE patient compared to the control group and surprisingly, 100% of SLE patients revealed high IL-12 concentration indicating the role of dendritic cell in development of SLE as these cells represent the main source of IL-12 (6). These findings are consistent with results revealed by similar studies; CK Wong for instance has revealed a similar result to the current study in respect to IL12 during his study of various proinflammatory cytokines in SLE patients(7). Similarly, E. R. CAPPER in his study that discussed IL12 in both active and quiescent SLE has also revealed a significantly higher concentration of IL12 in patients with SLE compared to control group(8)including interleukin (IL. Many other studies have shown similar results despite being different from the current study in study design and aim(8)(9). The current study has shown a significantly higher serum anti-nucleosome antibody concentration in SLE patients compared to control group This increase in anti-nucleosome may reflect the extent of cell damage caused by SLE which explain its
flare up shown in the current study as well, these result consistent with that revealed in studies of Ahemd Ali Abid and P Cairns where anti-nucleosome concentration was significantly higher in SLE patients compared to the control group\(^{10}(11)\). In simon study, a similar result has been also obtained. Many studies have discussed the association between various infectious factors and the development of SLE at the top of which is EBV infection. In the current study, 92.5% of patients with SLE were positive for anti- EBV-VCA, while 45% of the control group were seropositive for the same antibody, a result clarifies the significant association between EBV and SLE. Chougule, for instance has revealed a similar result to the current study in respect to VCA during his study of EBV antibody profile in SLE patients\(^{12}\). Similarly, Alaa Y. Al-Hamadany, in his study that discussed EBV in Systemic Autoimmune Patients has also revealed a significantly higher concentration of VCA in patients with SLE compared to control group\(^{13}\). Many other studies have shown similar results despite being different from the current study in study design and aim\(^{14}(15)\).

At the same time, 90% of patient with SLE were anti- EBV-EA positive while only 22.5% of the control group were seropositive for the same antibody. In fact, the difference of EA seropositivity between SLE and control group was more significant than VCA; this might indicate the role of increased EBV reactivation in patients of SLE and this reactivation could be secondary to decreased cytotoxic T cell response to EBV with subsequent impaired control of replication of EBV in SLE patient\(^{16}\). This finding is consistent with the results revealed by many similar studies ; NS Rasmussen, for instance has revealed a similar result to the current study in respect to EA during his study of antibodies to early CMV, EBV, and HHV6 antigens in SLE patients\(^{17}\). Similarly, Evan S Vista, in his study discussed viral associations with SLE in Filipinos and this study also revealed a significantly higher concentration of EA in patients with SLE compared to control group\(^{18}\). Many other studies have shown similar results despite being different from the current study in study design and aim\(^{19}\). In addition, the current study has shown a significantly higher concentration of EBNA in patients with SLE compared to control group, a result that is consistent with the findings revealed by many similar studies. Chougule, for instance has revealed a similar result to the current study in respect to EBNA during his study of EBV antibody profile in SLE patients\(^{20}\). Similarly, Evan S Vista, in his study that discussed viral associations with SLE in Filipinos has also revealed a significantly higher concentration of EBNA in patients with SLE compared to control group\(^{18}\). Another study has shown similar results despite being different from the current study in study design and aim\(^{21}\).

Regarding CMV infection, it was noticed that 97.5% of SLE patients were seropositive for CMV IgG while only 27.5% of control group were seropositive for the same antibody; a result is statistically significant and was consistent with similar studies which revealed a similar association, BARZILAI, for instance revealed a similar result to the current study in respect to CMV during his study of EBV and CMV in autoimmune diseases \(^{1}\). Similarly, Muhsin, in his study, he discussed the association of various viral infections with the development, in his study, Muhsin revealed a significantly higher concentration of CMV in patients with SLE compared to control group\(^{14}\).

Taken together, this study revealed an essential association of all EBV serological markers studied, namely VCA, EA, and EBNA proteins, when compared to control group. And a threshold values were statistically assigned in order to differentiate between SLE and normal population which might help in diagnosis. This association revealed in this study was also confirmed by previous reports done elsewhere in the world. This indicates several things. First, the association between SLE and EBV can be expressed as a scientific fact. Second, it was found that EBV markers of reactivation, namely EA protein, and markers for latency, EBNA proteins, are remarkably increased in SLE when compared to control group; this highlights that EBV is highly reactivated in SLE patients as well as ssEBV latency is an active ongoing process where EBNA proteins are abundantly synthesized. A recent study found that EBNA 1 and 2 work as transcriptional activators for about half of high risk genes associated with SLE occurrence\(^{15}\). Therefore, EBV is related to SLE in different ways including both active ongoing latency and reactivation of latent infection.

Actually, this poses a question, is EBV a consequence or an etiology for SLE. The research to answer this question is underway; however, it is thought that the most probable nature of relationship between EBV and SLE is bidirectional in which EBV is reactivated in SLE patients due to deregulated immune system and this in turn can further promote and/or propagate SLE disease \(^{22}\). It is noteworthy to mention that SLE as such is not
considered an immune suppression condition; moreover, the SLE patients selected in the current study were those not receiving immunosuppressive drugs. Hence, it is believed that the significance of this study might issue from comparing a non-immunosuppressed patient of SLE with control group. Therefore, any significant association shown in the current study was not due to immune suppression. This accordingly, shed light on a probable role of EBV in promoting/propagating SLE disease in susceptible individuals. Nevertheless, this requires a far deeper research in terms of molecular and immunological levels.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

Conflict of Interest: Non

Funding: Self-funding

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Study of Immunological Parameters, Hematologic Outcomes And Epidemiology Features of Renal Dysfunction Frequently in Karbala Province, Iraq

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Abstract
Renal failure or dysfunction: A disease occurs by a severe weakness in one kidney or both, they lose ability to do their functions effectively, resulting in the body’s inability to remove waste and fluids, Leading to a significant changes in chemistry of blood and body fluid.

The study occurred in Karbala province where study samples were collected, which included (124). Samples divided in (64) patients and (60) control, patients had another division according to sex (44) male and (20) female. Immunologic parameters include (kidney injury molecules (KIM-1), pro-inflammatory TNF-α, IgG antibodies) Elabscience Kit, concentration in serum was massacred by (ELISA) Technique and hematologic test measured automatically by (Humlate plus-1 Device).

The results showed increase in kidney injury in age groups beyond the age of 40 years. A significantly higher incidence of disease among males more than females. Results show significant statically variations in serum levels:

1- kidney injury molecules (KIM-1) levels was increased in serum in patients significantly compare with control.
2- (TNF-α) levels was increased in patients than control.
3- IgG levels decreased in patients than control.

Another routine tests occurs to patients to know the effects of disease on blood variations, the test was included CBC count the results show CBC tests: (WBC, MHC, MCHC, RDWS, RDWC, PLT, PCT, PDWS, PDWC, P-LCC and P-LCR) have no significant differentials while CBC tests: (LYM., MON., GRA., RBC., HGB., HCT., MCV , MPV) which decrease in patient compare with control significantly.

Increase kidney injury and inflammatory in serum patients with disease, by measured some parameters levels in sera as indicators for disease progression and decrease in some antibodies such as IgG concentration of in sera, as well as the hematologic tests refer to disease may associated with anemia.

Keywords: Renal failure, (KIM-1), TNF-α cytokines. IgG antibodies, CBC test.

Introduction
Kidney failure is a syndrome occurs when the kidney loses its ability to filter blood from toxins, along with several other factors that interfere with kidney dysfunction such as exposure to toxic substances, environmental contaminants, chemical preservatives and many renal failure diseases. Kidney failure (Renal disease) sometimes lead to death by accumulation of toxins in the body (1). Etiology of renal insufficiency include loss of blood flow to the kidneys, resulting in heart failure, heart attacks, heart disease and liver cirrhosis, as well as dehydration, severe burns and infections, as well as the use of certain anti-inflammatory drugs. Some diseases and conditions lead to kidney failure such as exposure to blood clots, urinary hemolytic syndrome,
plasma cell carcinoma of the bone marrow, scleroderma, use of chemotherapy drugs, Priority (2). Kidney failure is due to insufficient blood delivery to the kidneys for a long time result decrease in kidneys size, kidneys begin to shrink and slowly work until stopping or caused by a sudden blockage that affects the flow of urine from the kidneys (3) Acute kidney injury is common disease (4). According to The National Institute for Health and Care Excellence refer that the epidemiology of renal failure is seen in approximately 13–18% in the world specially in elderly population (5). Symptoms of renal failure are swelling of the legs, ankles and feet, undue distress in breathing, drowsiness or fatigue, nausea, confusion, pain or chest compression and other coma sometimes (6). Kidney failure is diagnosed by urine analysis, by measuring the amount of urine, along with blood samples to measure the material that is filtered by the kidneys such as urea and creatinine (7). Kidney injury molecule 1 is a protein . Its precise function is unknown, but elevated serum and urinary KIM-1 levels are associated with human renal injury, KIM-1 levels increased associated with histopathological evidence of kidney damage, fibrosis, and inflammation (8), along with some imaging tests such as ultrasound, magnetic resonance imaging, And radiographic tomography (9). Treatment of renal failure is through what is known as dialysis as an alternative to what the kidneys do in normal conditions, and the other treatment lies in kidney transplantation (10). There are strong relationship between of kidney failure development and other risk factors can be minimized by age, sex, exposure for chemical toxicants, such as gases, tobacco, pesticides and other toxic products. Attention should be paid to the doctor’s recommendations, appropriate treatment under his supervision and proper diet (11).

Current study pointed out on kidney failure disease, which is one of the most common diseases at present, by Establishing Demographic study to the patient of renal failure to show frequently diseases in patients according to aging, gender. Determent of renal failure by measured kidney injury molecule-1 as an indicator by ELISA technique. Estimate serum immunologic parameters such as TNF-α, IgG. Tacking the routine tests (CBC tests) for all patients with renal failure.

The samples were collected from the renal dialysis unit at Al Hussein Educational Hospital in Karbala city during the period of time 1/12/2018-15/3/2019. groups included 64 patients composed of (44) males and (20) females and healthy control (60) was apparent with no disease symptoms, based on clinical diagnosis by the physician and their health history. Data collected for patients including age and gender, some cases was excluded such as patients with hepatitis, Because of the and the interaction between patients and the impact of this on immune standards.

2- Blood sampling collection

5 ml of venous blood was collected in gel tubes for immunological studies; The serum was separated by Centrifuge (3,000 cycles for 5 minutes). The serum was then collected in sterile clean plastic tubes and kept in the refrigerator at -10 ° C until use. The serum was used to investigate the level.

Statistically analysis: by ANOVA appropriate, \(X^2\) test, students’ independent T test, And \(p\) value (<0.05).

Results and Discussion

Demographic distribution of renal failure patients:

In current study which dealing with demographic, immunologic and hematologic parameters in Renal Failure patients in Karbala city. Distribution of Renal Failure patients according to study variables including (age, gender of renal failure) table (1). The number of current study (124) samples distribution according to age categories ranging from (>39-<51) year including (64) patients and 60 (control) and divided according to Gender (44) male and (20) female. The result show no significant in demographic data \(P\) value more (<0.05). The \(P\) value result recorded 0.33, according to the age and 0.15 according to the gender. According to the Age frequency disease is increase in male more than female.

Materials and Method

1- Patients: Study type was identified as a study of patients’ cases with renal failure compared to control.
<table>
<thead>
<tr>
<th>Study Variable</th>
<th>percent patients</th>
<th>sample</th>
<th></th>
<th></th>
<th></th>
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<tbody>
<tr>
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<tr>
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<tr>
<td>% within gender</td>
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</table>

The data of the study showed about the demographic distribution that age groups after 40 years is the most vulnerable to the disease and the kidney failure as the results of the study is widespread in males compared with female. That refer to important demographic data (Age, Gender) effects on disease development. Kidney exposure during ageing to changes can be divided two parts namely: structural and functional. Structural changes include: decreased kidney weight and volume; cortical atrophy, loss of renal parenchyma atrophy. Kidney loss of functional glomeruli include decreased glomerular filtration rate, decreased effective renal plasma flow, increased impaired water, electrolyte, and glucose handling and decreased vasodilator activity of prostacyclin mechanisms for ageing-associated with increase oxidative stress. Alterations in sexual responses and hormones can effected on kidney functions the cause may result from high levels of uremic toxins. Change in sex hormone such as decreases in testosterone levels and increases in prolactin levels, are common and cause erectile difficulties and decreased spermatocyte counts in male that can effect on kidney function.

**Immunologic study of renal failure patients:**

Immunologic parameters in current study as showed
in table (2) significant differences at (<0.05). The concentration of (KIM-1) molecules increase in serum of patients with Renal Failure (10.44±3.44 ng/ml) compare with control (0.78±1.25 ng/ml) at p. value (0.00) (Figure 1). Levels of pro-inflammatory TNF-α significantly higher in patients serum compared to control group where means have (151.81±81.69, 84.90±69.36 pg/ml) respectively (Figure 2). IgG registered decline (0.45±0.29 ng/ml) in patients than control (6.29±4.71 ng/ml) in sera (Figure 3).

**Table 2: Immunologic parameters distribution between renal failure patients and control.**

<table>
<thead>
<tr>
<th>Study variable</th>
<th>Patients renal failure (Mean ± SD)</th>
<th>Control renal failure (Mean ± SD)</th>
<th>T test</th>
<th>P. values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kidney injury molecule-1 (KIM-1) ng/ml</td>
<td>9.44±3.44</td>
<td>0.87±1.25</td>
<td>18.18</td>
<td>0.00</td>
</tr>
<tr>
<td>TNF-α</td>
<td>243.81±81.69</td>
<td>84.90±69.36</td>
<td>11.64</td>
<td>0.00</td>
</tr>
<tr>
<td>IgG</td>
<td>0.50±0.29</td>
<td>7.29±4.71</td>
<td>-11.52</td>
<td>0.00</td>
</tr>
</tbody>
</table>

**Figure 1: KIM-1 molecule levels in renal failure patients and control.**
During immunologic study which dealt with important parameters such as KIM-1 molecules, pro-inflammatory TNF-α, IgG antibodies show all parameters levels was increased in Renal failure patients serum except the level of antibodies that indicated the patients have immune response against disease lead to induced pro-inflammatory cytokines in the end stage of disease and decrease the level of antibodies which may increase in early stage of disease and return to decline. Immune detection of KIM-1 found high levels in serum and urine by the sandwich ELISA technique. All aspects of inflammation and immune function may be affected by the high levels of urea and metabolic wastes, including a decrease in humeral and cell-mediated immunity, and defective phagocyte function. Inflammatory response mediated by TNF-α response causes from persons who are
receiving dialysis, vascular access devices are common portals of entry for pathogens (17). Increase levels of TNF-α were more common and associated with decrease levels of kidney function (18). In experimental models, TNF-α causes direct kidney injury, TNF-α molecules may mediate glomerular injury by promoting an influx of immune cells such as macrophages and monocytes, induced proliferation of mesangial cells, and facilitating fibrosis in kidney (19). The results demonstrated a significant decrease in serum total protein and in patients with kidney failure compared to healthy individuals (20) research showed that antibodies such as IgG, production by plasma cells from patients with kidney failure was lower than those produced by B cells from normal individuals. This found demonstrated decrease humeral immune response in patients with renal failure (21).

Hematologic study of renal failure patients:

Current study dependent on hematological data collected by mean (CBC tests) which give picture to WBC, RBC, Platelets numbers in blood was score different in some blood variables this variations have significant statically at (<0.05) was appeared in (LYM., MON., GRA., RBC., HGB., HCT., MCV, MPV.) testing there are different between patients and control which recorded (1.06±0.42, 0.64±0.38, 3.62±1.04, 3.04±0.78, 8.33±1.84, 24.72±5.44, 85.06±8.29, 8.48±0.49) respectively compare with control (4.81±1.11, 0.40±0.18, 5.42±1.14, 4.02±0.46, 14.93±1.45, 33.64±3.58, 9.22±1.10) respectively at p. value (0.00) lower (<0.05). While remain tests have not significant statically between patients and control such as (WBC, MHC, MCHC, RDWS, RDWS, PLT, PCT, PDWS, PDWS, PLCC, PL-CR) tests.

As a routine tests can be using to all patients with renal failure to find out how the disease effect on another blood criteria, so that all patients take all blood films. During this study the results showed higher percent of patients have anemia by decline in RBC numbers and hemoglobin level. Patients with end-stage renal disease can suffer from anemia (22). Results reported that anemia can develop well before the onset of uremic symptoms due to renal failure, and red blood cells production (23). The deficit in red blood cell production is affected by several factors such as the inability of kidneys to secrete erythropoietin hormone. In addition, other factors associated with renal failure, such as the accumulation of uremic toxins which play a role in inhibition bone marrow function (24). In patients receiving dialysis blood loss resulting from loss of blood in the dialysis tubing and dialyzer after each hemodialysis treatment may also contribute to decrease Hb rate in blood (25). Laboratory results refer that patients with renal disease show a variety of changes in hematological parameters (26). The RBCs count, Hb and HCT levels in these patients, although often within the normal range, were significantly lower when compared to their levels in healthy controls the fall in white blood cells (WBC) that occur during hemodialysis may be attributed to the different dialysis membranes and sterilization methods employed (27). However, indicated that the decreased RBC production by the bone marrow can attributed to iron deficiency, (28).

Conclusion

Increase kidney injury and inflammatory in serum patients with disease, by measured some parameters levels in sera as indicators for disease progression and decrease in some antibodies such as IgG concentration of in sera, as well as the hematologic tests refer to disease may associated with anemia.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: Non

Funding: Non

References


Study on Correlation between IL-33 serum level, IL-33 Gene Single Nucleotide Polymorphism and Rheumatoid Arthritis Susceptibility

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Abstract

Objective: To discuss the association between single nucleotide polymorphism (SNP) of rs1929992 in IL-33 gene and IL-33 serum level in rheumatoid arthritis (RA) susceptibility among Iraq population. Methods: A total of 50 samples were collected from 35 RA patients from November 2018 until end of January 2019 together with 15 healthy physical examines in the same period were chosen as the subjects. The serum IL-33 levels measured by commercial ELISA kits. Erythrocyte sedimentation rate, white blood cell were measured by standard laboratory techniques The RFLP-PCR reaction technique was used to detect the genotype distributions for rs1929992 in IL-33 gene was carried out by using restriction enzyme. The frequency of each allele and genotypes distribution was calculated so as to evaluate the association between genotype distribution and RA susceptibility. Results: Serum IL-33 concentration was significantly higher in patients with RA than in control groups. The homozygous genotype AA recorded higher frequency in RA patients (42.9%) than controls (6.7%) with a significant difference (P-value 0.001). Homozygote genotype GG frequency (45.7%) was a significant in patients compared to controls subject (33.3%) with a significant difference (P-value 0.016), and the genotype heterozygous GA frequency (11.4%) were non-significant in patients compared to controls (60.6%). The allele frequency for allele G was (51.4%) in patients compared with controls (63.3%) with a significant difference (P-value 0.022) while for the allele A was (48.6%) in patients compared with controls (36.7%) with a significant difference (P-value 0.001). Conclusions: significant correlation between RA patients susceptibility and genotype AA and alleles at rs1929992 in IL-33 gene is observed. From this study showed that the IL-33 levels were influenced by genetic variation at SNPs rs5743708 and rs1929992, respectively.

Keywords: rheumatoid factor, single nucleotide polymorphism, Rheumatoid arthritis.

Introduction

Rheumatoid arthritis (RA) is one of the most common inflammatory autoimmune diseases. It is characterized by persistent synovitis, systemic inflammation and production of autoantibodies. The molecular mechanisms of RA pathogenesis are not fully understood it is believed that approximately half of the risk factors for RA are attributed to genetic factors such as the human leukocyte antigen (HLA) alleles while the other half of the risks are environmental factors including infection and smoking. The human IL-33 gene and protein, structure of the human IL-33 gene. The gene spans >42 kb, contains 8 exons, and is located on chromosome 9 at 9p24.1 has also been described. IL-33, a member of the IL-1 family, is a ligand for the ST-2R receptor. When binds to IL-33, it enhances inflammatory cytokines via the activation of nuclear factor-κB (NF-κB) and MAP kinases. Although it was initially thought that IL-33 was crucial for Th2 cytokine-mediated immune responses, it is now known that, it can overcome to have a role in RA.

Methodology

A total of 50 samples were collected from 35 RA patients from November 2018 until end of January 2019 together with 15 healthy physical examines in the same period were chosen as the subjects, with age ranged between 30to 69 years old. The RA patients diagnosed by RF test. RFLP-PCR was used to detect the genotype distributions single nucleotide polymorphisms (SNP) in
the gene of IL-33. About 6 ml of blood samples were
drawn from each patients and control, 4ml were collected
in sterile test tube (plain tube) and allow to clot at room
temperature for minutes to 1 hr., the sera were separated
by centrifugation for 10 min. at 2500 r.p.m, (then serum
would be divided into two Eppendorf tube, one tube for
RF test, and other for IL-33 ELISA assay), the separated
sera were labeled and stored at -30°C until in-vitro tests
were performed. other 2 ml of blood were collected in
ethylinditetracic acid (EDTA)tube and stored at 4°C for
ESR,WBC count and for DNA extraction for detection
of IL-33 polymorphism gene by PCR-RFLP technique.

Peripheral blood DNA extraction

2 mL of fasting peripheral venous blood was taken
from all subjects and 0.2% of EDTA-Na2 was used for
anticoagulation. Modified salt fractionation was used for
DNA extraction (Genomic DNA Extraction Kit (Human
blood).Favorgen, USA) and the extraction was reserved
in refrigerator at -20 °C.

Primer design

Primer and probe were synthesized by Bio Labs,
England Company with forward primer being F:5-
GAAGTCTCATCATCAACTTGGGAACC-3, and reverse
primer being,R:5GGATTGGAATCCCATGGTC-3.

DNA amplification and purification

PCR reaction system was 20 L, containing 100 ng of
genomic DNA. The reaction conditions were as follows:
predenaturing at 95 °C for 10 min, followed by 35 cycles
denaturing at 95 °C for 30 s, annealing at 61 °C for
30 °C s, and extension at 72 °C for 30 s, with a final
extension at 72 °C for 7 min. Gel DNA Purification Kit
was used for the purification of amplified production.

Genotyping

RFLP-PCR mix was prepared by using SspI
restriction enzyme (New England Biolabs,UK); this mix
has been done independently according to company ,
After PCR cycles was finished, (1 µl) unit of enzyme
was added to(1µl) of IL-33 PCR product with (5µl)
of enzyme buffer, then incubated for 5-15 min in 37
° C.After cooling down, they were put into mixed liquor
of polyacry lamide and carbamide for electrophoresis
for 3 h at 70 V.

Immunological investigations:

The serum IL-33 levels measured by commercial
ELISA kits (USA, Elabsciencee) according to the
manufacturers guidelines. This study including RF
test, CRP, in this method all the reagents preparation
and assay procedures were carried out according to
manufacturer’s descriptions.

Statistical Methods

Sample collection of patients and genotype
frequencies of IL-33gene were estimated by direct counts
and expressed as percentage. The comparison between
patients and control was analyzed by Unpairedχ²-cal.
The statistical significance of the measured number
was assessed by a special χ² formula. p-value (<0.05)
was considered significant by using software packages
SPSS the figures constructed was by SPSS program of
Microsoft Office 2010. Significant association between
RA susceptibility and the genotype distribution were
assessed using Chi-squared test to estimate the Odd
Ratio (OR) and 95% of confidence interval (CI) for
genotype. IL-33 polymorphism was tested by using Chi-
squared test. all significance were determined as being
below the conventional level of P= 0.05.

Results

The clinical features of the35 RA patients and15
healthy controls were listed in Table1.Mean age of
disease was 51.80±1.55. years, mean age of healthy
control was 53.07±3.25. years. There were no statistical
differences between the RA patients and controls
regarding to age and , P> 0.05. The finding obtained
from this study were illustred in table 1 that shows
the gender distribution and reveal that the majority of
patients with RA were females ( 88.6%)with significant
difference at (p-value0.001)compared with control of
females were(66.7%) while in males were(11.4% )in
RA patients (females at more risk than males) compared
with control of males were(33.3%) with non-significant
at(p-value 0.73). As shown in table 1, the the mean of
ESR ,WBC and IL-33 were significantly higher in RA
group than control group.

Genetic polymorphism of IL-33 gene which was
observed with three genotypes (GG,GA, and AA)
as shown in table 2 which illustrated the distribution
of genotypes of IL-33 in RA patients and healthy
controls. The homozygous genotype AA recorded
higher frequency in RA patients (42.9%) than controls
(6.7%) with a significant difference (P-value 0.001).
Homozygote genotype GG frequency (45.7%) was a
significant in patients compared to controls subject
(33.3%) with a significant difference (P-value 0.016), and the genotype heterozygous GA frequency (11.4%) were non-significant in patients compared to controls (60.6%). The allele frequency for allele G was (51.4%) in patients compared with controls (63.3%) with a significant difference (P-value 0.022) while for the allele A was (48.6%) in patients compared with controls (36.7%) with a significant difference (P-value 0.001) as in table 3. The levels of IL-33 according to cytokine gene polymorphism in RA patients and the control groups have been demonstrated in Table 4. The mean serum level of IL-33 in patients with AA genotype (1.396) was higher than mean serum of GG (1.249), AG (1.362) genotype that in patients, but the differences were not statistically significant (p-value 0.687). Moreover, no significant differences were observed among RA patients with AA, GA or AA genotypes regarding the mean serum levels of IL-33. But the significant differences were observed between RA patients genotypes AA (p-value 0.006) and GG (0.001), AG (0.005) and healthy groups at rs1929992 with respect to the levels of IL-33 Table 4. The frequency of genotype AA recorded odd ratio (OR) 10.500 with a confidence intervals (CI) value between 1.240-88.920 under 95% it showed a significant difference (p-value = 0.012) according to Pearson chi-square, this genotype AA association with risk RA according to OR. The genotype AG recorded OR 0.086 with CI between 0.02-0.373 under 95% it showed a non-significant difference (p-value = 0.001) according to Pearson chi-square. The frequency of genotype GG recorded OR 1.684 with CI between 0.476-5.954 under 95% it showed a non-significant difference (p-value = 0.416) according to Pearson chi-square.

### Table 1: General Information and Clinical Features of RA Patients and Controls.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Patients n=35</th>
<th>Control n=15</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td>51.80±1.55</td>
<td>53.07±3.25</td>
<td>0.692</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>31(88.6%) *</td>
<td>10(66.7%)</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>4(11.4%)</td>
<td>5(33.3%)</td>
<td>0.73</td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RF n(%)</td>
<td>0(0.0%)</td>
<td>15(100%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>35(100%)</td>
<td>0(0.0%)</td>
<td></td>
</tr>
<tr>
<td>ESR (mm/hr)</td>
<td>46.80±1.90 *</td>
<td>13.07±0.92</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>WBC (X3L)</td>
<td>15.66±0.37 *</td>
<td>7.6±0.50</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>IL-33 (pg/ml)</td>
<td>1.32±0.08 *</td>
<td>0.24±0.043</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Abbreviations: CRP, C-reactive protein; SD, standard deviation; WBC, white blood count. a Values are expressed as No. or mean±SD.
Table 2: Distribution of IL-33 –rs1929992 genotype between patients and controls.

<table>
<thead>
<tr>
<th>Genes</th>
<th>genotypes Groups</th>
<th>Patients n=35</th>
<th>Control n=15</th>
<th>Sig.</th>
<th>Chi-Square</th>
<th>OR CI (95%) SIG.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL-33</td>
<td>GG</td>
<td>16 45.7%</td>
<td>5 33.3%</td>
<td>0.016</td>
<td>5.762</td>
<td>1.684 0.476-5.954 0.416</td>
</tr>
<tr>
<td></td>
<td>AG</td>
<td>4 11.4%</td>
<td>9 60.0%</td>
<td>0.166</td>
<td>1.923</td>
<td>0.086 0.02-0.373 0.001</td>
</tr>
<tr>
<td></td>
<td>AA</td>
<td>15 42.9%</td>
<td>1 6.7%</td>
<td>0.001</td>
<td>12.250</td>
<td>10.500 1.240-88.920 0.012</td>
</tr>
<tr>
<td></td>
<td>Sig.</td>
<td>0.022</td>
<td>0.041</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Distribution of IL-33 allele between patients and controls.

<table>
<thead>
<tr>
<th>Gene</th>
<th>frequency alleles</th>
<th>study groups</th>
<th>patients</th>
<th>control</th>
<th>Total</th>
<th>SIG.</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL-33</td>
<td>A</td>
<td>Count</td>
<td>34</td>
<td>11</td>
<td>45</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>% within study groups</td>
<td>48.6%</td>
<td>36.7%</td>
<td>45.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>G</td>
<td>Count</td>
<td>36</td>
<td>19</td>
<td>55</td>
<td>0.022</td>
</tr>
<tr>
<td></td>
<td>% within study groups</td>
<td>51.4%</td>
<td>63.3%</td>
<td>55.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>SIG.</td>
<td>0.811</td>
<td>0.144</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4. Association between SNP IL-33 rs1929992 genotypes and allele, and total IL-33 serum level.

<table>
<thead>
<tr>
<th>IL-33 serum level</th>
<th>SNP</th>
<th>Study groups</th>
<th>RA patients n=35</th>
<th>Control n=15</th>
<th>Mean</th>
<th>Std. Error</th>
<th>Mean</th>
<th>Std. Error</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GG</td>
<td></td>
<td>1.249</td>
<td>0.15260</td>
<td>0.142415</td>
<td>0.022126</td>
<td>0.001*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AG</td>
<td></td>
<td>1.362</td>
<td>0.31800</td>
<td>0.199045</td>
<td>0.054142</td>
<td>0.005*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>AA</td>
<td></td>
<td>1.396</td>
<td>0.22100</td>
<td>0.090706</td>
<td>0.00.</td>
<td>0.006*</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sig.</td>
<td></td>
<td>0.687</td>
<td></td>
<td>0.066</td>
<td></td>
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</table>

*Significant Differences at p value <0.05
Discussion

Rheumatoid arthritis (RA) is a long-lasting autoimmune disorder that primarily affects joints. It typically results in warm, swollen, and painful joints. Pain and stiffness often worsen following rest. Most commonly, the wrist and hands are involved with the same joints typically involved on both sides of the body. The disease may also affect other parts of the body. This may result in a low red blood cell count, inflammation around the lungs, and inflammation around the heart. Fever and low energy may also be present. Often, symptoms come on gradually over weeks to months. This study showed this disease occur in all ages but the highest frequency of patient age infected with RA was in 50 - 59 years from other group. This study agree with the disease affects all ages, but the rate of infection increases with age and the severity of the disease with age between 60 to 40 years. This results which showed the female more than male in study groups with infected in RA were agreement with Gabriel et al., the cohort of RA patients were predominantly female, which is similar to findings from other parts of the world, including the USA. The dysregulation of the oestrogen level might explain why women are much more likely to develop RA than men, whereas androgens may play a suppressive role in the development of the disease. In this study show the level of IL-33 in serum of RA patients was significantly higher than that in the control group this agreement with also reported that in patients with RA, the serum level of IL-33 and ST2 was significantly higher than that of healthy controls. this study demonstrated that the patients with RA had detectable levels of IL-33 in serum, supporting the idea that IL-33 is implicated in the pathogenesis of RA, this result similar with study of which showed that IL-33 has been implicated in joint inflammation and destruction in animal models. This study show Genetic factors contribute to the development of RA that IL-33 gene plays an important role in the pathogenesis of RA and indicate that the IL33 genetic variants associated with RA, this result agree with they found The gene encoding IL-33 may serve as a genetic factor and be associated with the risk of RA. Human IL-33 gene is mapped on chromosome 9p and several SNPs have been reported in the cytokine gene. The association of the SNP rs1929992 with several non-malignant diseases such as ankylosing spondylitis and Behcet’s disease. SNPs within IL33 seem to be an asthma-susceptibility gene, IL33 encodes a cytokine belonging to the IL1 superfamily, and is the natural ligand for the IL1RL1 receptor which has been previously implicated in asthma, inflammation, and a number of immune disorders. Another study show that the implication of 6 genetic IL33-IL1RL1 variants in the susceptibility to several inflammatory diseases. Regarding genetic studies, polymorphisms located both in IL33 and IL1RL1 have been associated with autoimmunity, cytokine pathway genes, which have critical modulatory effects on innate and adaptive immunity, have been shown to represent an important component of the genetic network associated with immune-mediated processes. In conclusion, this study to discuss the association between IL-33 gene polymorphisms and the risk of RA. The present research suggested that the IL-33 gene rs1929992 was related to RA susceptibility in Najaf population. These data showed that the IL-33 levels were influenced by genetic variation at SNPs rs5743708 and rs1929992, respectively. These data signify that the IL-33 levels were influenced by genetic variation at SNP rs1929992, a significant differences in the frequencies of genotypes AA at SNP rs1929992 in IL-33 gene between RA patients and controls, the genotypes AA at SNP rs1929992 association to patients RA this result agree with they showed that rs 1929992 IL-33 gene polymorphisms may be associated with susceptibility to RA.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

Conflict of Interest: Non

Funding: Self-funding

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Association between IL12A Gene of G/A genotype Polymorphism and Pulmonary Tuberculosis Risk in Baghdad Population

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Abstract

The study included eighty samples. This cases-controlled study was performed including fifty Pulmonary tuberculosis patients, their ages ranged from 12 to 77 year (27 female and 23 male) and thirty controls (healthy), their ages ranged from 19 to 58 year (15 female and 15 male). We confined the frequency of IL12A gene (G/A rs568408 genotype) polymorphism by Tetra-ARMS PCR (Tetra amplification refractory mutation system-polymerase chain reaction) technology. Also, we determined the association of IL12A Gene (G/A rs568408 genotype) polymorphism with Pulmonary tuberculosis patients in Baghdad. Statistical results showed significant difference in genotype frequency of IL12A Gene (G/A rs568408 genotype) polymorphism between Pulmonary tuberculosis patients and control (healthy). The G allele shows high frequency in Pulmonary tuberculosis patients comparison with control (healthy) and present related with etiological fraction risk of Pulmonary tuberculosis patients and its ratio 62% in patients and 51.67% in control (healthy), While A allele shows high frequency in control (healthy) comparison with Pulmonary tuberculosis patients and present related with protective fraction of Pulmonary tuberculosis patients and its ratio 48.33% in patients and 38% in Pulmonary tuberculosis patients. The genotypes of GG and AA homozygotes shows high frequency in Pulmonary tuberculosis patients comparison with control (healthy), and its ratio 42% and 18% respectively in Pulmonary tuberculosis patients, while its ratio 3.33% and 0% respectively in control (healthy), also GG and AA genotypes appear related with etiological fraction risk of Pulmonary tuberculosis patients, while the GA heterozygote show high frequency in control (healthy) and its ratio 96%, GA genotypes related with preventive fraction of Pulmonary tuberculosis patients. Our findings demonstrate that the IL12A Gene (G/A rs568408 genotype) polymorphism may represent a significant risk factor for pulmonary tuberculosis patients in Baghdad population.

Keywords: IL12A Gene, Pulmonary Tuberculosis, Polymorphisms, Tetra-ARMS PCR

Introduction

The Pulmonary tuberculosis (TB) is a major cause of morbidity and mortality throughout the world, especially in Asia. The statistical data showed 9.6 million new cases and 1.5 million deaths, based on the WHO (World health organization) of 2015 year (1). TB caused by Mycobacterium tuberculosis is an aerobic rode and intracellular pathogenic bacteria which have target the lungs and causative agent of tuberculosis (2). Cytokines are pivotal in activation of the cell mediated immunity required for controlling of intracellular growth and eliminating of pathogens (3). Interlukin-12 cytokine play an important role in immune response of Mycobacterium tuberculosis (4), and mainly produced by immune cells (macrophages and dendritic cells) (5). IL-12 induces T lymphocyte cells and Natural Killer cells to produce pro-inflammatory cytokines such as TNF-α and IFN-γ in the immune response of pulmonary tuberculosis (6). IL12A gene is located on chromosome 3 of short arm in region 12 (3p12) (7). There is an association of IL-12A gene polymorphism with the risk of pulmonary tuberculosis (8). The variability in the IL-12A gene circuit association studies probably confirm of the genetic heterogeneity underlying susceptibility to pulmonary tuberculosis (9).
The study presents an association between IL-12 gene and pulmonary tuberculosis risk, by using a panel of single nucleotide polymorphism providing comprehensive coverage of these genes (10). IL12A gene is hypothesized to be involved in the progression and development of Pulmonary Tuberculosis. Genetic polymorphisms of \textit{IL12A} gene, was found that genetic variants G/A rs568408 genotype associated with an increased risk of Pulmonary Tuberculosis. The results of this study demonstrate that genetic polymorphism of IL12 pathway may individually or jointly contribute to the sensibility to and prognosis of Pulmonary Tuberculosis TB (3). The study aimed to the finding association between IL12A gene polymorphism in position G/A rs568408 genotype and risk of pulmonary tuberculosis development in Baghdad population.

**Materials and Methods**

**Population samples Study**

The population samples Study consisted of 50 patients with pulmonary tuberculosis (27 female and 23 male), there ages range from 12 to 77 years, and 30 control healthy individuals, (15 female and 15 male), and there ages range from 19 to 58 years. All the samples of pulmonary tuberculosis patients were collected from The National Center for Chest and Respiratory Diseases/ Medical City in Baghdad. They had an established diagnosis of pulmonary tuberculosis by the clinical examination and laboratory test.

Genotyping of IL12A gene (G/A rs568408 genotype)

Genomic DNA was extracted by taking five ml of blood from each patient and healthy control by venipuncture, later, 2.5 ml was added in to EDTA tubes then DNA was extracted by DNA isolation kit (Promega, USA) and according to manufacture instructions manual. DNA purity was qualified by Nano drop and it was about 1.6 ±1.8. All samples were kept at 20 °C for further study. Polymorphism of IL12A gene (G/A rs568408 genotype) was examined by using Tetra-ARMS-PCR technology. The PCR reaction was carried out on a DNA template with a pair of specific primers (Alpha DNA, Canada) that designed according to (11). Table (1), 20 μl was the total volume of reaction mix (PioNeer, Korea), and the molecular marker size (Promega, USA) 100-2000 base pair. Tetra-ARMS-PCR programs were summarized in table (2). The genotypes were established by analyzing electrophoresed 2.5% agarose gel stained with diamond dye (Promega).

**Table (1): primer sequences of IL12A gene (G/A rs568408 genotype) by Tetra-ARMS PCR technology**

<table>
<thead>
<tr>
<th>Target Gene</th>
<th>primer</th>
<th>Primer sequences (5' \rightarrow 3')</th>
<th>Size (bp)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IL12A gene (G/A rs568408)</strong></td>
<td>Forward outer</td>
<td>5'(-AATTTTGGAATACCATGTAAGTCATGCT)-3'</td>
<td>556 bp</td>
</tr>
<tr>
<td></td>
<td>Reverse outer</td>
<td>5'(-AGTTAGCTCGATGCTTTCATGATTACC)-3'</td>
<td></td>
</tr>
<tr>
<td><strong>IL12A gene (G and A allele)</strong></td>
<td>Forward inner (A allele)</td>
<td>5'(-GAAGGATGAGGACTATTACATCCACCTA)-3'</td>
<td>271 bp</td>
</tr>
<tr>
<td></td>
<td>Reverse inner (G allele)</td>
<td>5'(-AAATGTCAAAAATACTTGATCAGGTCCTC)-3'</td>
<td>352 bp</td>
</tr>
</tbody>
</table>
Table (2): The cycling condition for Tetra-ARMS PCR program for detection of IL12A gene (G/A rs568408) by outer primer in pulmonary tuberculosis patient and control groups (healthy) samples.

<table>
<thead>
<tr>
<th>Target gene</th>
<th>steps</th>
<th>Temperature (°C)</th>
<th>Number of cycles</th>
<th>Time (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL12A gene (G/A rs568408)</td>
<td>Pre-denaturation</td>
<td>94</td>
<td></td>
<td>300</td>
</tr>
<tr>
<td></td>
<td>Initial denaturation</td>
<td>94</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Annealing</td>
<td>65</td>
<td>35</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Extension</td>
<td>72</td>
<td></td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Final Extension</td>
<td>72</td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

Statistics

Differences in the frequencies of of IL12A gene (G/A rs568408 genotype) for pulmonary tuberculosis patient in this study with control groups were analyzed with a value P<0.05 by Fisher’s exact test. Odds ratios (OR) and confidence intervals (CI) were calculated using Compare 2 Ver.3.04 software J. H. Abramson (2003-2013). Preventive Fraction (PF) and Etiologic Fraction (EF) results were compared with Hardy-Weinberg equilibrium and according to the software within the following website www.had2know.com.

Results

The genetic polymorphisms of IL12A gene (G/A rs568408) in fifty pulmonary tuberculosis patients with mean age 34.95±1.4 year, and thirty of healthy individuals as a control samples with mean age 26.7 ±1.9 year. Notably, the two alleles G/A are more present for IL12A gene (G/A rs568408) with GG, GA and AA genotypes in pulmonary tuberculosis group and control (figure 1), use of tetra-ARMS PCR technology in study. The allelic frequency and genotypes distribution for each tested polymorphisms for healthy control and pulmonary tuberculosis patient are presented in table (3). With respect to the IL12A gene (G/A rs568408) polymorphisms, there was a significance in pulmonary tuberculosis patient in compare with control group (P>0.05), and the G and A alleles were different in frequency, so allele G frequency was 62% for pulmonary tuberculosis patient while allele A frequency was 38%, as compared with G and A alleles in control group that it’s frequency was 51.7% and 48.3% (figure 2). The odds ratio (OR) for G allele was 1.53 with confidence intervals (CI) 0.80 to 2.90 at 95 % (Table 3), and it was 0.21 as an etiological fraction (EF), while for allele A there is no significance in pulmonary tuberculosis patient comparison with control and OR was 0.6 with CI 0.34 to 1.25 at 95%, and the value of allele A as preventive fraction (PF) was 0.17 (Table 3). The previous report on polymorphisms of IL12A gene (G/A rs568408) show that may G allele be an etiological fraction and also, it’s describe that the A allele may be a preventive fraction that correlated with the risk of pulmonary tuberculosis patients. The genotyping polymorphisms for IL12A gene (G/A rs568408) by tetra-ARMS PCR technology, there are a genotypes frequency significance in pulmonary tuberculosis patients, so GG and AA genotypes showed the high frequency in pulmonary tuberculosis patients as compared with control (health) group, and it was 42 % and 18 % respectively (Figure 3), also the OR for GG and AA genotypes was 21 and 14 respectively, with CI 2.74 to 161.1 and 0.82 to 238.1 respectively. The GG and AA genotypes presented of association with etiological fraction for risk pulmonary tuberculosis, while for GA genotype the frequency was 40% and 96% for pulmonary tuberculosis patients and control (health) group respectively (Figure3), also the OR was 0.02 and CI was 0.00 to 0.18 and the value for GA genotype as protective fraction was 0.94. Briefly, the result showed that GG and AA genotypes were correlated with the risk of pulmonary tuberculosis, while GA genotype was correlated with the protective fraction of pulmonary tuberculosis in Baghdad Population. The results are
consistent with (8, 10 and 12).

Figure (1): The genotypes of IL12A gene (G/A rs568408) polymorphisms for Pulmonary tuberculosis patient samples. Electrophoretic scheme (M is DNA marker, IL-12 gene 565bp, samples of 1 and 10 GG homozygous (352bp), 2, 4, 6, 8, 11 and 12 AA homozygous (271bp) and 3, 5, 7 and 9 heterozygous).

Figure (2): Allelic frequencies of IL12A gene (G/A rs568408) polymorphisms for Pulmonary tuberculosis patient and healthy samples

Figure (3): The genotypes frequencies of IL12A gene (G/A rs568408) polymorphisms for Pulmonary tuberculosis patient and healthy samples
Table (3): The allelic frequency of IL12A gene (G/A rs568408) for Pulmonary tuberculosis patient and healthy samples

<table>
<thead>
<tr>
<th>Target Gene</th>
<th>Allele</th>
<th>pulmonary tuberculosis Patients (%)</th>
<th>Control (%)</th>
<th>OR (95%CI)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL12A gene (G/A rs568408)</td>
<td>G</td>
<td>62 (62%) 31 (51.7%)</td>
<td>1.53 (0.80 to 2.90)</td>
<td>0.247</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E.F</td>
<td>38 (38%) 29 (48.3%)</td>
<td>0.6 (90.34 to 1.25)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>38 (38%) 29 (48.3%)</td>
<td>0.6 (90.34 to 1.25)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>P.F</td>
<td>38 (38%) 29 (48.3%)</td>
<td>0.6 (90.34 to 1.25)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Notes: OR= Odds ratio, CI= Confidence Interval, P.F= Preventive fraction E.F= Etiological fraction , P<0.05 by Fisher’s test.

Discussion

Interleukine-12 is an immuno-regulatory cytokine, which linked innate and acquired immune responses to mycobacterium through induction of IFN-γ production (13). A series of recent reports in the cytokine pathway suggest that more subtle variants of relevant genes may contribute to susceptibility to tuberculosis at the general population level. To investigate whether polymorphism in the interleukin-12 (IL-12) gene predispose individuals to tuberculosis, we studied these genes by single-strand conformational polymorphism analysis and direct sequencing (6). The most potent enhancer of reactivated T-cells and interferon production which is necessary for killing intracellular bacteria like mycobacteria is interleukin-12 (IL-12), and confirms to be an effective and successful adjuvant to a standard anti-tuberculous medication in patients suffering from progressive pulmonary tuberculosis (TB) (14). IL-12, produced mainly by macrophages and dendritic cells, has an important role in the immune response to Mycobacterium tuberculosis, also, IL-12 induces T cells and NK cells to produce pro-inflammatory cytokines such as Interferon-γ and Tumor necrosis factor-α while also regulate the production of IL-17 in immunity response for Mycobacterium tuberculosis (6). The genetic polymorphisms of the IL-12 pathway may individually contribute to the susceptibility to and prognosis of pulmonary tuberculosis TB (12). We investigated the impact of IL12A rs568408 gene polymorphisms on risk pulmonary tuberculosis in a sample was living in southeast (13). The IL12A rs568408 variant was not a risk factor for susceptibility to pulmonary tuberculosis in codominant, dominant and recessive tested inheritance models (11), but another study showed association between IL12A rs568408 polymorphisms and risk of pulmonary tuberculosis in Chinese population and It was found that genetic variants AG/GG of rs2243115 (IL12A) were associated with a decreased risk of pulmonary tuberculosis (12).

Conclusion

The statistical data of current study proved the association between of IL12A gene (G/A rs568408) polymorphism and Pulmonary tuberculosis risk in Baghdad Population.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: Self-funding

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Diseases (2010): volume 29, pages1291–1295


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Evaluation of Oxidative Stress and Antioxidants in Iraqi Patients with Hydatid Disease

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Abstract

Antioxidants and oxidative stress status are clinically important in the detection of many diseases. In order to estimate the role of oxidative stress in hydatid disease pathogenesis, the antioxidant levels and oxidative stress status were examined in the patients of hydatid cysts. Thirty patients having active hydatid cyst of Echinococcus granulosus, previously diagnosed by X-ray, were adopted as patients’ group. Additionally, 25 healthy individuals who did not have hydatid infection or any other parasitic infection constituted the control group. Antioxidant status and oxidative stress levels were determined using biochemical tests including plasma Malondialdehyde (MDA) level, and erythrocyte Catalase (CAT), Glutathione Peroxidase (GSH-Px), Superoxide Dismutase (SOD), Glutathione-S-Transferase (GST) activity, in addition to erythrocyte Glutathione concentration GSH-conc. The statistical evaluation of plasma MDA levels showed significantly higher levels in hydatid patients than in healthy controls, while erythrocyte SOD, GSH-Px, CAT, GST and GSH levels were significantly declined in hydatid patients compared to the control which can be used as diagnostic markers in the laboratory diagnosis of the disease. To conclude, hydatid patients show elevated oxidative stress status, and therefore, the antioxidant therapy should be considered in addition to the routine medicines in this group of patients.

Keywords: Hydatid disease, Echinococcus granulosus, Antioxidant, Oxidative stress.

Introduction

Hydatid disease, or cystic echinococcosis (CE), is an endemic cosmopolitan zoonosis. It is developed from an infection with the larval stage of the tapeworm Echinococcus granulosus. The disease is transmitted to human by oral intake of parasite eggs expelled in the dogs’ feces, the main definitive host, which can result in single or multiple hydatid cysts (1-3). The liver and lungs are noticeably most affected organs; however, the brain, kidneys, spleen, heart as well as bones can also be infected via lymphatic and hematogenous routes (4,5). Indeed, earlier diagnosis leads to a highly successful rate of treatment, yet, it is difficult to be diagnosed clinically due to the variable signs and symptoms, which correlate with the infected organs. However, successful diagnosis requires a combination of different techniques including physical examination, imaging and serological investigations (2,6-8).

Free reactive oxygen radicals such as nitric oxide (NO), hydrogen peroxide H₂O₂ and hydroxyl as well as superoxide radicals are strongly reactive molecules which are produced during the normal metabolism or after exposition to ecological pro-oxidants. Overproduction of free radicals causes a serious chain reaction which can destroy the lipids, nucleic acid, proteins and other cellular compounds (9). The body fights the excessive free radicals via its antioxidant defence system, which comprised of antioxidant enzymes such as catalase (CAT), superoxide dismutase (SOD), glutathione peroxidase (GSH-Px) and by nutritional antioxidants for instant vitamins E and C and also ceruloplasmin (10). However, oxidants and antioxidants level in healthy individuals are at a good balance.

The oxidant and antioxidants balance will be disrupted in the prolonged exposure to E. granulosus antigens due to the continuous immune reactions of the parasite products with oxygen radicals during the parasitic infection, which increases the oxidant stress and ultimately leads to oxidative damage, which in turn has an impact in the complications of the disease as in various other diseases (11).

Cells containing antioxidant functions have a great
influence in the protection against reactive radicals by fighting the oxidative damage of the basic structural elements of cells such as lipids, proteins and nucleic acids (12), and ultimately, it leads to cell death via necrosis or apoptosis (13). However, it is noteworthy that the antioxidant system is composed of antioxidant enzymes including superoxide dismutase (SOD), catalase, glutathione peroxidase (GPx) and glucose 6-phosphate dehydrogenase (G6PD); metal binding proteins which are non-enzymatic substances such as transferrin, ceruloplasmin and albumin; vitamins such as alpha-tocopherol and beta-carotene, as well as trace elements including iron, copper and zinc (12).

The hydatid cyst causes phagocytic cell activation during the host immunosuppressive response, resulting in the release of reactive oxygen species (ROS) and reactive nitrogen products from the macrophages in response to the cyst pathogenicity (13). Although studies of oxidative stress have been reported in humans (14), camels, sheep and cattle (15), there is no study performed in the patients of cystic echinococcosis that studied together the plasma malondialdehyde (MDA) level and erythrocyte CAT, SOD, GST, GSH-Px activities and erythrocyte GSH-conc. Therefore, the goal of this study is to estimate whether oxidative stress has any role in the pathogenicity of hydatid infection by examining the levels of oxidative stress and antioxidant status in the patients of hydatid disease.

Method

Subjects

Plasma and erythrocyte samples were obtained from the Hospital of Specialized Surgeries in Baghdad-Iraq from the patients of hydatid cysts. Thirty patients and 25 controls were considered in the current study. The controls were free of any medication for at least one week before and during the study.

Biochemical tests

A- Plasma MDA assay: the plasma MDA was assayed according to Ohkawa et al. (1979) with the modification done by Hirayama et al. (2000). Every two acid-reactive molecules of Thiobarbituric acid (TBA) will react with one molecule of plasma MDA to produce a reddish chromogen which can be detected at 532 nm wave length.

B- SOD assay: SOD was investigated according to Kakkar et al. (1984). In this method, the resulted oxygen from the photo-reduction of riboflavin will inhibit the reduction of nitro blue tetrazolium (NBT). Fifty percent of inhibition known as one unites of SOD activity.

C- CAT assay: The activity of CAT was estimated according to Eaton et al. (1972) method. CAT catalyzes the H₂O₂ to H₂O₂ and O₂. The rate of H₂O₂ decomposition by the action of CAT is measured photometrically at 230nm. To increase the stability of the hemolysate, the ethanol should be added to prevent the breakdown of the catalase and H₂O₂. After applying 50µl of tris buffer, 900µl H₂O₂ and 30µl of H₂O, the system incubated at 37˚C for 10 minutes, and the hemolysate was applied following 10 minutes. The decrease of OD is measured versus a blank at 412 nm.

D- GSH-Px assay: GSH-Px has assayed according to Paglia and Valentine (1967) with some modifications from Hopkins and Tudhope et al. (1973) and Pleban et al. (1982). The recycling procedure of the estimation of the activity of GSH-Px relies on the oxidation of the glutathione to glutathione reductase by the GSH-Px in the presence of NADPH and exogenous GSSG which regenerates GSH for GSSG (16). The enzyme level was monitored by following the decline in the absorbance at 340nm as an indicator of NADPH exhaustion (10).

E- GST assay: GST was assayed by the procedure of Habig et al. (1974) with some modifications from Carmagnol et al. (1981). The enzyme concentration was investigated through monitoring the absorbance difference at 340nm. A complete assay mixture without glutathione was used as a reference.

F- GSH: Measuring the level of GSH in the erythrocyte was performed as prescribed by Virgil et al. (2000) and Beutler et al. (1963). Virtually, all the non-protein sulfhydryl groups of erythrocytes are found as a reduced GSH. In addition, 5, 5-Dithio bis 2-nitrobenzoic acid (DTNB) is a disulphide chromogen that is readily reduced by the sulphydryl compounds to an intensely yellow compound. The reduced chromogen absorbance is measured at 412nm.

Statistical Analysis

The results were analyzed by t-test. P value ≤ 0.05 was considered significant. Data analysis was performed using statistical software (IBM SPSS Statistics 20).
Results

The mean ± SD of plasma MDA level (µmol/L Hb) was significantly increased in the patients with hydatid disease compared with that in healthy subjects \((p < 0.005)\). Moreover, the mean ± SD of erythrocyte SOD activity was decreased in hydatid cyst patients compared with healthy control \((p \leq 0.001)\).

Additionally, the mean ± SD of erythrocyte CAT activity (U/mg Hb) in hydatid patients was lower than those in the healthy control \((p < 0.001)\).

Moreover, the mean ± SD of erythrocyte GSH-Px activity was significantly declined in group 2 of hydatid patients compared with healthy control \((p < 0.005)\). However, hydatid patients had a significantly lower mean ± SD of erythrocyte GST activity (U/g Hb) compared with healthy individuals \((p \leq 0.005)\).

Similarly, the mean ± SD of erythrocyte GSH-conc. (µmol/g Hb) of hydatid patients was also lower than that of the control \((p \leq 0.001)\).

Table (1): The statistical analysis of the investigated tests in the groups of the patients and the control.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Normal control (n = 25)</th>
<th>Hydatid patients (n = 30)</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plasma MDA level (µmol/L Hb)</td>
<td>4.32 ± 1.45</td>
<td>8.55 ± 2.5</td>
<td>&lt; 0.005</td>
</tr>
<tr>
<td>Erythrocyte SOD activity U/mg Hb</td>
<td>4.04 ± 0.63</td>
<td>1.7 ± 0.46</td>
<td>≤ 0.001</td>
</tr>
<tr>
<td>Erythrocyte CAT activity U/mg Hb</td>
<td>66.9 ± 5.2</td>
<td>43.9 ± 5.23</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Erythrocyte glutathione peroxidase activity GSH-Px U/g Hb</td>
<td>33.01 ± 1.09</td>
<td>20 ± 0.88</td>
<td>&lt; 0.005</td>
</tr>
<tr>
<td>Erythrocyte GST activity U/g Hb</td>
<td>2.2 ± 0.7</td>
<td>0.87 ± 0.29</td>
<td>&lt; 0.005</td>
</tr>
<tr>
<td>Erythrocyte GSH-conc. µmol/g Hb</td>
<td>7.2 ± 0.98</td>
<td>3.54 ± 0.8</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

*P-value from student’s t-test.

Discussion

The current study has investigated the levels of plasma MDA, erythrocyte CAT, SOD, GST and GSH-Px activities as well as the erythrocyte GSH in cystic echinococcosis patients to find if they can be used as indicators to the oxidative stress and antioxidant status in the patients of hydatid disease. The statistical evaluation has reached significant differences in the level of plasma MDA, CAT, SOD, GST and GSH-Px activities as well as GSH concentration in the patients with hydatid cysts compared to healthy individuals.

To begin, it has been found that the SOD concentrations were enormously decreased in the patients having hydatid cysts compared to healthy individuals. In addition, it has demonstrated that MDA, a non-enzymatic antioxidant and a biomarker of lipid peroxidation, was extremely higher in hydatid cysts patients compared to normal control. Importantly, lipid peroxidation is a main deteriorating change in unsaturated fatty acids of the cell membranes induced by the excess free radicals \(^9\). Similarly, it was shown that MDA level has been adopted as a biomarker to the extent of free radicals’ production, oxidative stress and tissue damage and it was increased significantly in the hosts infected with hydatid cysts \(^{14,27}\). Undoubtedly, the over-generation of MDA is clearly confirming the accumulation of reactive oxygen radicals and the incidence of oxidative stress, especially in hepatic hydatid infection. Therefore, the estimation of MDA levels is a reliable approach to evaluate the percentage of peroxidative damage of cell membranes because it serves as the most abundant aldehyde.
produced as a secondary product (28). Moreover, lipid peroxidation resulted from excess free radicals leads to the disarrangement and, subsequently, disruption of cell membranes which leads to necrotic death (15). Deger et al. (2008) reported a positive correlation between the serum MDA and aspartate transaminase, an important predictor of hepatic damage, in the sheep with cystic echinococcosis. Thus, it has suggested that the oxidative damage could have an impact on the liver damage in the sheep with hydatid cysts.

Additionally, the current study revealed a significantly lower reserve of CAT, GSH-Px, GST activities and erythrocyte GSH in the hydatid patients, which is consistent with the previous reports indicated that the concentrations of antioxidant enzymes including the GSH, glutathione peroxidase and SOD were prominently declined in hydatid patients (14). Surely, glutathione transferases and enzymes in the cellular metabolic detoxification process are involved in the removal of genotoxic and cytotoxic compounds and in the protection against the oxidative damage as well (30). The cellular metabolic detoxification process depends primarily on the reduction and hydrolysis reactions due to the low cytochrome P450 efficiency. Consequently, the cytosolic GSTs became the major types of detoxifying enzymes in helminths (31).

The examination of oxidative stress level and antioxidant status in the patients of hydatid disease and their role in the pathogenesis of the hydatid cyst has not investigated before by determining the oxidative stress level and antioxidant status using biochemical tests included the levels of plasma MDA, CAT, SOD, GST, GSH-Px activities and the erythrocyte GSH-conc in hydatid cyst patients.

Conclusions

The current study showed that the oxidative stress increases in the patients infected with hydatid cysts, which suggest that it might lead to the increase in the tissue necrosis and inflammation, while the decrease in the antioxidants level can be associated with low stimulation of cell-mediated immune response. Therefore, the antioxidant therapy should be considered in addition to the routine medicines in this group of patients.

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Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

Conflict of Interest: Non

Funding: Self-funding

References
Pharmacological Effects of Dexamethasone in Rats

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Abstract

Dexamethasone is one of the most widely used glucocorticoids which has a prominent glucocorticoid with slight mineralocorticoid property. This study was performed on twenty four adult Sprague Dawley rats to evaluate the proposed effects of dexamethasone offering as intraperitoneal injection. The animals were allocated randomly into three groups of eight rats to each. The protocol of experiment was: the control group; animals are injected intraperitoneally with 2ml of distilled water, the dexamethasone 1 group; animals are injected intraperitoneally with dexamethasone 2mg/kg, and the dexamethasone 2 group; animals are injected intraperitoneally with dexamethasone 4mg/kg. The injection period extended for one month. The results illustrate that dexamethasone cause significant declination in RBC, PCV, Hb, HDL, and neutrophils besides significant elevations in WBC, eosinophils, monocytes, LDL, TC, TG, VLDL, AST, ALT, and creatinine on a direct positive proportion with the increase in dexamethasone dose comparing with control group at (P≤0.05).

Key words: Dexamethasone, Rats, intraperitoneally.

Introduction

Dexamethasone is one of the most widely used artificial glucocorticoids which has many properties like anti-inflammatory, immune suppressant and others (1; 2). It is associated with vast range of diseases related to metabolism (3). Many studies have reported the effects of dexamethasone on different body functions and systems like dexamethasone effects on rat’s body weight (4), on the embryonic development of rat (5), the dexamethasone effects on bone related diseases (6), on the blood electrolytes of rats (7), the effect on musculoskeletal system (8). It’s effect on liver by causing steatosis (9), on the eye retinal neurons and optic nerve (3), and others. Extended use of dexamethasone has been associated with increasing its adverse effects so we focus in our study on the proposed effects of dexamethasone on blood lipids, electrolytes, red cells parameters, leukocytes parameters and liver enzymes of rats for one month.

Materials and Method

Animals of the experiment

Twenty four adult male Sprague - Dawley rats (Rattus norvegicus) of 175 - 180 grams weights were adopted. The animals were bought from the Iraqi Center for Genetics and Cancer Research in Baghdad. The animals were housed in standard opened cages made of plastic with a stainless steel roof. The temperature of the room was set on 24±1℃ and the lighting was fit on a pattern of 12 hours dark/light cycle. The animals lived two weeks of acclimatization prior to the experiment.

Diet of animals

Animals were fed a standard rat diet recommended by the subcommittee on laboratory animal nutrition (Nutrient requirements of laboratory Animals, 1995) along the experiment period which continued for three months. Rats were given free access to food and water ad libitum along the period of experiment.

Experimental protocol

The allocation of the animals into groups was on a random pattern as below:

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1- Control group, comprises 8 male rats. They were being dosed intraperitoneally with 2ml of normal saline NaCl 0.9% daily for one month.

2- Dexamethasone 1 group (DEXA1), comprises 8 male rats. The rats of this group were being dosed intraperitoneally with 2ml solution containing dexamethasone as 2mg/kg daily for one month.

3- Dexamethasone 2 group (DEXA2), comprises 8 male rats. The rats of the second treatment group were dosed intraperitoneally with 2ml solution containing dexamethasone as 4mg/kg daily for one month. The dose of dexamethasone was chosen according to (10; 11). Dexamethasone was given for 1 month according to (12). Dexamethasone was purchased from local veterinary bureau supplier (trademark of Merck, Germany).

Specimens’ collection

Blood samples were collected from the animals of all groups at the end of the one month period of the experiment. Syringes with needles of 25 gauge were used to collect 2.5 ml of blood from the saphenous (lateral tarsal) veins of rats. The collected 2.5 ml of blood were being divided as 1 ml to be poured into anticoagulant tubes to perform the hematological exam and 1.5 ml to be poured into a gel tube to obtain serum to perform the serological tests. The handling of the rats, intraperitoneal injection and the blood sampling technique were applied respecting the recommendations of (13).

Results

Blood Parameters Changes: The effects of dexamethasone were very clear from the results, where it causes significant declination in the number of red blood cells (RBC), hemoglobin (Hb) and packed cells volume (PCV) and the declination was more prominent in direct proportion with increase in dose of dexamethasone comparing with control group as it is seen in table (1). Dexamethasone also causes leukocytosis representing by increased total white cells count (WBC), eosinophilia, and monocytosis beside declination in number of neutrophils (neutropenia) significantly and positively directional with increase of dexamethasone dose as it is obvious in table (2).

Effects Of Dexamethasone On Lipid Profile: Considering the lipid profile results in table 3 which reveal that dexamethasone causes significant elevations in total serum cholesterol (TC), triglycerides (TG), low density lipoprotein (LDL), very low density lipoprotein (VLDL), beside significant declination in high density lipoprotein (HDL) with a positive proportion with the dose of dexamethasone comparing with control group at (P≤0.05).

Effects Of Dexamethasone On Hepato-Renal Functions: Regarding the hepato-renal function, table 4 reveal that dexamethasone causes significant elevations in aminotransferases enzymes (AST and ALT), and creatinine with a positive correlation with the dose of dexamethasone comparing with control group at (P≤0.05).

Table 1. Dexamethasone effect on blood aspects

<table>
<thead>
<tr>
<th>GROUPS</th>
<th>R.B.C × 1012 /L</th>
<th>Hb g /dL</th>
<th>P.C.V. %</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTROL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a</td>
<td>9.33</td>
<td>a 13.17</td>
<td>a 42.5</td>
</tr>
<tr>
<td>± 0.51</td>
<td>± 0.40</td>
<td>± 1.22</td>
<td>± 0.63</td>
</tr>
<tr>
<td>DEXA 1 (2mg)</td>
<td>b 8.17</td>
<td>b 10.5</td>
<td>b 36.76</td>
</tr>
<tr>
<td>± 0.40</td>
<td>± 0.54</td>
<td>± 0.63</td>
<td></td>
</tr>
<tr>
<td>DEXA 2 (4mg)</td>
<td>c 7.33</td>
<td>c 10</td>
<td>c 33</td>
</tr>
<tr>
<td>± 0.51</td>
<td>± 0.6</td>
<td>± 1.41</td>
<td></td>
</tr>
<tr>
<td>LSD</td>
<td>0.83</td>
<td>0.50</td>
<td>3.76</td>
</tr>
</tbody>
</table>

Numbers represent mean ± standard deviation. Different letters refer to significant differences.
### Table 2. Dexamethasone effect on Leukocytes

<table>
<thead>
<tr>
<th>Groups</th>
<th>W.B.C. (Cell/mm3) x 10^3</th>
<th>Neutrophil %</th>
<th>Acidophil %</th>
<th>Lymphocyte %</th>
<th>Monocyte %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>3.69 ± 0.29</td>
<td>57.00 ± 1.69</td>
<td>1.25 ± 0.46</td>
<td>37.00 ± 1.69</td>
<td>4.00 ± 0.75</td>
</tr>
<tr>
<td>DEXA 1 (2mg)</td>
<td>17.38 ± 0.18</td>
<td>27.75 ± 0.88</td>
<td>3.25 ± 0.46</td>
<td>48.37 ± 2.13</td>
<td>14.87 ± 0.64</td>
</tr>
<tr>
<td>DEXA 2 (4mg)</td>
<td>17.57 ± 0.10</td>
<td>25.50 ± 0.75</td>
<td>4.25 ± 0.70</td>
<td>51.87 ± 2.58</td>
<td>15.00 ± 1.06</td>
</tr>
<tr>
<td>LSD</td>
<td>0.18</td>
<td>1.06</td>
<td>0.49</td>
<td>1.94</td>
<td>0.75</td>
</tr>
</tbody>
</table>

Numbers represent mean ± standard deviation. Different letters refer to significant differences.

### Table 3. Dexamethasone effect on lipid profile

<table>
<thead>
<tr>
<th>Groups</th>
<th>TC (mg/dl)</th>
<th>HDL (mg/dl)</th>
<th>TG (mg/dl)</th>
<th>LDL (mg/dl)</th>
<th>VLDL (mg/dl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTROL</td>
<td>88.76 ± 2.49</td>
<td>40.30 ± 2.53</td>
<td>69.62 ± 2.68</td>
<td>34.53 ± 3.02</td>
<td>14.79 ± 0.88</td>
</tr>
<tr>
<td>DEXA 1 (2mg)</td>
<td>95.15 ± 4.09</td>
<td>32.28 ± 3.48</td>
<td>71.88 ± 2.37</td>
<td>48.49 ± 3.39</td>
<td>14.37 ± 0.47</td>
</tr>
<tr>
<td>DEXA 2 (4mg)</td>
<td>136.37 ± 3.86</td>
<td>25.60 ± 3.67</td>
<td>86.13 ± 3.00</td>
<td>93.54 ± 3.62</td>
<td>17.89 ± 1.16</td>
</tr>
<tr>
<td>LSD</td>
<td>6.39</td>
<td>6.68</td>
<td>14.25</td>
<td>13.96</td>
<td>3.1</td>
</tr>
</tbody>
</table>

The numbers represent the mean ± standard deviation. Different letters refer to significant differences.
Table 4. Dexamethasone effect on hepatic and renal enzymes

<table>
<thead>
<tr>
<th>Groups</th>
<th>AST (U/l)</th>
<th>ALT (U/l)</th>
<th>Creatinine (mg/dl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>59.87 ± 6.15</td>
<td>32.32 ± 2.75</td>
<td>0.37 ± 0.03</td>
</tr>
<tr>
<td>DEXA 1</td>
<td>75.35 ± 3.23</td>
<td>36.11 ± 3.88</td>
<td>1.06 ± 0.05</td>
</tr>
<tr>
<td>(2mg)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEXA 2</td>
<td>83.34 ± 9.04</td>
<td>75.32 ± 3.20</td>
<td>2.23 ± 0.07</td>
</tr>
<tr>
<td>(4mg)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSD</td>
<td>15.48</td>
<td>3.79</td>
<td>0.69</td>
</tr>
</tbody>
</table>

Numbers represent mean ± standard deviation. Different letters refer to significant differences.

Discussion

The present study has been conducted to study the pharmacological effects of two doses of dexamethasone on hematological parameters, leukocytes, lipid profile and finally its effect on liver and kidney functions. The effect of dexamethasone on red blood cells, hemoglobin, and packed cell volume in our study comes in line with the study of (14) who explained that consuming a constant amount of dexamethasone may cause suppression of the bone marrow. Dexamethasone was reported in our study to cause elevation in total leukocyte account and this agrees with the studies of (15, 16). The hyperlipidemic effect of dexamethasone and its effects on hepatic-renal enzymes in our study agrees with the studies of (17, 9). The mechanisms by which dexamethasone exerts its effects like hyperlipidemia are not fully recognized (18). But, one is assured that the effects of dexamethasone are greatly depends on the dose of which, the period of treatment and the type of animal (19).

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: Self-Funding

References

6. Lon HK, Debra CD, Justin CE, Richard RA, William JJ. Modeling effects of dexamethasone on disease progression of bone mineral density in


Association of soluble HLA-G and HLA-G 14bp ins /del Polymorphism in some Iraqi patients with Breast Cancer

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Abstract

Human leukocyte antigen-G is known to be implicated in a tumor-driven immune escape mechanism in malignancies. The main objective of the study is to evaluate the HLA-G 14-bp polymorphism in the 3′-untranslated region of the HLA-G gene in that associated with the susceptibility to breast cancer patients. This study has been done on 60 BC patients & 30 Benign tumor and30 control groups. Estimation of sHLA-G markers was assayed by using ELISA technique. Thus, polymorphism of HLAG HLA-G 14-bp were detected by PCR methods. The plasma levels of HLA-G shows a significant elevation in BC patients compared to benign breast tumour and controls (32.79±0.9 vs. 13.84 ±0.30 and 12.72 ±0.45 ng/ml, P≤0.05). There was a significant difference between newly diagnosed breast cancer patients and healthy control groups in homozygous genotype HLA-G 14-bp del/del genotyping (66.7% vs. 36.7%; OR=3.45; P˂0.01). While, no significant differences in the homozygous genotypes Ins/ins frequency were observed between patients with breast cancer (6.6%) and the healthy control group (0.0%) (OR=3.45, P˃0.001). There was a significant increase frequency of heterozygous genotype Ins/del in controls compared to patients (63.3%vs.26.7%). No significant difference was found between the patients and control groups at HLA-G 14bp insertion and deletion allelic frequency.

Keywords: Human leucocyte antigen-G, Gene polymorphism, Breast cancer

Introduction

Breast cancer is most commonly found malignancy in women around the world, & almost 1.7 million new cases have been diagnosed in 2012, representing approx.. (12%) of the new cancer cases & (25%) of all women cancers¹. The increased CEA is correlated with metastatic disease in breast cancer. The pre-operative CEA measurements was shown to be related to pathological stages & it is stages dependent. The levels of circulating CEA in BC patients directly depends upon the sizes of metastatic & the primary tumor. CEA in BC patients is replaced by other markers with high specificity like CA- 15-3². The tumor marker is used to diagnose and monitor the clinical course of the breast cancer, and this marker can also be found in benign breast tumors³⁴⁵. The HLA-G gene can be an excellent candidate gene for the disease susceptibility, since, given its immunomodulatory function, can act as a protective molecule in inflammatory responses⁶. The human leukocyte antigen-G (HLA-G) belongs to class I non-classical HLA gene family & is located on chromosome 6p21⁷. HLA-G gene encodes 7 isoforms by alternative splicing of the primary transcript, including 4 membrane-bound (HLA-G1, -G2, -G3, & -G4) as well as 3 soluble isoforms (HLA-G5, -G6, & -G7)⁸. HLA-G plays an important role in suppression of the immune responses and participate in the long-term immune tolerance or escape. HLA-G expression may be induced in many diseases such as cancers⁹¹⁰. HLA-G alleles relatively restrict polymorphisms & low sequence variations in many populations¹¹¹². To HLA-G gene, 47 alleles were assigned, primarily in the exons 2, 3, & 4. The diversity of the promoter and the 3-untranslated region (UTR) of HLA-G gene controlled the HLAG protein expression¹³. HLA-G gene also has the absence or presence of a 14 bp at the 3′-UTR)¹⁴¹⁵. A 14 bp
ins/del polymorphism in exon 8 in the 3’UTR of HLA-G was found to be associated with the stability and splicing patterns of HLA-G mRNA isoforms. In addition, HLA-G polymorphisms were investigated in several cancers types and were regarded as predictive markers and risk factors for cancers\(^\text{[16]}\).

**Patient & Method**

This study has been performed on 60 untreated patients with breast cancers, who were diagnosed by oncologist consultant doctors at the oncology teaching hospital baghdad / Iraq and 30 healthy control groups with age range 40-60 years (Mean:50.73±1.60) from March to June 2019 for diagnosis and treatment. All of them had no malignancy other than BC, recurrent breast cancer cases and untreated with chemotherapy or radiotherapy or hormone therapy were also excluded. In addition, 30 Benign and 30 apparently healthy women were also included in this study; matched patients with mean (46.90±2.58; 48.93±3.00). Five ml venous blood was collected from each patients and controls. Blood samples were divided into two aliquots. The first aliquot was transferred into an EDTA tube and stored at -20 ºC until assayed for HLA-G 14bp ins/del polymorphisms. The second aliquot was to transfer to EDTA tube and then centrifuge samples for 10 min at 5000 rpm and then collect the plasma to assayed sHLA-G.

**Mesurment of sHLA-G in the sera of the studied groups**

The serum sHLA-G levels were estimated by sHLA-G Enzyme Linked Immunosorbent Assay (ELISA) kit (Elabscience, USA).

**The amplification of exon 8 of HLA-G 14bp in/del gene using PCR.**

DNA was extracted from EDTA blood samples of the BC patients & the healthy controls using the commercial Geneaid method kit (Geneaid Biotech. Ltd, Taiwan). The genotype of HLA-G 14bp ins/del was detected by PCR with specific primer(forword 5’-TCA CCC CTC ACT GTG ACT GAT A - 3’ and reverse 5’-GCA CAA AGA GGA GTC AGG GTT - 3’). Five μL of Master Mix was used in a 25 μL reactions mixture with 1 μL for each primer and 1.5 μL DNA, then complete volume by add 16.5 μL. The PCR Steps composed of of initial denaturation at 95°C for 3 minutes, followed by 40 cycles of denaturation at 95°C for 40 seconds, annealing at 50°C for 45 seconds, extension -1 at 72°C for 40 seconds and extension- 2 at 72°C for 7 minutes. The PCR product have been observed under the UV on a 2% agaroses gel (Promega Company, USA) stained by 3 μl red safe stains. The size targeted fragment size was compared with 5 μl of universal DNA ladder fragments (KAPA™, Universal LadderKK6302, USA).

**Statistical Analysis**

The IBM SPSS version 25 computer program was used to calculate the mean, standard error and the probability by using student t-test, ANOVA table and Duncan test. Also, For allele & genotyping frequencies, the online Hardy-Weinberg calculator was applied to calculate the variation significance. The differences were significant if \(P<0.05\).

**Results**

The serum HLA-G level was significantly elevated in BC patients in comparison to benign breast tumour and control groups (32.79±0.9 vs. 13.84 ±0.30 and 12.72 ±0.45 ng/ml, \(P\leq0.05\)). Thus no significant variation was pointed between benign tumor group & the healthy controls (13.84 ± 0.30 and 12.72 ±0.45 ng/ml, \(P>0.05\) (Table 1).

**Table 1: Plasma level of sHLA-G in untreated BC patients and control group.**

<table>
<thead>
<tr>
<th>Groups</th>
<th>Plasma sHLA-G level (ng/ml)-Mean± SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients</td>
<td></td>
</tr>
<tr>
<td>Breast cancer</td>
<td>32.79 ± 0.9 A</td>
</tr>
<tr>
<td>Control</td>
<td></td>
</tr>
<tr>
<td>Benign tumor</td>
<td>13.84 ± 0.30 B</td>
</tr>
<tr>
<td>Healthy</td>
<td>12.72 ± 0.45 B</td>
</tr>
</tbody>
</table>

Duncan test, Similar letters: No significant variation (\(p > 0.05\)) between the means. Different letters:Significant variation (\(p \leq 0.05\)) between means.

Genotyping of HLA-G 14bp in/del polymorphisms in exon 8 at the 3’UTR regions were performed by PCR methods. The HLA-G 14 bp alleles & genotypes frequency in breast cancer patient group & the healthy control are shown in the table (2). The allele & genotyping frequency of HLA-G 14bp polymorphisms have been examined as for Hardy-Weinberg equilibrium.
The current HLA-G Ins/del findings detected 2 alleles (Ins & del), which were corresponding to 3 genotypes (Ins/ins, Ins/del & del/del). No significant differences were shown between the expected and observed genotype frequency among SLE patients and the control group.

Comparing between controls & patients revealed a significant difference between the BC patients and healthy control groups in homozygous genotype HLA-G 14-bp del/del genotyping (66.7% vs. 36.7%; OR=3.45; P˂0.01). While, no significant differences in the homozygous genotypes Ins/ins frequency were observed between patients with breast cancer (6.6%) and the healthy control group(0.0%) (OR=3.45, P=0.279). In addition, there was a significant increase frequency of heterozygous genotype Ins/del in controls compared to patients (63.3%vs.26.75) (Table 2).

In contrast, del allele exhibited a non-significant increased frequency in the patient group in comparison with the control group (80% vs. 68%). Ins allele showed a non-significant elevation in healthy control groups compared to breast cancer patients (32% vs. 20%) (Table 2).

Table (2): Allele Frequencies and HLA-G-14bp genotype among BC patients and controls.

<table>
<thead>
<tr>
<th>Genotyping</th>
<th>Breast cancer (60)</th>
<th>A healthy control group (30)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Observed frequency</td>
<td>Expected frequency</td>
</tr>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Del/Del</td>
<td>40</td>
<td>66.7</td>
</tr>
<tr>
<td>Ins/ins</td>
<td>4</td>
<td>6.6</td>
</tr>
<tr>
<td>Ins/del</td>
<td>16</td>
<td>26.7</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
</tr>
<tr>
<td>P-HWE</td>
<td>0.196 (NS)</td>
<td></td>
</tr>
</tbody>
</table>

Allele Frequency

<table>
<thead>
<tr>
<th>Genotyping</th>
<th>Breast cancer (60)</th>
<th>A healthy control group (30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ins</td>
<td>20</td>
<td>32</td>
</tr>
<tr>
<td>Del</td>
<td>80</td>
<td>48</td>
</tr>
<tr>
<td>OR: Odd ratio, (P): Fischer’s exact probability (two-tailed), (P)-HWE: the probability of Hardy-Weinberg Equilibrium.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

serum levels of CEA and CA15-3 in patients with breast cancer are higher than the healthy control group.

Circulating levels of sHLA-G were significantly increased in BC patients in comparison with the controls, which is close to a formerly data reported by Khattab and Jeong et al. who stated that serum sHLA-G was significantly higher in BC group than that of the controls(17)(18). We found that serum sHLA-G levels were significantly increased in the breast cancer group, which was in agreement with results of Rebman et al(19) who showed a significant high serum sHLA-G level in patients who suffered from BC. This result strongly hypothesized that sHLA-G could be utilized as tumour markers in the sera of BC cancer patients for the detection or treatment monitoring. Despite the usefulness of sHLA-G might be proven to help identifying malignant vs benign clinical cases, there are lways many challenges ahead.
Several studies demonstrated that the HLA-G molecules are relatively highly expressed in different tumor types like hematologic malignancies (acute leukemia, lymphomas), primary solid (melanomas, neck & head, urogenital, gastrointestinal, lung and breast cancers) as well as metastases \(^{(20)(16)}\). This mechanism can be used by tumors to escape from immune surveillance\(^{(21)}\). Other studies showed that HLA-G expression is affected by 14-bp ins/del polymorphisms in the 3’ UTR\(^{(22)}\). In 3’ untranslated region (3’ UTR) of HLA-G gene, an insertion/deletion polymorphism of 14 bp was found to affect the stability of mRNA. The effect of this polymorphism in disease susceptibility is controversial. In Iraqi people, no report on HLA-G polymorphisms regarding BC has been found. In the present study, HLA-G Ins/Del polymorphism & risk of Iraqi women with breast cancer patients have been studied, there was a significant increased frequency of del/del genotype as well as of del allele in breast cancer patients compared to the controls, while Ins/del genotype as well as Ins allele showed a non-significantly decreased frequency in the controls when compared with the patients. The present results were in agreement with Al Omar and Mansour, (2019) who showed a high significant increase between the14-bp Del allele & occurrence of breast cancer. Females with homozygous genotype Del/Del were 2.5-fold more probably to develop breast cancer than the non homozygous\(^{(23)}\).

Our results affirm the important influence of HLA-G 14-bp Ins/Del polymorphism on BC occurrence in the Saudi Arabia population and agreed with those stated formerly by\(^{(23)}\) and agreed with the Tunisian results which confirmed the elevation of del allele frequencies among the patients in comparison with the control group and conferred a risk to BC development (52% Vs 45%). An Iranian study showed elevated Del allele & del/del genotype frequencies in BC women in comparison with the control group\(^{(24)}\). These results illustrated the potential role played by the 14-bp polymorphisms in BC history development owing to its role in HLA-G alternative splicing & in the stability of RNA\(^{(25)}\)\(^{(18)}\).

Our results did not agree with Ge et al. & Ramos \textit{et al.} when they stated that the HLA-G 14-bp Ins/Del polymorphisms were correlated with BC and all cancer risks among Asian people\(^{(26)}\) and Brazilian population\(^{(27)}\). In this state, several studies revealed that the 14-bp Ins/Del polymorphisms played a key role in development of different diseases such as various cancers types including the Non Hodgkin lymphomas\(^{(28)}\), hepatocellular carcinoma\(^{(29)}\) and esophageal carcinoma. These discrepancies in the results between studies may be associated with the genetic variations between various ethnic people investigated.

### Conclusions

These results showed an association between breast cancer susceptibility and HLA-G 14-bp Del/del as a potential genetic risk factor in the progression of the disease. While HLA-G 14-bp Ins/del was considered as a protective factor against breast cancer.

### Ethical Clearance:
The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

### Conflict of Interest:
Non

### Funding:
Self-funding

### References


Detection of Acute Childhood Meningitis using PCR in a group of Children at Childs Central Teaching Hospital/Baghdad

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Abstract

Bacterial meningitis is an important cause of death in both developed and developing world.

The study was done on 116 patients admitted to child central teaching hospital in Baghdad, and diagnosed with meningitis depending on CSF findings and PCR results while determination of type of microorganism depend on PCR result. In this study we aimed to assess the patients regarding their numbers, clinical manifestations, complications and type of bacteria causing the disease. Regarding the results of PCR, streptococcus meningitis at the top of the list for the bacterial causes while no any reported cases with Hemophillus influenza and this could be referred to the program of vaccination applied in Iraq which included the vaccines against both types of bacteria. Results of 116 patient involved in this study, majority (44%) were below 1 year, with male predominance (57.8%), most of the patients symptoms between 1-3 days (56%). All patients presented with fever. The diagnosis depend on the PCR results (57.8%) were negative and (37.9%) showed streptococcal infection. All blood culture were surprisingly negative because majority of included patients received antibiotics in outpatient visits before admission and diagnosis.

Patients admitted and followed up to one year for development of complications. Sixteen cases developed complications, (3.4%) of them with subdural effusion and most of complication occur in streptococcal positive PCR results.

Keywords: PCR; Childs central teaching; childhood; Baghdad

Introduction

Meningitis in generic is defined as membranes of the inflammation that surround the spinal cord and brain. The causes Microbiological include, utilize the routine pneumococcal vaccine conjugate, meningitis bacterial affected about 6000 people all the year in the United States; the children at 18 years old or less happen the half case [1].

In infants and young children, Streptococcus pneumoniae, Neisseria meningitides, and Haemophilus influenzae type b are the commonest causes of bacterial meningitis worldwide. While among children older than 5 years of age and adolescents, S. pneumoniae and N. meningitidis are the main causes of bacterial meningitis [1,2].

The incidence of meningitis caused by Hib has decreased predominantly in areas of the world where Hib conjugate vaccines are used routinely [3].

In 1995, before global fortification versus Streptococcus pneumoniae, the happen of meningitis pneumococcal was most than 20 cases per 100,000 US population in younger children less two years old [1]. The seven more common types that cause meningitis in the United States are 4, 6B, 9V, 14, 19, 18C, and 23 [4]. These types are involved in the heptavalent pneumococcal conjugate vaccine. The incidence of disease invasive, containing meningitis bacterial, make happen via S. pneumoniae has been markedly reduced via near 90% after the introduction of this vaccine beginning in
in infancy.[5]

Typical result of CSF in meningitis bacterial contain pleocytosis commonly with a WBC count major, than 1000 cells/mm3 and dominance of polymorphonuclear leukocytes. the WBC count can be normal in some cases, especially when performed early in the course of the disease, [6], and there could be a lymphocyte predominance. It is common for the polymorphonuclear leukocyte count to increase after 48 hr. of diagnosis and then reduced gradually after that [7], usually concentration of Glucose is decreased with a CSF-to-serum ratio glucose at 0.6 or low in neonates and 0.4 or low in children less 2 months of age, while concentration of protein is increased [8].

Exception of meningitis happen via gram-negative bacilli enteric, the benefit of bacterial CSF cultures ordinarily decreases soon after antibiotic therapy started [9-10]. Polymerase testing chain reaction of CSF is most sensitive than CSF culture, especially in patients who previous received therapy antimicrobial [11].

Wide-range polymerase chain reaction have appear a sensitivity Of at 86% and specificity of 97% in detecting organisms multiple together compared with the results culture [12]. The reaction of polymerase chain techniques sensitive comparative with o clinical setting [13]. The focal neurologic signs, instability cardiovascular, makes the doubt of increased pressure intracranial most like. In that cases, imaging brain should be done prior to a lumbar puncture to possible avoid the herniation [14].

**Patient and Method**

A retrospective study was conducted on patients admitted to child’s Central teaching hospital in Baghdad from the first of January 2018 till first of July 2018. This hospital is a tertiary care center for pediatrics and receive many referred cases from periphery of Baghdad and other governorates.

Data were collected, according to preformed questionnaire designed by the researchers, the information regarding, Age, sex, clinical presentations, laboratory tests including CSF findings and PCR results, lines of treatment, and acute complications were recorded.

The studied sample include 116 patients admitted to infectious ward at child’s central teaching hospital. The inclusion criteria include clinical manifestations of meningitis including (fever, seizure, refuse to eat, vomiting, headache, bulging fontanel and positive meningeal signs)[15] plus either a culture positive from CSF or culture negative with a positive CSF antigen study or gram stain in conjunction with CSF leukocyte concentration of > 10/mm3, blood positive culture with CSF, WBC. >100/mm3; in ambiguity of isolates bacterial; CSF WBC > 4000/mm3.[16] CSF samples collected on admission were subjected to laboratory investigations including cells count and their differentiation, glucose and protein level, and CSF culture and CSF samples for PCR results also had been sent to Central public health laboratory. Because PCR of CSF is more sensitive than CSF culture in patients previously treated with antibiotics [11]; and as soon as most of the included patients were treated with antibiotics prior to admission, so we depend on PCR of CSF results while CSF culture results was non informative. All patients underwent full neurological examination on admission to assess any neurological deficit at time of diagnosis, during the period of treatment and up to 1 year follow up visits.

Management usually started with empirical antibiotics with intravenous dexamethasone and supportives then the antibiotics can be changed depending on CSF culture and PCR results then the patient was followed for response to treatment and for acute complications during the period of hospitalization.

Any recorded cases with missed information regarding clinical manifestations, CSF findings, PCR results and complications was omitted. Patients with chronic disease, congenital cranial or spinal cord malformations, prosthetic valve on CNS, cerebral palsy and previous episodes of bacterial meningitis were all excluded from the study.

All included patients were vaccinated according to Iraqi schedule of vaccination, those who were not complete their vaccination and immigrants who are missing many doses of vaccination were all excluded from the study.

All admitted patients were followed during the period of admission for development of acute neurological complications (subdural effusion, hydrocephalus, abscess, stroke, cortical atrophy, diminished consciousness, persistent seizure, spasticity, hypotonia). Those with acute neurological deficit at time of admission were also registered.
Brain imaging was done for patients with focal neurologic signs, cardiovascular instability, or papilledema prior to a lumbar puncture to avoid possible herniation\textsuperscript{14}. Imaging study also done for those with new onset neurological deficit and suspected complications.

**Results**

The mean age of patients was 2.58 ± 3.36 years; 57.8% were males and 42.2% were females and 90.5% were from Baghdad. Fever was presented in all patients followed by seizure which was found in 64.7% as shown in table and figure (1). Subdural effusion was found in 3.4% of cases as shown in table (2).

**Table 1: Distribution of study patients by general characteristics**

<table>
<thead>
<tr>
<th>Variable</th>
<th>No. (n=116)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 1</td>
<td>51</td>
<td>44.0</td>
</tr>
<tr>
<td>1 - 5</td>
<td>48</td>
<td>41.4</td>
</tr>
<tr>
<td>6 - 10</td>
<td>11</td>
<td>9.5</td>
</tr>
<tr>
<td>&gt; 10</td>
<td>6</td>
<td>5.2</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>67</td>
<td>57.8</td>
</tr>
<tr>
<td>Female</td>
<td>49</td>
<td>42.2</td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Baghdad</td>
<td>105</td>
<td>90.5</td>
</tr>
<tr>
<td>Outside Baghdad</td>
<td>11</td>
<td>9.5</td>
</tr>
<tr>
<td>Duration of symptoms before admission</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 24 hrs.</td>
<td>13</td>
<td>11.2</td>
</tr>
<tr>
<td>1 – 3</td>
<td>65</td>
<td>56.0</td>
</tr>
<tr>
<td>&gt; 3</td>
<td>38</td>
<td>32.8</td>
</tr>
</tbody>
</table>

According to CT scan finding that showed in table (3), brain lesion was detected in 11.2% of cases (6% of them was in the right side), brain edema in 6.9% and bleeding in 2.6% of cases.

**Table 2: Distribution of study patients by complication**

<table>
<thead>
<tr>
<th>complication</th>
<th>No. (n=116)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subdural effusion</td>
<td>4</td>
<td>3.4</td>
</tr>
<tr>
<td>Hydrocephalus</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>Abscess</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>Stroke</td>
<td>2</td>
<td>1.7</td>
</tr>
<tr>
<td>Diminished Consciousness</td>
<td>2</td>
<td>1.7</td>
</tr>
<tr>
<td>Persistent Seizure</td>
<td>1</td>
<td>0.9</td>
</tr>
<tr>
<td>Spasticity</td>
<td>3</td>
<td>2.6</td>
</tr>
<tr>
<td>Hypotonia</td>
<td>2</td>
<td>1.7</td>
</tr>
</tbody>
</table>

Regarding outcome, all study patients were discharged well.

**Discussion**

regardless of the advance in medicine, meningitis...
bacterial causes essential morbidity and death-rate in children in both developing and developed countries. loss of the hearing Sensorineural, hydrocephalus and mental retardation, seizures, motor disabilities, as well as most delicate outcomes such as academic and cognitive, and problems the behavioral are discover in post-meningitis children.\textsuperscript{[17]}

Bacterial meningitis is an important cause of morbidity and mortality worldwide so early diagnosis is an important step to decrease its complications and this must be start from high index of suspicion regarding any symptom that may present bacterial meningitis and at the top of the list the fever which was seen in all patients in our study and this differs from a study done by HFM farag\textsuperscript{[18]} who found that fever was the presenting feature in 92.1% of the patients and this may be explained by the time lag between the onset of symptoms and presentation at hospital as majority of patients in current study delayed in seeking medical attention and hospitalization. Regarding the age distribution of the patients, the infants in current study were more liable for bacterial meningitis than other age groups (44%) of the total cases and this result agree with Rehana Basri et al’s\textsuperscript{[19]} study where (54%) of the patients were below one year.

The male patients was the predominat in current study (57.8%) and this result agree with H Choudhury etal and Kirimi E etal\textsuperscript{[20]} where male patient accounting for 58.6%.

The most important point in our study is the type of microorganism that causing meningitis. we depend on PCR result rather than CSF culture although it’s more expensive than CSF culture and sensitivity but it’s more precise and it is not affected by prior use of antibiotics\textsuperscript{[11]} ,as soon as most of participated patients in our study were given oral antibotics before diagnosis of meningitis and prior to blood sampling so majority of the results of CSF culture involved in our study were negative.

In current study PCR results showed that streptococcal pneumonia is the most common causative organisms (37.9%) followed by Neisseria meningitis (4.3%) and this result agree with Erleena nur H etal who found that streptococcal pneumonia also the commonest organisms and account for (23%) and Neisseria meningitis (4%)\textsuperscript{[21]}

In current study there is no H. influenza microorganisms and this differs from Hussain IH et al who found that Homophiles influenza kind b (Hib) were the utmost common aetiological agent\textsuperscript{[22]} and this may be explained by the vaccination program in Iraq which include H.influenza vaccine since 2012 and all included patient in this study were vaccinated according to Iraqi schedule of vaccination.

As a part of our study we look for the development of complications and this depends on the early and late follow up of the patients during admission and after discharge from the hospital, and its relationship to causative agent. subdural effusion was at the top of the list (3.4%)of the total complications followed by spasticity(2.6%), then stroke, hypotonia, disturbed level of consciousness (1.7%) finally the hydrocephalus, persistent seizure and abscess(0.9%). These results compared with Sadie Namani (1) where subdural effusion founded in 28.6%, recurrent seizure 7.8% and hydrocephalus (2.6%)\textsuperscript{[17]} and this is explained as the insufficient drainage of CSF through the arachnoid villi which is more occurred in children which favor the development of subdural effusion.

**Conclusion**

Infectious meningitis is a big health problem. Though the introduction of vaccination program in Iraq had changed the frequency of the causative agents ;and eliminate H. Influenza from the list. Streptococcus pneumonia remains on the top; We hope in the next years with recent introduction of pneumococcal vaccine to Iraqi schedule of vaccination ,to reduce or minimize the number of infected patients and in turn reduce complications and suffering children..

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHESR in Iraq.

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Funding:** Self-funding

**References**


Molecular Physical Properties of Cryoglobulin in Patients with Hepatitis B Virus in Al-Najaf Province

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¹University of Kufa, Faculty of Science, ²Department of Laboratory Investigations, Najaf, Iraq

Summary

Cryoglobulins (CGs) are a cold precipitating abnormal immunoglobulins. The incidence of hepatitis B was discovered to be greater in age groups (46-55 years) relative to other age groups. CGs were detected in 50 (33.3%) out of 150 patients with Hepatitis B. Three types of CGs precipitation nature were identified. Gelatinous (76%), flocculate (20%), and crystallineous (4%). No relation was found between patient’s age and CGs molecular physical properties.

The cryocrit test of 50 serum samples revealed that CGs are characterized by their reversible precipitation at 4°C between 12 hours to five days and solubility time at 37°C ranged between half an hour and three hours.

Keywords: Hepatitis B virus, Cryoglobulins (CGs), Najaf province.

Introduction

Hepatitis B virus is a public health problem worldwide. It causes acute and chronic liver disease. Chronic hepatitis B can progress to cirrhosis, liver insufficiency or liver cancer¹. The world health organization has prepared a plan in 2016 to eliminate the public health threat of HBV infection globally by 2030².

Fulminant hepatic failure may occur due to acute liver injury caused by HBV infection and cute exacerbations of chronic HBV infection. The mortality rate in this case exceeds 75%³. The most effective method to prevent HBV infection is vaccination⁴.

CGs are immunoglobulins (IGs) characterized by precipitation ability at low temperature (below 37°C) and re-dissolving after warming⁵. CGs can cause damage to many organs such as liver, kidney, peripheral nerve, skin, and others⁶. CGs have different composition, which influences the clinical course and the type of underlying disease. Cryoglobulinemia is classified into two categories: type I, that is exclusively found in clonal hematologic diseases, type II and III, which is known as mixed cryoglobulinemia and is found in hepatitis C virus infection and systemic diseases such as connective tissue disorder and B-cell lineage hematologic malignancies⁷.

The best description of GCs pathogenicity is the one of Hepatitis C virus (HCV) associated cryoglobulinemia. Clonal B-cell expansion is induced due to HCV infection. B-cell secretes monoclonal IgM that binds anti-HCVIgG and form immune complexes. Endothelial cells bind to these immune complexes via C1q to C1q receptors receptor. This combination promotes the recruitment of inflammatory cells. Consequently, Vasculitis is produced⁷. The extrahepatic manifestation of cryoglobulinemia associated with HBV are rarely reported⁸.

The clinical presentation of cryoglobulinemia is broad and differs between types of diseases, it includes: purpura, arthralgia, glomerulonephritis, skin ulcers, and peripheral neuropathy. Life-threatening manifestations can develop in a small proportion of patients⁷.

The aim of this work was to detect the presence of CGs in the serum of patients with Hepatitis B and study their molecular physical properties.

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Methods

Blood sample processing

Between July 2018 and March 2019, blood samples were collected from 150 patients (15-65 years) were clinically diagnosed with viral hepatitis type B attending public health laboratories in Al-Najaf province. 10ml of blood samples was drawn from each patient and immediately incubated at 37ºC to allow the blood to clot. The blood was centrifuged at 1500xg for 5 minutes at 37ºC. 2ml of serum samples were used for the detection of GCs.

ELISA detection of hepatitis B surface antigen (HBsAg).

This is a sandwich-type direct immunoenzymatic technique in which anti-HBs covered antibodies on microtiter plate reservoirs act as the peroxidase-marked antibody capture and goat antibodies act as conjugate antibodies. The sample to be analyzed is incubated in one of the antibody coated reservoirs during the test operation. If the sample includes HBsAg, the antigen will attach on the palate to the antibody. To eliminate any unbound material after washing. Goat anti-HBs conjugate is added to the well and permitted to respond with antigen-antibody complex created during the first incubation. An enzyme substratum containing chromogen is added after a second incubation and subsequent washing. If the sample is positive for HBsAg, the substratum will create a blue color. After blocking with sulphuric acid, the blue color shifts to yellow. The intensity of the color is proportional to the quantity of HBsAg in the test sample.

Cryoglobulin assay

The experiment was conducted according to Irish Committee of Cryoglobulinemia guidelines. 2ml of serum was loaded into Sahli tube. The Sahli tubes were incubated at 4ºC for 7 days. The tubes were checked for the appearance of precipitate each 12 hours for the first day. Then the tubes were checked daily.

After the appearance of GCs, the tubes was transported into a water bath at 37ºC to solubilize the GCs. The tubes were checked every hour for the disappearance of GCs precipitate.

Results

Age of patients

CGs were detected in the serum of 50 patients out of 150 patients infected with HBV. There was no relations between patient’s age and the CGs properties, as both the precipitation and solubility time varied within each age group. HBV patients were divided into seven age groups (Fig1).

Percentage of HBV infections in age groups

Figure (1). The percentage of HBV infections according to patient's age.
The highest incident of HBV infection was found in age group of 46-55 years, followed by age groups 26-35, 36-45, 16-25, 56-65, 5-15, and over 65 years. No relation was found between the GCs properties and patient’s age.

**Cryoglobulin molecular-physical properties**

**Nature of CGs precipitates**

CGs are temperature sensitive proteins, they form different types of precipitates depending on the type of CG, physical nature, and precipitation conditions (13. In this study, three precipitate types were noticed. 38 out of 50 were gelatinous, 10 were flocculent, and 2 were crystalline (Fig 2).

**Cryoglobulin precipitation time**

CGs differ in their precipitation time, type I CG may precipitate within 24 hours of incubation at 4°C. While type II and III (mixed) may precipitate within several days. In this study, the first CGs precipitate started to appear after 12 hours of incubation at 4°C in one of the serum samples, while the longest time of GCs precipitation was five days. Most of the cryoglobulins (36%) in the serum of patients with Hepatitis B appeared after one day of incubation (Fig 3).
Most of CGs (18 samples, 36%) in HBV patient’s serum have precipitated in one day of incubation at 4°C, followed by 28% (14 samples) in two days, 22% (11 samples) in three days, 8% (4 samples) in four days, and 4% (2 samples) in five days. 2% (only one patient’s serum) showed a CG precipitation in 12 hours.

**Cryoglobulines solubility time**

In this study, CGs solubility time was between half an hour and three hours at 37°C. Most of the cryoglobulins (19 samples, 38%) became soluble after one hour and half (Fig 4).

![Figure (4). Time of solubility cryoglobulin in 37°C](image)

Most of CGs (19 samples, 38%) in HBV patient’s serum was solubilized in one hour and half, followed by (15 samples, 30%) in two hours, (9 samples, 18%) in one hour, (3 samples, 6%) in two hours and half, (2 samples, 4%) in three hours. And another (2 samples, 4%) in half an hour.

**Discussion**

Chronic Hepatitis B induce a massive monoclonal expansion of B-cell and mixed cryoglobulinemia. About 20% of patients with chronic HBV infection develop mixed cryoglobulinemia\(^{14}\). In contrast, another report has demonstrated that HBV-associated cryoglobulinaemia is rarely reported\(^ {15}\). Our results showed that 33.33% of HBV patients have developed a cryoglobulinemia. This percentage is much higher than the other reported ones. It seems that the prevalence of CGs in patients with Hepatitis B varies in different populations. Another reason for the low percentage of cryoglobulinemia in HBV patients reported by Li et al is the improper management of blood samples. Specimens for CGs detection should be transported and centrifuged at 37°C\(^ {16}\).

Gelatinous precipitate is the dominant type of CGs precipitation, crystalline precipitation is rarely seen. The extra-hepatic clinical manifestation varies widely depending on the type and precipitation nature of cryoglobulins produced\(^ {13}\). Type I CGs (mostly IgM) are found in the serum of lymphoproliferative disease patients\(^ {17}\). Type I CGs cryoprecipitate can appear within 24 hours after incubation, while mixed cryoglobulins (type II and III) cryoprecipitate appears after several days\(^ {6}\). In this study, 36% of cryoglobulins precipitate appeared after one day of incubation, and 76% of the CGs precipitate have a gelatinous nature. Most likely they are type I cryoglobulins. This finding demonstrates that lymphoproliferative disease is most likely to be the extra-hepatic manifestation in patients with HBV.
We found that 38% of GCs precipitate can solubilize within one hour and half. All the CGs precipitated in this study were soluble at 37°C within the range of half an hour to three hours.

**Acknowledgment:** None.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

**Conflict of Interest:** Non

**Funding:** Self-funding

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Hospital Door Knobs as a Source of Bacterial Contamination: A Study in Iraqi Hospitals

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Abstract
In this study, 20 swabs were collected from three hospitals in the holy city of Karbala (Al Hussein General Hospital, Al Abbas Private Hospital and Maternity Hospital). Nutrient agar was grown on solid feed medium and incubated at 37 °C for 24-48 hours for isolation and diagnosis. Bacterial isolates obtained underwent biochemical and bacteriological tests for diagnosis. I prepared different doses of isolated bacteria according to the McFarland model. Then take 0.1 ml of 1/10000 IV dilution and add to Muller Hinton agar medium.

The results of the preliminary diagnosis of the isolated bacteria showed that the positive bacteria of Cram stain were higher than those of Cram negative bacteria. The largest number of \textit{S.aureus} bacteria was in the hospital environment from which swabs were taken and in all locations, especially bathrooms. By calculating the percentage of the total number of samples diagnosed for each hospital separately, the results showed that Hussein General Hospital had the highest contamination rate of 90%, while Al-Ahli Hospital had the lowest contamination rate of 40%. With regard to the effect of antiseptics, the concentration gave 75% Dettol the highest amount of inhibition of bacterial growth compared with other concentrations.

On the other hand, the synergistic effect of both antiseptics (Dettol and chlorine) 75% -25% had an effect on inhibition of bacterial growth and its total elimination in the medium compared to other concentrations.

Keywords: Door Knobs, Bacteria, Contamination, Antiseptic, Microorganism.

Introduction
With the application of the principle of prevention better than treatment and with the development and scientific progress and scientific achievements of many inventions and discoveries that are in the interest of humanity we had to know the impact of microorganisms in hospitals and health environments, according to the campaign of infection prevention in hospitals and provided by the United States Hospitals aggravated by routine work and failure to adopt hygiene standards applied to the physical environment of diseases of the same level of importance available in cleaning hands and people led to this large amount of pollution and can be avoided Reducing the rates of contamination in hospitals to 10% by establishing or adopting modern sterilization mechanisms and designing studies that focus on the basic rates of infection and the type of injury and trying to avoid them and identify the causes. Persons facilitate the transmission of germs throughout the building (1).

In recent times, many types of antibiotic-resistant bacteria have begun to emerge. The poor health culture of many nurses, they help spread it (2).

Door handles for toilets and taps in toilets are parts contaminated with microorganisms. Microbes carry human skin on two endemic and transient species (3) (4) (5) (6).

Human hands are usually the port of microorganisms as a normal flora of the body, as well as the transmission of microbes through the environment (5) (6) (7).

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Some of the most important species that may be found on the hand as transmitted species from external sources include *Escherichia coli*, *Salmonella spp.*, *Shigella spp.*, *Clostridium* \(^8\) at a high rate and have a significant impact on the third of public places.

Repeated use of the same surfaces, including door handles by people living on the hand, will be easily transmitted to other users of all ages and environments.

Substances used to eliminate microorganisms (disinfectants, detergents and disinfectants) are variously concentrated chemical compounds used in the medical field to prevent the spread of diseases causing hospital infections and are used for personal health and to prevent accidental contamination of nurses and staff \(^9\).

### Materials and Method

#### Sample Collection

In this research, samples were collected from Al-Husseini, Abbasi and Maternity Hospital in the holy city of Karbala, where swabs were taken from the hospital environment (door handles for bathrooms, emergency and operations) during the period 1/1/2016 to 25/1/2016 as shown in Table (1)

### Table (1) shows samples and sources of obtaining them

<table>
<thead>
<tr>
<th>No.</th>
<th>Hospital</th>
<th>Samples</th>
<th>Source</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Elhosany</td>
<td>20</td>
<td>Emergency</td>
<td>Baths</td>
<td>Operations</td>
</tr>
<tr>
<td>2</td>
<td>Elwelada</td>
<td>20</td>
<td>Emergency</td>
<td>Baths</td>
<td>Operations</td>
</tr>
<tr>
<td>3</td>
<td>Abbasi</td>
<td>20</td>
<td>Lack of emergency in the hospital</td>
<td>Baths</td>
<td>Operations</td>
</tr>
</tbody>
</table>

The number of swabs taken was 20 swabs per hospital. These swabs were transported to the laboratory by Transport media. They were transplanted to Nutrient agar solid medium and incubated at 37 ° C for 24-48 hours for isolation and diagnosis.

#### Diagnosis of samples

Bacterial isolates obtained from biochemical and bacteriological tests were subjected to diagnosis as well as the action of slices and dyed with Gram stain.

#### Isolation of bacteria

Wipes were planted on the following media: Nutrient agar, Blood Agar and MacconKy agar.

**Mannitol salt agar** (especially for the diagnosis of *S. aureus*).

The dishes were incubated aerobically for 24 hours at 37 ° C and the colonies were initially diagnosed by recognizing their morphological and agricultural characteristics in the general culture media (Nutrient agar) to determine the type and isolation of the isolated bacteria.

#### Confirmation tests:

After that, confirmatory tests were carried out:

**Confirmation examination on the center of Mannitol Salt Agar for the diagnosis of S.aureus**

The isolates were planted on the mannitol glue. The dishes were incubated for 24 hours at 37 ° C to study the agronomic characteristics of the form, color and size of the colonies and their ability to ferment lactose sugar.

**Blood Agar confirmation for Streptococcus Spp.**

The isolates were planted on the medium of B.A. Then the dishes were incubated for 24 hours at 37 ° C to study the agricultural characteristics of the shape, color and size of the colonies and the types of decomposition they produce (α, β, γ).
Test of the effectiveness of the enzyme cytochrome oxidase (Oxidase test)

The filter paper was moistened with drops of reagent and several colonies were transferred from the center of the glue feeding with wooden sticks and mixed well with the reagent and after (20 - 30) seconds after the colonization of the colonies violet positive result \(^{(11)}\).

Catalase test

Transfer part of the bacterial suspension to the surface of a clean glass slide and add a drop of reagent (5% hydrogen peroxide solution). The emergence of bubbles indicates that the result is positive. This detection is used to investigate the ability of the bacterium to produce the catalase enzyme that decomposes H\(_2\)O\(_2\) into oxygen and water \(^{(12)}\).

CO - Agulase test

Two drops of plasma were placed on the surface of a glass slide and then a rich colony of bacterial suspension was added. After 10-15 seconds, the coagulation or agglomeration was an indication of the positive result and the bacterium was \(S.aureus\).

Diagnostic tests were carried out which included the examination of all specimens in Gram stain where the dominance of \(Staphylococcus\ Spp\) was recorded. On other bacterial species. Confirmation tests were also conducted for all samples that included both growth on the center of Mannitol Salt Agar. Blood lysis, Oxidase, Catalase.

Exposure to disinfectants:

After isolation and diagnosis of bacteria for swabs taken from hospitals and then their development on the liquid nutrient broth (nutrient).

Different dilutions of the isolated bacteria were prepared according to the McFarland model. Then 0.1 ml of the fourth dilution was taken 1/10000 and added to the center of Muller hiton agar \(^{(13)}\).

Some disinfectants used in the hospitals were swabs, which included (Dettol and chlorine), which was in the concentration of chlorine (5% sodium hypochlorite) and dettol at a concentration of (10% xylenol) prepared four different dilutions for each disinfectant separately (100%, 75%, 50%, 25%). Where distilled water was adopted for dilution. Where the sample was taken without dilution 100%, 75% by adding 25 ml distilled water and 75 ml of disinfectant, 50% was 50 ml of disinfectant and 50 ml distilled water and 25% was 25 ml disinfectant with 75 ml of distilled water and so on for the second disinfectant. The same number of mitigations but both antiseptics attended together to study their synergistic effect together to inhibit bacterial growth.

Each dilution was taken 0.1 ml and added to the implantcenter (muller hiton agar) by two repeaters for each dilution after being pollinated with bacteria that were isolated and diagnosed from the door handles on the one hand and on the other hand the same amount of disinfectants were taken together and in the same way the circles were held in a temperature of 37 for 24 hours.

Results and Discussion

The results of the initial diagnosis of bacteria isolated from (door handles) for all hospitals adopted in the study showed that the bacteria positive to the pigment of karam were more compared to the bacteria negative for the pigment of the pigment and as shown in table 2 that shows the results of diagnostic tests and biochemical For isolated bacterium No. 5, this is consistent with the search results \(^{(10)}\). and table (2).

Table 2: types of bacteria isolated from door handles in all hospitals (Al-Hussein General, Abbas Al Ahli and elwelada)

<table>
<thead>
<tr>
<th></th>
<th>Gram Stain</th>
<th>Mannitol Salt agar</th>
<th>MacconKey agar</th>
<th>Blood agar</th>
<th>Catealase test</th>
<th>Oxidase test</th>
<th>Coagulase test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staphylococcus. Spp.</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>(\beta^+)</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>Proteus</td>
<td>-</td>
<td>-</td>
<td>+ Forming swarming</td>
<td>+ Forming swarming</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
The results of the research showed the spread of *S. aureus* bacterium in the hospital environment from which the surveys were taken and in all locations, especially the baths, and this result was agreed with its findings (binding2) + Planet Saadi) and as described in table (3) and Figure 1.

**Table 3:** shows the total number of bacterium and types of microbiology isolated from the door handles for all sites taking wipes in hospitals

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Positive samples</th>
<th>Staphylococcus. Spp</th>
<th>Strepococcus spp.</th>
<th>Bacillus spp.</th>
<th>seudomonas aeruginosa</th>
<th>Clostridium spp.</th>
<th>Proteus</th>
<th>Klebsiella</th>
<th>E.coli</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elhosany</td>
<td>38</td>
<td>12</td>
<td>8</td>
<td>3</td>
<td>6</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>elwelada</td>
<td>27</td>
<td>10</td>
<td>5</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Elabassi</td>
<td>15</td>
<td>7</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>29</td>
<td>17</td>
<td>6</td>
<td>12</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>10</td>
</tr>
</tbody>
</table>

**Figure 1** shows the total number of bacterium and types of microbiology isolated from the door handles for all hospital swabs.

By calculating the percentage of the total number of samples diagnosed for each hospital, the results showed that Husseini Hospital had the highest infection rate, while in Abbas Hospital the lowest contamination rate as in Table 4.

**Table 4: Percentages of Total Positive Results for Total Samples**

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Samples</th>
<th>Positive Samples</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elwelada</td>
<td>20</td>
<td>14</td>
<td>70%</td>
</tr>
<tr>
<td>Elhosany</td>
<td>20</td>
<td>18</td>
<td>90%</td>
</tr>
<tr>
<td>Abbasi</td>
<td>20</td>
<td>8</td>
<td>40%</td>
</tr>
<tr>
<td>total</td>
<td>60</td>
<td>40</td>
<td>67%</td>
</tr>
</tbody>
</table>
After isolating and diagnosing the bacteria from samples taken from the door handles, the bacteria were activated by developing them in the nutrient-liquid broth and conducting a series of dilution specimens based on the McFarland model and took 0.1 of the fourth dilution 1/10000 and was added to the center mullar hitun agar)) and after Study the efficiency of some common and approved disinfectants for use by hospitals that have been taken wipes, which included both chlorine with a concentration (5% sodium hypochlorate) and ditol with a concentration (10% coselinol) and the preparation of four different concentrations for each disinfectant individually (100%, 75%, 50%, 25%) as shown in table 5 below.

Table 5: shows the results of the effect of various concentrations of disinfectants on inhibiting the growth of bacteria

<table>
<thead>
<tr>
<th>Disinfectants</th>
<th>25%</th>
<th>50%</th>
<th>75%</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloren</td>
<td>H</td>
<td>I</td>
<td>I</td>
<td>H</td>
</tr>
<tr>
<td>Dettol</td>
<td>H</td>
<td>I</td>
<td>W</td>
<td>I</td>
</tr>
<tr>
<td>Synergistic (chloranddetol)</td>
<td>I</td>
<td>I</td>
<td>V.W</td>
<td>H</td>
</tr>
</tbody>
</table>

H: Heavy I: Intermediate W: Weak V.W.: Very Weak

The concentration gave 75% Dettol the highest amount to inhibit the growth of bacteria compared to other concentrations.

On the other hand, the results showed that the synergistic effect of disinfectants combined (ditto-chlorine 75%-25%) The highest inhibition rate of the bacterium in the middle compared to other concentrations and the basic sample without the addition of disinfectants.

We note through the results of the isolation and diagnosis of bacteria from the swabs of door handles to hospitals that the number of bacteria positive for the dye of the dignity more than the negative bacteria of the pigment of gram and this means that the negative bacteria of the dye of the gram can be transmitted through the handles of the doors but by a small percentage where the spread of the common ity of positive bacterium is the dominant, and this is consistent with what he has come up with(12).

As for disinfectants and sterilizers performed on a series of disinfectants which are (100%, 75%, 50%, 25%), it was found that the dilution rate of 75% Dettol gave a high rate of inhibition of bacteria for disinfectants each individually, and on the other hand the results showed that the synergistic effect of disinfectants together Dettol Chlorine with a dilution of 75% was enough to eliminate the bacteria in the middle compared to the other disinfectants, whether for disinfectants on the cheek or both disinfectants (binding 2). Exposure to biocides, disinfectants and sterilizers results in reducing the sensitivity of insulation to antibiotics and deadly biomaterials by means of natural or acquired resistance mechanisms in addition to the possession of adaptable microbiology when exposing to biomaterials. The killer by acquiring plasmids or jumping genes that make these micro-organisms resistant and that the same strategies that gain bacteria to resist biocides give them resistance to antibiotics(10).

Conclusions

1- In this study we reviewed the effects and microbiology that can be transmitted between infected people and when they use door handles in hospitals as well as medical staff when conducting tests or operations or neglecting the necessary preventive and health measures at the present time and few Attention to the beginning of prevention, especially in the health and medical services. The results discussed confirmed that the increased use of door handles on a continuous basis leads to increased amounts of microbes and that the majority were from the bacterium positive for the pigment of Karam.

2- Bathrooms are considered one of the most important sources of contamination with microbes as a result of human secretions of skin, saliva, administration, fecal matter and others.

3- Cleaning hands after using bathrooms in a routine way especially by people who do not have health awareness and do not use detergents in the right way before leaving and using door handles for bathrooms makes it a rich medium and ideal for various pathogenic microbiology especially Hospitals and public places.

4- From our findings, it is found that local hospitals had high levels of contamination of the handles and the presence of bacteria at high rates requires greater...
attention to hygiene and sterilization.

5- Disinfectants on the surfaces are very necessary to prevent injuries and the transmission of microbes, especially on the surfaces that are constantly touched by the hands in order to reduce and determine their presence and prevent their transmission from one person to another.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Funding:** Self-funding

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Estimation the Level of Metals (Lead, Cadmium, Copper and Zinc) In Multiple Sclerosis Patients in Basra\ Iraq

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Abstract

Multiple sclerosis (MS) is a demyelinating inflammatory disease of the central nervous system white matter that displays a triad of pathogenic symptoms. The toxicity of heavy metals can disrupt or damage central nervous systems. Long-term exposure of human population to heavy metals has shown neurological impairments. The degenerative processes are similar to Alzheimer’s disease; Parkinson’s disease. This study compared the serum level of Lead, Cadmium, Copper and Zinc in MS patients with their levels in a control group.

Methods: prospective study of cohort includes fifty Iraqi people selected from the Southern area of Multiple Sclerosis Clinic Center divided into two groups, in which the first group contains twenty five patients with MS and twenty five people without MS. Serum level of Lead, Cadmium, Copper and Zinc have been measured.

Results: In the present study, there was a significant increase in the concentration of (copper - lead –cadmium) in patients with multiple sclerosis as compared with normal people ($p<0.05$). There is a significant decrease in the concentration of zinc in patients with multiple sclerosis as compared with normal people ($p<0.05$).

Conclusion: Lead, copper, cadmium and zinc could affect on the susceptibility of patients to induce MS attack.

Keywords: heavy metals, health; Patients; critical levels

Introduction

Multiple sclerosis (MS) is a chronic autoimmune, inflammatory neurological disease of the central nervous system (CNS)[1]. MS attacks the myelinated axons in the CNS, destroying the myelin and the axons to varying degrees [2]. In most patients, the disease is characterized initially by episodes of reversible neurological deficits, which is often followed by progressive neurological deterioration over time[3], and 50% of patients will need help walking within 15 years after the onset of the disease[4].

Twice as many women are affected as men, and persons of Northern European descent appear to be at highest risk for MS[5]. The disease is diagnosed on the basis of clinical findings and supporting evidence from ancillary tests, such as magnetic resonance imaging (MRI) of the brain and examination of the cerebrospinal fluid (CSF). MS typically presents in adults 20 to 45 years of age; occasionally, it presents in childhood or late middle age[6].

The cause is unknown, but it appears to involve a combination of genetic susceptibility and a non-genetic trigger, such as a virus, metabolism, or environmental factors, that together result in a self-sustaining autoimmune disorder that leads to recurrent immune attacks on the CNS[7].

The term “heavy metals” refers to any metallic element that has a relatively high density and is toxic or poisonous even at low concentration. Heavy metals is a general collective term, which applies to the group of metals and metalloids with atomic density greater than 4 g/cm3, or 5 times or more, greater than water[8].

Cadmium and lead are among the most abundant heavy metals and are particularly toxic. The excessive
content of these metals in food is associated with etiology of a number of diseases e such as chronic obstructive pulmonary disease, lung cancer, nephrotoxicity and mild anemia\(^9\).

Nonessential heavy metals and metalloids (e.g. arsenic [As], lead [Pb], mercury [Hg] and cadmium [Cd]) are xenobiotic and theoretically are capable of exerting toxic effects at any level of exposure\(^{10}\).

Some metals (e.g. copper [Cu], zinc [Zn], selenium [Se] and chromium [Cr]) serve as micronutrients and are essential to normal metabolic function as trace elements but are toxic at high levels of exposure\(^{11}\). A few metals are not known to be essential to human health but may have some beneficial effects at low levels of exposure. These include silicon, nickel, boron, and vanadium\(^{12}\).

Heavy metals usually enter the human body via different food chains, inhalation, and ingestion. In addition, heavy metals have been used for long time by humans for making metal alloys and pigments for paints, cement, paper, rubber, and other materials\(^{13}\). The toxicity of heavy metals can disrupt or damage central nervous systems\(^{14}\), change blood composition\(^{15}\), damage lungs \(^{16}\), kidneys \(^{17}\), livers. \(^{18}\) The long-term exposures of human population to heavy metals have been shown many degenerative diseases like Alzheimer’s disease\(^{19}\), Parkinson’s disease\(^{20}\).

### Subjects and Methods

A cross section study of 25 MS patients and 25 healthy participants without MS. They were selected from the Multiple sclerosis center in Basra Governorate.

**Exclusion Criteria**: The exclusion criteria include the Patients with renal failure, Patients with congenital condition, Patients live near high way, gas station and industrial factory, Patients taking food supplement containing zinc and other elements.

**Blood sampling:**

Blood sample (10 ml) taken from each participant studied groups , centrifuged to isolate the serum that be used for estimation of trace elements ,and the remaining of the sample put into Ethylene diaminetetraacetic acid (EDTA) tubes to keep whole blood for estimation of heavy metals\(^{21}\).

### Biochemical assay

Frozen serum was allowed to thaw at room temperature, assessment of inorganic elements (Zn, Cu) \(^{22}\). Refrigerated (Whole blood Pb) was performed by Flam Atomic Absorption Spectrophotometry (FAAS) \(^{23}\), while(Cd ) was performed by Graphite Furnace Atomic Absorption spectrophotometry (GFAAS)\(^{24}\).

### Statistical Analysis

Numerical data were expressed as mean± standard deviation (SD). The data were analyzed by utilizing computerized statistical package for the social sciences SPSS program. Unpaired student t-test was performed for each group pair includes comparison between two groups (\(P\)-values\(<0.05\)) were considered to be statistically significant. Chi-square test was used to assess the statistical significance in distribution between different discrete variable.

**Ethical Consideration:** All administrative approvals were taken from the Participants, the administrative team of the hospital. Also we take patients concern.

### Results

In table (1), there are no significant differences in age and weight when compared between the patients with multiple sclerosis and normal individuals \((p>0.05)\). In the table (1), there were no significant relationship in sex, marital status and residency when compared between the patients with multiple sclerosis and the people without multiple sclerosis meanwhile there was significant differences in job status between the patients with multiple sclerosis when compared to the people without multiple sclerosis.
Table (1): Demographical information of patients with multiple sclerosis and healthy participant without MS.

<table>
<thead>
<tr>
<th>Characters</th>
<th>Patients with multiple sclerosis</th>
<th>Normal people</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (in years)</td>
<td>42.46±9.3</td>
<td>41.12±10.11</td>
<td>0.491734</td>
</tr>
<tr>
<td>Weight (in kg)</td>
<td>75.12±12.39</td>
<td>78.1±10.27</td>
<td>0.380247</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>10(40%)</td>
<td>11(44%)</td>
<td>0.834558</td>
</tr>
<tr>
<td>Female</td>
<td>15(60%)</td>
<td>14 (56%)</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>7(28%)</td>
<td>9(36%)</td>
<td>0.712553</td>
</tr>
<tr>
<td>Married</td>
<td>18(72%)</td>
<td>16(64%)</td>
<td></td>
</tr>
<tr>
<td>Residency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Center</td>
<td>13(52%)</td>
<td>9(36%)</td>
<td>0.517219</td>
</tr>
<tr>
<td>Rural</td>
<td>10(40%)</td>
<td>13(52%)</td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>2(8%)</td>
<td>3(12%)</td>
<td></td>
</tr>
<tr>
<td>Job status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employee</td>
<td>8(32%)</td>
<td>23(92%)</td>
<td>1.24034E-05</td>
</tr>
<tr>
<td>Not-employee</td>
<td>17(68%)</td>
<td>2(8%)</td>
<td></td>
</tr>
</tbody>
</table>

Clinical information of patients with multiple sclerosis

In table (2), the onset of multiple sclerosis in the patient was around (82.8±39.3) months, the classes of multiple sclerosis was differ in which the patients with Primary progressive multiple sclerosis was 6(24%) , patients with Relapsing Remitting Multiple Sclerosis was 16(64%) meanwhile the Secondary Relapsing Multiple Sclerosis was 3(12%) .

Table (2): Clinical information of patients with multiple sclerosis

<table>
<thead>
<tr>
<th>Characters</th>
<th>Patients with multiple sclerosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset of disease (months)</td>
<td>82.8±39.3</td>
</tr>
<tr>
<td>Type of multiple sclerosis</td>
<td></td>
</tr>
<tr>
<td>Primary progressive Multiple Sclerosis</td>
<td>6(24%)</td>
</tr>
<tr>
<td>Relapsing Remitting Multiple Sclerosis</td>
<td>16(64%)</td>
</tr>
<tr>
<td>Secondary Relapsing Multiple Sclerosis</td>
<td>3(12%)</td>
</tr>
</tbody>
</table>

Biochemical results of heavy metals

In table (3), lead, cadmium and cupper concentration for the patients with multiple sclerosis was significantly higher when compared to normal peoples \((p<0.05)\). Cadmium concentration for both groups was within normal values, lead concentration for both groups was higher than normal values, cupper concentration for both groups was lower than normal values and patients with multiple sclerosis have zinc concentration lower than normal values meanwhile normal peoples have zinc...
concentration within normal values

<table>
<thead>
<tr>
<th>Table (3): Blood Heavy Metal Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients with multiple sclerosis</td>
</tr>
<tr>
<td>Lead concentration (µg/dl)</td>
</tr>
<tr>
<td>Cadmium concentration (µg/L)</td>
</tr>
<tr>
<td>Cupper concentration (µg/dl)</td>
</tr>
<tr>
<td>Zinc concentration (µg/dl)</td>
</tr>
</tbody>
</table>

- Data are expressed as mean±S.D.
- Values with non-identical capital letters superscripts (A,B) consider significant different when compared between tests groups (P>0.05)
- Normal value of cadmium is less than 1.2(µg/dL), Normal value of copper is between (72-166) (µg/dL), Normal value of zinc is between (80-120) (µg/dL), Normal value of lead is less than 10 µg/dL

**Discussion**

Multiple sclerosis (MS) is a demyelinating inflammatory disease of the CNS white matter that displays a triad of pathogenic symptoms: mononuclear cell infiltration, demyelination, and scarring (gliosis)[25].

Toxicity by heavy metals has been shown to be affected by individual susceptibility, genetic factor, nutritional and health[26].

Lead plays a crucial role in the redox-reactions which generate free radical species by participating in the transfer of electrons. The molecular mechanism of lead toxicity is multifactorial as it generates free radical species, decreases glutathione antioxidant sulphhydril pools; inhibits enzyme activity and blocks important trace element absorption[27]. Other report study has described a patient with MS treated for neurological symptoms which were thought to be a progression of his disease but which were subsequently found to be caused by lead poisoning; his clinical signs improved with oral chelation therapy[28].

In this ecological study, there are evidences that lead positively correlated with MS incidence. Thus, further investigation is suggested for the effects of lead poisoning on MS patients[29].

Zinc (Zn) has a key role in regulation of the immune system. For instance, Zn is involved in releasing tumor necrosis factor alpha (TNFα), which activates the immune system. It was shown that even a mild Zn deficiency can weaken the function of the immune system[30]. Copper (Cu) is used in the synthesis of myelin; thus, the deficiency may potentially cause myelinopath[31]. Furthermore, its influence on autoimmune diseases through the catalyze of prostaglandins (anti-inflammatory drugs) has been known. In addition, it is documented that there is an interaction between Zn and Cu. This means that a high level of Zn could be a reason for Cu deficiency and vice versa. Moreover, Cu and some other elements, such as cadmium, may compete with Zn[32].

Many studies have been focus on the role of heavy metals in the pathogenesis of MS. One study showed that an increase in Cu and a decrease in Zn might stimulate the immune system toward MS[33], other studies also highlighted the etiological role of zinc and Cu. This study suggested that impaired Cu and Zn homeostasis may be a cause of MS disease[34]. Cadmium is one of the most important toxic metals[35]. The precise molecular mechanisms of Cd toxicity are not known however, it has been suggested that Cd indirectly enhances the free radical generation and participates in oxidative
stress via Fenton reaction\textsuperscript{[35]}.

Cd induces neurological abnormalities, neonatal cerebral edema and cerebral hemorrhage in animal experimental studies\textsuperscript{[36]}.

As Cd has been increased the production of reactive radicals and interferes with antioxidant enzymes activity in adult rat brain. This effect in turn results in alteration of membrane-bound enzymes including Na+/K+ ATPase and structural lipids integrity\textsuperscript{[37]}.

In developing rat, it has been observed that initially Cd changes the vascular endothelium permeability resulting in focal edema, brain oxygen and nutrient uptake interference and finally the necrotic changes in neuronal components which are secondary to this effect\textsuperscript{[38]}.

A previous study has been found that, blood cadmium level was higher in multiple sclerosis patients in comparison with healthy individuals also the researchers suggested the possible relation between premature mortality and tobacco smoking in MS patients\textsuperscript{[39]}.

On the other hand, other study was shown that there is a significantly elevated cadmium level in patients’ blood sample. It could be inferred that various cadmium exposure might be affected susceptibility to multiple sclerosis and could increase its risk of development\textsuperscript{[40]}.

Conclusions

1- Patients with MS show high level of Lead, Cadmium, Copper, and low level of Zinc.

2- There could be a role of Lead, Cadmium, Copper, and Zinc in pathogenesis of MS.

3- There is increase in concentration of Lead, Cadmium, Copper in healthy participant without MS.

Acknowledgment: The authors thank the college of the pharmacy/ University of Baghdad for supporting the project.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

Conflict of Interest: Non

Funding: Self-funding

References


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14- Gybina AA, Prohaska JR . Fructose-2,6-bisphosphate is lower in copper deficient rat cerebellum despite higher content of phosphorylated


The Differences of Individual Characteristics and Working Environment That Influence Job Stress on Female and Male Workers at Pt. X Sidoarjo (Using Gender Perspective)

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Abstract

Job stress can be defined as a dangerous physical and emotional response that occurs when work requirements are not matched with our own ability, resources, or needs of the workers. Job stress needs special attention by the company because it relates a worker individual’s health and affects operational continuity of the company’s production. The risk factors as the cause of job stress on female and male workers in PT. X are related to the characteristics and the perceptions of a work environment. The purpose of this research is to examine the individual characteristics and perceptions of the working environment that affects the incidence of job stress on female and male workers.

This type of research is observational by designing cross-sectional research with the number of respondents as many as 50 people. The independent variables in this study included age, education, employment, marital status, noise, lighting as well as temperature. Dependent variable was job stress on female and male workers in PT. X.

Female workers at PT. X experienced 32% of job stress and 20% of male workers. The results of logistic regression analysis obtains a significant influence of working time with job stress (P=0.027) as well as noise with job stress (P=0.017) on female workers. Male workers are significant to the job stress namely age (P=0.011), working period (P=0.030) as well as lighting (P=0.005). Advice for job-stress workers to take a leave, using personal protective equipment to reduce the risk of working environment. The company provides leave permits for workers and periodically performs work rotation.

Keywords: job stress, female worker and male, individual characteristics, work environment.

Introduction

The use of technology in the industry demand workers to continue to evolve following the progress. Workers will face 3C (complexity, competition, changes), therefore workers must follow them in order not to be left behind. The condition resulted in workers who are unable to keep up with the development will result in anxiety with increasing stress as one of psychosocial risks. Job stress is a dangerous physical and emotional response that occurs when there is a discrepancy between capacity and the workload experienced by the worker.¹ Job stress can cause complaints on health and may even result in injuries or accidents. One is able to work optimally with the compatibility between task and working capacity, lowering the risk of psychosocial.²

The main cause of job stress is the interaction between the characteristics of the worker and working Conditions.¹ Based on the analysis of the main components of the ergonomic workplace revealed that human factors and significant environmental factors related to the job stress.³ Occupational stress is
influenced by individual factors and physical workloads, impactful individual factors including age, employment and the education level. Physical work of labor, affecting employee work stress, the better the condition of physical work environment based on lighting, air temperature, color, sound noise, hygiene, motion room, and occupational safety, the work stress felt by the The officers will decline.

Factors that affect job stress to the aluminum industry workers are the physical factors of the working environment including temperature, humidity, lighting and noise, as well as individual worker factors that include the age and working period. The stressful physical environment is characterized by noise, air pollution, temperature, vibration, heavy loads and works in an inappropriate or exhaustive position that is potentially a potential source of stress as well as an influence on employee health.

Data of BPS shows that in the last decade, the women’s employment indicator in Indonesia showed improvement. During the period 2014 – 2017, female labor force grew 2.09% per year over the male workforce which was only 1.43% per year. This suggests that more and more women are involved in the industrial world.

A national Survey of working conditions in Spain in 2012 that women had higher stress levels than in males when exposed to the demands of certain tasks. Women workers in the Australian construction industry have experienced more anxiety and symptoms of acute stress than the male workers.

PT. X is one of the companies in Sidoarjo Regency, Indonesia. The company is engaged in manufacturing industry which manufactures export grade plastic sacks and has long stood almost approximately 30 years. Preliminary studies conducted at PT. X known that the company employs female employees and men in the production section which are fairly balanced. The company gives the same treatment to women and men (gender equality) workers in work. Workers get the same treatment in working in hot, noisy, workload and uptime.

**Method**

This research aims to analyse differences in individual characteristics and perception of work environment influencing job stress on female and male workers in PT. X, Sidoarjo. The design of this research is cross-sectional by going through an observation approach or data collection at a time. The subject of this study amounted to 50 people, independent variable of the research were age, education, employment, marital status, noise, lighting and temperature. Dependent Variable binding was the job stress on women and men workers at PT. X. Data collection techniques was done using Questionnaire instrument to know the individual characteristics and environmental factors influencing workers job stress.

**Results**

**Age:** Based on the results of the study, we found that most female and male respondents were in a group of age 25 – 49 years, of which as many as 21 respondents (84%) and 14 respondents (56%).

**Education level:** Based on the results of the study, we found that most female respondents were educated in Middle School amounting to 16 respondents (64%) and 23 respondents (92%) High school-educated men.

**Working Period:** Based on the results of the study, we found that most female and male respondents have been working for 5-19 years many as 13 respondents (52%) and 14 respondents (56%).

**Marital Status:** Based on the results of the study, we found that most female and male respondents were married as many as 25 respondents (100%) and 16 respondents (64%).

**Noise:** Based on the results of the study, we found that most female and male respondents felt their working environment was noisy as many as 20 respondents (80%) and 22 respondents (88%).

**Lighting:** Based on the results of the study, we found that most female and male respondents felt their working environment was well lit, as many as 16 respondents (64%) and 19 respondents (76%).

**Temperature:** Based on the results of the study, we found that most female and male respondents felt their working environment was hot as many as 18 respondents (72%) and 16 respondents (64%).

The result of analysis on Gender difference to job stress in PT. X
The Mann-Whitney and cross tabulation test results in table 1 indicate that there is a difference in gender to job stress (p-value = 0.04). We found that female respondents and men with job stress were 8 respondents (32%) and 5 respondents (20%).

**Results of analysis on factors that influence job stress on female workers with male workers in PT. X**

Table 1 The test results job stress

<table>
<thead>
<tr>
<th>Gender</th>
<th>Job stress</th>
<th>p-value (0.05)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes N (%)</td>
<td>No N (%)</td>
</tr>
<tr>
<td>Female</td>
<td>8 (32%)</td>
<td>17 (68%)</td>
</tr>
<tr>
<td>Male</td>
<td>5 (20%)</td>
<td>20 (80%)</td>
</tr>
</tbody>
</table>

Table 2 The test results of influence on female and male workers

<table>
<thead>
<tr>
<th>Independent</th>
<th>Dependent</th>
<th>Gender</th>
<th>Variable</th>
<th>Category</th>
<th>Job stress</th>
<th>p-value (0.05)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td></td>
<td></td>
<td>Yes N (%)</td>
<td>No N (%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Age</td>
<td>&lt; 25 years</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>25 - 49 years</td>
<td>7 (33.3)</td>
<td>14 (66.7%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt; 49 years</td>
<td>1 (25%)</td>
<td>3 (75%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Education level</td>
<td>Elementary</td>
<td>0 (0%)</td>
<td>1 (100%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Junior High</td>
<td>5 (31.3%)</td>
<td>11 (68.7%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Senior High</td>
<td>3 (37.5%)</td>
<td>5 (62.5%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Working period</td>
<td>&lt; 5 years</td>
<td>1 (50%)</td>
<td>1 (50%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5 - 19 years</td>
<td>5 (38.5%)</td>
<td>8 (61.5%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt; 19 years</td>
<td>2 (20%)</td>
<td>8 (80%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Marital status</td>
<td>Yes</td>
<td>8 (32%)</td>
<td>17 (68%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Noise</td>
<td>Yes</td>
<td>4 (20%)</td>
<td>16 (80%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No</td>
<td>4 (80%)</td>
<td>1 (20%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lighting</td>
<td>Yes</td>
<td>5 (31.3%)</td>
<td>11 (68.7%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No</td>
<td>3 (33.3%)</td>
<td>6 (66.7%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Temperature</td>
<td>Yes</td>
<td>5 (27.8%)</td>
<td>13 (72.2%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>No</td>
<td>3 (42.9%)</td>
<td>4 (57.1%)</td>
</tr>
</tbody>
</table>
The results of logistic and cross tabulation regression in table 2 indicate that an independent variable that influences the dependent variable (job stress) based on a logistic regression test (P-value of < 0.05) on a female respondent was working time variable (P-value= 0.027) and noise (P-value= 0.017). On male respondent, the influential factor was the age variable (P-value= 0.011), the working period (p-value= 0.030) and the lighting (p-value= 0.005).

### Discussion

Based on the statistical results, the factors that influence job stress on female workers are working days and noise. The work period that influences the job stress on women is worth a negative value, meaning that the length of the respondent’s work will reduce the incidence of job stress. A person working with a long working period will have lighter job stress because the person is experienced and fast response in facing various problems of the work. The female respondent at PT. X with a little working experience is a new employee, so they are still learning about the problem of work. Female respondents with a new experience are still adjusting to the job and the working environment, resulting in greater risk of job stress. Other research suggests that fewer working days tend to suffer from the job stress.

Another factor that influenced female respondents was the noise, the effect of noise on job stress was positive value. This means more and more female respondents are feeling noisy, the bigger the female respondents will experience working stress. Workers who are in a working environment with high noise intensity and long periods are more prone to stress and boredom in routine work that tends to be monotonous. The threshold value of physical factors and chemical factors at work mentions that the work in the area with a noise exposure of 85 dB maximum 8 hours per day. The noise existed in the working environment of PT. X is 88.2 dB for 8 hours per day, this has exceeded the specified threshold value. Women in work are more sensitive about the company’s environmental concerns compared to the men.
Women’s sensitivity to environmental noise encourages negative effects of a noisy workspace condition. Most female respondents assumed that while carrying out production activities at a high noise level, the employees were quick to feel tired, giddy and less comfortable in work, thereby triggering the onset of job stress.

The factors that influence job stress on male workers are age, employment and lighting. The influence of age of male respondents to job stress was a negative value which means workers aged older men tend to have lower working stress. Another study expressed the level of occupational stress experienced by older workers usually tends to be low. This is because in elderly workers, they are more mature thus they have the ability to process stress better compared to young workers. Most of the male respondents in PT. X are under 25 years of age, this is one of the factors of significant relationship between age and job stress. Male respondents with younger age have no experience and a lot of understanding in working, thus in certain types of occupations, age becomes a trigger for stress.

The work period that influences the job stress on male respondents is positive, which means that workers with longer working days have a greater chance of experiencing work stress. Work life-related stress is related in the cause of boredom in work. Workers who have worked more than five years usually have a higher working boredom rate compared to new workers. This boredom can then affect workplace stress. The capacity of male respondents is considered to be active, strong, intelligent, and independent when compared to women. Male respondents who do easy job when it is compared to their capacity and repetitive work routines, there will be a risk of boredom that can trigger the onset of stress. Respondents who stated that they are tired have a greater chance of experiencing heavy job stress compared to respondents who do not get bored.

The next factors that influence the job stress of male respondent was the lighting. An influential explanation had a negative value, which means that more and more male respondents declared that the lighting was less likely to experience job stress. The data on the explanation of the information of lighting by PT. X is an average of 757 lux. The influence of lighting on job stress on male respondents who considered too strong lighting could have a psychological impact on workers as most male respondents complained of tired and giddy. This condition can even lead to a working accident due to lighting in the workspace. High glare levels and minimum lighting can cause eye strain and cause stress in the workplace.

**Conclusion**

Female workers at PT. X experienced 32% of job stress and 20% of male workers. The results of logistic regression analysis obtains a significant influence of working time with job stress (P=0.027) as well as noise with job stress (P=0.017) on female workers. Male workers are significant to the job stress namely age (P=0.011), working period (P=0.030) as well as lighting (P=0.005).

**Conflict of Interest:** None

**Ethical Clearance:** The data was collected after the study proposal passed the ethical clearance and passed by Health Research Ethics Commission of Faculty of Public Health Airlangga University.

**Source of Funding:** Self

**References**

Estimation of Pitch and Fundamental Frequency Variation Between Normal Males, Females and Intersex Population

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Abstract

Human beings have certain uniqueness in their voices that helps determine their individuality. The most important characteristic of voice is the Pitch. The average vocal range for masculine voice ranges from 90-150 Hz and for feminine voice, it ranges from 190-240 Hz. This pitch is decided by the development of the vocal tract during puberty by the effect of testosterone hormone i.e. Longer the tract, lower the pitch and vice versa. However, for people belonging to the intersex community, the low production of testosterone causes the vocal tract to develop differently than males and females. Because of this reason, their pitch has its own individual range and hoarseness of quality. This study was aimed to evaluate the difference in intersex population voice characteristics as compared to normal adult males and females. It was found that intersex voice has a distinctive Pitch range of 150-190 Hz with the mean frequency being 167 Hz. It was also discovered that due the peculiar dialect practiced by the intersex community, especially in the western part of the Indian subcontinent, there is a noticeable difference in the time duration for pronouncing various vowels from the time duration taken by males and females to pronounce the same vowels.

Keywords: intersex; pitch; fundamental frequency; forensic

Introduction

The sound produced in a person’s larynx and uttered through the mouth, as speech or song is known as the ‘voice’ of that person, as defined by the Oxford Dictionary. Voice has many different measurable characteristics like loudness, pitch and quality. The human sound system consists of 3 systems- Respiratory system generate the air pressure that produces sound through the vocal cords. Phonatory system causes the closure and opening of the vocal cords. Sub-glottic air pressure is chiefly responsible for producing sounds by vibrations of the vocal cords. The frequency of vibration of the vocal cords is called fundamental frequency, also known as the Pitch. As the sounds moves through vocal tract, it gets modified into different formant frequencies, based on language, size, illness etc. Articulatory system is responsible for converting sound into speech.

Intersex is a condition due to which a person is born with sexual organs that do not classify completely under the definitions of male or female physiology. The adrenal glands are responsible for production of endocrine hormones like testosterone. During puberty this hormone causes the development of secondary sexual characters like facial hairs, pubic hairs and deepening voice. At birth, the vocal tract of males and females are of same length. But due to action of testosterone during growth years, the vocal folds of males increase in length twice the rate of females. However, in intersex people, there is abnormalities in the levels of testosterone produced due to several reasons causing the quality of voice to differ from males and females. These conditions may not be seen at birth but may develop at the onset of puberty due to virility caused by low or none production of sex hormones. The various conditions that cause intersex in a person, as given by Intersex Society of North America are:

- Androgen Insensitivity Syndrome (AIS)

This is seen in a genetically male human, due to a genetic anomaly passes from the mother. Due to this
anomaly, the body does not respond to the androgen hormones like a normal male. Hence, they do not develop male reproductive organs. Their physiology is like that of the external female reproductive system.

- **Aphallia**
  
  This condition exists when a person is born without a penis and the testicles do not descend. They are otherwise biological male, without being able to function as one.

- **Clitoromegaly**
  
  This condition is seen due to introduction of unsafe steroids in a pregnant woman causing the female foetus to develop a large clitoris. As they reach adolescence the biological women tend to acquire male characteristics.

- **Congenital Adrenal Hyperplasia**
  
  This is a type of genetic disorder that affects the adrenal glands. It affects the production of androgens, that regulate the development of primary and secondary sexual characters in a human being. This results in development of ambiguous genitalia in female fetuses. The other symptoms seen are absence of menses, excessive facial and body hairs, and a deepened voice. Excessive production of testosterone affects the overall development of a genetic female.

- **Klinefelter Syndrome**
  
  This syndrome is seen when a biological male child is born with an extra X chromosome. It causes lower production of testosterone at adulthood. They have lesser facial hairs and enlarged breast tissue. They are mostly sterile.¹

The effects of these syndromes produce varying results in different individuals. But the underlying insufficiency of testosterone affects the overall development of voice, which is the main focus of this study. While performing any automated speech analysis to determine the culprit, algorithms used generally classify the voices according to pitch and formant frequencies. So, it is of utmost importance that there be an objective range of pitch for all the three genders existing in the society today.

For **literature review**, the researches that were considered showed that mostly subjective tests like questionnaires, rating scales and interviews were used to judge how the subjects themselves, speech therapists and neutral audience perceived the voice they heard. This raises a lot many questions, regarding the perceived masculinity or feminity of one’s voice, irrespective of their physical features or the way they perceive themselves. The subjects underwent a number of procedures such as testosterone treatment, Pitch-raising surgery and Glottoplasty to change the range of Fundamental Frequency of their voice. Although all the researches showed a huge correlation between Pitch and Gender Perception, an objective value of the pitch range of Intersex community was not established.

**Materials and Methodology**

**Sample Collection:**

In this study, we collected total 300 samples from the Gujarati population. 100 of these samples were from the intersex population, 100 were from the male and 100 from the female population. Consent forms were prepared for collecting information about the subjects with fields about the subjects’ mother tongue, place of origin, any habits of oral conditions that might affect the speech sample and finally, a declaration that the samples will not be used for any other purpose other than for the research intended. Since most of the subjects were illiterate and knew little or no English, a standard text could not be used. Instead they were made to give their introduction for a period of 2 minutes. The recording was done in indoor environment making sure that only one speaker was being recorded. All the recordings were done in a standard instrument, namely, Digital Voice Recorder VN-711PC.

**Sample Preparation:**

For the purpose of sample preparation, Goldwave software was used. Using this software, the formats were changed from .wma to .wav as Praat software accepts only .wav or .mp3 format for analysis. The samples were then saved as a PCM signed 24 bit mono channel at 11025 Hz sampling rate. If there was noise in any of the samples, it was reduced using this software.

Further 5 samples of each vowel chosen for analysis, was segregated by cutting and pasting into a sub-file of mono channel and 11025 Hz sampling rate from the entire sample. This was used for the final analysis done in Praat software.

**Analysis**

- The sample of interest is fed into the software
from the Open→ Open long sound file option in the main window of Praat (13,15).

- The sub-window of Praat showing the waveform of speech is opened. It has 2 windows. The top one shows the frequency time graph. The bottom one shows the energy graph and pitch markings.

- The entire sample is heard and the mean pitch of the whole sample is noted (Figure 1). The words with the chosen vowels are selected and ‘sel’ option is clicked at the bottom of the screen.

- This magnifies the selected portion of the sample. From this the vowel is selected and time duration notes. The average pitch for that segment is taken as an observation.

- This process is repeated 3 times in the same sample for the same vowel. The chosen vowels are /a/, /e/ and /u/.

- The analysis is done on all the 30 samples of speech. The observations are noted down in Excel worksheets.
Findings

Observations based on Pitch Frequency among the three groups

Graph 1: Bar graph representing the mean pitches of the three groups according to vowels.

Using the graph above, we can see that there is a clear demarcation of pitch range between males, females and intersex. The intersex pitch range exists between the male and female pitch range, i.e. from 150-190 Hz if seen in a broad sense. This information can be used to further individualize the voice function for the intersex community. Individualisation of pitch values while working with voice samples is a very important tool when it comes to forensic voice analysis as it can help in narrowing down the suspect pool and characterize the voice as male, female or intersex.

Observation based observations of time duration for chosen vowels among the three groups

<table>
<thead>
<tr>
<th>Gender/ Time duration (Seconds)</th>
<th>Vowel /a/</th>
<th>Vowel /i/</th>
<th>Vowel /u/</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intersex</td>
<td>0.083</td>
<td>0.073</td>
<td>0.074</td>
</tr>
<tr>
<td>Males</td>
<td>0.075</td>
<td>0.064</td>
<td>0.084</td>
</tr>
<tr>
<td>Females</td>
<td>0.075</td>
<td>0.064</td>
<td>0.086</td>
</tr>
</tbody>
</table>
From the above bar graph, we can clearly see that the time duration needed to enunciate the chosen vowels shows more similarities between males and females, than with intersex subjects. This is due to the fact that the intersex community, especially in the western part of India have developed their own unique pattern of intonation of speech. Some words that would otherwise not be dragged as much while speaking in normal dialect by male and female subjects, are pronounced in a distinctive prolonged fashion by the intersex subjects. This is another individualizing characteristic that could be found through this study.

**Conclusion**

From this study undertaken using 100 subjects each from the male, female and intersex genders, it was found that the Pitch, also called Fundamental Frequency is unique for each of the genders. The pitch for males and females were known to us due to different studied previously done. The purpose of this study was to find an objective range of Pitch values for the intersex voice. From the results obtained it was seen that intersex voice lie in the range of 150-190 Hz, whereas male and female voice lies in ranges of 116-133 Hz and 217-255 Hz respectively. This gives us a very individualized characteristic of intersex voice, which can be a topic for further research.

**Conflicts of Interest:** There are no conflicts of interests to be declared

**Source of Funding:** This was a self-funded project for partial completion of MSc Forensic Science degree in GFSU, Gandhinagar.

**Ethical Clearance:** The samples were collected from volunteering participants and a record of their signed consent had been maintained using consent forms.

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Dating of Long Bone Fracture Healing among Egyptian Pediatrics by Radiography (X-Ray)

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Abstract

Background: Estimating the timing of skeletal injury accurately is of great importance in forensic cases and has a significant bearing on the judicial process (related to abused children). This work aimed to assess dating of long bone healing in fractures occurring to children aged from 1 to 18 years through using plain radiography (X-Ray) which can determine 6 features of fracture healing process that are especially important in alleged cases of child abuse. The most commonly affected ages were “1-6” years presenting 68%. Males were the majority of cases (56%). The illustrated data of each feature of healing (6 features of fracture healing) form a prototype timetable of fracture healing. These data suggest that fractures with soft-tissue swelling alone are acute fracture (< 1 week old). Fractures with periosteal reaction alone are likely to be recent fracture (between 8 days and 3 weeks old). Once Remodelling, bridging & hard callus fractures detected then old fracture is expected (more than 6 weeks old).

Key words: dating, long bone, fracture healing, X-ray.

Background

One of the biggest challenging areas of pediatric medicine is what relating to child abuse. Child abuse includes wide variations of injuries and assaults which includes social, emotional and sexual in addition to physical matters. Therefore, the diagnosis of a child as being suffer from an event of abuse has important social, civil and criminal implications. Child mortality and morbidity are a significantly outcome from exposure of those children to maltreatment and abuse.

To investigate children who have suffered potential abuse, the investigation must be multi-disciplinary and involve healthcare and social professionals, physicians with appropriate medical subspecialties and paediatricians. Radiology supplies a relatively small but important role to the investigation of visceral and skeletal injuries.

Methodology

The study represents collaborative research between Forensic Medicine and Clinical Toxicology Department and Diagnostic & Interventional Radiology Department, Faculty of Medicine, Cairo University, Egypt.

Study design and setting

This study is a prospective, cross-sectional study that was conducted on injured paediatrics, of known injury timing in the period between January 2017 to January 2018.

Study population

For this study one hundred patients of both sex aged 1-18 years were selected during the study period and subdivided into 3 main groups, group 1: 68 children (1 to 6 years), group 2: 22 young (<6 to >12 years) and group 3: 10 young from (<12 to 18 years). Potential participants who had Unknown time of fracture, Fractures need to be treated with internal fixation, Patients with co-existent

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head injury and who had metaphysial fracture were excluded from the study.

The study was conducted according to the declaration of Helsinki and the protocol was approved by Ethics Research Board of both departments. All participants provided written informed consents by their legal guardians before being enrolled in the study.

**Methodology in Detail**

Cases were analysed according to Demographic data of the patients: age, sex, time of imaging (measured in days since injury), date 1, 2, 3, 4, 5, 6 and 7 up to 50 days or more from time of fracture.

**Radiography**

Radiographs were presented to the pediatric radiologist in a random order where the identity, age of the child, time and cause of injury were unknown for him. They were supplied in batches of 6–12 to minimize memory bias and fatigue and he assessed each radiograph with irregular time interval.

**Interpretation of radiographs:**

The presence or absence of each of the following six radiographic features of fracture healing was scored for all radiographs.

1. **soft-tissue swelling**, which was defined as disruption of the soft-tissue planes or the presence of an effusion in a supracondylar fracture.

2. **periosteal reaction**, which was defined as linear elevation and calcification of the periosteum along the shaft of the bone around or adjacent to the fracture site.

3. **soft callus**, which was defined as the fluffy appearance of early new bone around the fracture site which gradually ossifies and calcifies.

4. **hard callus**, which was defined as well-demarcated new bone with a dense edge that is nearly as dense as the cortex as more mature callus develops.

5. **bridging**, which was defined as the loss of fracture line definition with complete bridging of the fracture gap by a soft or hard callus.

6. **remodeling**, which was defined as the complete healing with the shape at the fracture site returning to that of the original bone.

Radiologist of the study scored films with an initial 5-point scale plus an additional score, P, for undetermined.

Radiographs time was grouped into bands based on the known age of the fracture. The time bands were selected according to the data (with at least 20 radiographs in each time frame) and to reflect the age estimation process in practice. Narrow time bands were possible for the first week, with increasing width thereafter. The time bands were: 1–2, 3–7, 8–14, 15–21, 22–35, and 36 days up to 50 days. They were classified as follows:

- Date 1: 1-2 days / Date 2: 3-7 days / Date 3: 8-14 days / Date 4: 15-21 days / Date 5: 22-35 days / Date 6: 36-50 days / Date 7: < 50 days.

**Statistical Analysis**

Data were coded and entered using the statistical package SPSS (Statistical Package for the Social Sciences) version 25. Data were summarized using frequency (count) and relative frequency (percentage) for categorical data. For comparing categorical data, Chi square ($\chi^2$) test was performed. Exact test was used instead when the expected frequency is less than 5.

P-values less than 0.05 were considered as statistically significant.

**Findings**

302 radiographs were done as follows: (97 cases had radiographs at date 1), (48 cases had radiographs at date 2), (52 cases had radiographs at date 3), (44 cases had radiographs at date 4), (43 cases had radiographs at date 5), (14 cases had radiographs at date 6), (4 cases had radiographs at date 7).

Results show that 68 % of cases were from 1-< 6 years old, 22 % of cases from 6 - <12 years and 10% of cases 12- 18 years old, according to sex; 56% of cases were males & 44% of cases were females.

Figure(5) shows tissue swelling only detected during date 1 by 33.8% of cases. Periosteal reaction started to be detected during date 1 by 10.8% of cases, it was detected during date 2 in 3.4% of cases, during date 3 in 69.4% of cases, in 81.2% of cases during date 4, in 88.5% of cases during date 5. During date 6; it was detected by 50% and in 100% of cases during date 7. Soft callus detected only during date 6 in 25 % of cases. Hard callus started to be detected during date 1 by 10.8% of cases, it was
detected during date 2 in 10.3% of cases, during date 3 in 58.3% of cases, in 75% of cases during date 4, in 80.8% of cases during date 5. During date 6; it was detected by 50% and in 100% of cases during date 7. **Bridging** started to be detected during date 1 by 3.1% of cases, it was not detected during date 2, during date 3 in 27.8% of cases, in 21.9% of cases during date 4, in 57.7% of cases during date 5. During date 6; it was detected by 50% and in 100% of cases during date 7. **Bone remodelling** started to be detected during date 4 by 3.1% of cases, it was detected during date 5 in 19.2% of cases & lastly detected in 50% of cases during date 6.

Figure (5): Collective graph for 6 signs of healing during the seven dates for age group (1-6 years).

Figure (6) shows **tissue swelling** started to be detected during date 1 by 19% of cases, it was detected during date 4 in 20% of cases and lastly detected during date 5 in 36.4% of cases. **Periosteal reaction** started to be detected during date 1 by 9.5% of cases, it was detected during date 2 in 38.5% of cases, during date 3 in 20% of cases, in 60% of cases during date 4, in 72.7% of cases during date 5. During date 6; it was detected by 75% and in 100% of cases during date 7. **Soft callus** was only detected during date 5 by 18.2%. **Hard callus** started to be detected during date 1 by 19% of cases, it was detected during date 2 in 61.5% of cases, during date 3 in 30% of cases, in 40% of cases during date 4, in 81.8% of cases during date 5. During date 6; it was detected by 75% and in 100% of cases during date 7. **Bone remodelling** started to be detected during date 2 by 9.5% of cases, it was detected during date 2 in 15.4% of cases, during date 3 in 10% of cases, in 81.8% of cases during date 5, during date 6; it was detected by 75% and in 100% of cases during date 7. **Bone remodelling** started to be detected during date 2 by 15.4% of cases & lastly detected during date 7 in 100% of cases.

Figure (6): Collective graph for 6 signs of healing during the seven dates for age group (6-12 years).
Discussion

In forensic cases, it is highly important to estimate the timing of skeletal injury appropriately as it has a significant bearing on the judicial process\(^9\).

The study showed that the most commonly affected ages “1-6” years followed by < 6- > 12 years and the least ages affected were <12-18 years. These results are in agreement with the results obtained by Prosser\(^7\,9\) who showed that broken bones are very common in childhood who have more physically active lifestyles and their fractures are generally less complicated than fractures in adults. As age increase, bones become more brittle and more likely to suffer fractures from falls that would not occur in young age. This in contrary to study done by Islam\(^5\) who showed that most of cases were adolescence (8-17) years.

In this study, males represented the majority of cases (56%) in comparison to females (44%), these results are coincident with the results obtained by Islam\(^5\), where boys 67% of cases. The other studies did not mention gender as point of study as most of studies was done on young ages less than 6 or even 1 year.

Soft tissue swelling most detected during 1\(^{st}\) period of healing “1-2 days” from fracture. Then its detection regressed during the later periods of healing.

This come in agreement with study\(^11\) which recorded that early soft-tissue resolution occurs between 2 and 5 days, peaking between 4 and 10 days, which concurs with the peak presence of soft-tissue swelling in our dataset at 1–2 days. Islam\(^5\) detect it within the first week also, Prosser\(^7\) detected soft tissue swelling in 59% of radiographs around the same time.

Regarding periosteal reaction it was highly significant detected <50 days from fracture while its detection was significantly increasing from day 1 to 35 days from fracture from 9.4% to 86% respectively. This come in agreement with study\(^12\) which showed that periosteal reaction had a time frame similar to subperiosteal new bone formation suggested by studies\(^6,11\) whom detected also that periosteal reaction persisted longer as in our study, Prosser\(^7\) showed that highest detected periosteal reaction between 15-35 days, warner\(^9\) showed it was early identified and seen at day 7 and in increasing pattern. In contrary Islam\(^5\) showed that periosteal reaction not detected before 2 weeks.

Soft callus was detected between 8 to 50 days since fracture. This come in agreement with Islam\(^5,6\) who detected soft callus up to the day 35 then it started to decline, also with Prosser\(^7\). This in contrary to\(^11\) in their study soft callus was identified earlier in time while Halliday\(^10\) found that no any callus detected before 20 days.

Hard callus highly significant detected <50 days since fracture while its detection was significant increasing during the periods of healing.

This come in agreement with\(^5,7,11\) that detected hard callus increase in prevalence with time. In contrary to Halliday\(^10\) who didn’t identify any callus before 20 days.

Bone bridging highly significant detected <50 days from fracture, on the other hand its detection was significant increasing during the periods of healing.

This come in agreement with\(^5,7,11\) whom detected that bone bridging was increasing in prevalence with time while Warner\(^9\) showed that bridging was first identified at day 15 & majority of cases between 15-67 days.

Bone remodelling highly significant detected< 50 days from fracture, on the other hand its detection was increasing during the periods of healing. This come in agreement with\(^5,7,11\) who detected bone remodelling increase in prevalence with time. In contrary, Warner\(^9\) showed that remodelling was first seen from days 51-247; the study was performed among infants less than 1 year.

To discuss each age group separately we can find some differences between groups, the group (1-6 years), showed that remodeling last seen was from 35-50 days. The group (6-12), periosteal reaction was detected with high percentage of cases 38.5% during the first week & soft tissue swelling was still detected in some cases during the 3\(^{rd}\) week of fracture. The group (12-18 years), showed that periosteal reaction last detected during the period from 22-35 days & remodeling last detected during the 3\(^{rd}\) week but it may be explained by small sample size at this age.

In other study of Prosser\(^7\), soft tissue swelling alone is acute (<1 week old). Fractures with periosteal reaction alone are likely to be between 5 days and 2 weeks old. When periosteal reaction and soft callus are present, these findings are consistent with a fracture of
2–3 weeks old. Once hard callus or bridging appears, the fracture is 3 weeks old or older. Remodelling intimates that a fracture is more than 6 weeks old.

**Conclusion**

The presence of the different radiologic features of fracture healing can indicate fracture ages. Each line represents the prevalence of each feature in the radiographs assessed. less than 1 week, soft-tissue swelling was the predominant feature. (8–35 days) fractures showed a combination of soft callus and periosteal reaction, with increasing prevalence of hard callus and bridging. (≥36 days) fractures showed a combination of periosteal reaction, hard callus, bridging, and remodelling.

So that appearance of each feature forms a prototype timetable of fracture healing. These data suggest that fractures with soft-tissue swelling alone are acute fracture (<1 week old). Fractures with periosteal reaction alone are likely to be recent fracture (between 8 days and 3 weeks old). Once remodelling, bridging & hard callus fractures detected then old fracture is expected (more than 6 weeks old).

For each age group separately, some differences were noticed between groups, the group (1 - >6 years), showed that remodeling last seen was from 35 -50 days. The group (6 - >12), periosteal reaction was detected at high percentage of cases 38.5% during the first week & soft tissue swelling was still detected in some cases during the 3rd week of fracture. The group (12 -18 years), showed that periosteal reaction last detected during the period from 22-35 days & remodeling last detected during the 3rd week but it may be explained by small sample size at this age.

**Competing Interests:** The authors declared that they have no competing interests

**Ethics approval:** The study work was conducted after the approval of Ethical Committee, Faculty of medicine, Cairo University.

**Consent for publication:** Consent forms were given and signed by all subjects prior to participation.

**Acknowledgement:** Mohamed Ali Mahros (orthopedic surgeon).

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Risk of Nutritional Status and Blood Sugar on Type 2 Diabetes Mellitus with Pulmonary Tuberculosis in Sawahan Subdistrict, Surabaya, Indonesia

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Abstract

The diabetics have risk of pulmonary tuberculosis. It caused by lacking of immune system and malnutrition, eventhough the diabetics’ nutritional status commonly is normal or overweight. This research aimed to analyze risk of nutritional status and blood sugar to patients of diabetes mellitus with pulmonary tuberculosis. The study was observational analytic with case control design. There were 20 samples in each case and control located in Sawahan Sub-district, Surabaya. The data collection used questionnaire and medical record of participants from the community health care. The data was analysed using Pearson test correlation and odd ratio. The result showed no correlation between body mass index and blood sugar of both random (p=0.138) and fasting (p=0.166). The obesweight diabetics are much more likely to get pulmonary tuberculosis 1.3 times compared to normal diabetics (95% CI= 0.313<OR<5.393), while the odd ratio of pulmonary tuberculosis in underweight diabetics is estimated to be 1.2 times compared to diabetics who are normal (95% CI= 0.121<OR<11.865). The diabetics who have random blood sugar level of ≥200 mg/dL are 0.46 times to have pulmonary tuberculosis compared to blood sugar level of <200 mg/dL (95% CI=0.111<OR<1.94). The diabetics who have fasting blood sugar level of ≥126 mg/dL showed effect 2.43 times to be likely get pulmonary tuberculosis either they have <126 mg/dL 95% CI= 0.51<OR<11.51). There was no relationship between blood sugar level, nutritional status, and pulmonary tuberculosis on patients with type 2 diabetes mellitus.

Keyword: Nutritional Status, Blood Sugar, Type 2 Diabetes Mellitus with Pulmonary Tuberculosis

Introduction

Non-communicable diseases are a public health discussion globally due to the recent cases that have occurred this. In 2016, non-communicable diseases have caused 41 million deaths (71%). The problem of non-communicable diseases is more prevalent in developing countries. Metabolic factors such as high blood sugar and obesity require attention from public health experts. This is due to the prevalence of excessive blood sugar levels in 2014 estimated at 9% in the world according to WHO in 2018. The number of people with diabetes has nearly a quarter of the world’s population since 1980 and it is estimated that there are 650 million obese people above the age of 18 in 2016(1).

Diabetes mellitus includes non-communicable diseases and is a metabolic disorder with characteristics of hyperglycemia caused by the pancreas not producing enough insulin or the body cannot use insects that are produced effectively so that there is an increase in glucose concentration in the blood2. Diabetes include a serious threat to public health because of one of the diseases that contribute to high mortality, morbidity and health costs across the country(2). Indonesia as one of the developing countries is estimated to have total deaths from non-communicable diseases in 2016 of 73% of total deaths(1).

Diabetes is positively associated with the risk of tuberculosis (TB)(3). East Java Province has a diabetes prevalence of 2.02% while the prevalence of diabetes mellitus in the city of Surabaya alone reaches almost 3.5% (4). Sawahan Subdistrict in Surabaya City is one of the regions with a third population density of Mostof 29.75%(5). Variable occupancy density and contact
between households include risk factors for transmission of pulmonary TB\(^6\).

The incidence of pulmonary TB in diabetics is related to nutritional status and blood sugar levels\(^7\). Patients with type 2 diabetes mellitus are in fact more often found with normal or nutritional status overweight so that the risk of nutritional status of the two categories needs to be studied against cases of pulmonary TB in patients. Based on these problems, the study will analyze the risk and correlation of nutritional status and blood sugar levels of patients with type 2 diabetes mellitus with and without pulmonary TB. This study aims to analyze the risk of blood sugar levels and nutritional status on the incidence of pulmonary TB in patients with type 2 diabetes mellitus. This study is expected to be useful for improving the quality of health services in disease prevention and adding new information about the incidence of type 2 diabetes mellitus with TB lung.

**Material and Method**

This study used design case control with observational analytic types. The research locations were in the Sawah Puloh and Sawahan Health Center, Surabaya City. The study took place from September 2017 to December 2017. The population of the case was all patients diagnosed with type 2 diabetes mellitus with pulmonary TB in Sawahan District, Surabaya City while the control population was all patients with type 2 diabetes mellitus in the same location. Retrieval of data using probability sampling techniques with method simple random sampling. Sample calculation using the formula case control uses the value of \(Z_{α} = 95\%\) and \(Z_{β} = 90\%\) \(^8\). The proportion of population effect cases \(P_1 = 0.82\) and control population \(P_2 = 0.49\) \(^9\). The results of the sample calculation with the ratio of the number of cases compared to the number of controls of 1:1, there were 20 samples in each case and control. Sampling of cases and controls were randomized (random).

Characteristic variables studied in the respondents included case group and control, sex, body mass index, random blood sugar, and fasting blood sugar of type 2 diabetes mellitus. The dependent variable is pulmonary TB while the independent variable is blood sugar levels and nutritional status.

Data retrieval is done by interviewing questionnaires and documentation from the respondent’s medical record from the health center where the respondent is treated. Data taken from medical records is a diagnosis of pulmonary TB and type 2 diabetes mellitus.

**RESULTS**

The results of the study on the characteristics of the respondents (Table 1) showed that the majority were women (22%). The nutritional status of the respondents was mostly in the category overweight (62.5%) and the lowest was the group underweight (10%). The majority of respondents had random blood sugar 80-180 mg / dL (80%) and fasting blood sugar ≥100 mg / dL (85%).

The results of the Pearson test correlation with \(α = (0.05)\) showed no correlation between body mass index and random blood sugar levels \((p = 0.14 > 0.05)\) and fasting blood sugar \((p = 0.17 > 0.05)\) Pearson correlation coefficient showed a weak correlation in both correlations, namely the correlation of body mass index with random blood sugar levels (Pearson correlation = 0.24) and body mass index correlation with fasting blood sugar levels (Pearson Correlation = 0.22) (Table 2).

**Tabel 1: Distribution of Respondents based on Characteristics of Diabetes Mellitus Patients**

<table>
<thead>
<tr>
<th>Variabel</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>18</td>
<td>45</td>
</tr>
<tr>
<td>Female</td>
<td>22</td>
<td>55</td>
</tr>
<tr>
<td>Nutritional Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>Normal</td>
<td>11</td>
<td>27.5</td>
</tr>
<tr>
<td>Overweight</td>
<td>25</td>
<td>62.5</td>
</tr>
<tr>
<td>Fasting Blood Sugar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 126 mg/dL</td>
<td>11</td>
<td>27.5</td>
</tr>
<tr>
<td>≥ 126 mg/dL</td>
<td>29</td>
<td>72.5</td>
</tr>
<tr>
<td>Random Blood Sugar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 200 mg/dL</td>
<td>9</td>
<td>22.5</td>
</tr>
<tr>
<td>≥ 200 mg/dL</td>
<td>31</td>
<td>77.5</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100</td>
</tr>
</tbody>
</table>
Tabel 2: Pearson Statistics Test Results on the Relationship between Body Mass Index (BMI) and Random Blood Sugar and Fasting Blood Sugar

<table>
<thead>
<tr>
<th>Variabel</th>
<th>Pearson Corelation</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI with Random Blood Sugar</td>
<td>0,24</td>
<td>0,14</td>
</tr>
<tr>
<td>BMI with Fasting Blood Sugar</td>
<td>0,22</td>
<td>0,17</td>
</tr>
</tbody>
</table>

Values odds ratio in table 3 show the meaning that the risk of type 2 diabetes mellitus with pulmonary tuberculosis in respondents who have a random blood glucose levels ≥200 mg / dL was 0.46 times than that flies random blood sugar levels <200 mg / dL. The result of the odd ratio in fasting blood sugar levels showed the risk of type 2 diabetes mellitus with pulmonary TB in respondents who had fasting blood sugar levels 6126 mg / dL was 2.43 times greater than respondents with fasting blood sugar levels <126 mg / dL. The two odd ratio values do not show the relationship between blood sugar levels and the incidence of pulmonary TB in patients with type 2 diabetes mellitus, which is viewed from the confidence interval values (Table 3).

The results odds ratio of the risk pulmonary TB in patients with type 2 diabetes mellitus with nutritional status underweight 1.2 times greater than respondents with normal nutritional status. In respondents with nutritional status they overweight have a risk 1.3 times more likely to be exposed to pulmonary TB than respondents who are of normal nutritional status.

Tabel 3: Odd Rasio Blood Sugar and Nutritional Status Type 2 Diabetes Mellitus Patients with and without pulmonary TB

<table>
<thead>
<tr>
<th>Blood Sugar</th>
<th>Type 2 Diabetes Mellitus Patients</th>
<th>Total</th>
<th>Odd Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Case</td>
<td>Control</td>
<td>N</td>
</tr>
<tr>
<td>Random Blood Sugar ≥ 200 mg/dL</td>
<td>16</td>
<td>55,2</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>36,4</td>
<td>7</td>
</tr>
<tr>
<td>Random Blood Sugar &lt; 200 mg/dL</td>
<td>4</td>
<td>55,2</td>
<td>7</td>
</tr>
<tr>
<td>Nutritional Status I</td>
<td>2</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>Underweight</td>
<td>5</td>
<td>45,5</td>
<td>6</td>
</tr>
<tr>
<td>Normal</td>
<td>7</td>
<td>54,5</td>
<td>13</td>
</tr>
<tr>
<td>Nutritional Status II</td>
<td>13</td>
<td>52</td>
<td>12</td>
</tr>
<tr>
<td>Overweight</td>
<td>5</td>
<td>45,5</td>
<td>6</td>
</tr>
<tr>
<td>Normal</td>
<td>19</td>
<td>55,2</td>
<td>19</td>
</tr>
</tbody>
</table>

Discussion

The majority of respondents who suffer from type 2 diabetes mellitus have nutritional status overweight. Similar studies also state that the majority of the nutritional status of diabetics is overweight (10). The results of research in Indonesia also stated that based on the 2014 TB-DM Registry, comorbidities of TB and DM were more commonly found in patients who had a relatively heavier body weight than TB without DM(11). Similar to the results of a study which states that someone with nutritional status obesity and overweight is associated with TB infection in diabetics (12). This is
because obesity is a risk factor for diabetes\textsuperscript{(13)}. The risk of developing diabetes is four times greater in obese people than those who have a normal BMI \textsuperscript{(14)}. Other causes can be related to reduced exposure to rifampicin (antibiotics for pulmonary TB) in patients treated\textsuperscript{(15)}. In contrast to the research of Chiang \textit{et al} in 2019 the majority of patients with type 2 diabetes mellitus with pulmonary TB experienced weight loss. Decreasing weight occurs as a result of decreased appetite due to TB disease which is also experienced\textsuperscript{(15)}.

The risk of pulmonary TB for diabetics can occur in both patients with nutritional status \textit{underweight} and \textit{overweight} \textsuperscript{(16)}. Findings in this study found a different matter, namely there was no correlation between nutritional status of BMI of type 2 diabetes mellitus patients with the incidence of pulmonary TB. These results are also similar to the study by Lin \textit{et al} in 2018 which is a non-significant risk between obesity, diabetes and tuberculosis. Possible causes of these results are confounding variables that affect like socio-economic status. If confounding variables can be controlled or regulated while the research is taking place, there may be an association between the two variables that can occur such as dividing the average number of people with obesity who are obese and not obese with their socio-economic status. The variable diabetes mellitus itself is an intermediate variable between the causal relationship between BMI and pulmonary TB but cannot be connected entirely because the BMI has two traits. The two characteristics of BMI associated with pulmonary TB are protective and risk. The biological mechanism in the body about this matter has also not been found clearly. Several possible mechanisms of origin originate from the role of fat tissue in the body against the bacteria \textit{Mycobacterium tuberculosis} \textsuperscript{(17)}.

The risk of high blood sugar levels from normal limits in diabetics has been designated as a causal factor for type 2 diabetes mellitus with pulmonary TB \textsuperscript{(18)}. It is different from the findings of this study which shows that there is no relationship between blood sugar levels and incidence of pulmonary TB in patients with type 2 diabetes mellitus. There are studies that also support these results, no relationship to the diagnosis of diabetes mellitus with a history of 37,862 respondents\textsuperscript{(4)}.

The results of the study by Lin \textit{et al} in 2017 explain that 90\% of TB patients who initially have fasting blood sugar levels \textless{}6.1 mmol / L can maintain \textless{}6.1 mmol / L while undergoing treatment for tuberculosis and show absolutely no symptoms of diabetes mellitus. This proves that TB patients who do not have a history of diabetes mellitus are proven by normal fasting blood sugar, there will not be comorbid diabetes mellitus \textsuperscript{(19)}.

This study shows no association between blood sugar levels and nutritional status with the incidence of pulmonary TB in type 2 diabetes mellitus, but the risk of nutritional status and blood sugar levels in diabetics needs to be considered together to avoid complications and comorbidities such as pulmonary TB. Lifestyle changes and physical activities to maintain normal nutritional status and routine blood sugar checks are preventative steps that can be taken for diabetics. Health services also need to improve diabetes care so that it can reduce comorbidities in patients and prevent diabetes with pulmonary TB \textsuperscript{(18)}. For diabetics with TB, health services should have diabetes screening at the beginning of TB treatment, appropriate treatment, and monitoring treatment to reduce the failure of TB treatment in patients with diabetes mellitus \textsuperscript{(20)}.

\section*{Conclusion}

There is no relationship between BMI and random blood sugar levels in people with diabetes mellitus with the incidence of pulmonary TB but there is a risk of BMI \textit{underweight} and \textit{overweight} and abnormal random blood sugar levels in diabetics for co-occurring pulmonary TB. The important thing to recommend for diabetics is to keep controlling blood sugar regularly, changing healthy lifestyles, and increasing physical activity in order to prevent comorbidities that arise.

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\section*{Ethical Clearance:} This study was approved by the Ethics Committee of the Faculty of Public Health Airlangga University No. 516-KEPK.

\section*{References}

2. World Health Organization. \textit{Global report on


Risk Factors of Green Tobacco Sickness on Tobacco Farmers in Jember Indonesia

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Abstract

Introduction. Green Tobacco Sickness (GTS) is a disease in the working population that is still not widely disclosed. GTS characterized by the main symptoms of nausea, vomiting, dizziness, excessive sweating, and occurs when in contact with wet tobacco. This research purpose is to assess the factors associated with the incidence of GTS in tobacco farmers in Jember, Indonesia. Methods. The research design is case control. Research variables are occupational factors and individual factors. Data analysis using binary logistic regression. Result and Discussion. The results stated that the variable influencing the case of GTS in tobacco farmers was the work period OR = 2.944, (CI 1.127-7.693) smoking status OR = 18.083 (CI 6.815-47.984) dermatosis complaints OR = 3.876 (CI = 1.238-12.138) and nutritional status was assessed with a BMI, OR = 2.643 (CI = 1.038-6.733). Farmers with a working period of working 18 years have a risk of 2.944 times GTS compared to farmers with a work period of <18 years. Farmers with smoking status have a risk of 18.083 times GTS compared to non-smoking farmers. Farmers who have dermatoses have a risk of 3.876 times GTS compared to farmers who do not have complaints of dermatosis. Farmers with an abnormal (overweight) BMI have a risk of 2.643 times GTS compared to farmers with a normal BMI. Conclusion. Factors that influence the GTS are age, sex, smoking status, complaints of dermatosis, nutritional status, and years of service. The findings of this study suggest that integrated promotive and preventive measures from both agricultural owners and first-rate health care providers need in the form of providing self-help to reduce direct contact with wet tobacco, healthy living behavior without smoking and maintaining nutritional status.

Keywords: work-related diseases, green tobacco sickness, tobacco farmers.

Introduction

Green Tobacco Sickness (GTS) is an acute nicotine poisoning that occurs through absorption through the skin(1). GTS occurs in the population of workers or tobacco farmers, especially when planting and harvesting tobacco(2)(3). Some previous studies have suggested that GTS characterize by the main symptoms of dizziness, nausea, vomiting headaches, and excessive salivary secretion sometimes accompanied by decreased consciousness. The risk of nicotine poisoning increases when mixed with wet conditions due to rain, dew, or sweat(4).

GTS describes as occurring in several tobacco-producing countries throughout the world, in Brazil, Korea, Thailand, and several other countries (5)(6)(7). In Brazilia, the prevalence of GTS in men is 6.6%, and in women, 11.9% occurs during the harvest season and results in workers having to take leave (5). The incidence of GTS in Korea is 15 people among 40 people (37,5). Based on gender, the incidence of GTS in women (55%) was higher than in men (20%), and this difference was significant. However, if it is distinguished by age, there is no difference in the age group towards the occurrence of GTS. The incidence of GTS was high in the nonsmokers (57.5%) compared to the smokers’ group (0%), and this difference was significant (p <0,01) (6). A study in Malaysia states that farmers who use personal protection experience GTS complaints more often than those who do not use personal protection. GTS complaints are more common than complaints of pesticide poisoning (8). Tobacco farmers are groups of working populations that are vulnerable to work-related diseases. In Indonesia, research on GTS as work-related disease or occupational
illness has not been widely revealed. This study aims to identify what factors influence the occurrence of GTS in tobacco farmers. From the results of this research, it is expected that prevention programs work-related diseases can run effectively and efficiently.

**Material and Method**

**Research design.**

The study observed the variables, then carried out an analysis of risk factors or causal factors for the events to be studied. The research design used was Case Control.

**Location and time of research.**

The study was conducted on farmers in Jember Regency. The first consideration is that some health risks to tobacco farmers show that tobacco farmers in Jember Regency have a history that leads to work-related diseases. The second consideration is that initial research has been conducted on the health risks of tobacco farmers. The study was conducted for six months starting in May 2018-October 2018.

**Population and Samples.**

The study population was all tobacco farmers who met the inclusion criteria and exclusion criteria. Inclusion criteria are having age between 18-55 years, working at least five years as a tobacco farmer, being involved in the process in tobacco farming for at least the last three months, and willing to engage in research by signing informed consent. Exclusion criteria for respondents who were pregnant or sick had a history of pulmonary disease and skin disease.

Sample size. The sample size is taken using the following formula (9)

\[
\begin{align*}
P2 &= 0.31, \text{ Proportion of Exposure to the group that is not sick} \quad (10) \\
P1 &= \text{Exposure proportion in the sick group} \\
\text{Odds Ratio} &= 2.31, \text{Odds ratio in previous studies} \quad (11) \\
Z1-\alpha / 2 &= \text{value in the standard normal distribution which is equal to the significance level } \alpha = 0.05, \text{ so the value of } Z = 1.96 \\
Z1-\beta &= \text{value in the standard normal distribution equal to power by 90%, value 1.28.}
\end{align*}
\]

From the formula for calculating the sample above, the sample size is 129 (=130). Sample of 25 people was added, so the number of samples became 155 people.

**Research variable**

The variables examined in this study were individual variables in the form of age, sex, education, smoking status, passive smoking, nutritional status, individual hygiene, personal protective use, dermatosis complaints. While the work variables studied are the main work, workload during work, length of work, and length of rest.

**Instrument**

In this study, respondents with GTS, cases were defined as people who tested positive for urine cotinine and experienced some significant clinical symptoms, namely dizziness, headache, nausea, vomiting, decreased consciousness. Urine Cotinine is measured using the COT Rapid Test Cotinine Cassette Right sign which is capable of detecting cotinine up to 200 ng/ml and can detect cotinine 2-3 days after exposure. Other data was taken through interviews with questionnaires.

**Data analysis**

The collected data were analyzed using the back wald binary logistic regression test. The level of significance was determined from the value of \( p <0.05 \). Interval Confidence (CI) values are classified into two groups if CI> 1 is a risk factor, and if CI <1 is a protective factor. Whereas if CI passes number 1, it means that the variable is not meaningful.

**Finding**

**Result and Discussion**

In general, the work process in the tobacco processing industry is divided into two, namely upstream industry and downstream industry. In this study, it is limited to the upstream industry. Each stage of tobacco processing contains health risks.

The first stage is processing land, including irrigation, eradicating pests, planting seeds, and providing fertilizer. Risks that arise are exposure to solar heat, contact with chemicals and unnatural work postures. The next stage is harvest. At this harvest stage the biggest risk is direct contact with nicotine tobacco. At this stage many workers experience complaints of dizziness, nausea, headaches and itching. After harvest,
the next stage is sorting and drying tobacco leaves. The health risks that appear at this stage are itching of the palms and feet, coughing and complaints of joints.

The binary logistic regression analysis of individual factors and GTS obtained results of individual variables related to GTS were gender, smoking status, passive smoking, and nutritional status. In detail, they are presented in Table 1.

**Table 1. Individual Risk Factors of Green Tobacco Sickness**

<table>
<thead>
<tr>
<th>No.</th>
<th>Variables</th>
<th>B</th>
<th>Sig</th>
<th>Exp (B)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. ≥45 years old</td>
<td>-0.868</td>
<td>0.078</td>
<td>0.420</td>
<td>0.160-1.102</td>
</tr>
<tr>
<td></td>
<td>b. &lt;45 years old</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Male</td>
<td>1.669</td>
<td>0.000</td>
<td>5.308</td>
<td>2.517-11.193*</td>
</tr>
<tr>
<td></td>
<td>b. Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. High</td>
<td>0.065</td>
<td>0.922</td>
<td>1.068</td>
<td>0.289-3.944</td>
</tr>
<tr>
<td></td>
<td>b. Low</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Smoking status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Aktif smoker</td>
<td>2.895</td>
<td>0.000</td>
<td>18.083</td>
<td>6.815-47.984*</td>
</tr>
<tr>
<td></td>
<td>b. Not smoker</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Pasif Smoker Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Pasif smoker status</td>
<td>0.773</td>
<td>0.032</td>
<td>0.462</td>
<td>1.070-4.384*</td>
</tr>
<tr>
<td></td>
<td>b. Not pasof smoker</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Nutrition status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Normal</td>
<td>0.972</td>
<td>0.042</td>
<td>2.643</td>
<td>1.038-6.733*</td>
</tr>
<tr>
<td></td>
<td>b. Overweight, obesitas, malnutrition</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Individual hygiene</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Good</td>
<td>0.828</td>
<td>0.117</td>
<td>2.289</td>
<td>0.813-6.445</td>
</tr>
<tr>
<td></td>
<td>b. Poor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>Personal Protective Equipment using</td>
<td>0.133</td>
<td>0.816</td>
<td>1.142</td>
<td>0.372-3.502</td>
</tr>
<tr>
<td></td>
<td>a. Good</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>b. Poor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Dermatosis reported it self</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. No complaint</td>
<td>1.355</td>
<td>0.020</td>
<td>3.876</td>
<td>1.238-12.138*</td>
</tr>
<tr>
<td></td>
<td>b. Complaint</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
From the results of the logistic regression test showed that tobacco farmers with age <45 years had a risk of 0.42 times being affected by GTS compared to age ≥45 years. Young age is a protective factor of GTS. Similar to a study conducted by Saleoon (7), Unlike Fassa et al. (5), the prevalence of GTS at a younger age is more than that of old age. Based on gender, tobacco workers are dominated by female sex. The condition is because the characteristics of work in tobacco farming require patience. From the results of the above research, it is seen that the risk of the female sex is 5,308 times as significantly as GTS compared to men. This condition is consistent with the GTS study in Korea that the incidence of GTS in women was higher (55%) compared to men (20%) (6). The prevalence of GTS is also higher in women compared to men. GTS occurs more in the female population compared to men (12).

Tobacco farmers who have low education have a risk of 1,068 times experiencing GTS compared to low education. Education about occupational health is essential for farmers and owners to be able to reduce the risk of GTS. The education in question covers the symptoms and prevention of GTS (13).

Tobacco farmers who have a smoking habit have a risk of 18,083 times experiencing GTS compared to tobacco farmers who do not smoke. Smoking causes a decrease in body defense immunity, making it easy to experience pain. In field observations, it was found that farmers who smoke often experience GTS complaints less. The condition might occur because of the mechanism of nicotine intolerance. However, McBride et al. Stated that smoking is not a protection factor for GTS (14). The status of tobacco farmers as passive smokers have a risk of 0.773 for GTS compared to farmers who are passive smokers. Non-smoking status is a protection factor for GTS.

Based on nutritional status, farmers who have poor nutritional status have a risk of 2,643 times experiencing GTS compared to farmers with proper or healthy nutrition. This risk is statistically significant. Farmers with functional nutritional status will have active self-defense against physical work activities, not quickly tired, not easily sick, so high work productivity.

Farmers with poor individual hygiene are at risk of developing GTS 2,289 times compared to farmers with good individual hygiene. The habit of using bad personal protective risks is 1,142 times the occurrence of GTS compared to those who regularly use personal protection. The use of personal protection for tobacco farmers in addition to preventing the risk of GTS also protects from contact with pesticides (15).

Farmers who complain of dermatosis have a risk of 3,876 times the occurrence of GTS compared to farmers who do not complain of dermatosis. The same thing happened to tobacco farmers in North Carolina. Farmers who reported subjective rash complaints were more at risk of having GTS with OR 3.3 (95% CI 2.17-5.02) (11). Nicotine in tobacco leaves more easily enters through the skin. In the skin that has a rash, wounds, nicotine will be more easily absorbed.

Based on the analysis of occupational factor, and the incidence of GTS, the results of the working period variables were significantly associated with GTS and in detail, presented in Table 2.

<table>
<thead>
<tr>
<th>No.</th>
<th>Variables</th>
<th>B</th>
<th>Sig</th>
<th>Exp (B)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The main job</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. Landowners and farmers</td>
<td>0.158</td>
<td>0.767</td>
<td>1.171</td>
<td>0.413-3.322</td>
</tr>
<tr>
<td></td>
<td>b. Farm workers</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Workload</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a. High risk</td>
<td>0.364</td>
<td>0.496</td>
<td>1.439</td>
<td>0.505-4.102</td>
</tr>
<tr>
<td></td>
<td>b. Low risk</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Farmers are at risk of experiencing GTS by 1,171 times compared to landowners and farmers. Farm workers do almost all stages of the upstream tobacco industry, so contact with tobacco is higher than the landowner.

High workloads are at risk of experiencing GTS of 1.439 times compared to low workloads. High workloads indicate the type of activity carried out varies and with varying frequency. Hoang Van Minh expressed a similar thing that farmers who cultivated tobacco 3.5 times had health problems compared to those who did not cultivate tobacco (16).

Long working period means greater exposure to hazard exposures. Tobacco farmers with a working period of ≥ 15 years risk 2,944 times experiencing GTS compared to farmers with a working period of <15 years and statistically significant. The working period is related to the length of exposure to the hazard received. Long-term exposure can affect the somatosensory sensory system and the central process of sensory information (17).

Working time <8 hours is a protection factor for farmers with long working hours <8 hours will protect from GTS. Long rest more than 1 hour is a protection factor. Farmers with longer breaks of more than 1 hour will protect from GTS.

### Conclusion

The findings of this study indicate that female sex, farmers with smoking status and passive smoking, poor nutritional status, having a subjective complaint of dermatoses, and a work period of more than 18 years are risking factors for GTS.

**Conflict of Interest:** There is no conflict of interest

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**Ethical Clearance:** Research ethics approval was proposed through the Health Research Ethics Commission of the Faculty of Public Health, Airlangga University, Surabaya. Research has passed the Ethics Review by the Health Research Ethics Commission of the Faculty of Public Health Airlangga University Surabaya No 472-KEPK August 3, 2018.

**References**


Identification of the Direction and Strength of Relationship between Complaints of Musculoskeletal Disorders (MSDs) to Smoking Habits and Repetitive Movements of Informal Workers in Surabaya, Indonesia Using Spearman Correlation Test Methods

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Abstract

The right statistical test to find out the relationship between variables that have ordinal data scale is a spearman correlation test. Spearman correlation shows how strong the relationship and the direction of the relationship between variables. The increasing muscle complaints have a close relationship with smoking habits. The longer and the higher the frequency of people smoke, the smaller the lung capacity. It then results in a decrease in the lung ability to consume oxygen. It also causes one more easily tired when carrying out tasks that require exertion. In addition, complaints due to repetitive movements occur because the muscles continuously receive workload pressure without a chance for relaxation. This condition triggers the occurrence of nerve swelling which will cause pain in the musculoskeletal area. This is an observational study with a cross sectional design. The study used a total sampling population of 12 workers. Spearman correlation is used to examine the strength and direction of the relationship between the dependent variable, MSDs complaints, an ordinal data scale, with independent variables, smoking habits and repetitive movements. This study found that smoking habits and the level of complaints of MSDs in the shelf frame bending workers have fairly strong, positive and unidirectional relationship with correlation coefficient value of 0.357. It also found that repetitive movements and complaint levels MSDs have a positive and perfect relationship with the correlation coefficient value of 1.000.

Keywords: smoking habits, repetitive movements, complaints of musculoskeletal disorders, spearman correlation

Introduction

Spearman test is a statistical tool used to test the relationship between variables with ordinal scale data. Spearman correlation method is a method used for ordinal or ranking scale and free of distribution (non-parametric). The Spearman correlation value is between -1 and 1. The coefficient value of 0 indicates that there is no correlation or relationship between independent and dependent variables. The spearman value of 1 indicates that there is a positive relationship between independent and dependent variables and if the value is -1, it indicates that there is a negative relationship between the variables¹.

After the industrial revolution, the development of the industrial sector in Indonesia grew rapidly. This was marked by the development of informal industries. This development occurs because this sector has strong resistance to economic crisis and high absorption capacity of labor. The informal sector is an unorganized and irregular sector, yet many of them were unregistered.
Complaints often felt by workers are usually in parts of tendons, ligaments and joints. According to the European Agency for Safety and Health at Work, MSDs are one of the occupational related diseases. The Institution of Occupational Safety and Health estimates 553,000 workers in 2014-2015 suffered from musculoskeletal disorders caused by their current or past work. About 223,000 of these workers suffer from back pain. 233,000 of them had problems related to the upper limb and neck and around 97,000 had lower limb problems. As a result of the incident, it was estimated that 9.5 million workdays were lost due to illness in the musculoskeletal area caused by or worsened by work.

In his book, Tarwaka suggested that there are several factors that cause complaints of musculoskeletal disorders, such as excessive muscle stretching, repetitive movements, unnatural working attitudes, secondary causes, and combination causative factors. Some experts also argued that individual factors, such as smoking habits, and occupational factors, such as repetitive movements, can also cause musculoskeletal complaints.

The increasing muscle complaints have close relationship with the length and level of smoking habits. The longer and higher the frequency of smoking a worker has, the higher the level of muscle complaints they make. Smoking habits can reduce lung capacity which then makes lungs ability to absorb oxygen decreases. As a result, the body’s freshness also decreases. This then makes workers to be easily tired, especially when they carry out tasks that require exertion. The tiredness is because oxygen in the blood is low, burning carbohydrates is inhibited, and lactic acid accumulates, which then leads to the rise of muscle soreness.

Repetitive movements are the second main factor causing MSDs complaints. Repetitive motion is a movement that repeats itself at certain intervals. The time interval of the movement may be the same or not the same. Complaints due to repetitive movements occur as the result of continuous workload pressure received by the muscles without the opportunity for relaxation. Repeated movements that are carried out without sufficient relaxation time have the potential to cause nerve damage or swelling, which will cause pain in the musculoskeletal area.

Previous research on chronic musculoskeletal pain and smoking habits in Canada stated that, even though the relationship between the two variables is not very strong, chronic back pain is more common in smoking individuals, who smoke every day. Another study conducted on electricians stated that ergonomic factors such as awkward postures, static and repetitive movements were closely associated with the occurrence of musculoskeletal disorders.

This study aimed to examine the direction and strength of the relationship between complaints of musculoskeletal disorders with smoking habits and repetitive movements of informal workers using the Spearman correlation test.

**Material and Method**

This study was an observational study as the data was obtained by interviews and observations without any treatment to the object of research. This study used a cross sectional design as the variables were observed at the same time. Data was analyzed using descriptive statistics, which describes the process by analyzing the direction and strength of relationships between variables.

The population of this study was all workers in the welding section of the informal industry in Surabaya Indonesia, totaling 12 people. The sample in this study used the total sampling method, so the sample was 12 workers. The variables in this study were smoking habits, repetitive movements and musculoskeletal disorders. Only primary data was collected in this study. The data was obtained through interviews, for the variables of smoking habits and complaints of perceived MSDs (Nordic Body Map method), and observations, for the variable of repetitive motion.

The dependent variable in this study was MSDs complaints, which is an ordinal data, while the independent variables were smoking habits and repetitive movements, which were nominal and ordinal data. For the data type of those variables, the right statistical test to use to analyze data is the Spearman correlation test.

**Findings**

To obtain data on workers regarding smoking habits, repetitive movements and complaints of MSDs, two methods were used. Interviews were used to collect data on smoking habits and complaints of worker MSDs, while observations were used to collect data about repetitive movements.
MSDs complaint assessment can be done using the Nordic Body Map (NBM) method. The NBM method is a method used to assess the severity of musculoskeletal system disorder (MSDs) occurrence. Some argued that this method is a very subjective assessment method, which means that the successful application of this method depends on the situation and conditions experienced by workers. However, this method has often been used by ergonomists to assess the severity of disorders of the musculoskeletal system and has proven to have fairly good validity and reliability.

This method was proven to be able to assess the level of complaints felt by workers on 28 body parts. It asked the workers to range the degree of pain they felt, ranging from no pain to very pain. The result of body map analysis of workers’ complaints was used to determine the level of MSDs complaints.

<table>
<thead>
<tr>
<th>No</th>
<th>Part of Body</th>
<th>Percentage of Respondents in Working Position Sitting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>0.</td>
<td>Upper neck</td>
<td>3</td>
</tr>
<tr>
<td>1.</td>
<td>Lower neck</td>
<td>0</td>
</tr>
<tr>
<td>2.</td>
<td>Left shoulder</td>
<td>0</td>
</tr>
<tr>
<td>3.</td>
<td>Right shoulder</td>
<td>0</td>
</tr>
<tr>
<td>4.</td>
<td>Upper left arm</td>
<td>1</td>
</tr>
<tr>
<td>5.</td>
<td>Back</td>
<td>0</td>
</tr>
<tr>
<td>6.</td>
<td>Upper right arm</td>
<td>0</td>
</tr>
<tr>
<td>7.</td>
<td>Waist</td>
<td>5</td>
</tr>
<tr>
<td>8.</td>
<td>Bottom</td>
<td>1</td>
</tr>
<tr>
<td>9.</td>
<td>Hip</td>
<td>1</td>
</tr>
<tr>
<td>10.</td>
<td>Left elbow</td>
<td>11</td>
</tr>
<tr>
<td>11.</td>
<td>Right elbow</td>
<td>12</td>
</tr>
<tr>
<td>12.</td>
<td>Lower left arm</td>
<td>4</td>
</tr>
<tr>
<td>13.</td>
<td>Lower right arm</td>
<td>4</td>
</tr>
<tr>
<td>14.</td>
<td>Left wrist</td>
<td>1</td>
</tr>
<tr>
<td>15.</td>
<td>Right wrist</td>
<td>1</td>
</tr>
<tr>
<td>16.</td>
<td>Left hand</td>
<td>4</td>
</tr>
<tr>
<td>17.</td>
<td>Right hand</td>
<td>4</td>
</tr>
<tr>
<td>18.</td>
<td>Left thigh</td>
<td>5</td>
</tr>
<tr>
<td>19.</td>
<td>Right thigh</td>
<td>0</td>
</tr>
<tr>
<td>20.</td>
<td>Left knee</td>
<td>6</td>
</tr>
<tr>
<td>21.</td>
<td>Right knee</td>
<td>1</td>
</tr>
<tr>
<td>22.</td>
<td>Left leg</td>
<td>6</td>
</tr>
<tr>
<td>23.</td>
<td>Right leg</td>
<td>0</td>
</tr>
<tr>
<td>24.</td>
<td>Left ankle</td>
<td>10</td>
</tr>
<tr>
<td>25.</td>
<td>Right ankle</td>
<td>0</td>
</tr>
<tr>
<td>26.</td>
<td>Left foot</td>
<td>11</td>
</tr>
<tr>
<td>27.</td>
<td>Right foot</td>
<td>4</td>
</tr>
</tbody>
</table>
On the table above, TS means not hurt, AS means a little hurt, S means hurt, and SS means very hurt. The table illustrates complaints of the informal workers based on the level of pain from the 28 body parts. The table shows that the pain complaints by informal workers were mostly on the body parts of the left and right shoulder, back, right upper arm, right knee right thigh, right leg, and right ankle. This can be seen from the largest percentage in the complaints category of very pain from 28 body parts.

Table 2. Frequency of MSDs Complaints Levels of Informal Workers Using the NBM Method

<table>
<thead>
<tr>
<th>Level of MSDs Complaints</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medium</td>
<td>5</td>
<td>42</td>
</tr>
<tr>
<td>High</td>
<td>7</td>
<td>58</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>100</td>
</tr>
</tbody>
</table>

The MSDs complaint level category was divided into several categories, namely low, medium, high and very high. However, the results show that there were no workers whose complaints of MSDs in the level of either low or very high. Therefore, based on Table 1, it is known that the majority of 58% of workers have high levels of MSDs complaints and 42% of workers have moderate levels.

The results on the direction and strength of the relationship between smoking habits and repetitive movements with MSDs complaints can be found in the tables below:

Table 3. Relationship between Smoking Habits and MSDs Complaints Levels of Informal Workers

<table>
<thead>
<tr>
<th>Smoking habit</th>
<th>Level of MSDs Complaints</th>
<th>Total</th>
<th>Spearman Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Medium</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>4 36 (%)</td>
<td>7 64</td>
<td>11 100</td>
</tr>
<tr>
<td>No</td>
<td>1 100 (%)</td>
<td>0 0</td>
<td>1 100</td>
</tr>
<tr>
<td>Total</td>
<td>5 42 (%)</td>
<td>7 58</td>
<td>12 100</td>
</tr>
</tbody>
</table>

The table above shows that the majority of workers who have a smoking habit (64%) are at a high level of complaints of MSDs. Meanwhile, all workers who did not have the smoking habit were at the complaints level of medium category. Data analysis found that smoking habits and MSDs complaint rates in shelf frame bending workers had a strong, positive and unidirectional relationship. This can be seen from the Spearman coefficient of 0.357.

This finding is in line with the research conducted on rock breaker industrial lift-up workers in Karangnongko Sub-district, Klaten which found a positive relationship between smoking habits and musculoskeletal complaints. This is due to the fact that smoking can cause loss of bone mineral content. The pathogenesis is complex, due to direct toxic effects on the activity of osteoblast or nicotine osteoclasts, and indirect effects on sex and adrenocortical hormones, vitamin D, and calcium absorption in the intestines, vessels and oxygen.
smoking can trigger or even worsen the development of rheumatoid arthritis and back pain\textsuperscript{9}.

Table 4. Relationship between Repetitive Movement and MSDs Complaints Level of Informal Workers

<table>
<thead>
<tr>
<th>Repetitive Movement</th>
<th>Level of MSDs Complaints</th>
<th>Total</th>
<th>Spearman Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Medium</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td>High</td>
<td>5</td>
<td>42</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>58</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>5</td>
<td>42</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>58</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

Repetitive movements were divided into two categories, namely low (cycle time $>30$ seconds) and high (cycle time $<30$ seconds). However, the results show that there were no respondent with low level of repetitive movements. Table 4 shows that most respondents (58\%) with high repetitive movements have high rates of complaints of MSDs. Data analysis found that repetitive movements and complaint levels of MSDs in informal workers in Surabaya had a perfect relationship and positive direction. It is shown by the correlation coefficient of 1.000. This result is in line with research conducted on Ulos weaving workers in South Siantar Sub-district, Pematang Siantar City which found that there was a relationship between repetitive movements and musculoskeletal disorders\textsuperscript{10}.

**Conclusion**

There is a fairly strong correlation between smoking habits and MSDs complaints in informal workers in Surabaya, Indonesia. In addition, there is a perfect relationship with a positive direction between repetitive movements with the level of MSDs complaints of informal workers in Surabaya, Indonesia. Workers are recommended to stretch between jobs to reduce pain complaints in some of their body parts and reduce smoking, both in terms of quantity (number of cigarettes) and intensity.

**Conflict of Interest:** All authors have no conflicts of interest to declare.

**Source of Funding:** Artikel berikut “Identification of the Direction and Strength of Relationship between Complaints of Musculoskeletal Disorders (MSDs) to Smoking Habits and Repetitive Movements of Informal Workers in Surabaya, Indonesia Using Spearman Correlation Test Methods” funded by author.

**Ethical Clearance:** The research was approved by the institutional Ethical Board of the Public Health Faculty, Airlangga University.

**References**


Influence of Vitafort and Lactobifadol Probiotics on Excremental Microbiocenoses of Turkey Poults

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1Bashkir State Agrarian University, Ufa, Russia, 2Ural State Agrarian University, Yekaterinburg, Russia, 3South-Ural State Agrarian University, Troitsk, Russia, 4K.G. Razumovsky Moscow State University of technologies and management (the First Cossack University), Moscow, Russia

Abstract

The article presents the results of research on the use of probiotics “Vitafort” at a dose of 0.5 ml (107 CFU / g) and “Laktobifadol” at a dose of 0.2 g per 1 kg of live weight in the turkey poults breeding, which ensured the development of beneficial intestinal microflora, increased preservation turkey poults, an increase in the digestibility of raw protein and nitrogen-free extractive substances, nitrogen absorption, improvement of hematological and biochemical blood parameters and, ultimately, an increase in live weight and intensity of turkey poults by 9.2 and 12.5%.

Key words: turkey poults; Vitafort and Laktobifadol probiotics; intestinal and excremental microbiocenosis; live weight, growth rate; blood

Introduction

In modern conditions of livestock and poultry development, complex biologically active substances, prebiotics and probiotics are widely used mainly to stimulate the growth and development of young farm animals and poultry1-3. Specifically, probiotics, being cultures of microbes that are symbiotic with respect to the normal microflora of the gastrointestinal tract 4, suppress the vital activity of pathogenic and conditionally pathogenic bacteria of the intestine, increase the resistance of the animal’s organism, improve digestibility and assimilation of nutrients of food, activate metabolic processes 5,6, produce an antiallergic action in a number of cases 7-10. The new probiotic “Vitafort” investigated by us on the basis of the antagonistic bacteria Basillussubtilis of strain 11B is produced by OOO Research and Production Enterprise “Biofort” (Ufa)4, 11. Preliminary doses and safety of probiotic “Vitafort” are established on the basis of experimental data obtained on experimental laboratory animals (white mongrel mice), in which 109 colony-forming units (CFU) were the optimal dose for an organism per animal. Probiotic Lactobifadol contains live microorganisms of the L. acidophilus lactobacterium (not less than 1 million/g) and B. adolescentis bifidobacteria (not less than 80 million/g). Lactobifadol is a probiotic preparation for veterinary use12-14. Its use improves metabolism, feed conversion, increases daily average gains, reduces the time of growing and fattening.

The aim of the research is to study the effect of probiotics “Vitafort” and “Lactobifadol” on the quantitative composition of microorganisms: lactobacteria, bifidobacteria, E. coli, Staphylococcus aureus, enterococci and clostridia contained in feces of poults.

Material and Method

The study of the influence of probiotics “Vitafort” and “Laktobifadolo” on the formation of intestinal microbiocenosis conducted studies of excrements of turkey poultry in the framework of the experiment carried out according to the scheme presented in Table 1. The scientific and economic experience was conducted in the conditions of the “Bashkir poultry breeding complex M. Gafuri” Meleuz district of the Republic of Bashkortostan on broad breasted white turkey poults during 42 days (6 weeks). For the experiment, 3 groups of pairs-analogues
of turkey poulters were formed at a day old without division by sex. The poulters of all groups were kept on deep litter in accordance with the technology adopted at the complex, and the technological parameters corresponded to the recommended ones. The poulters were fed with feeds produced at the feed mill complex with a content of 100 g of feed 285 kcal of exchange energy and 27.5% of crude protein in the period from 1 to 21 days old, 295 kcal of exchange energy and 27.5% of raw protein in the period from 21 to 42 days of age (Table 2). Probiotic intake was daily throughout the study period. Probiotic “Vitafort” was given to turkey poulters with boiled chilled drinking water, “Lactobifadol” was distributed manually after the step of pre-mixing with compound feed. Bacteriological examination of feces was carried out according to the methodological guidelines “Isolation and identification of bacteria in the gastrointestinal tract of animals”, approved by the Veterinary Department of the Ministry of Agriculture of the Russian Federation No. 13-5-02 / 1043 from May 11, 2004. Weights of feces weighing 1 g were homogenized in 9 ml of sterile buffer solution (content of inoculum 10⁻¹ g / ml). From the main dilution, by transferring 1 ml of the suspension, a series of ten-fold serial dilutions was made in a sterile buffer solution containing native seed material from 10⁻² to 10⁻¹⁰ g / ml. For the indication of pathogenic enterobacteria, a sowing from the main breeding was carried out on Levin and Ploskirev medium. In order to study the cultural and biochemical properties of Escherichia coli, nutrient media were used: Endo, meat infusion agar-agar, meat infusion broth, beef-extract gelatin, Simmons agar, Giss medium; indole formation and production of hydrogen sulfide was studied. On 5% blood agar, morphologically different colonies with hemolytic properties were counted, counting their percentage of the total number of specified microorganisms of this family. Isolation of Staphylococcus aureus was performed on yolk-salt agar in Petri dishes with subsequent microscopy of the grown colonies. Bacteria of a round shape with a characteristic grape-like arrangement were attributed to the genus Staphylococcus. After a day of incubation, colonies with golden pigment were taken into account, the ability to ferment mannitol (+) was determined from the isolated microorganisms, tested in the plasma-coagulation reaction (+), and the lecithinase activity (+) was determined. To isolate anaerobic spore-forming bacteria, Wilson-Blair medium was used. The presence of clostridia was judged by the detection of black colonies in the depth of the medium at the bottom of the tube. Gram-positive rods with slightly rounded edges were detected by microscopic examination – Gram stain. The population level of each group of microorganisms was expressed in decimal logarithms. For this, the number of colonies was transferred to the decimal logarithms and, taking into account the appropriate dilution, the population level was calculated in lg CFU / g of feces.

**Table 1. Scheme of scientific and economic experience in growing turkey poulters using probiotics “Vitafort” and “Lactobifadol” (n = 50)**

<table>
<thead>
<tr>
<th>Group</th>
<th>Feeding features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>Basic diet (BD)</td>
</tr>
<tr>
<td>Experimental 1</td>
<td>BD + probiotic “Vitafort” in a dose of 0.5 ml (10⁷ CFU / g) per 1 kg of live weight</td>
</tr>
<tr>
<td>Experimental 2</td>
<td>BD + probiotic “Laktobifadol” in a dose of 0.2 g per 1 kg of live weight</td>
</tr>
</tbody>
</table>

The turkey poulters of all groups were kept on the floor on deep litter, in accordance with the technology adopted at the complex, the technological parameters were consistent with those recommended. The poulters were fed with feeds produced at the feed mill complex containing in 100 g of feed 285 kcal of exchange energy and 27.5% of crude protein from 1 to 21 days old, 295 kcal of exchange energy and 27.5% of crude protein from 21 to 42 days of age (Table 2).
Table 2. The average consumption of feed and nutrients of turkey poults

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Daily Consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>from 1 to 21 days of age</td>
</tr>
<tr>
<td>Compoundfeed PK-11-2-75, г</td>
<td>44,3</td>
</tr>
<tr>
<td>Compoundfeed PK-11-2-76, г</td>
<td>-</td>
</tr>
<tr>
<td>Exchange energy, kcal</td>
<td>126,3</td>
</tr>
<tr>
<td>Crude protein, g</td>
<td>12,2</td>
</tr>
<tr>
<td>Crude fiber, g</td>
<td>1,71</td>
</tr>
<tr>
<td>Lysine, g</td>
<td>0,85</td>
</tr>
<tr>
<td>Methionine + cystine, g</td>
<td>0,52</td>
</tr>
<tr>
<td>Threonine, g</td>
<td>0,49</td>
</tr>
<tr>
<td>Calcium, g</td>
<td>0,58</td>
</tr>
<tr>
<td>Phosphorus, g</td>
<td>0,39</td>
</tr>
<tr>
<td>Iron, mg</td>
<td>2,22</td>
</tr>
<tr>
<td>Copper mg</td>
<td>0,89</td>
</tr>
<tr>
<td>Zinc, mg</td>
<td>4,43</td>
</tr>
<tr>
<td>Manganese, mg</td>
<td>5,32</td>
</tr>
<tr>
<td>Iodine mg</td>
<td>0,13</td>
</tr>
<tr>
<td>Vitamin A, 1000 IU</td>
<td>0,53</td>
</tr>
<tr>
<td>Vitamin D3, 1000 IU</td>
<td>0,11</td>
</tr>
</tbody>
</table>

Statistical data processing was performed by generally accepted methods of variation statistics using the statistical analysis package for Microsoft Excel. An assessment of the significance of differences in arithmetic averages was performed using Student’s t-test, the differences were considered statistically significant at P <0.05.

Results and Discussion

The results of microbiological studies of turkey poultry feces are presented in Table 3. Research has established that the use of probiotics Vitafort and Laktobifadol in diets of turkeys poults of all ages led to an increase in lacto- and bifidobacteria, i.e. there occurred an increase in the acidity of the intestinal contents due to lactic acid bacteria, which naturally prevented the development and further reproduction of pathogenic microorganisms. At 14 days of age, the number of lactobacilli in experimental groups 1 and 2 was 6.68 and 7.44 lg KOE / g, which is 1.7 and 1.9 times more, and the number of bifidobacteria was about 2 times higher (6.32 and 6.42 lg KOE / g and the number of E. coli significantly decreased by 42.6 and 41.2% (P <0.05) correspondingly compared with the control group. The number of Staphylococcus aureus, enterococci and clostridia in the experimental groups showed a tendency to decrease without significant differences. At the 28-
day age, the same tendency was observed as in the 14-day age. By the 42-day age, along with an increase in the proportion of lacto-and bifidobacteria and a decrease in E. coli, a significant decrease in Staphylococcus aureus and enterococci was found in the experimental groups, except for clostridia. Thus, throughout the entire period of scientific and economic experience in the experimental groups, more useful and less pathogenic microflora were observed, which naturally affected the safety and growth rate of the poults. During the 42-day cultivation period, the safety of the population of turkey poults in the control group was 92.0%, which is 6.0% less than in the experimental group 1, and 7.0% less than in the second. The increase in live weight and growth rate of turkey poults was higher by 9.2% and 12.5%, respectively (P <0.01 and P <0.001). Consumption of feed also decreased by 7.9–11.0% per 1 kg gain in live mass in the experimental groups compared to the control group.

A study of the digestibility of nutrients in the diet of poults at 42 days of age showed that the use of probiotics Vitafort and Laktobifadol contributed to an increase in the digestibility of crude protein by 3.6–4.3 abs. % and nitrogen-free extractive substances - by 4.2–5.0 abs. % (P <0.05). We found that turkey poults of the first and second experimental groups actively digested and actively transformed the nitrogen of feed into the protein of the muscle tissue; accordingly, the nitrogen utilization ratio was higher by 8.8–9.2 abs. % than in control. According to the balance of calcium and phosphorus, we established a tendency for their better assimilation in the body of the poults of the first and second experimental groups compared to the control group, however, no significant differences were found.

Table 3. Microbiological analysis of turkey poults feces, lgKOE/ g (n = 3)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>14-day aged (X ± Sx)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lactobacteria</td>
<td>3.88 ± 0.68</td>
<td>6.68 ± 0.59*</td>
<td>7.44 ± 0.78*</td>
</tr>
<tr>
<td>Bifidobacteria</td>
<td>3.12 ± 0.72</td>
<td>6.32 ± 0.71*</td>
<td>6.42 ± 0.69</td>
</tr>
<tr>
<td>Coliform bacterium</td>
<td>6.84 ± 0.63</td>
<td>4.06 ± 0.66*</td>
<td>4.02 ± 0.67*</td>
</tr>
<tr>
<td>Staphylococcus aureus</td>
<td>3.47 ± 0.74</td>
<td>1.45 ± 0.78</td>
<td>1.76 ± 0.76</td>
</tr>
<tr>
<td>Enterococcus</td>
<td>5.48 ± 0.75</td>
<td>4.18 ± 0.69</td>
<td>4.14 ± 0.81</td>
</tr>
<tr>
<td>Clostridia</td>
<td>2.46 ± 0.78</td>
<td>1.69 ± 0.72</td>
<td>1.48 ± 0.75</td>
</tr>
<tr>
<td><strong>28-day aged (X ± Sx)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lactobacteria</td>
<td>5.44 ± 0.69</td>
<td>8.28 ± 0.67*</td>
<td>8.48 ± 0.72*</td>
</tr>
<tr>
<td>Bifidobacteria</td>
<td>5.16 ± 0.64</td>
<td>7.92 ± 0.62*</td>
<td>7.96 ± 0.65*</td>
</tr>
<tr>
<td>Coliform bacterium</td>
<td>6.98 ± 0.65</td>
<td>4.01 ± 0.64*</td>
<td>3.98 ± 0.68*</td>
</tr>
<tr>
<td>Staphylococcus aureus</td>
<td>3.67 ± 0.56</td>
<td>1.95 ± 0.59</td>
<td>2.28 ± 0.74</td>
</tr>
<tr>
<td>Enterococcus</td>
<td>5.78 ± 0.68</td>
<td>4.22 ± 0.62</td>
<td>4.33 ± 0.61</td>
</tr>
<tr>
<td>Clostridia</td>
<td>2.96 ± 0.37</td>
<td>2.39 ± 0.31</td>
<td>2.22 ± 0.38</td>
</tr>
<tr>
<td><strong>42-day aged (X ± Sx)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lactobacteria</td>
<td>6.78 ± 0.73</td>
<td>9.69 ± 0.74*</td>
<td>9.96 ± 0.69*</td>
</tr>
<tr>
<td>Bifidobacteria</td>
<td>5.98 ± 0.65</td>
<td>8.78 ± 0.68*</td>
<td>8.99 ± 0.67*</td>
</tr>
<tr>
<td>Coliform bacterium</td>
<td>5.64 ± 0.51</td>
<td>3.36 ± 0.52*</td>
<td>3.22 ± 0.55*</td>
</tr>
<tr>
<td>Staphylococcus aureus</td>
<td>4.58 ± 0.53</td>
<td>2.42 ± 0.49*</td>
<td>2.49 ± 0.51*</td>
</tr>
<tr>
<td>Enterococcus</td>
<td>5.96 ± 0.52</td>
<td>3.82 ± 0.54*</td>
<td>3.78 ± 0.55*</td>
</tr>
<tr>
<td>Clostridia</td>
<td>3.52 ± 0.33</td>
<td>2.36 ± 0.32</td>
<td>2.14 ± 0.28</td>
</tr>
</tbody>
</table>
Positive changes also occurred in the blood composition, an increase in the number of erythrocytes by 12.8–15.8% was noted; 7.0–8.7% and hemoglobin by 7.1–8.8% at 28 and 42 days of turkey poult life compared with the control group (P <0.05). It is quite logical that only in the first 14 days of use of probiotics “Vitafort” and “Laktobifadol” there was a significant increase in the content of leukocytes by 13.7 and 14.7% (P <0.05) as compared with the turkey poult's of the control group.

It is well known that an increased level of leukocytes in the blood can be in cases where the body takes probiotics for foreign organisms. Within the physiological norm, as the poult's of all groups grew and developed, an increase in the concentration of total protein was observed in the serum, especially in turkey poult's who received the probiotics Vitafort and Laktobifadol, respectively, 9.67% and 9.89% compared to the control group. With an increase in the content of total protein in the serum of turkey poult's, especially at 42 days of age, a redistribution of serum protein fractions was observed towards the reduction of the amount of albumin (by 11.4–11.8%) and towards the increase of the amount of globulins mainly due to β- (by 7.1–8.1%) and γ-globulins (by 5.0–5.7%) as compared with the control, which is usually characteristic of intensively growing animals and birds.

**Conclusion**

The use of probiotics “Vitafort” in a dose of 0.5 ml (107 CFU / g) and “Laktobifadol” in a dose of 0.2 g per 1 kg of live weight when growing turkey poult's ensured the development of beneficial intestinal microflora, increase of the safety of turkey poult's, increase of digestibility of crude protein and nitrogen-free extractive substances, nitrogen digestibility, improvement of hematological and biochemical blood parameters and ultimately an increase in live weight and growth rate of turkey poult's from 1 to 6 weeks by 9.2 and 12.5%.

**Ethical Clearance:** Taken from The Ethics Commission of Bashkir State Agrarian University, Ufa, Russia committee

**Source of Funding:** Self-funding.

**Conflict of Interest:** Authors declare no conflict of interest

**References**


Analysis Of Work Climate And The Increase Of Blood Pressure Of Construction Workers In Pamekasan Regency

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Abstract

The excessive exposure of work climate can cause health problems to workers. One of the problems is a change in physiological response in the form of increased blood pressure. The purpose of this study is to determine the relationship between the work climate and the increase of blood pressure in construction workers in Pamekasan Regency. This study is a descriptive observational study with a cross sectional design. The contingency coefficient correlation test was used to analyze and determine the relationship of the variables. The subjects were 19 construction workers in Pamekasan Regency, East Java, Indonesia drawn from the population according to the specified criteria. To collect the data, several different instruments were used. Questtemp 36 was used to measure the workclimate, direct observation with the standard of SNI 7269-2009 was carried out to assess the physical workload and sphygmomanometer was used to measure the blood pressure. The blood pressure measurement was carried out the someone with the medical competence. The result of work climate exposure showed that most of workers (84.3%) were exposed to beyond-threshold-value work climate. The results of blood pressure measurement showed that (36.8%) workers showed abnormal blood pressure. The statistical analysis for the correlation of work climate and the increase in blood pressure showed a moderate correlation with the contingency coefficient value of 0.314. It is recommended for companies in this construction project to add blower fan to the working areas where the work climate exceeds the threshold limit value (TLV) as well as at workers’ resting places. In addition, companies are suggested to hold periodic health checks, especially routine blood pressure checks.

Keywords: work climate, workload, blood pressure

Introduction

Hot work climate is a physical factor, a micrometeorology of the work environment, which is related to air temperature, humidity, air movement speed, and radiation heat. The comfortable temperature for Indonesians to work is in the range of 24-26°C with 35%-60% humidity. More than that range, workers will likely feel uncomfortable as the working environment being too hot. The continuous hot and humid working environment will reduce work productivity and bring a negative impact on the safety and health of workers¹².

Workers who are in a hot working environment can experience excessive exposure to a hot work climate by means of heat that arises from the production process that spreads throughout the work environment. The heat increases the air temperature in the work environment. Hot work climate in the work environment can be emitted from the body to the surrounding environment by conduction, convection and sweat evaporation. The heat can also be transferred from the environment to the body through radiation and convection⁹. Responding the heat, the thermoregulatory system in the hypothalamus will respond by performing controls such as conduction, convection, radiation and evaporation. This is to regulate body temperature and maintain the body heat to 36–37°C. However, the hot exposure that continuously ignored can cause the control system to stop working⁷.

A hot work climate increases the workload and has a negative impact on the physiological response of
workers. Therefore, workers need to have good health condition and acclimatization to work in the workplace. The physiological reaction to the exposure to heat pressure can also be an indicator to identify the danger of physical factors, especially the presence of heat stress in the workplace environment\(^9\). One of physiological responses that caused by hot work climate is increases in blood pressure\(^2\).

Based a study in Machine Division at PT. PLN (Persero) and found increase in blood pressure after exposure to a hot work climate. The measurement of blood pressure showed that the average of systolic and diastolic before exposure to heat was 116.33 mmHg and 79.00 mmHg and after the exposure to be 123.29 mmHg and 80.89 mmHg. These results showed an increase of 6.96 mmHg in systolic blood pressure and of 1.89 mmHg in diastolic blood pressure\(^6\).

Based a research on the Confined Space Heater division in PT. Nippon Shokubai Indonesia. Her result showed that there was an increase in the average pulse and blood pressure with Wet Bulb Globe Temperature Index value of 34.9\(^\circ\)C. The results of physiological responses examination showed an increase before and after work. Blood pressure measurement showed that the average systolic and diastolic pressure before work was 124.85 mmHg and 72.05 mmHg, while the average systolic and diastolic after work was 126.05 mmHg and 72.45 mmHg. It then can be concluded that the pulse and blood pressure of workers increase as they work in high temperatures workplace\(^14\).

Furthermore, if heat exposure continuous and the physiological impact is not immediately addressed, health risk will increase due to the hot workplace. There are several occupational illnesses caused by hot exposure in the workplace, such as Heat Edema, Heat Cramps, Heat Exhaustion, Heat Syncope, Heat Stroke\(^3\). Data from the CDC (Center for Disease Control and Prevention) also reported 20 cases of heat-related illnesses, 13 of them died and 7 of them suffered non-fatal losses but their suffering affected other workers. From 2001 to 2010, there were more than 28,000 hospitalizations in 20 countries participating in the tracking program from the CDC\(^10\).

This kind of cases makes the companies suffer a loss as the productivity decreases due to workers take work leave for the health issues. Workers are also disadvantaged by large financial expenditures due to the cost of their medical treatment for their illness which is caused by the hot work climate. The purpose of this study is to identify the relationship between the work climate and the increase in blood pressure in construction workers in Pamekasan Regency.

**Material and Method**

Based on the method of retrieval of data, this is a quantitative study, a descriptive observational study with a cross sectional design. The subjects were construction workers. The study used total population sampling. The sample was drawn from the population according to the specified criteria. The criteria were to have no history of hypertension and cardiovascular diseases and willing to be the subject of this research. Based on the criteria, 19 construction workers in Pamekasan Regency, East Java, Indonesia were selected as the subject of this research.

Data used in this research were primary data as it was collected and measured directly in the workplace. There were three variables collected namely work climate, physical workload, and blood pressure. Those variables were measured using different methods. The work climate was measured with the Wet Bulb Globe Temperature (WTGB) using Questtemp\(^36\) Thermal Environment Monitor was used (wet-bulb temperature, dry-bulb temperature, globe temperature, relative humidity (RH), and absolute humidity). The workload of each worker was calculated using the assessment table for workload based on caloric requirements according to SNI 7269:2009\(^8\). The measurement of blood pressure was performed by someone with medical competence using sphygmomanometer. The secondary data was the profile of working area and list of the workers. Data was analyzed using chi-square which presented in a cross tabulation. The correlation level between variables can be seen from the \(r\) value on the output result from the contingency coefficient correlation. Data collection was carried out in March 2019 for one week.

**Findings**

**Work Climate**

The work climate was measured with the Wet Bulb Globe Temperature (WTGB) using Questtemp 36. The results of measurements obtained include Wet Temperatures (WT), Dry Temperature (DT), Radiation Temperature (RT), and Wet Bulb Globe Temperature (WGBT). The result for work climate measurement is shown in table 1.
Table 1 shows that the highest WBGT is in the Room 1 which is 28.8 °C and the lowest is in the Room 6 with the temperature of 28.2 °C. The average wet temperature is 26.5 °C. The average dry temperature is 30.2 °C. The average radiation temperature is 33.7 °C. Given that temperatures data, the WBGT was calculated and came with the average WBGT of 28.8 °C. To determine the working climate whether appropriate or not with a threshold limit value (TLV) on workers was determined by comparing the measured indoor WBGT index, the workload based on the energy level expenditure and caloric needs according to SNI 7269:2009, and patterns of work with established standards. The standard used was the Regulation of the Minister of Manpower and Transmigration No. 5 of 2018. A light workload is categorized as ≤ 200 kcal/h, a medium workload is 200 kcal/hr < workload ≤ 350 kcal/h, and a heavy workload is 350 kcal/hr < workload ≤ 550 kcal/h. Therefore, the working climate is divided into 2 two categories (> TLV and ≤ TLV).

The result shows that 3 workers (15.7%) were exposed to safe work climate in accordance with the threshold limit value (TLV) and the rest samples (84.3% or 16 workers) were exposed to unsafe work climate, beyond the threshold limit value. The hot work climate they received in the work environment will be an extra heat load in addition to the heat load generated by the their body. This can bring a negative result that influences their health and can lead to health problems, one of which is the increase in blood pressure.

Hot work climate, especially one that exceeds the threshold value, can cause health problems to workers, both physical and psychological problems. A high-temperature work environment needs to be carefully supervised as it can cause bigger problems than the low-temperature one. This is due to the fact that human will generally be easier to protect themselves from the effects of low temperatures than high temperatures.

Workers who exposed to the hot work climate, will more likely to show signs or symptoms of discomfort such as increasing blood pressure, increasing body temperature, headaches, nausea, and other symptoms of excessive exposure to heat. To be continuously exposed to excessive heat makes workers to acclimatize as a sign of environment adaptation. Among body adaptation mechanism are sweating efficiency, stable circulation, relatively low pulse and low body temperature. Therefore, the caused symptoms are less seen than of those who do not acclimatize.

A comfortable temperature for Indonesians, who are accustomed to the tropical climate, to do activities is the temperature ranging from 24-26°C, by acclimatizing with temperatures around 28-32°C with 85% - 95% humidity. Hot temperatures can reduce the ability to think and even worse when it reach the temperature above 32°C. In addition, hot temperatures also result in a lack of agility, long reaction time, and slow decision making. Therefore, hot temperature can decrease work efficiency and productivity.
**Blood Pressure**

Increased blood pressure is one of the causes of occupational diseases and productivity decreases. Blood pressure was measured using a *sphygmomanometer*. The increase of blood pressure was divided into two categories, normal and abnormal. The normal increase showed the systolic of < 140 mmHg, while the abnormal was the systolic of > 140 mmHg¹.

The result shows that the lowest blood pressure before working is 100/70 mmHg, the highest is 130/100 mmHg, and the average is 117.8/80/5 mmHg. The measurement result of blood pressure after working shows that the lowest is 110/80, the highest 160/100 and the average is 127.4/89.4 mmHg. Based on the results of blood pressure measurements before and after work, it is known that all respondents experienced an increase in blood pressure. As the increase blood pressure increases, 12 workers (63.2%) showed an increase but were still in the normal category and 7 workers (36.8%) showed an increase and were in the category of abnormal blood pressure.

An increase in blood pressure is classified to be above the threshold if it passes the limit of hypertension. The limit is systolic blood pressure (SBP) of ≥ 140 mmHg and/or diastolic blood pressure (DBP) of ≥ 90 mmHg in two different measurements¹. Every individual who experiences changes in blood pressure has a mechanism to distribute blood in varying amounts to various parts of the body, depending on what someone is doing and the current condition of the person. The main reason why blood pressure changes up and down is to keep the capillary blood pressure at the same condition and remain constant. It is also to change the spiral muscles that surround the smallest arteries (arterioles) that cause changes in blood pressure⁴. Someone who does a job that expose them to heat will experience an increase in blood pressure as the work environment temperature increases. In addition, physiological changes in blood pressure will also occur when someone does excessive and continuous physical work¹¹.

**Work Climate and the Increase of Blood Pressure**

<table>
<thead>
<tr>
<th>Work Climate</th>
<th>Blood Pressure</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>≤ TLV</td>
<td>3</td>
<td>100</td>
</tr>
<tr>
<td>&gt;TLV</td>
<td>9</td>
<td>56.3</td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>63.1</td>
</tr>
</tbody>
</table>

Table 2 shows that respondents who work in the working environment with the unsafe work climate (exceed the threshold value) experience the increase in their blood pressure. Seven of them experienced abnormal blood pressure, while 9 of them experience an increase but still below or on the threshold limit value. Respondents who work in the safe work climate experience normal increase of blood pressure. None of them showed abnormal blood pressure. Statistical analysis showed that there is a correlation between work climate and the increase in blood pressure of construction workers in Pamekasan Regency. It is shown by the Contingency Coefficient value of 0.341, which means that there is a moderate correlation between the two variables.

Workers work under the influence of a hot environment, the brain still controls body temperature by monitoring blood temperature. However, when the blood temperature rises, the body begins to take control of the heat mechanism. Comprehensive control of the mechanism resulted in increasing body heat. This can also cause the heat regulating system to rise, which then encourages the increase of blood pressure. The increasing blood pressure makes the heart pump more
One effort to prevent workers from experiencing work-related illnesses as a result of a hot work climate is to consume mineral water at least 1 glass (150-200 cc) every 15 - 20 minutes\textsuperscript{13}. The body needs to replace fluids and electrolytes lost due to exposure to heat by drinking water. Therefore, there is a need for media promotion, periodic health checks and training for workers about health hazards due to exposure to heat\textsuperscript{10}.

**Conclusion**

The measurement result of WBGT showed that the highest is Room 1 with temperature of 28.8 °C and the lowest is in the Room 6 with the temperature of 28.2 °C. It also showed that (84.3\%) workers were exposed to beyond work climate in accordance with the threshold limit value (TLV). The measurement of blood pressure showed that 12 workers (63.2\%) showed normal blood pressure. There were 7 workers (36.8\%) who showed abnormal blood pressure. There was also a moderate correlation of work climate and the increase in blood pressure with contingency coefficient value of 0.314.

It is recommended for companies in this construction project to add blower fan to the working areas where the work climate exceeds the threshold limit value (TLV) as well as at workers’ resting places. In addition, companies are suggested to hold periodic health checks, especially routine blood pressure checks.

**Funding:** Self funding

**Conflict of Interest:** There are not any of conflicts amongst the authors

**References**

Relationship between Temperature and Behavior with Pulmonary TB Incidence in Women in the Banyu Urip Health Center Surabaya, Indonesia

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1Department of Environmental Health, Public Health Faculty, Airlangga, University, 60115, Surabaya, East Java, Indonesia

Abstract

Tuberculosis was a one of infectious disease caused by Mycobacterium tuberculosis. The transmission of this disease was influenced by environmental factors and poor behaviour. Based on observation result, the working area of Banyu Urip Health Center was a densely populated area. The purpose of this research was to analyze the house physical quality and behaviour with pulmonary TB incidence in women at the working area of Banyu urip health center.

This research was observational analytic research with case control study design. The data analysis was using chi square test. The sample was taken by simple random sampling of 30 houses with pulmonary TB patients and 30 house with no pulmonary TB patients. The data collection was using questionnaire, house physical quality measurement was using observation sheets. The result of the study indicate that temperature and behavior have a significant relationship with the existence of Mycobacterium tuberculosis in house air (p<0,05).

The conclusion based on chi square test was bedroom temperature and behavior have a relationship with pulmonary TB incidence in women at the working area of Banyu urip health center 2018. The communities were expected to maintain their house physical quality by maintaining the cleanliness of the house and increasing ventilation to facilitate air circulation in the house.

Keyword: Temperaure, behavior, pulmonary TB

Introduction

Tuberculosis (TB) is an infectious disease caused by the bacterium Mycobacterium tuberculosis which more often infects the lung organs than other organs. This disease can spread through droplets of people who have been infected with TB bacilli(1). Worldwide, TB is one of the 10 causes of death and the main cause of a single infectious agent. Every year millions of people fall ill due to tuberculosis(2).

Patients and deaths from TB in most countries in the world, more common in men than women. But TB is a cause of death from infectious diseases in women. Every year, around 700,000 women die from TB, and more than three million get TB. The impact of TB on women is primarily economic and reproductive, and affects children and other family members(3).

The second highest number of TB cases in Indonesia in the last 3 years (2015 - 2017) are in East Java Province. The discovery of new TB cases in 2017 reached 22,585, in 2016 it reached 23,390, in 2015 it reached 23,487(1,4). The health profile of East Java Province shows that the city of Surabaya is the region with the highest number of TB patients in 2016 with 5,428 cases and increasing in 2017 with 6,338 case(1).
Various factors are thought to be related to the incidence of pulmonary TB in women, namely marital status, pregnancy, parity, history of DM involvement, physical activity, education level, knowledge, contact history, kitchen smoke pollution, occupancy density, and ventilation area. Various problems will arise if women suffer from TB, given the role of women, especially those who are married, pregnant, and have children. His role as a housewife who has to carry out the physical and mental care tasks of children while taking care of her husband will be disrupted\(^{(4)}\).

**Material and Method**

Research on the relationship between temperature and behavior with the incidence of pulmonary TB in women in the work area of Banyu Urip Health Center in Surabaya City was an observational analytic study that aimed to obtain an explanation of the risk of a disease cause. This study is a case-control study that is by identifying groups with certain diseases or effects (cases) and groups without effects (controls), this study uses a retrospective approach (looking back) that aims to determine the causes of disease by tracking risk factors in the incidence of tuberculosis Lung in women.

Analysis of the relationship between the incidence of pulmonary TB in women with behavior and temperature is using the chi-square test with \( \alpha \) 5%. If \( p < 0.05 \), it can be said that there is a significant relationship between the two variables so that \( H1 \) is accepted, \( p > 0.05 \), meaning that there is no meaningful relationship between the two variables, \( H1 \) is rejected.

**Findings**

Measurement of temperature variables is carried out using a thermohygrometer. Based on the results of research in the Banyu Urip Health Center Work Area, the environmental characteristics based on temperature can be seen in Table 1 below:

**Table 1. Temperature distribution in the Banyu urip Health Center Work Area in 2018**

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Case</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>18°C - 30°C</td>
<td>14</td>
<td>46,7</td>
</tr>
<tr>
<td>&lt;18°C and &gt;30°C</td>
<td>16</td>
<td>53,3</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100,0</td>
</tr>
</tbody>
</table>

Temperature categorization based on PMK No. 1077 of 2011 which categorizes room temperature 18 °C - 30 °C is the room temperature that meets the requirements. In Table 1, it can be seen that most of the respondents environmental characteristics are based on temperature in the case group, there are 16 (53.3%) respondents having a temperature <18 °C and >30 °C. Whereas in the control group there were 24 (80%) respondents who had a temperature of 18 °C - 30 °C which means that most control groups in the Banyu urip Health Center Work Area had temperatures that met the requirements of PMK Number 1077 of 2011\(^{(5)}\).

Behavior variables in this study were in the form of knowledge, attitudes, and actions of the case group respondents and the control group related to prevention and control efforts regarding pulmonary TB. In this study several questions were asked with a questionnaire.

Based on the research results of the respondents knowledge with 10 questions in the questionnaire in the Banyu Urip Health Center Working Area, the results in Table 2 can be seen:
Table 2 Distribution of knowledge levels of respondents in the Banyu Urip Health Center work area in 2018

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Case</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Less</td>
<td>7</td>
<td>23,3</td>
</tr>
<tr>
<td>Well</td>
<td>23</td>
<td>76,7</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100,0</td>
</tr>
</tbody>
</table>

Based on Table 2, it can be seen that the assessment of the level of knowledge in the case group respondents obtained less categories as much as 7 (23.3%) people and as many as 23 (76.7%) people. In addition, knowledge in the control group found that there were less categories (1, 3.3%) and 29 (96.7%) good categories. Knowledge of respondents who were still lacking was caused by respondents who did not know the causes of pulmonary tuberculosis and also many respondents who did not know how to prevent transmission of pulmonary tuberculosis.

Based on the results of the research on the attitude of the respondents with 7 questions in the questionnaire in the Banyu Urip Health Center Working Area, the results in Table 3 can be seen:

Table 3 Distribution of the attitude level of respondents in the Banyu Urip Health Center work area in 2018

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Case</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Less</td>
<td>7</td>
<td>23,3</td>
</tr>
<tr>
<td>Well</td>
<td>23</td>
<td>76,7</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100,0</td>
</tr>
</tbody>
</table>

Based on Table 3, it can be seen that the assessment of attitudinal level in the case group was obtained in the less category as many as 7 people (23.3%) and the good category was 23 (76.7%) people. In the control group, there were less categories of 1 (3.3%) people and 29 (96.7%) good categories of people. The attitude of respondents is still lacking because there are still many respondents who do not agree with how to prevent transmission of pulmonary tuberculosis.

Based on the results of the research of the respondent’s actions by being given 7 questions on the questionnaire in the Banyu Urip Health Center Working Area, the results in Table 4 can be seen:

Table 4 Distribution of respondent’s practice in the Banyu Urip Health Center work area in 2018

<table>
<thead>
<tr>
<th>Practice</th>
<th>Case</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Less</td>
<td>22</td>
<td>73,3</td>
</tr>
<tr>
<td>Well</td>
<td>8</td>
<td>26,7</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100,0</td>
</tr>
</tbody>
</table>
Based on Table 4, it can be seen that the assessment of the level of action in the case group obtained less categories as many as 22 (73.3%) people and good categories as many as 8 (26.7%) people. In the control group, there were 2 (6.7%) less categories and 28 (93.3%) good categories. The respondent’s actions that were still poor were caused by respondents being lazy and busy working especially in terms of cleaning the house such as mopping with disinfectants and cleaning spiderwebs on the walls and ceiling.

Temperature variables with the incidence of pulmonary TB in women were tested by Chi Square test. The test results can be seen in the following table:

Table 5 Chi Square Test on temperature variable with the incidence of pulmonary TB in women

<table>
<thead>
<tr>
<th>Variable</th>
<th>p-value</th>
<th>Explanation</th>
<th>OR</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Temperature</td>
<td>0.016</td>
<td>There is a relationship</td>
<td>0.219</td>
<td>protective risk factors</td>
</tr>
</tbody>
</table>

Based on Table 5 shows that the temperature variable has a relationship with the incidence of pulmonary TB in women because it has a significant p value (p <0.05). If seen from the OR value it can be said that the temperature variable that does not meet the requirements is 0.219 times more risky with the incidence of pulmonary TB in women in their homes.

Behavioral variables consisting of knowledge, attitudes and actions of respondents related to prevention and prevention efforts about pulmonary TB with Chi Square test. The test results can be seen in the following table:

Table 6 Chi Square Test on Behavior Variables with the incidence of Pulmonary TB in women

<table>
<thead>
<tr>
<th>Behavior Variables</th>
<th>p-value</th>
<th>Explanation</th>
<th>OR</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>0.052</td>
<td>There is no relationship</td>
<td>0.113</td>
<td>protective risk factors</td>
</tr>
<tr>
<td>Attitude</td>
<td>0.052</td>
<td>There is no relationship</td>
<td>0.113</td>
<td>protective risk factors</td>
</tr>
<tr>
<td>Practice</td>
<td>0.015</td>
<td>There is a relationship</td>
<td>0.080</td>
<td>protective risk factors</td>
</tr>
</tbody>
</table>

Based on Table 5 shows that the knowledge and attitude variables do not have a relationship with the incidence of pulmonary TB in women because they have a p value that is not significant (p > 0.05). While the action variable has a relationship with the incidence of pulmonary TB in women because it has a significant p value (p <0.05) If seen from the OR value it can be concluded that the respondent’s actions were 0.080 times more risky with the incidence of pulmonary TB in women in his home.

**Discussion**

Temperature is the average air temperature in the house measured using a thermohygrometer. Based on the results of the study it can be seen that the temperature is related to the incidence of pulmonary TB in the Banyu Urip Health Center Work Area in 2018 (p <0.016 <0.05).

Respondents who have a temperature <18 ° C and> 30 ° C 0.219 times more at risk of pulmonary TB incidence than respondents who have a temperature 18 ° C - 30 ° C. According to Gould and Brooker, there is a temperature range that is favored by the bacteria Mycobacterium tuberculosis, in that temperature range there is an optimum temperature that allows the bacteria to grow rapidly. Mycobacterium tuberculosis is a
mesophilic bacteria that thrives in the range of 25 ° C - 40 ° C, but at 31 ° C - 37 ° C it will grow optimally(6).

Knowledge is the result of human sensing or the result of knowing someone about something through their senses. Knowledge plays an important role in forming one’s actions. Behavior based on knowledge will be longer than that which is not based on knowledge(7). Knowledge in this study is knowledge about pulmonary tuberculosis (TB).

The results of the study of 60 respondents indicated that the level of knowledge of patients and non-tuberculosis (TB) patients was good. The Chi Square test results showed that knowledge with the incidence of pulmonary TB in women did not have a significant relationship.

The research obtained results (p = 0.019 and OR = 0.107) which means that there is a relationship between knowledge and the presence of Mycobacterium tuberculosis in the air in his house. The results of this study indicate that there is no relationship between knowledge and incidence of pulmonary TB in women, but knowledge still plays a role in the transmission of pulmonary tuberculosis (TB). This happens because knowledge influences one’s actions in clean and healthy lifestyle as an effort to prevent transmission of pulmonary tuberculosis (TB)(8).

Attitude is a reaction or response of someone who is still closed to a stimulus or object. Attitude is not yet an action or activity, but it is a tendency to accept or refuse to take an action in a behavior(7).

The results of the study of 60 respondents showed that patients and non-tuberculosis (TB) sufferers had a positive or good attitude in an effort to prevent transmission and treatment of pulmonary tuberculosis (TB). While the Chi Square test results show that the action and presence of Mycobacterium tuberculosis in the air has a significant relationship, besides that the Odds Ratio (OR) value is 0.080, which means that the respondents who have a bad action 0.080 times the risk of Mycobacterium tuberculosis in the air in the environment his house.

Attitudes are very important in an effort to prevent pulmonary tuberculosis (TB), a good attitude will allow someone to have good actions. Attitude is the second stage after knowledge. The attitude is shown by someone’s interest to be willing to take an action(7).

Attitudes are not taken from birth but are learned and formed from experience and practice throughout one’s development. The formation of a person’s attitude is influenced by several factors, including personal experience, culture, other people who are considered important, mass media, educational institutions or institutions and religious institutions, and emotional factors in individuals(9).

The practice is the manifestation of attitude into a real action or activity that requires supporting factors in the form of facilities and support from various parties so that the practice can be realized. This is because an attitude does not automatically manifest in an action (overt behavior)(9).

The results of the study of 60 respondents, most of them showed good action. These results indicate that pulmonary tuberculosis (TB) sufferers are still not paying attention to clean and healthy living practices that can prevent the occurrence of Mycobacterium tuberculosis in the air which is the cause of pulmonary tuberculosis (TB). While the Chi Square test results show that the action and presence of Mycobacterium tuberculosis in the air has a significant relationship, besides that the Odds Ratio (OR) value is 0.080, which means that the respondents who have a bad action 0.080 times the risk of Mycobacterium tuberculosis in the air in the environment his house.

Actions (practices) related to disease include practices in preventing and curing diseases. The results of this study indicate that the majority of respondents both the case group and the control group had actions that tended to be bad even though they had shown a positive or good attitude in an effort to prevent transmission and treatment of pulmonary tuberculosis (TB)(10). The respondent’s practice that were still poor were caused by respondents being lazy and busy working especially in terms of cleaning the house such as mopping with disinfectants and cleaning spiderwebs on the walls and ceiling. There were still many respondents who did not cover their mouths when they sneezed or coughed and did not use masks during their daily activities on the grounds of being hot and uncomfortable. Just as respondents in the case group, which made the actions of the control group respondents still poor. In addition, they also do not limit contact with pulmonary tuberculosis (TB) patients.

**Conclusion**

From the results of the study it can be concluded that:
1. Based on the results of the analysis of the chi square test, the results showed that the behaviors that included knowledge, attitudes and actions related to the incidence of pulmonary TB in women in the Banyu Urip Health Center Working Area in 2018 were practice.

2. Based on the results of the chi square test analysis that the temperature is related to the incidence of pulmonary TB in women in the Banyu Urip Health Center Working Area in 2018.

Conflict of Interest: All authors have no conflicts of interest to declare.

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Ethical Clearance: The study was approved by the institutional Ethical Board of the Universitas Airlangga Faculty of Dental Medicine Surabaya, Indonesia.

Reference
Correlation of Standing Work Position and Musculoskeletal Disorders (MSDs) Complaints on Rack Frame Bending Section Workers in Informal Industry of Rack Making in Surabaya, Indonesia

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1Department of Occupational Safety and Health, Faculty of Public Health, Airlangga University, 60155 Surabaya, East Java, Indonesia

Abstract

This research was conducted to analyze the correlation between standing work position and complaints of musculoskeletal disorders on rack frame bending workers in the informal industry of rack making in Surabaya, Indonesia. When doing rack bending, standing work position was affected by work position. The jobs forced workers to work with non-ergonomic standing work position. This caused workers to experience complaints on the skeletal system (MSDs) faster. This research was an observational research with cross sectional design. The sample used a total population of 5 workers. Data obtained by interview, measurement of height and weight and observation of work position. The data analysis method used was descriptive statistics. It was known that due to non-ergonomic standing work position, 40% of rack frame bending workers had a moderate and high MSDs risk category while 20% of other workers were in the low category. In addition, it was known that 40% of workers had low and moderate MSDs complaints category and 20% of other workers had high MSDs complaints category. Based on the results, the standing work position on the rack frame bending workers had a strong and positive correlation with a correlation coefficient of 0.655. In addition to the work position, there was a strong correlation between age, working period, and BMI with MSDs complaints of rack frame bending workers. It was recommended that the employer adjust the frame size on each bending machine and provide seat for workers to rest.

Keywords: standing work position, musculoskeletal disorders complaints, REBA, NBM

Introduction

Musculoskeletal complaints are complaints of skeletal muscle parts that are felt by a person starting from a complaint of bearable to unbearable pain. Complaints to this disorder are usually termed musculoskeletal disorders3. According to Peter Vi, there were several factors that can cause musculoskeletal disorders (MSDs) such as excessive muscle stretching, repetitive movements, unnatural working attitudes, secondary causes, and combination factors4.

According to the European Survey on Working Condition in 2005, around 24.7% of European workers complained back pain, 22.8% complained muscle pain, and about 45.5% of workers reported working with fatigue while 35% were assigned to handle heavy loads in their work5. In Europe, this occupational disease affected millions of workers and can spend billions of euros to fund treatment for workers. Whereas in chronic cases, MSDs can even caused disability which can caused workers to stop working6.

Workers in the rack frame bending section in the informal rack making industry in Surabaya, Indonesia, worked with standing work position. This section
required workers to work with changing work position while standing, that was stooping and twisting their waist to press and lift the lever so that the rack frame can be bent. The working process of the rack frame bending section was carried out for 7 working hours/day or >50% work shift. Based on observations, it was known that the frequency of repetitive motion in rack frame bending section every 30 seconds was 6 times, and there were workers who’s complaining pain in some of their limbs.

According to previous research on welders with standing work position, showed that there was a correlation between standing work position and MSDs complaints especially on the neck, back, and shoulders, also the risk of MSDs was included in the moderate category. In addition, based on the results of research conducted on weaving workers at PT. Delta Merlin Textile, Kebakramat, Karanganyar, known that there was a very strong correlation between standing work position and musculoskeletal complaints and a positive direction of correlation.

Thus, the purpose of this research was to learn the direction and strength of the correlation between working position and musculoskeletal disorders complaints in rack frame bending section workers in the informal industry of rack making in Surabaya, Indonesia.

**Material and Method**

Based on the data collection method, this research was observational, data obtained by observing without giving any treatment to the objects of research during the research. Based on the analysis, this research was descriptive statistics, which described the process by analyzing the strength and direction of correlation between variables.

The population of this research were all workers in the rack frame bending section in the informal industry of rack making in Surabaya Indonesia, with total of 5 people. Sampling of this research used the total sampling method, namely the sample used in this research were all members of the population. Variables in this research were age, working period, Body Mass Index (BMI), work position and musculoskeletal disorders complaints. The data collected in this research were only primary data obtained by interviews, measurements of height and weight and observation of work position.

**Findings**

The research results of workers data collection about the workers age, working period, Body Mass Index (BMI), work position and musculoskeletal disorders complaints were obtained by different methods. Age and working period obtained by interview method, while BMI obtained by calculating using formulas related to measurement of height and weight.

Assessment of work position were done using the Rapid Entire Body Assessment (REBA) method. The application of REBA method is intended to prevent the risk of injury to the musculoskeletal system muscle.

<table>
<thead>
<tr>
<th>MSDs Risk Category</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>1</td>
<td>20%</td>
</tr>
<tr>
<td>Moderate</td>
<td>2</td>
<td>40%</td>
</tr>
<tr>
<td>High</td>
<td>2</td>
<td>40%</td>
</tr>
<tr>
<td>Total</td>
<td>5</td>
<td>100%</td>
</tr>
</tbody>
</table>

The risk level of MSDs is divided into several categories, namely very low, low, moderate, high and very high risk but in this research there were no workers with very low and very high MSDs risk categories. Therefore, based on Table 1, it was known that the majority of 40% of workers had moderate and high MSDs risk category and 20% of other workers had low MSDs risk category.

For example, the risk level of MSDs on one of the rack frame bending section workers was known in the high category because it got a final score of 10 (high category final score = 8-10). The final score was obtained from the position score of the position of the neck, body, legs, upper arm, forearm, wrist, type of coupling, type of muscle activity (repetitive movements, significant changes in body posture, and unstable body posture during work) and load or workers force which were of course also significant (the position is becoming flexion-extension or getting more non ergonomic). The risk level of high MSDs category certainly required action.
to improve work posture as soon as possible to minimize and prevent the occurrence of higher musculoskeletal complaints in workers.

The assessment of musculoskeletal complaints in this research used the Nordic Body Map (NBM) method. Nordic Body Map is a method used to assess the severity of the disruption of the musculoskeletal system. This method can be used to know the level of complaints felt by workers on 28 limbs ranging from feeling bearable to unbearable pain. Determining the level of MSDs complaints can be done by seeing the result of the workers’ body map analysis.

Table 2. Frequency Distribution of MSDs Complaint Levels on Rack Frame Bending Section Workers Using NBM Method

<table>
<thead>
<tr>
<th>MSDs Complaints Level</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>2</td>
<td>40%</td>
</tr>
<tr>
<td>Moderate</td>
<td>2</td>
<td>40%</td>
</tr>
<tr>
<td>High</td>
<td>1</td>
<td>20%</td>
</tr>
<tr>
<td>Total</td>
<td>5</td>
<td>100%</td>
</tr>
</tbody>
</table>

The level of MSDs complaints was divided into 4 categories, namely low, moderate, high and very high, but in this research there were no workers with very high MSDs complaints. Based on Table 2, the majority of 40% workers had low and moderate MSDs complaints, while 20% of other workers have a higher level of MSDs complaints.

Table 3. Correlation between MSDs Risk Category and Complaints Level on Rack Frame Bending Section Workers

<table>
<thead>
<tr>
<th>MSDs Risk Category</th>
<th>MSDs Complaints Level</th>
<th>Total</th>
<th>Association Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>Low</td>
<td>0</td>
<td>0%</td>
<td>1</td>
</tr>
<tr>
<td>Moderate</td>
<td>1</td>
<td>50%</td>
<td>1</td>
</tr>
<tr>
<td>High</td>
<td>1</td>
<td>50%</td>
<td>0</td>
</tr>
</tbody>
</table>

The correlation between standing work position and MSDs complaints can be seen in Table 3. Based on the results of data analysis that produced the table above, it was known that all workers who had a low MSDs risk category had a moderate MSDs complaints. In addition, it was known that the association coefficient value was 0.655 which means that there was a strong and positive direction of correlation that means the higher the risk of musculoskeletal disorders complaints on rack frame bending section workers will also becomes higher. This was in line with research carried out on plywood making that there was a correlation between standing work position and musculoskeletal complaints on plywood makin in Ketapang, Kendal (p=0.001)

Research result about workers age, working period and Body Mass Index (BMI) with MSDs complaints can be found in the tables below.
Table 4. Correlation between Age and MSDs Complaints Level on Rack Frame Bending Section

<table>
<thead>
<tr>
<th>Age</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Total</th>
<th>Association Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>15-19</td>
<td>1 100%</td>
<td>0 0%</td>
<td>0 0%</td>
<td>1 100%</td>
<td>0.756</td>
</tr>
<tr>
<td>20-24</td>
<td>0 0%</td>
<td>0 0%</td>
<td>1 100%</td>
<td>1 100%</td>
<td></td>
</tr>
<tr>
<td>25-29</td>
<td>1 33%</td>
<td>2 67%</td>
<td>0 0%</td>
<td>3 100%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2 40%</td>
<td>2 40%</td>
<td>1 20%</td>
<td>5 100%</td>
<td></td>
</tr>
</tbody>
</table>

Based on the table above, the results showed that all workers (100%) aged 20-24 years were at a high level of MSDs complaints. In that age group was dominant productive age to work, because workers in this age group will try to work for a long time to get bigger salary. According to Oborne (1995) stated that age is the main cause of complaints on muscle, because as we get older or age increases than the muscle strength decreases\textsuperscript{11}. Supported by a research stated that MSDs are the most common and symptomatic health problems in middle and old age. The results of the research revealed that the age group with the highest rate of back pain and muscle fatigue was aged 20-24 years for men\textsuperscript{12}

According to the data analysis that has been done, the age and MSDs complaints level on rack frame bending workers had a strong correlation and a positive or same direction of correlation that seen from the association coefficient of two variables by 0.756.

Table 5. Correlation between Working period and MSDs Complaints Level on Rack Frame Bending Section

<table>
<thead>
<tr>
<th>Working period</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
<th>Total</th>
<th>Association Coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>&lt;6 years</td>
<td>1 50%</td>
<td>0 0%</td>
<td>1 50%</td>
<td>2 100%</td>
<td></td>
</tr>
<tr>
<td>6-10 years</td>
<td>1 33%</td>
<td>2 67%</td>
<td>0 0%</td>
<td>3 100%</td>
<td>0.607</td>
</tr>
<tr>
<td>Total</td>
<td>2 40%</td>
<td>2 40%</td>
<td>1 20%</td>
<td>5 100%</td>
<td></td>
</tr>
</tbody>
</table>

Based on the table above it was known that workers whose 6-10 working period were mostly 67% of workers with moderate levels of MSDs complaints. According to the data analysis that has been done, working period and the level of MSDs complaints on rack frame bending workers had a strong correlation and a positive or same direction of correlation that seen from the association coefficient of the two variables by 0.607.

This was not in line with the theory which states that when a muscle receives excessive workload that is carried out repeatedly for a long time, complaints will
arise due to damage in joints, ligaments and tendons. So based on this theory, the working period was directly correlated to MSDs complaints. However, based on the results of the data analysis, it was known that the working period of the worker had a strong and positive direction of correlation or in line with the level of MSDs complaints. In accordance with research conducted on informal workers, that there was a relation between working period and MSDs complaints. Based on the results of the research, it was known that workers who experience high MSDs complaints were workers with <5 years working period not workers with a working period of >5 years.

Table 6. Relation Between Body Mass Index (BMI) and MSDs Complaints Level on Rack Frame Bending Section Workers

<table>
<thead>
<tr>
<th>BMI</th>
<th>MSDs Complaints Level</th>
<th>Total</th>
<th>Association coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low (%)</td>
<td>Moderate (%)</td>
<td>High (%)</td>
</tr>
<tr>
<td>Thin</td>
<td>1 50%</td>
<td>0 0%</td>
<td>1 50%</td>
</tr>
<tr>
<td>Normal</td>
<td>1 33%</td>
<td>2 67%</td>
<td>0 0%</td>
</tr>
<tr>
<td>Total</td>
<td>2 40%</td>
<td>2 40%</td>
<td>1 20%</td>
</tr>
</tbody>
</table>

Based on the table above, it was known that workers included in the thin BMI category had complaints of low and high MSDs around 50% each, whereas in the normal BMI category, the majority of workers around 67% had moderate MSDs and the remaining 33% have low MSDs. According to a research, it was said that height, strength, and body mass were also considered could increase the risk of MSDs but the evidence is far from convincing. But based on the results of other studies conducted at maintenance workers PT. Antam Tbk 2014 UBPE, Pongkor, stated that there was a significant relation between BMI and MSDs complaints.

According to the data analysis that has been done, BMI and MSDs complaints level of workers in rack frame bending section have strong and a positive direction of correlation that can be seen from the association coefficient of both second variables by 0.607.

Conclusion

The existence of a strong degree of correlation between working position with MSDs complaints on rack frame bending section workers. In addition, the strong and same direction of the correlation (positive) between the characteristics of workers which are age, tenure, and body mass index (BMI) with MSDs complaint level. The advice given to the company is the company should be evaluating the work station that is usually occupied by rack frame bending section workers. If reshaping the work station to minimize the risk of MSDs requires a large amount of money, the employer can adjust the size of the bending machine lever to the size of the rack that is about to be bend by workers (specialization of frame size on each bending machine) to reduce workers to work with hunchback positions that are too low. In addition to reduce MSDs complaints on workers in standing work position, the employer can provide seats for rack frame bending section workers around the bending machine area so that workers can rest to relax tired limbs after work in a standing work position.

Conflict of Interest: All authors have no conflicts of interest to declare.

Source of Funding: This is an article “Correlation of Standing Work Position and Musculoskeletal Disorders (MSDs) Complaints on Rack Frame Bending Section Workers in Informal Industry of Rack Making, Surabaya, Indonesia” of Occupational Safety and Health Department that was supported by Activity Budget Plans
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Ethical Clearance: The research was approved by the institutional Ethical Board of the Public Health Faculty, Airlangga University.

References


Genetic variation analysis and kinship relationship between Dayak Ngaju tribe and Dayak Bukit tribe through examination of core DNA of Bukit CODIS STR Locus (combine DNA index system) 13 for the purpose of Forensic Identification

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Abstract

Dayak Ngaju tribe lived scattered along the Kapuas and Kahayan river. Meanwhile, the Dayak Bukit tribe lived scattered the mountain and valley area. Kinship between Dayak Bukit and Dayak Ngaju tribe is still under debate. DNA examination is one of the most reliable methods in determining personal identity, community, and kinship relationship. FBI has recommended DNA analysis using 13 short tandem repeat loci, known as CODIS 13 for DNA test. We used the system to identify the difference between Dayak Ngaju and Dayak Bukit tribe and analyze the kinship between these two tribes. There are loci and alleles that always owned by each individual of Dayak Ngaju tribe. The Dayak Ngaju characteristic which cannot be discovered in Dayak Bukit tribe are TPOX allele 6 locus, FGA allele 25.2 locus, CSF allele 8, 10.3, 11 locus, VWA allele 13, 15.1 locus, D18S51 allele 9, 13, 18, 20 locus, D21S11 allele 34 locus, D7S870 allele 12.1 locus. Dayak Bukit tribe has locus and allele that owned by each individual of Dayak Bukit tribe. The Dayak Bukit tribe characteristic which cannot be discovered in Dayak Ngaju tribe are FGA alleles 18.3, 19.3, 21.2, 23, 23.1 locus, CSF allele 28.2 locus, D7S870 allele 7.3 and allele 8 locus. The similarity of Dayak Ngaju tribe and Dayak Bukit tribe lied on 5 dominant loci named THO1 allele 9.3 locus, D5S818 allele 11, VWA allele 16, D3S1358 allele 16, D13S317 allele 8, but these loci are also found in Banjar Hulu tribe. The similarity that only discovered in Dayak Ngaju and Dayak Bukit tribe are located in TPOX allele 7 locus, FGA allele 20.2, 20.3, and D3S1358 allele 15.2. According to the research results above, it can conclude that Dayak Ngaju tribe doesn’t have a close kinship to the Dayak Bukit tribe.

Keywords: Dayak Ngaju tribe, Dayak Bukit tribe, Identification, Kinship, CODIS 13

Introduction

Dayak tribe are considered as the original inhabitants of Borneo Island. Dayak tribe is divided into approximately 405 sub-tribes.¹ The Dayak tribe existence’s spread throughout the Borneo Island, they lived scattered on the headwaters, highlands, valleys, and foothills. There have been some difference of opinion about the Dayak Bukit (Dayak Meratus) tribe population’s origin. According to Tjilik Riwut, The Dayak Bukit tribe population is part of Dayak Ngaju tribe but it is still in doubt because there are differences in language and beliefs aspect.² Whereas Idwar Saleh argues that the Dayak Bukit tribe is the South of Borneo Island original inhabitants who used to inhabit the coastal area and outskirts of Tabalong river, but due to the arrival of Melayu immigrants in 400-500 A.D. They were excluded to the mountain area.³

The absence of acurate data about different characteristics of these tribes may cause difficulties in further identification. In the aspect of forensic medicine, DNA profile plays a role in identifying the perpetrators and murder victims, sexual violence, mutilation victims,
mass disaster victim, and can be used to determine paternity.\textsuperscript{4}

Examination of Short Tandem Repeats (STR) in the core of Deoxyribonucleic Acid (DNA) is often used in the determination of genetic variation and forensic identification. The STR is generally an area that does not encode proteins but has a simple repetition of nucleotide motifs. Alleles at the STR locus are vary greatly depending on the number of its motif units, so that it can be used to study population sub-structure and short-term evolution and also to measure the phylogenetic relationships of its each populations. STR can also used as a marker in observing population proximity from ethnic, linguistic, cultural, and historical population aspects. In 1990, Federal Bureau of Investigation (FBI) began a DNA mapping project using Combine DNA Index System (CODIS). The FBI has recomended DNA analysis using the STR CODIS locuses in the identification process.\textsuperscript{5}

By conducting DNA analysis through the STR CODIS locuses, it is expected to be able to find and explain the genetic variation of Dayak Bukit and Dayak Ngaju tribe so that data can be used for the benefit of forensic identification and law enforcement, beside that it can be also be known the kinship between these two tribes.

\textbf{Materials and Method}

This type of research is descriptive observational, which is one type of research that aims to provide an explanation and real facts in the field that depending on the situation about the genetic variation of the Dayak Ngaju tribe and Dayak Bukit tribe, and the kinship between these two tribes, with a cross sectional design. The sample consisted of 35 volunteers (18 people from the Dayak Ngaju tribe and 17 people from the Bukit Dayak tribe) aged over 21 years who agreed to donate their blood for genetic studies. All volunteers were asked and confirmed that they were from the Dayak Ngaju tribe or Dayak Bukit tribe along 3 generations. Blood is taken from the arm vein based to the standard protocol for DNA isolation. The laboratory analysis did in Genetic Laboratory of Tropical Disease Center, Faculty of Medicine, Airlangga University. All performed procedure had got the ethical approval from the Ethical Committee of Medical Research, Faculty of Medicine, Lambung Mangkurat University.

DNA is isolated from the blood using the Nucleospin Blood Quick Pure device. Amplification of 13 STR loci was carried out using PCR (Takara) application, with a total volume of 10 μl per tube consisting of 6 μl ddH2O, 10 μl PCR master mix kit (10x buffer Taq polymerase, dNTP, MgCl2, primer, Taq DNA Polymerase, ddH 2O), 1 μl primary forward, 1 primary reverse and 2 μl blood genomic DNA with 94° C PCR 1 minute cycle for pre-denaturation, followed by 35 cycles of 94 ° C 1 minute denaturation, 60 ° C 1 minute for strengthening process, and 72 ° C 1 minute for extension, and one cycle 72 ° C for final incubation.

In the PCR result DNA that have been amplified using the primary STR CODIS are carried out electrophoresis using polycrilamide composite gel to determine the success of these DNA amplification and continued by analysis of each electrophoresis result.

The alleles frequency for each CODIS 13 locus was analyzed to determine the genetic variation and kinship relationship between the Dayak Ngaju tribe and Dayak Bukit tribe.

\textbf{Results and Discussion}

Based on this study results, Dayak Ngaju tribe has loci and alleles that owned by each individual of Dayak Ngaju tribe which are D8S1179 allele 12 locus and D16S539 allele 12 locus. Alleles on these locuses are distinctive markers for Dayak Ngaju tribe. Therefore in order to determine an individual as a member of the Dayak Ngaju tribe population, the alleles at these loci must be present. On the other hand, the Dayak Bukit tribe has their characteristic locus and allele which owned by each individual of Dayak Bukit tribe which are TPOX allele 9 locus, D13S317 alelle 8 locus and D8S1179 allele 12 locus. Alleles at these loci are distinctive markers for the Dayak Bukit tribe. Therefore, in order to determine an individual as a member of the Dayak Bukit tribe population, the alleles at these loci must be present.

The distinctive features of the Dayak Ngaju Tribe which cannot be discovered in the Dayak Bukit tribe are the presence of TPOX allele 6 locus, FGA allele 25.2 locus, CSF allele 8, 10.3, 11 locus, VWA allele 13, 15.1 locus, D18S51 allele 9, 13, 18, 20 locus, D21S11 allele 34 locus, D7S870 allele 12.1 locus. The presence of alleles at these loci is very valuable, in order to distinguish the Dayak Ngaju tribe from the Dayak Bukit tribe. While the distinctive characteristics of the Dayak Bukit tribe that cannot be discovered in the Dayak Ngaju
tribe are the presence of the FGA alleles 18.3, 19.3, 21.2, 23, 23.1 locus, CSF allele 28.2 locus, D7S870 allele 7.3, 8 locus. Therefore, the presence of alleles at these loci can distinguish the Dayak Bukit tribe and the Dayak Ngaju tribe.


Table 1. STR Codis patterns of Dayak Bukit and Dayak Ngaju tribe

<table>
<thead>
<tr>
<th>The distinctive features of Dayak Bukit tribe</th>
<th>The distinctive features of Dayak Ngaju tribe</th>
<th>Dayak Bukit and Dayak Ngaju’s specific loci with same allele</th>
</tr>
</thead>
<tbody>
<tr>
<td>• TPOX allele 6 locus</td>
<td>• GA alleles 18.3, 19.3, 21.2, 23, 23.1 locus</td>
<td>• TPOX allele 7 locus</td>
</tr>
<tr>
<td>• FGA allele 25.2 locus</td>
<td>• CSF allele 28.2 locus</td>
<td>• FGA allele 20.2, 23.3 locus</td>
</tr>
<tr>
<td>• CSF allele 8, 10.3, 11 locus</td>
<td>• D7S870 allele 7.3, 8 locus</td>
<td>• D3S1358 allele 15.2 locus</td>
</tr>
<tr>
<td>• VWA allele 13, 15.1 locus</td>
<td>• D18S51 allele 9, 13, 18, 20 locus</td>
<td></td>
</tr>
<tr>
<td>• D18S51 allele 9, 13, 18, 20 locus</td>
<td>• D21S11 allele 34 locus</td>
<td></td>
</tr>
<tr>
<td>• D21S11 allele 34 locus</td>
<td>• D7S870 allele 12.1 locus</td>
<td></td>
</tr>
</tbody>
</table>

In this study, it was known that the Dayak Ngaju tribe had 215 heterozygous alleles and 45 homozygous alleles, indicating that the Dayak Ngaju tribe had heterogamous patterns of marriage. Dayak Ngaju population has exogamous pattern of marriage. While the Dayak Bukit tribe had 214 heterozygous alleles and 42 homozygous alleles, indicating that the Dayak Bukit tribe has a heterogamous pattern of marriage. Dayak Bukit population has exogamous marriage patterns.

The Dayak Ngaju and Dayak Bukit tribes respectively have specific loci with the same allele which are TPOX allele 7 locus, FGA allele 20.2, 23.3 locus and D3S1358 allele 15.2 locus. Meanwhile, these two tribes also has similarities at the THO1 allele 9.3 locus, D5S818 allele 11 locus, VWA allele 16 locus, D3S1358 allele 16 locus, D13S317 allele 8 locus, D8S1179 allele 12 locus, but the presence of these loci based on research are also found in the Banjar Hulu tribe.

From the this study results, we know that the Dayak Ngaju tribe does not have a close relationship with the Bukit tribe. The reason that might be the cause of their low level of kinship is geographically separated, where the Dayak Bukit tribe inhabits the highlands of the Bukit Mountains while the Dayak Ngaju Tribe inhabits the watersheds that far from the Bukit Mountains. The Dayak Ngaju tribe lived scattered the Kapuas River and Kahayan Rivers with extensive distribution, mainly in Palangka Raya, Pulang Pisau, Gunung Mas, Kapuas, Katingan, East Waringin City and Seruyan. The Dayak Ngaju villages are scattered along the river with the far distance between villages and scattered, as well as their lamin or betang (Dayak Ngaju houses). On the other
hand, the Dayak Bukit tribe occupied the forest area of Bukit Mountains. They lived scattered the mountain and valley area between the river stream. The main villages are villages that have never been abandoned, while the location of their underling village is far apart. Between one underling village and the other are separated by mountains, forests and rivers, with springs as a natural barrier.

Their low level of kinship is in accordance to the previous research which states that the population inhabiting the Bukit mountains is not a Dayak, but coastal Malay residents who migrated into the forest of Bukit Mountain.6,7

Conclusion

Dayak Ngaju tribe has loci and alleles that only owned by each individual in the population, namely D8S1179 allele 12 locus and D16S539 allele 12 locus. Dayak Bukit tribe has the locus and allele that only owned by each individual in the population, namely TPOX allele 9 locus, D13S317 allele 8 locus, D8S1179 allele 12 locus. The presence of these loci and alleles is a distinctive marker for these two tribes. The Dayak Ngaju tribe doesn’t have a close kinship with the Dayak Bukit tribe.

Ethical Clearance: This study approved and received ethical clearance from the Committee of Medical Ethics of Medical Faculty, Airlangga University, Indonesia.

Source Funding: This study was done by self-funding from the authors.

Conflict of Interest: The authors declare that they have no conflict interests.

References

Occurrence of Emerging Pollutants in Skudai River in Johor Bahru Region of Malaysia

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Abstract

Increase in landuse development and human activities have significant influence on the occurrence of emerging pollutants (EPs) in water bodies such as rivers. As rivers are the main source of water supply in Malaysia, a study was conducted to determine the occurrence of EPs in one of the drinking water sources, namely Skudai River. Samples were collected five times at eight sampling points from the upstream up to the water intake of the river. Sample pre-treatment was performed by solid-phase extraction (SPE), whereas the analyses of the EPs were performed by Liquid Chromatography-Mass Spectrometry (LCMS-MS QTOF). Results showed that about 50 compounds were detected and fall into categorise as pharmaceuticals, Personal Care Products (PCPs), and Endocrine Disrupting Chemical (EDC). The most prevalent (75-100%) compounds detected were of these categories, whereas the least (less than 40%) were mainly pharmaceuticals. The concentration of styrene, a health-hazards EPs ranged from 45.11 to 203.48 µg/L with increasing trend towards downstream of the river. Based on the landuse data of Skudai River Basin, the study concluded that human activity, landuse, and environmental factors could possibly contribute to the presence of the EPs in the river.

Keywords: pharmaceutical, personal care products, styrene, endocrine disrupting chemical, Skudai River

Introduction

Emerging pollutants (EPs) are defined as synthetic or naturally occurring compounds that are not often monitored but have the potential to enter the environment causing known or suspected adverse ecological and human health effects (1–3). They are categorized into more than 20 classes based on their origin. The most important classes are pharmaceuticals, personal care products (PCPs), pesticides, by-products of disinfection, wood preservative and industrial based chemicals (3,4).

Emerging pollutants have been detected in surface water, groundwater, treated water and in effluent of wastewater treatment plants (WWTPs) (5). Several countries including UK, US, and Japan had reported the presence of PPCPs in concentrations ranging from ng/L to µg/L in WWTPs (6). In addition, EPs are also released from diffuse sources through atmospheric deposition or from crop and animal production (3,7,8).

One of the main concerns with regards to EPs is their ability to alter the normal function of endocrine systems and give adverse effect in animals and human. These EPs, known as Endocrine Disrupting Chemicals (EDCs), act by blocking, mimicking, development disorders and alter function systems of hormones in animals and human body (9–11).

Skudai River is an important river in the district of Johor Bahru as it is one of the sources of water supply in the area. The river originates from oil palm plantation and flows through several townships and industrial areas before it reaches the water intake point. As the river is exposed through various landuse and human activities, the river is anticipated to receive different types of pollutant including EPs. Being the source of water supply, it is of our interest to investigate the impact of the landuse and human activities on the occurrence of the EPs in the Skudai River. This paper reports the findings of the study on EPs conducted over a one-year period.
of 2016-2017 and quantifying the presence of styrene in Skudai River.

Methodology

The Study Area

The Skudai river is 46 km length with basin coverage area of 325 km². Skudai River is located in the southern part of Johor. The river starts from Sedenak area and flows down to the Straits of Johor. The average monthly rainfalls in the Skudai River basin is 169.5 mm with the highest rainfall occurring in October to November (12). The upstream of the river is mainly covered by oil palm plantation while the central and downstream of the river are mainly urbanized.

Sampling

The water samples were taken at eight sampling points. The surrounding landuse of the sampling points is shown in Table 1. Five sampling exercises were conducted during the study. Grab samples were taken at about 0.5 m depth from the water surface. Samples were kept in clean amber glass bottles at temperature below 4°C prior to analysis. The collected samples were analysed within 48 hours of sampling.

Table 1: The location and landuse of the sampling stations

<table>
<thead>
<tr>
<th>Station No.</th>
<th>Name of Location</th>
<th>Land Use Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1</td>
<td>Sedenak</td>
<td>Agriculture</td>
</tr>
<tr>
<td>P2</td>
<td>Kg. Sengkang</td>
<td>Oil palm plantation</td>
</tr>
<tr>
<td>P3</td>
<td>Taman Mewah</td>
<td>Residential &amp; Agriculture</td>
</tr>
<tr>
<td>P4</td>
<td>Kg. Pertanian</td>
<td>Residential</td>
</tr>
<tr>
<td>P5</td>
<td>Saleng</td>
<td>Industrial</td>
</tr>
<tr>
<td>P6</td>
<td>Bridge to Airport</td>
<td>Residential &amp; Industrial</td>
</tr>
<tr>
<td>P7</td>
<td>Lee Rubber Plantation</td>
<td>Residential &amp; Agriculture</td>
</tr>
<tr>
<td>P8</td>
<td>Skudai Water</td>
<td>Intake Residential</td>
</tr>
</tbody>
</table>

Chemicals

Methanol and acetonitrile were of gradient grade for liquid chromatography and purchased from Merck, Germany. Styrene standard solution was obtained from Sigma Aldrich, USA. Ultra-pure water was produced using Sartorius H₂O PRO-UV-T Arium.

Analytical Method

Sample extraction procedure

Chromabond C18 (500 mg, MachereyNagel, Germany) was used for the SPE process. SPE cartridges were used on a 10-fold vacuum extraction box (Vacmaster10, MachereyNagel, Germany). The cartridge was first conditioned with 5.0 mL of methanol, followed by 5.0 mL acetonitrile, and finally, 5.0 mL of ultrapure water. Water sample of 500 mL was eluted at 10 mL/min. After the sample passed through the cartridge, 5.0 mL of ultrapure water was eluted from the cartridge followed by drying under vacuum conditions for about 30 min.

The analyte in the cartridge was eluted with 2.5 mL acetonitrile, followed by 2.5 mL methanol. The eluted part was collected in soda glass tubes (Samco, England) and air-dried until dryness. The residue was dissolved in 2.0 mL of the same solvent and capped with a poly stopper. The extract was transferred to a 2.0 mL glass vial (Agilent Technologies USA) with flexible stopper and injected into LCMS-MS QTOF.

Liquid Chromatography-Tandem Mass Spectrometry of Quadrupole Time of Flight

After pre-treatment, the samples were analysed using Liquid Chromatography-Tandem Mass Spectrometry of Quadrupole Time of Flight (LC-MS-MS QTOF) (Agilent 6560 IM-QTOF). The capillary column used was Zorbax Extend-C18(2.1X50 mm/1.8 micron), equipped with a splitless injector. Purified helium (99.99%) was used at a flow rate of 1.6 mL/min as the carrier gas. The oven ramp was set to an initial temperature of 70°C, (and held for 2.0 min), followed by an increase to 100 °C at a rate of 5 °C per min (held for 2.0 min), to 200°C at 5°C/min (held for 2.0 min) to 250°C at 5 °C/min (held for 2.0 min) and increased stepwise up to 250°C with a total run time of 32 minutes.

Results and Discussion

Characterisation of EPs

The occurrences of EPs along with its percentage of detection during the sampling exercise are shown in Figures 1 to 3. About 50 compounds of different types were detected and they are categorized into three, namely pharmaceutical, PCPs and EDCs. The
The pharmaceutical group comprises of medicines, antibiotics, supplements, and steroids, while the PCPs comprised of soaps, surfactants, perfumes, lotions, toiletries and cosmetics. The EDCs are those related to manufacturing industries such as plasticizers, resin and polymers.

Figure 1: Frequency of detection of pharmaceutical compounds

Figure 2: Frequency of detection of personal care product compounds
Of the pharmaceutical compounds detected, majority of them are detected at a frequency of more than 50%. Eighteen compounds were detected at 75% and more, while only four compounds were detected less than 50%. Seven of these pharmaceutical compounds were detected at all samplings. As for the PCPs, only one of the eight compounds was detected less than 50% frequency, while five were detected at 75% and above, including two were detected at all samplings. All the EDCs were detected at 50% frequency and more with four of them detected at all samplings.

The findings of the study indicate that the water of Skudai River comprised of mixtures of EPs as it received effluent discharges from sewage treatment plants and industries which are located in Kulai and Senai areas. Additionally, sullage from the housing areas and shop houses, and urban runoff during rainy season contribute to the river pollution. The presence of the EPs in the river water suggest their poor biodegradability or resistance that results in their leaching into the environment. In the long run, these compounds, particularly EDCs, can exert adverse health effects to human and the environment due to accumulation even under exposure at low concentrations (13). As Skudai River is used for the source of water supply, further study is therefore needed to determine the ability of the conventional water treatment process in removing these EPs.

**Styrene**

Styrene is a semi-volatile organic compound found in daily use and the industrial production of numerous chemicals and industrial products (14). It is considered a carcinogenic compound with significant risk of cancer, as well as toxic and mutagenic effects on humans. Styrene is regarded as a potent toxin with potential adverse effects on the renal, respiratory, nervous, and gastro-intestine systems of humans (15,16). As styrene was detected in Skudai River at a very high detection frequency (ie. 90%), and due to its health hazards, further study was carried out to determine the concentration of styrene in the water samples. Table 2 presents the concentration of styrene based on the five sampling exercises at the different sampling points. The concentration of styrene was determined using LC-MS-MS based on the calibration curve made using styrene standard solutions of 200, 250, 500, and 1000 µg/L.

![Figure 3: Frequency of detection of endocrine disrupting chemicals](image-url)
Table 2: Concentration of styrene at different sampling points

<table>
<thead>
<tr>
<th>Sampling Point</th>
<th>Sampling exercise</th>
<th>SB1</th>
<th>SB2</th>
<th>SB3</th>
<th>SB4</th>
<th>SB5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Concentration (µg/L)+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1</td>
<td>ND</td>
<td>146.83</td>
<td>ND</td>
<td>78.72</td>
<td>ND</td>
<td></td>
</tr>
<tr>
<td>P2</td>
<td>ND</td>
<td>200.76</td>
<td>166.43</td>
<td>219.01</td>
<td>25.63</td>
<td></td>
</tr>
<tr>
<td>P3</td>
<td>87.78</td>
<td>188.44</td>
<td>159.39</td>
<td>106.00</td>
<td>176.89</td>
<td></td>
</tr>
<tr>
<td>P4</td>
<td>41.74</td>
<td>230.35</td>
<td>75.67</td>
<td>157.33</td>
<td>146.04</td>
<td></td>
</tr>
<tr>
<td>P5</td>
<td>207.12</td>
<td>150.57</td>
<td>152.32</td>
<td>197.15</td>
<td>310.25</td>
<td></td>
</tr>
<tr>
<td>P6</td>
<td>97.00</td>
<td>121.01</td>
<td>144.89</td>
<td>130.80</td>
<td>237.77</td>
<td></td>
</tr>
<tr>
<td>P7</td>
<td>161.10</td>
<td>46.05</td>
<td>82.27</td>
<td>149.95</td>
<td>282.37</td>
<td></td>
</tr>
<tr>
<td>P8</td>
<td>104.70</td>
<td>15.25</td>
<td>108.50</td>
<td>383.11</td>
<td>298.21</td>
<td></td>
</tr>
</tbody>
</table>

\(^{+}\)ND – Not detected

Based on the average values of each sampling points, the concentration of styrene increased along the path of Skudai River from 45.11 to 203.48 µg/L. The highest and lowest concentrations were observed at P1 and P5, respectively, although P8 also recorded a relatively high concentration of styrene at 181.95 µg/L. The results reported for P1 can be ascribed to its location in a less densely populated but predominantly agricultural area compared to P5 which is located in the heart of the industrial belt. Styrene is an important raw material for the large-scale production of plasticisers, beverages, and PCPs \(^{(14)}\). Therefore, the high concentration observed at P5 is expected since numerous factories in the vicinity utilize styrene as their raw material. The presence of styrene in the water samples examined in this study suggests that the wastewater treatment in these areas requires further attention.

**Conclusions**

The study presented preliminary findings on the occurrence and detection of EPs in Skudai River in Johor Bahru region of Malaysia. The detection technique employed was LC/MS-QTOF. The selected method was based on the preliminary assessment of EPs in selected river water samples, which was found to be sensitive and selective for the characterisation of some pollutants. The results showed that the detected compounds could be broadly categorised as pharmaceuticals, PCPs and EDCs. Some of the compounds in these categories were detected at 100% frequency. Some of the pharmaceutical compounds, however, were detected, the least prevalent (Less than 40%). Furthermore, the concentration of styrene was examined and found to be present in the range 45.11 to 203.48 µg/L. The results highlight the urgency to examine the discharge of EPs such as styrene in Skudai River. It is envisaged that such measures will help to forestall future risks to human health, safety, and the environment.

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**Ethical Clearance:** Not needed as the study does not involve research on animal.

**Source of Funding:** Ministry of Higher Education of Malaysia

**Conflict of Interest:** The authors confirmed that there is no conflict of interest in this study.

**References**


Relationship of Individual Factors, and Social Factors with Mother’s Intention to Continue Early Marriage Tradition in Indonesia

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Abstract

Early marriage is a marriage conducted by teenagers under the age of 20 who are not ready to carry out a marriage. Indonesia ranks 37th in the world and 2nd in ASEAN as a country with high rates of young marriage. Marriage at a young age affects physical, psychological and social health. The tradition of getting married at a young age is still high in Sumenep Regency. Sumenep Regency occupies the first position on the island of Madura with 2692 married women <20 years old. This happens because the tradition of young marriage still continues as a result of low individual understanding and supported by social factors. The purpose of this study was to analyze the relationship of individual factors and social factors to the mother’s intention to continue early marriage tradition in Sumenep Regency.

This is a descriptive study using a qualitative approach. The method of data collection was performed qualitatively using in-depth interview and observation methods. The research instruments in this study were observation sheets and interview guidelines with a total of 32 main and key informants. Data analysis was performed using qualitative analysis including content analysis, analytical procedure, and translations.

This study shows that in Sumenep, mothers with history of experiencing young age marriage had the intention to continue the tradition of early marriage. The mothers’ intention to continue the early marriage tradition is formed due to the existence of individual factors of past behavior and social factors including education, employment, culture, first marriage and religion.

The conclusion of this study is that early marriage will continue. Therefore, cross-sector collaboration between central and regional governments, community leaders and related agencies (KUA and Health center) to reduce and prevent the occurrence of marriage of young children is required.

Keywords: early marriage, tradition, child marriage

Introduction

Early marriage is conducted by teenagers under the age of 20 who are not ready to carry out a marriage. It has an impact on physical, psychological and social health. According to Abdurradjak, et al (2016) marriages under the age of 20 years lead to pregnancies under the age of 20 years which result in complications. There were 764 cases of complications consisting of pregnancy complications, complications of labor and complications of the baby’s delivery(1). The psychological impact arises in 5 out of 6 married women of young age who are not ready to play a role in the household. The social impact arises in 2 out of 6 married women at a young age in the form of a bad relationship with the community(2).

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Early marriage is related to maternal death and infant mortality. The World Health Organization (2012) stated that 90% of the 16 million young women who give birth every year are married and 50 thousand of them died. The risk of maternal mortality and mortality of newborns is 50% higher born to mothers of <20 years than mothers of ≥20 years\(^3\).

Sumenep is one of the districts with highest number of early marriage with brides younger than 20 years in Madura. Based on the results of data collection from BKKBN East Java province in 2017, the number of women who were married for the first time at the age of <20 years was 2692 people\(^4\). Factors that influence the occurrence of early marriage in Sumenep Regency is the existence of early marriage tradition formed by customary law combined with religious understanding about Islam and the social environment.

Tradition is a hereditary habit. Every tradition carried out by the community usually has the meaning and benefits perceived the perpetrators of the community. This tradition also encourages people to increasingly do and obey certain social orders\(^5\).

The elaborated description shows that individual and social factors lead to early marriage. The researchers were interested in conducting research on the relationship of individual factors and social factors with the mother’s intention to continue the tradition of child marriage in Sumenep Regency.

The purpose of this study was to analyze the relationship between individual factors and social factors with the intention of mothers to continue the tradition of early marriage in Sumenep Regency.

Material and Method

This is a descriptive study with a qualitative approach. The informants in this included main and key informants. The main informant in this study was the first-married woman <20 years old. Key informants include husbands, parents, community leaders and health workers. A total of 32 informants were included in this study.

Determination of 32 informants was carried out based on two principles of qualitative sampling including suitability and adequacy. Data collection was performed qualitatively using in-depth interview and observation methods. The research instruments in this study were observation sheets and interview guidelines. Data validity was checked using source triangulation.

Data analysis in this study used qualitative analysis. The data analysis stages were content analysis, analytical procedure, translations.

a. Content analysis

The activity carried out is to determine the informant in accordance with predetermined criteria. Data from in-depth interviews were converted into transcripts and read repeatedly for understanding.

b. Analytical procedure

The activity carried out is to make a collection of interview data to be analyzed. The next step is giving category terms to people/groups with the same potential. These categories are arranged in a coding book in the excel application. Coding books are also compiled to facilitate further analysis.

c. Translations

Interviews were conducted in Madurese Language. Madurese was used to adjust the language used by informants to make it easier to extract information from informants.

Findings

The main informants in this study included 10 informants with the first age of marriage <20 years. The key informants included 22 informants including husbands, parents, community leaders, health workers.

Based on research, individual factors appeared in ten informants with history of early marriage. The tradition of matchmaking in Sumenep Regency is high. The reasons for the matchmaking among the 5 informants was of family relations, 2 informants were physical growth, and 2 informants were the elderly people in the family.

Based on the research, social factors were related to the marriage of young children including education, employment, culture, age at first marriage, and religion. Of the ten informants, 8 informants had elementary school level and 2 informants had junior high school education. In terms of work, the informants’ jobs are as follows: Housewives (5 informants), Farmers (3 informants), Shop employees (1 informant), Laborers (1 informant).
The first age of the informant’s marriage varies. The lowest age is 13 years and the highest age is 19 years. The culture of young marriage in Sumenep Regency was revealed by ten informants with a marriage age range of 15-17 years for girls. The marriage tradition of young age is inseparable from religion. The ten informants adhered to Islam. Religious reasons are one of the factors in the tradition of young marriage in society.

The interview results showed that 6 out of 10 informants had the intention to continue the marriage of children at a young age. A total of 4 informants did not have the intention to continue the marriage of children at a young age.

Discussion

Individual factors are actions or activities carried out by informants in the past related to the occurrence of his first marriage at a young age. The results of the study showed that informants carried out young marriages because of arranged marriages by their parents in the past. In line with the research conducted by Munawarah, et al. (2015) the occurrence of young marriage in Madurese society was due to child marriage conducted by parents (6).

The reasons for matchmaking include family relationships, physical growth, and elderly people in the family. First, matchmaking on the grounds of family relations still occurs because parents want to re-strengthen the relationship between families and to bring families closer. Matchmaking was carried out since the informants was still toddler with his own family to bring the family relationship closer together. The union of families is carried out to continue family tree. Matching a child with someone who is still in a family relationship is a separate control for parents. Parents will find it easier to help solve a problem if there is a child domestic conflict.

Second, matchmaking takes place on the grounds of physical growth. Physical growth is a benchmark for people to marry off their children. Girls have fast physical growth, are easily seen and discussed by the community. Fast physical growth is characterized by a high and full body size. When children have attracted attention, parents experience promiscuity. Parents will immediately receive a male application without having to listen to the child’s opinion.

Third, matchmaking with the reasons of elderly people in the family that elderly people can see their grandchildren and grandchildren get married before he dies. The elderly person is the oldest person in the family, grandfather, grandmother, great-grandfather, and great-grandmother. Elderly people feel happy if they can still see their grandchildren getting married.

The tradition of matchmaking has become a separate law in the community. This makes the marriage behavior of young children difficult to prevent. This behavior will continue to be applied and become an individual factor to encourage mothers to continue the marriage of young children.

In addition to individual factors, there are also social factors that encourage mothers to continue the marriage of young children. Ajzen (2005) adds social aspects in background factors including education, work, culture, age of first marriage, and religion because it has something to do with one’s intention to do a certain behavior (7). The results of the study show that most of the informants had a low level of education, namely elementary school graduates. Low education affects the mother’s intention to marry her child at a young age. This is supported by research conducted by Anisa (2015) that the higher the parental education, the more positive the parents’ attitudes toward young age marriage (8). Education is one of the factors that influence a person’s perception. Education makes it easier for people to accept or choose a better change. The level of education illustrates the level of maturity of a person’s personality in responding to an environment that can influence thinking insight or respond to knowledge around him (9). Informants with a low level of education have insufficient knowledge and understanding of the impact that will occur when marrying young children. Informants tend to assume that marriage at a young age is a normal thing to do and does not feel a very visible impact.

The results showed that the majority (5 informants) worked as housewives (IRT). The community has a view that women do not have to work, enough to be a housewife by taking care and looking after the house. Similar to the research conducted by Munawarah, et al. (2015) women do not have freedom in the workplace (6). This view influences the informant’s intention to immediately marry off his child so that he can help him in terms of housewife’s work and looking after the house. After the child is married, the girl will live with her parents. It is a tradition of the community that most
married girls will live in their parents’ homes.

Early marriages and marriages have become a tradition in Sumenep community, even becoming customary law. The results of the study revealed that most girls have been married at the age of 15-17 years. According to Musfiroh (2016) the cultural and religious values that developed in the community were the driving factors for the occurrence of early marriage[10]. Culture has become the most influential factor in marriage behavior aged <20 years. The community has made marriage a young age as a local customary law that is obeyed by the community so that its implementation is considered normal.

Informants in this study revealed that they followed a culture or tradition that is the habits that exist in society. All behaviors that they will do must be in accordance with local behavior. Like early marriage, if marrying a child at a young age has become a culture of society, then any prevention will not be able to inhibit the implementation of marriage.

The other social factor is age. The age in this study focused on the age of women during the first marriage. The results showed that the lowest age of married women was 13 years and the highest age was 19 years. Ten informants in this study married for the first time under the age of 20 years. Girls in Sumenep Regency will be rushed to marry to prevent deviations from religion. Informants in this study revealed their fear of child relationships because nowadays it is easy to prioritize relationships before marriage (courtship). Khaparistia & Edward (2015) in their research revealed that girls had known dating since the age of 15 years[11]. As a result, informants anticipate this by marrying off children at a young age so as not to prioritize lust. Various methods are used to be able to marry off children at <2 years of age including age manipulation. According to Munawarah, et al. (2015) age manipulation is considered legitimate, because the aim is only to get a marriage book. Manipulation of age and married sirih has become a common thing for the people of Sumenep because the most important thing for the community is marriage and marriage witnesses. In addition, there is no other thing that can hinder the occurrence of marriage[6].

The results showed that there were 6 informants who had the intention to continue the marriage tradition of young children. This intention arises because of individual factors and social factors that encourage informants to marry off children at a young age. The informant in this study revealed that the intention was to marry off a child at a young age because he saw his past who was married at a young age. According to the informant, getting married at a young age does not have a loss. This shows that there is a relationship between individual factors with the mother’s intention to marry off a child at a young age.

Furthermore, there are also social factors that are also related to the emergence of the intention of the mother to marry off the child at a young age. The social factors are education, work, culture, first age of marriage, and religion. Social factors have a greater influence than individual factors. This is because informants are more obedient to culture and religion. Sumenep community cannot be separated from culture and religion. Culture and religion have merged into one in the order of life of society. The emergence of the prevailing Tradition in the community regarding the marriage of young age provides a positive perception for informants. According to Anisa, et al. (2015) people will follow traditions while according to the community this is good to do and not against religion[8].

**Conclusion**

Based on the explanation above, it can be concluded that of the 10 main informants in Sumenep Regency:

1. Ten informants had past experience of arranged marriages.
2. Most of the informants (8) only had primary education.
3. Most informants (5) work as housewives.
4. Early marriage culture still exists for girls of 15-17 years.
5. Ten informants had the first marriage at the age <20 years.
6. Ten informants adhered to Islam.
7. Married mothers of young age in Sumenep Regency had the intention to continue the marriage tradition of children aged <20 years.
8. There is a relationship between individual factors and social factors with the mother’s intention...
to continue the child marriage tradition in Sumenep Regency.

**Recommendation**

1. Mothers need to include children in any issues related to children, including marriage problems.
2. Parents need to fulfill children’s educational rights to reduce the risk of marriage of young children.
3. Health workers need to improve interventions in school youth evenly to increase their knowledge and understanding of the impact of young marriage.
4. Community leaders need to develop an atmosphere about marriage and the importance of mental readiness to deal with domestic life with parents and the community.
5. The Education Agency needs to provide intervention to the community regarding the fulfillment of children’s education rights with a minimum fulfillment of children’s education to high school (High School)

**Conflict of Interest:** All authors have no conflicts of interest to declare.

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**Ethical Clearance:** This study was approved by Universitas Airlangga Faculty Of Dental Medicine Health Research Ethical Clearance Commission with certificate number 95/HRECC.FODM/III/2019.

**References**

Knowledge, Attitude and Practice of Menstrual Hygiene among Primary School Adolescents in Surabaya, Indonesia

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Abstract

Background: Menstruation is a normal physiological process of an adolescent female. Adolescence is a very important transition period that requires special attention to ensure progress for all girls. Some studies found that menstruation is taboo to be discussed and many girls just known about menstruation when they have menarche. The genitourinary becomes more sensitive and susceptible to infection during the menstruation period. So the appropriate menstrual hygiene practice is very important to maintain the health of reproductive organs. This study objective is to assess the current knowledge, attitude, and practice of primary school adolescents on menstrual hygiene management in Surabaya, Indonesia.

Method: This is a descriptive cross-sectional study that was carried out from May to June 2019 in a primary school in Surabaya. This study was done among 78 students selected through total population sampling from a primary school in the urban area of Surabaya.

Results: The findings showed that 66.7% of participants have good knowledge, 60.3% have a good attitude and 79.5% have good practice regarding menstrual hygiene.

Conclusions: The majority of the participants have good knowledge, attitude and practice regarding menstrual hygiene. Nevertheless, the knowledge, attitude, and practice of all the participants still need to improve. The school along with the parents and health provider are expected to reinforce the health education program about menstrual hygiene management.

Keywords: Knowledge, attitude, practice, menstrual hygiene

Introduction

Menstruation is the release of blood from the uterus which is a natural process experienced by women because of the decay of the uterine wall when the egg is not fertilized by sperm cells. Menstruation lasts 2 to 7 days which occurs every 28 days.[1] Menstruation is a natural physiological process in adolescent females who usually experience it for the first time at the age of 9-12 years.[2]

Menstrual hygiene is the act of maintaining cleanliness during menstruation. This act such as cleaning the genitals properly and changing pads every 3-4 hours. Poor personal hygiene during menstruation can increase the potential for reproductive tract infections. To be able to practice menstrual hygiene properly, good knowledge about menstruation and menstrual hygiene management are needed.[3]

Health effects found based on the Menstrual Hygiene Management Research, one in four women reported problems with itching or pain in the pubic area and 9% stated pain during urination during menstruation. This is because they use sanitary pads too long because they cannot replace it at school. While the impact on education is decreasing participation and learning ability in schools due to illness, low concentration, and fear of being translucent or leaky.[4]
Many girls don’t have the understanding that menstruation is a normal biological process. They just find out when menarche or when they have menstruation for the first time.[5] Only 1 in 44 (2%) of elementary school students and 8 of 31 (26%) of junior high school students have an understanding that menstruation is a biological aspect, their knowledge is very limited. Their knowledge of menstrual hygiene is mostly not appropriate according to the recommended standards. In general, female primary school students also don’t understand what reproductive organs are and how they relate to menstrual hygiene.[1]

The main purpose of this study is to assess the knowledge, attitude, and practice of menstrual hygiene among primary school students in Surabaya.

**Material and Method**

This is a descriptive cross-sectional study. This study was carried out from May to June 2019 in a primary school in Surabaya. This study was done among 78 students selected through total population sampling from a primary school in the urban area of Surabaya.

Measuring instruments in this study using a questionnaire made by the researcher based on theoretical concepts and have been tested its validation and reliability. The level of knowledge, attitude, and practice were measured by using a set of five knowledge related questions, six attitude related statements, and eight practice-related questions. Each correct answer of knowledge and practice items were given score one and zero for an incorrect answer. The attitude item was measured four points Likert scale. All scores were summed and classified into two categories, good (the one with a score higher or similar to median) and poor (the one with a score less than the median).

**Findings**

The respondents involved in this study were 10-13 years old. The frequency distribution of the respondents was at most 12 years old with a percentage of 43.6%. As many as 23.1% of respondents were 13 years old and only 3.8% were 10 years old.

The majority of the respondents (46.2%) experienced menarche at the age of 11 years. As many as 28.2% experienced menarche at 12 years of age, 23.1% at the age of 10 years, and only 2.6% at age 13 years.

Most respondents have early menarche so they are vulnerable to early menarche impact which could affect their lives both socially and biologically. The younger age of menarche causes an unwanted pregnancy that causes premarital sexual activity. How it will increase the prevalence of illegal abortion and sexually transmitted diseases in adolescents.[6]

Respondents stated that information about menstruation and personal hygiene menstruation is very important to know. So they try to get this information from various sources. Some sources of information mentioned by respondents included family members (85.9%), teachers (32.1%), internet (26.9%), friends (15.4%) and books (11.5%).

On the other hand, the school or teachers only delivered a minimum menstrual-related study material because it was considered a sensitive topic. Meanwhile, parents as the main source of information for students usually only provide information after the child has menstruated.

Comprehensive information about menstruation and menstrual hygiene is needed by adolescent girls, especially before they menstruate. This is evidenced by the statement of all respondents or 100% stating the need for information about menstruation and menstrual personal hygiene. So that respondents will not have difficulty in accessing information and are sure of the truth of the information.
Table 1. Knowledge of Menstrual Hygiene

<table>
<thead>
<tr>
<th>No</th>
<th>Question</th>
<th>Correct</th>
<th>Incorrect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>1</td>
<td>What is menstruation?</td>
<td>74</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>94,9</td>
<td>5,1</td>
</tr>
<tr>
<td>2</td>
<td>What is the aim of menstrual hygiene practice?</td>
<td>73</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>93,6</td>
<td>6,4</td>
</tr>
<tr>
<td>3</td>
<td>What is the impact if the urogenital area is moist?</td>
<td>65</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td>83,3</td>
<td>16,7</td>
</tr>
<tr>
<td>4</td>
<td>What will happen if not changing sanitary pads in long time?</td>
<td>72</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>92,3</td>
<td>7,7</td>
</tr>
<tr>
<td>5</td>
<td>How many sanitary pads should be change in a day?</td>
<td>47</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td></td>
<td>60,3</td>
<td>39,7</td>
</tr>
</tbody>
</table>

As many as 94.9% of respondents knew that menstruation is the release of blood from the vagina caused by normal biological processes. Respondents who knew that the purpose of maintaining the cleanliness of genital organs during menstruation is to maintain cleanliness and health as much as 93.6%. The majority of respondents or as many as 83.3% already know if moist genitals will facilitate the growth of bacteria and fungi. As many as 92.3% of respondents knew that if they do not frequently change pads during menstruation, the bacteria will develop more easily into the vagina and cause infection. There are still quite a number of respondents or as many as 39.7% who do not know that the correct timeframe for changing sanitary napkins is every 4-6 hours.

Based on the analysis, found that the majority of the participants are 12 years old. Also most of them have menarche in the age under 12 years. The participants have good knowledge of menstrual hygiene because they have early menarche and have received the information regarding menstruation and menstrual hygiene. Moreover they have experience so automatically it will make them gain more knowledge about menstrual hygiene.[7]

Table 2. Attitude of Menstrual Hygiene

<table>
<thead>
<tr>
<th>No.</th>
<th>Statement</th>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>1</td>
<td>You should wash your hands before cleaning the genitals.</td>
<td>78</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>Changing underwear once a day is enough.</td>
<td>5</td>
<td>73</td>
</tr>
<tr>
<td></td>
<td></td>
<td>6,4</td>
<td>93,6</td>
</tr>
<tr>
<td>3</td>
<td>Sanitary pads should be replaced every 4-6 hours.</td>
<td>67</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>85,9</td>
<td>14,1</td>
</tr>
<tr>
<td>4</td>
<td>No need to replace sanitary pads after urinating and defecating.</td>
<td>35</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td></td>
<td>44,9</td>
<td>55,1</td>
</tr>
<tr>
<td>5</td>
<td>Used sanitary pads must be wrapped in paper or plastic before disposed.</td>
<td>75</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>96,1</td>
<td>3,9</td>
</tr>
<tr>
<td>6</td>
<td>You don’t need to change pads when you’re at school</td>
<td>11</td>
<td>67</td>
</tr>
<tr>
<td></td>
<td></td>
<td>14,1</td>
<td>85,9</td>
</tr>
</tbody>
</table>
All respondents agreed to wash their hands before cleaning the genital area. As many as 93% of respondents did not agree to replace underwear only once a day. 85% of respondents agreed to replace sanitary pads every 4-6 hours. There are still quite a number of respondents who agree that there is no need to replace sanitary pads after urinating and defecating. Almost all or 96.1% of respondents agreed to wrap used sanitary pads with paper or plastic before disposing of it. 85.9% of respondents did not agree that it’s no need to change sanitary pads while at school.

Although most of participants’ attitude of menstrual hygiene are good. At some points there still some or quite a few participants stated that no need to replace sanitary pads after urinating and defecating.

### Table 3. Practice of Menstrual Hygiene

<table>
<thead>
<tr>
<th>No</th>
<th>Statement</th>
<th>Yes</th>
<th>(%)</th>
<th>No</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n</td>
<td></td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Washing hands with soap before and after using sanitary pads.</td>
<td>46</td>
<td>59</td>
<td>32</td>
<td>41</td>
</tr>
<tr>
<td>2</td>
<td>Not washing hands before and after using sanitary pads.</td>
<td>7</td>
<td>9</td>
<td>71</td>
<td>91</td>
</tr>
</tbody>
</table>

Habit of replacing sanitary pads

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Replacing the pads every 4-6 hours even though the menstrual blood has decreased.</td>
<td>59</td>
<td>75,6</td>
<td>19</td>
<td>24,4</td>
</tr>
<tr>
<td>4</td>
<td>Not replacing the pads after urinating and defecating.</td>
<td>32</td>
<td>41</td>
<td>46</td>
<td>59</td>
</tr>
<tr>
<td>5</td>
<td>Not replacing the pads while in school.</td>
<td>23</td>
<td>29,5</td>
<td>55</td>
<td>70,5</td>
</tr>
</tbody>
</table>

Continued

### Table 3. Practice of Menstrual Hygiene

<table>
<thead>
<tr>
<th>No</th>
<th>Statement</th>
<th>Yes</th>
<th>(%)</th>
<th>No</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n</td>
<td></td>
<td>n</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Always wash the used sanitary pads before disposed of.</td>
<td>56</td>
<td>71,8</td>
<td>22</td>
<td>28,2</td>
</tr>
<tr>
<td>7</td>
<td>Always wrap sanitary pads with paper or plastic before dumping it in the trash.</td>
<td>75</td>
<td>96,2</td>
<td>3</td>
<td>3,8</td>
</tr>
<tr>
<td>8</td>
<td>Once threw the pads waste on a toilet.</td>
<td>2</td>
<td>2,6</td>
<td>76</td>
<td>97,4</td>
</tr>
</tbody>
</table>

Respondents’ practice of menstrual hygiene was assessed by analyzing the habit of hand washing, habit of
replacing sanitary pads, and habit of removing sanitary pads waste.

The habit of respondents’ hands washing is generally good, because as many as 59% of respondents wash their hands with soap every time before and after changing sanitary pads. And only 9% or 7 people do not wash their hands before and after changing the pads.

Respondents’ habits in replacing sanitary pads are shown by as much as 75.6% of respondents keep replacing pads every 4-6 hours a day even though menstrual blood has decreased. 41% of respondents did not replace sanitary pads after urinating or defecating. And as many as 23 female students or 29.5% female students claimed not to change pads while in school.

Respondents’ habits in disposing of pads waste are known as many as 71.8% of respondents stated that they always wash used sanitary pads before throw it away. Most of the respondents or 96.2% stated that they always wrap sanitary pads with paper or plastic before dumping it in the trash, only 3 people did not do so. As well as known only 2 or 2.6% female students who claimed ever thrown sanitary trash into the toilet, 76 people remaining or 97.4% claimed to have never done so.

Generally most of participants have good practice of menstrual hygiene. But if we take a look a little closer, it seen that quite a few participants (41%) don’t replace sanitary pads after urinating and defecating also 29.5% of participants don’t replace the pads when they at school. They choose to hold it until they come home from school even the pads already full of menstrual blood.

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Figure 1. Summary Index of Knowledge, Attitude, and Practice Regarding Menstrual Hygiene

This study found the knowledge, attitude, and practice of menstrual hygiene among a primary school adolescents in Surabaya generally are good. As shown on the figure 1, as many as 66.7% participants have good knowledge, 60.3% participants have good attitude, and 79.5% participants have good practice.

Based on this study known that there still quite a lot or as many as 39.7% of participants who don’t know when they should replace sanitary pads. Then from the attitude and practice assessment, known some participants state that they don’t replace pads after urinating and defecating and they agree with that. Besides that quite a lot of participants who don’t replace their pads in school and choose to hold it until they come home from school.

Besides because of lack of information or knowledge there is another reason that makes students feel lazy to replace sanitary pads at school is that the condition of the bathroom is poorly maintained, the number of toilets is small and the availability of water is inadequate. The poorly maintained condition of the toilet creates an uncomfortable impression for the users, especially for students who will replace the pads. Also, the quantity or proportion of bathrooms in schools is not comparable to the number of students. So that it can result in students urinating carelessly and students are reluctant to replace sanitary pads at school.[7]

Conclusions

The results indicate that the majority of the participants have good knowledge, attitude, and practice regarding menstrual hygiene. However, it was unsatisfactory, because there are still quite a lot of participants who haven’t understand about the right time when they have to replace the sanitary pads yet. Hence, health education program should be conducted in those communities to persuade behavior change. Also, menstrual hygiene management friendly water, sanitation, and hygiene infrastructure and facilities should be developed in school.

Conflicts of Interest: The author declares that there is no conflict of interest.

Source of Fundings: This study was self funded by the author.

Ethical Clearance: This study was approved by The Ethical Board Faculty of Dentistry, Airlangga University.

References


The Effect of Chromium Exposure on Creatinine and BUN Level of Tanners in Leather Industry in Magetan

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Abstract

Chromium in the leather tanning industry can have an impact on workers’ health. Kidney disease is often referred to as a side effect from exposure to chromium. Measurement of creatinine and BUN level is a method of examining kidney function.

The purpose of this study was to analyze the effect of chromium exposure on creatinine and BUN level in leather tanning workers in small leather industry in Magetan. This type of research is observational with cross sectional design. The sample of the study was 13 exposed worker groups namely chromium operators and 13 unexposed groups namely administrative workers.

The results showed that there were differences in the average levels of urine chromium in chromium operators and administrative workers (p-value = 0.000), there were differences in the average creatinine levels in chromium operators and administrative workers (p-value = 0.031), and there were no difference in the average level of BUN in chromium operators and administrative workers (p-value = 0.644). There were no influence of chromium levels in urine on the increase in creatinine levels (p-value = 0.189) and BUN (p-value = 0.854) in tanning workers, with a significance value of p-value> 0.05.

The conclusion of this study had that chromium was no effect on creatinine and BUN levels. High levels of urine chromium in tanning workers indicate a health risk that requires control effort. Suggestion given is that the tanners need periodic health examination, keep personal hygiene before and after working as well as using Personal Protective Equipment (PPE).

Keywords : chromium, creatinin, BUN, leather tanning

Introduction

Chemical material used in tanning process in chromium (Cr), in which 85% of the world’s leather is tanned by using chromium. In tanning industry, chromium can affect the tanners’ health. Chromium enters the body can be through direct contact of chromium with the skin, inhaled or swallowed by the body.

Kidney illness is often called as the side effect of chromium exposure. Chromium which is piled in the kidney will go through oxidation and reduction process where electrons are released. Electrons released have the characteristic of reactive or Reactive Oxygen Species (ROS). The increase of ROS in the body causes oxidative stress so that leads to damage of renal glomerulus cell. According to Pearce (2006), disorder of kidney function marked by the decrease of glomerulus filtration rate, so that the remaining metabolism substances including creatinine, urea, or BUN or creatinine which should be disposed causes the level decreases in urine, and increases in the blood instead.

The result of research conducted by Rasoul et al (2017) obtained that the exposure of chromium on the tanners in Egypt causes the significant mean of BUN and creatinine level on the tanners group who were exposed.
to chromium (18.01±5.2 and 0.61±0.26 mg/dl) higher than the group controlled (15.5±4.8 and 0.49±0.19 mg/dl). The increase of BUN and creatinine level in blood is one of the indicators of kidney function disorder.

Result of the work environment measurement on the preliminary survey in January 2019 using PDS (Personal Dust Sampler) obtained that from 3 points for 2 work hours, it was known that the chromium level in the air <0.0014 mg/cm³ which means that the chromium level in the air was still below the normal limit determined by the Regulation of the Ministry of Manpower of the Republic of Indonesia no. 5 of 2018 regarding the occupational safety and health of the work environment7 which is 0.5 mg/m³. However, based on the interview result on the indication of health complain conducted in the preliminary survey in 10 tanning industrial location in 10 chromium operators obtained data of health complain related to its workers which is itchy skin (60%), dizzy (40%), breathless (40%), tired (30%), dehydration (30%), low back pain (20%) and urinary disorder (10%) during working. This is also supported by the previous research conducted by Wibowo (2018)8. Based on the research, it was known that the mean of chromium level in the tanners’ blood was 36.1 µg/L which was more than the standard of health complain experience by the tanners.

Complain of low back pain and urinary disorder are ones of the indications of kidney function disorder symptoms9. According to Pusdatin (2017)10, the indication of chronic kidney disorder is the decrease of glomerulus filtration along with complain of being weak, nausea, decreased appetite, and decreased of body weight. The health complain occurred is possibly caused by the exposure of chromium. Based on the explanation above, it is considered that the analysis of the effect of chromium exposure on creatinine and BUN level on tanners in small leather industrial environment in Magetan is needed.

Method

The research design was observational through cross-sectional. This research was conducted in tanning industrial in Magetan in April-Mei, 2019. The research sample was 13 chromium operators who were exposed to chromium and 13 administrators who were not exposed to chromium. The data collection was performed through interview as well as urine and blood sampling. The examination of chromium level in urine used Atomic Absorption Spectrometry (AAS), while the creatinine and Blood Ureum Nitrogen (BUN) level were measure using Bartholot method. The data analysis was carried out using Mann-Whitney, anova and linear regression test.

Results

A. Characteristics of Worker

The individual characteristics in this research included were the education level, knowledge, personal hygiene, and the use of Personal Protective Equipment (PPE) including mask, glove, and boot. The illustration of workers characteristic frequency distribution was shown in Table 1.

| Table 1. Distribution of characteristics frequency on tanners in Magetan |
|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Characteristics Category        | chromium operators              | Administrators                  |
|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Education                       | N  | %       | n  | %       |
| Primary school                  | 2  | 15.38   | 0  | 0       |
| Secondary schools               | 6  | 46.15   | 2  | 15.38   |
| High school                     | 5  | 38.46   | 7  | 53.85   |
| College                         | 0  | 0       | 4  | 30.77   |
| Knowledge                       | N  | %       | n  | %       |
| Bad                             | 3  | 23.08   | 2  | 15.38   |
| Poor                            | 4  | 30.77   | 2  | 15.38   |
| Enough                          | 3  | 23.08   | 3  | 23.08   |
Table 1. Distribution of characteristics frequency on tanners in Magetan

<table>
<thead>
<tr>
<th></th>
<th>Well</th>
<th>23.08</th>
<th>6</th>
<th>46.15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal hygiene</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bad</td>
<td>2</td>
<td>15.38</td>
<td>2</td>
<td>15.38</td>
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<tr>
<td>Poor</td>
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<td>4</td>
<td>30.77</td>
<td>5</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPE Use of Mask</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>7</td>
<td>53.85</td>
<td>8</td>
<td>61.54</td>
</tr>
<tr>
<td>Sometimes</td>
<td>4</td>
<td>30.77</td>
<td>3</td>
<td>23.08</td>
</tr>
<tr>
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<td>2</td>
<td>15.38</td>
<td>2</td>
<td>15.38</td>
</tr>
<tr>
<td></td>
<td></td>
<td>58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPE Use of Gloves</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>7</td>
<td>53.85</td>
<td>11</td>
<td>84.61</td>
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<tr>
<td>Sometimes</td>
<td>4</td>
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<td>15.39</td>
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<tr>
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</tr>
<tr>
<td></td>
<td></td>
<td>58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPE Use of Boots</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>7</td>
<td>53.85</td>
<td>8</td>
<td>61.54</td>
</tr>
<tr>
<td>Sometimes</td>
<td>2</td>
<td>15.38</td>
<td>3</td>
<td>23.08</td>
</tr>
<tr>
<td>Yes</td>
<td>4</td>
<td>30.77</td>
<td>2</td>
<td>15.38</td>
</tr>
</tbody>
</table>

Based on Table 1, in terms of the education level, 6 chromium operators, 6 (46.2%) were Secondary schools, while 7 (53.85%) workers of the administrators were high school. The knowledge was determined based on their understanding on the chromium risk effect known by the workers. The chromium operators who had poor knowledge were 4 workers (30.77%), while the administrators who had good knowledge were 6 workers (46.15%).

Chromium operators who did poor personal hygiene were 7 (53.85%) workers, while the administrators who did well personal hygiene were 6 (46.15%) workers. The use of PPE was seen based on the equipment used by the workers including mask, glove and boot. Most of the chromium operators did not use mask as many as 7 (53.85%) workers, while the administrators who did not use mask were as many as 8 (61.54%) workers. In terms of the use of glove as PPE, most of the chromium operators did not use glove for as many as 7 (53.85%) workers, while the administrators who did not use glove were as many as 11 workers. In terms of the use of boot as PPE, 7 (53.85%) chromium did not use boot, while the administrators who did not use boot were as many as 8 (61.54%) workers.

B. The effect of workers’ characteristic on chromium level in urine

This research was conducted in order to know whether there was an effect of characteristics on the chromium level in urine on the chromium operators and administrator which was presented on table 2.
Table 2. The Effect of characteristic to urine chromium on tanners in Magetan

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Category</th>
<th>Urine Chromium</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Chromium operators</td>
<td>p-value</td>
<td>Administrators</td>
<td>p-value</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>primary school</td>
<td>46,514</td>
<td>13,114</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.035</td>
</tr>
<tr>
<td></td>
<td>secondary schools</td>
<td>38,434</td>
<td>11,703</td>
<td>13,75</td>
<td>0.899</td>
<td>5,452</td>
<td>5,189</td>
<td></td>
</tr>
<tr>
<td></td>
<td>high school</td>
<td>24,711</td>
<td>3,362</td>
<td>5,452</td>
<td>5,189</td>
<td>5,189</td>
<td>5,189</td>
<td></td>
</tr>
<tr>
<td></td>
<td>College</td>
<td>0</td>
<td>0</td>
<td>1,334</td>
<td>2650</td>
<td>1,334</td>
<td>2650</td>
<td></td>
</tr>
<tr>
<td>Knowledge</td>
<td>Bad</td>
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<td>1,221</td>
<td>13,75</td>
<td>0.899</td>
<td>13,75</td>
<td>0.899</td>
<td>0.017</td>
</tr>
<tr>
<td></td>
<td>Poor</td>
<td>30,405</td>
<td>4,715</td>
<td>9,122</td>
<td>5.392</td>
<td>9,122</td>
<td>5.392</td>
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</tr>
<tr>
<td></td>
<td>Enough</td>
<td>28,874</td>
<td>10,969</td>
<td>4,414</td>
<td>0.548</td>
<td>4,414</td>
<td>0.548</td>
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<tr>
<td></td>
<td>Well</td>
<td>28,037</td>
<td>6,357</td>
<td>2,002</td>
<td>4,883</td>
<td>2,002</td>
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<td>Personal hygiene</td>
<td>Bad</td>
<td>57,434</td>
<td>2,330</td>
<td>13,75</td>
<td>0.899</td>
<td>13,75</td>
<td>0.899</td>
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<tr>
<td></td>
<td>Poor</td>
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<td>5,597</td>
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<td>5.631</td>
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<tr>
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<td>Well</td>
<td>27,419</td>
<td>9,417</td>
<td>1,837</td>
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<td>1,837</td>
<td>2,556</td>
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<tr>
<td>PPE Use of Mask</td>
<td>No</td>
<td>42,456</td>
<td>11,032</td>
<td>5,759</td>
<td>5,357</td>
<td>5,759</td>
<td>5,357</td>
<td>0.013</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>26,691</td>
<td>1,749</td>
<td>3,996</td>
<td>6,905</td>
<td>3,996</td>
<td>6,905</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>21,613</td>
<td>2,039</td>
<td>6,472</td>
<td>9,140</td>
<td>6,472</td>
<td>9,140</td>
<td></td>
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<tr>
<td>PPE Use of Gloves</td>
<td>No</td>
<td>42,456</td>
<td>11,032</td>
<td>4,796</td>
<td>5,729</td>
<td>4,796</td>
<td>5,729</td>
<td>0.013</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>26,691</td>
<td>1,749</td>
<td>9,122</td>
<td>5.392</td>
<td>9,122</td>
<td>5.392</td>
<td></td>
</tr>
<tr>
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<td>Yes</td>
<td>21,613</td>
<td>2,039</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>PPE Use of Boots</td>
<td>No</td>
<td>42,129</td>
<td>11,530</td>
<td>5,759</td>
<td>5,357</td>
<td>5,759</td>
<td>5,357</td>
<td>0.021</td>
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<tr>
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<td>0,340</td>
<td>3,996</td>
<td>6,905</td>
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<tr>
<td></td>
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<td>2,575</td>
<td>6,472</td>
<td>9,140</td>
<td>6,472</td>
<td>9,140</td>
<td></td>
</tr>
</tbody>
</table>

Based on Table 3, the characteristics of education, knowledge, personal hygiene, the use of PPE of mask, glove and boot affect the urine chromium level at the chromium operators. The characteristics of education, knowledge and personal hygiene affected the urine chromium level at the administrators.

C. The difference of Urine Chromium, Creatinine Level and BUN Level
The mean difference between chromium operators and administrators can be seen in Table 3.

**Table 3. The mean difference of urine chromium, creatinine level and BUN level on the tanners in Magetan**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Chromium operators</th>
<th>Administrators</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean±SD</td>
<td>Mean±SD</td>
<td></td>
</tr>
<tr>
<td>Urine Chromium (μg/l)</td>
<td>34,40±12,12</td>
<td>5,46±5,693</td>
<td>0,000</td>
</tr>
<tr>
<td>Creatinine (mg/dL)</td>
<td>1,046±0,105</td>
<td>0,861±0,236</td>
<td>0,031</td>
</tr>
<tr>
<td>BUN (mg/dL)</td>
<td>18,93±2,75</td>
<td>19,29±2,22</td>
<td>0,644</td>
</tr>
</tbody>
</table>

Based on Table 3, the mean of urine chromium level for the chromium operators was 34,40 μg/L, while the mean of chromium level in urine for the administrators was 5,46 μg/L. The urine chromium level of the chromium operators was higher than the administrators.

The mean of creatinine level for the chromium operators was as much as 1,0462 mg/dL, while the administrators’ was as much as 0,8615 mg/dL. This means that the creatinine level at the chromium operators was higher than the administrators.

The mean of BUN level on the chromium operators was 18,93 mg/dL, while on the administrators was 19,29 mg/dL. This means that there was no difference on the BUN level between the chromium operators and administrators.

D. The effect of urine chromium exposure on creatinine and BUN level

This was carried out to know whether there was an effect of chromium level in urine on the creatinine and BUN level on the tanners using linear regression test. The research result can be seen in table 4.

**Table 4. The effect of chromium exposure to creatinine and BUN level on the tanners on Magetan**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Creatinine</th>
<th>BUN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>p-value</td>
<td></td>
</tr>
<tr>
<td>Urine Chromium</td>
<td>0,003</td>
<td>0,189</td>
</tr>
</tbody>
</table>

Based on Table 4. The effect of urine chromium level on creatinine and BUN level on the tanners had significance value or p-value > 0,05, which means that the urine chromium did not affect the creatinine and BUN level on the tanners in Magetan.

**Discussion**

Based on this research note that the level of education affect chromium urine on workers operator chromium and administration. High education level encouraged the increase of health status since the knowledge of the danger of substances used in tanning process was known. One of the supporting factors of someone behavior is the education level. So, the education level of someone determines the level of someone in behaving and acting.

Personal hygiene on tanners was known to be poor. This caused the entrance of chromium into body and increased in urine during excretion. This was due to the workers who seem to wear clothes when they had their meal. According to Were et al., (2014) on the research of tanners in Kenya, it obtained that poor personal hygiene caused the entrance of chromium into the body.
The result of the characteristic effect of the use of PPE including mask, glove and boot only affected the chromium operators and did not affect the administrators. The chromium operators did not use PPE such as mask, glove and boot during the tanning process. The custom of using PPE is one of the ways to decrease the workers’ risk of chemical exposures during the production, considering the chromium exposure route is respiration, absorption on the skin, and digestion route

The urine chromium level of the chromium operators was higher than the administrators’. According to Rosul et al., (2017) on the tanners in Mesir, it was known that the urine chromium level on the workers who were exposed to the chromium was higher than the workers who were not exposed. According to ACGIH (2005) BEIs (Biological Exposure Indices) of chromium in urine is as much as 25 µg/L.

The high level of chromium in the urine of chromium operators can be caused by the intensity of working period, the length period of working with chromium as well as the entrance path of chromium into the body. According to Rosul et al., (2017), the working duration of tanners in Mesir who worked for more than 8 hours caused the tanners to be exposed to the chromium concentration in the air in the tanning working environment.

Creatinine level of the chromium operators and administrators was caused by their working activity, where the chromium operators were exposed to chromium every day. In addition, the chromium operators also need more energy because of their heavy work. This is different from the administrators whose working pattern was in the room so that they were not exposed to chromium and their activity was light so that they did not need more energy. The creatinine level does not only depend on muscle mass, but also the muscle activity, diet and health status. The reference value of creatinine level in blood at adult male of 0.6 – 1.1 mg/dL, while for the female was 0.5 – 0.8 mg/dL.

There was no difference of BUN level between the chromium operators and administrators since both groups had BUN level above normal. The reference value of BUN level in blood as much as 6 – 20 mg/dL.

Based on the results of the impact that the level of known chromium urine will not effect the creatinin and bun on tanning leather workers in magetan. This research concluded that the effect chromium did not lead to the kidney function disorder yet, although the urine chromium mean value was above normal.

This could be possibly caused by other factors including eating pattern, diet, protein consumption, working period, and exposure frequency on the workers. According to Wang et al., (2010), the determination of high chromium level in urine which can significantly increase the serum urea level, creatinine level and the excretion of urine micro albumin showed the existence of damage in kidney tubules.

**Conclusion**

This research showed that the chromium exposure did not affect the creatinine and BUN level. The high chromium level in urine on the tanners showed that there was health risk so that effort of control was needed. Suggestion given is that the tanners need periodic health examination, keep personal hygiene before and after working as well as using Personal Protective Equipment (PPE).

**Conflict of Interest:** The authors inform that they have no conflict of interest

**Source of Funding:** This work has been supported by Annual budget of Public Health Faculty, Airlangga University

**Ethical Clearance:** Ethical approval was received from Health Research Ethical Clearance Commition, Public Health Faculty Airlangga University with standart WHO (2011) and CIOMS certificate number: 117/HRECC.FODM/IV/2019

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The Relationship Between Husband Support and Health Workers Support with Exclusive Breastfeeding Behavior in Sidotopo Village, Surabaya, Indonesia

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Abstract

Exclusive breastfeeding is breast milk given to babies from birth to 6 months without added food or drinks except drugs for medical indications. Many factors can affect mothers in giving exclusive breastfeeding. The purpose of this study was to analyze the relationship between husband’s support and the support of health workers with exclusive breastfeeding. The research used observational analytic method with cross sectional research design. The sample in this study were 65 mothers who have baby aged 7-12 months in Sidotopo Surabaya. The research used simple random sampling technique with Chi-square test with 95% confidence level. The results showed there was no correlation between husband support (p = 0.426) and health workers support (p = 0.166) with the behavior of mothers in exclusive breastfeeding. The conclusion of the study is that there is no significant correlation between husband support and health workers support with the behavior of mothers in exclusive breastfeeding. So it is necessary to increase counseling about the importance of exclusive breastfeeding, family planning counseling and lactation management.

Keyword: Exclusive breastfeeding, husband support, health workers support

Introduction

Exclusive breastfeeding is breast milk given to babies from birth to 6 months without added food or drink except drugs for medical indications. The benefits of exclusive breastfeeding are that it can support the growth and development of the baby. Whereas, the nutrients contained in breastmilk are like fat, protein, carbohydrates, vitamins and contain protective or immune substances(¹).

WHO and UNICEF recommend the importance of exclusive breastfeeding in infants because it can reduce infant mortality and can speed up the recovery of babies when they are sick. Exclusive breastfeeding given to babies can protect against common diseases suffered by babies such as diarrhea, pneumonia and have long-term benefits such as reducing the risk of being overweight and obesity in childhood and adolescence.

Based on other studies breast milk can reduce infant morbidity by 10 to 20 times and can reduce infant mortality 1 to 7 times, especially in infants who have a age of 4-6 months(²). One developing country that still has the problem of giving exclusive breastfeeding is Indonesia. The number of Indonesian women who provide ASI is 96%, but only 42% of babies under the age of 6 months are still exclusively breastfed. Based on Indonesian health profile data for 2017, the percentage of infants who get exclusive breastfeeding until the age of 6 months is only 35.73%. This is far from the national target set at 80%.

East Java Province is one of the provinces that have not met the National target in the scope of exclusive breastfeeding which is equal to 74% in 2016. As in one city in East Java, Surabaya is the advanced and largest city in Indonesia that exclusive breastfeeding coverage is still below the national target of 65.1% in 2017.
The Indonesian government has made various efforts to increase the coverage of exclusive breastfeeding. One of the efforts made was to make a policy on exclusive breastfeeding as in UU No. 36 of 2009 pasal 128 concerning health and PP (Government Regulation) No. 33 of 2012 concerning Provision of Exclusive ASI. The Surabaya City Government also made efforts in the Surabaya City Regional Regulation number 2017 on Health Efforts, one of which is to provide facilities for workers namely breastfeeding mothers through the provision of facilities for breastfeeding companies and agencies, providing opportunities for working mothers to provide breast milk Exclusive or pump breast milk during work time at work, and making internal workplace regulations that support the success of the Exclusive Breastfeeding program.

Many factors can affect mothers in giving exclusive breastfeeding. As is the case with research in the Cilacap Tengah I Public Health Center, Cilacap District, things that can affect exclusive breastfeeding are maternal age, maternal knowledge, and family support factors. Husbands support and health workers support have an important role in the success of exclusive breastfeeding.

The coverage of exclusive breastfeeding in Sidotopo Community Health Center in 2014 was 60.44% and decreased in 2015 which was 59.39%. In 2016 the coverage of exclusive breastfeeding in the work area of Sidotopo Community Health Center did not increase or decrease or stagnate at 59.39%.

The purpose of this study was to analyze the relationship between husband support and health workers support with exclusive breastfeeding behaviour.

Material and Method

The method in this study is analytic observational using a cross sectional research design. The population in this study is mothers who have babies aged 7-12 months in Sidotopo Village, Surabaya City. It is known that mothers who have babies aged 7-12 months number 148 people. Then the sample obtained in this study were as many as 65 mothers who had babies aged 7-12 months and were taken randomly using a simple random sampling method. This study was conducted in May to June of 2019.

In this study, the variables studied were husband’s support and health staff support as independent variables. Meanwhile, the dependent variable is the behavior of mothers in exclusive breastfeeding. Data collection in this study used a questionnaire sheet and analyzed using the chi square test with α less than 0.05.

Findings

Description and Research Location

Sidotopo Village is one of the villages in Semampir District, Surabaya. The total area of Sidotopo Village is 40 Ha with a population in 2018, namely a total of 16839 people and a total of 18552 people, with a total family of 10598 households.

Sidotopo Village also has several health facilities such as 1 unit Maternity Hospital, 1 pharmacy unit, and 1 unit of health center in the area. Sidotopo Village consists of 12 RW with 96 RT and 15 posyandu.

In addition, the Surabaya City Health Office also has a program in an effort to increase exclusive breastfeeding. The program is like Breastfeeding Village, Breastfeeding Motivator Cadre, Smart Mother Class, Pregnant Women Companion and others. Sidotopo Health Center has also implemented the program in its working area as in Sidotopo Village.

Description of Exclusive Breastfeeding Behavior

The following are the results of research on the description of exclusive breastfeeding behavior.

<table>
<thead>
<tr>
<th>Exclusive breastfeeding behavior</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breastfeeding</td>
<td>19</td>
<td>29.2</td>
</tr>
<tr>
<td>Not exclusive breastfeeding</td>
<td>46</td>
<td>70.8</td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
<td>100</td>
</tr>
</tbody>
</table>

Based on Table 1, above show that more than half of mothers do not give exclusive breastfeeding to their babies as much as 70.8% of 65 respondents. While the behavior of mothers who give exclusive breastfeeding is only 29.2%. This means that there are very few mothers who have the awareness to give exclusive breastfeeding to their babies.
Description of Husband Support and Health Workers Support

The following are the results of research on the description of husband support and health workers support.

Tabel 2. Distribution of husband support and health workers support Kesehatan di Kelurahan Sidotopo Surabaya

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Husband support</td>
<td>Support</td>
<td>45</td>
<td>69,2</td>
</tr>
<tr>
<td></td>
<td>Not support</td>
<td>20</td>
<td>30,8</td>
</tr>
<tr>
<td>Health worker support</td>
<td>Support</td>
<td>46</td>
<td>70,8</td>
</tr>
<tr>
<td></td>
<td>Not support</td>
<td>19</td>
<td>29,2</td>
</tr>
</tbody>
</table>

Based on Table 2, above show that more than half of mothers get husband support that is equal to 69.2% of 65 respondents. While mothers who have support from health workers are 70.8% of 65 respondents. This means that mothers who have support from their husbands and support from good health workers for exclusive breastfeeding behavior.

Relationship between Husband Support and Health Workers Support with Exclusive Breastfeeding Behavior

The following are the results of research on the relationship between husband support and health workers support with exclusive breastfeeding behavior.

Tabel 3. The relationship between husband support and health workers support with exclusive breastfeeding behavior in Sidotopo Village, Surabaya

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Exclusive breastfeeding behavior</th>
<th>TOTAL</th>
<th>P- value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Breastfeeding</td>
<td>Not Breastfeeding</td>
<td>n</td>
</tr>
<tr>
<td>Husband support</td>
<td>Support</td>
<td>15</td>
<td>33,3</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Not support</td>
<td>4</td>
<td>20,0</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>19</td>
<td>29,2</td>
<td>46</td>
</tr>
<tr>
<td>Health Worker support</td>
<td>Support</td>
<td>16</td>
<td>35,6</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>Not support</td>
<td>3</td>
<td>15,0</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>19</td>
<td>29,2</td>
<td>46</td>
</tr>
</tbody>
</table>
Based on Table 3, above show that the exclusivity in Sidotopo Surabaya is still relatively low. This is because of some reasons mothers do not give exclusive breastfeeding. These reasons are like the milk can not flows well, so that the mother no longer gives breast milk to her baby. The fact is that if the mother increases her breastfeeding frequency, it will increase milk production.

Breast milk can not flows well caused by a lack of care for the breast during pregnancy or before giving birth. In addition, there were some mothers who claimed that their breast milk not smooth because they participated in a family planning program. The condition is in accordance with the results study that inappropriate use of family planning indeed affects mother’s milk production(4).

Another reason for the mother not giving exclusive breastfeeding is because of the mother’s assumption that her baby is fussy and cries constantly because she is hungry, so the mother decides to provide additional food and drinks before the baby’s age is 6 months. The food provided is in the form of bananas, team rice and porridge, while the drink is formula milk. This action actually affects the health of babies who have not reached the age of 6 months. The impact on the health of the baby is in the form of respiratory tract disorders and the digestive tract of the baby.

Factors of social support consist of husband’s support and support from health workers for exclusive breastfeeding. Based on the results of the study showed that there was no significant relationship between husband’s support and exclusive breastfeeding behavior. is in accordance with study in Kademangan Sub-district, Blitar Regency. It was found that there was no significant relationship between husband’s support and the behavior of mothers in exclusive breastfeeding(5).

Husband support is one of the factors that can affect the success of mothers in giving exclusive breastfeeding. The form of husband’s support is given starting from information support, emotional support, instrumental support and award support. The form of husband’s support is like the husband informs the mother that the baby can only be given breast milk until 6 months, helps the mother’s daily activities in managing the household and hears complaints when the mother is tired.

The results of this study also show that there is no significant relationship between the support of health workers with exclusive breastfeeding behavior. This is in accordance with research in the RI Ministry of Health that there is no significant relationship between the support of health workers and the behavior of mothers in exclusive breastfeeding(6).

However, this study is not accordance with research in the Wundulako Health Center in Kolaka Regency that there is a significant relationship between the support of health workers and exclusive breastfeeding behavior(7). Support from health workers is very important especially during pregnancy and postpartum. This is because the information obtained from health workers will be a provision for mothers to prepare to breastfeed their babies. In accordance with the theory that health worker support influences a person’s behavior, so that someone will be able to determine his own healthy behavior(8).

The presence of mothers who have support from health workers but do not provide exclusive breastfeeding is due to the influence of giving formula milk because there is an assumption that this is the case more practical. In addition, according to the mother, health workers cannot monitor directly to the mother to continue giving her milk until the age of the baby is 6 months.

Conclusion

The conclusions in this research are as follows: there is no significant relationship between husband’s support and behavior in exclusive breastfeeding. There is no significant relationship between the support of health workers and the behavior of exclusive breastfeeding

Recommendation

1. Increasing counseling activities to mothers and husbands about the importance of exclusive breastfeeding and the impact on the health of the baby when given additional food and drinks before the age of 6 months.

2. Inviting mothers to participate in family planning counseling, so that mothers can choose a suitable family planning program and not inhibit exclusive breastfeeding.

3. Optimizing training activities for health workers such as doctors and midwives about management of lactation or breast care for pregnant women during counseling, so that mothers prepare to breastfeed their babies from birth to 6 months of age.
Conflict of Interest: All authors have no conflicts of interest to declare.

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Ethical Clearance: The study was approved by the institutional Ethical Board of the Public Health, Airlangga University.

Reference
Human Rights Based Law Protection Model for the Mental, Spiritual and the Healing Victims of Child Trafficking In Indonesia

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Abstract

Abstract: The protection needed by children to face the reality of being the victims of child trafficking is not only physical protection, but mental, spiritual, and social healing as well. The punishment system still focuses on criminals instead of the victims. The law protection model for the victims of child trafficking in Indonesia is not comprehensive, so there is little chance that the victims get their rights. Although Act Number 21 Year 2007 has guaranteed the victims’ rights, the chance to get their rights is relatively minimal.

Keywords: law protection, children, trafficking and human rights

Introduction

Indonesia is still considered weak in handling trafficking in person cases. Indonesia Tier-2 has arranged minimum policies as a deterrent to human trafficking. The law enforcement needs to be in accordance with the applicable law, Pancasila and the the 1945 Constitution of the Republic of Indonesia, and human rights. There are regulations related to the victims of child trafficking, for example Article 2 of Act Number 21 Year 2007 on the Eradication of the Criminal Act of Trafficking in Persons that states, an act of recruitment, transportation, storage, shipping, transfer or acceptance of somebody with the threat of violence, the use of violence, confinement, falsification, fraud, abuse of power, or vulnerable position, debt bondage, or giving payment or benefits, so that the perpetrator gets permission from the person who have control of somebody else, whether it is done domestically or internationally, in order to exploit or make somebody to be exploited. The birth of the Protocol to Prevent, Suppress and Punish Trafficking in Persons, Especially Women and Children as one of the protocols created from the United Nations Convention Against Transnational Organized Crime in Palermo, 12th – 15th December 2000, as stated by Bank Data KPAI is a very useful international instrument to prevent and fight trafficking in persons, and especially child trafficking.

According to the background above, the writer conducted two main problems that will be discussed is Why is the law protection on the victims of child trafficking? And How is the ideal human-rights-based law protection model for the victims of child trafficking?

Research Method

Normative research method is used in this paper, which is a research done with library studies. The discussion is based on the theories, legislations, documents, law journals, paper, and references which are relevant to the research topic, as stated by Marzuki.

Result and Discussion

1. The Law Protection for The Victims of Child Trafficking

Children are the most vulnerable group to the criminal act of human trafficking. As stated by Norris, “Child Trafficking, whilst not a phenomenon, remains a heinous activity as children are the most vulnerable members of society, yet it is exactly this vulnerability
that makes trafficking possible in the first instance. Official statistic by the Home Office and the United Nations highlight a continuing increase in this “industry” and whilst most of society holds the notion that children are not a commodity to be bought and sold, there remain a small but determined proportion of the population who are willing to exploit children for profit.”

In 2014 (January-April), there are 600 cases and 876 victims, 137 of which are child perpetrators, as stated in the UAJY Library.(5) In 2016, there are 99 prostitution victims. Today, according to the data of KPAI (The Indonesian Commission on Child Protection) during 2016, the trend of child sexual crimes tends to increase. In that year, there are 1,593 cases of children sexual crimes. According to Mia(6), 25 cases among them are online sexual crimes. Article 1 paragraph (2) of Act Number 35 Year 2014 Amendment of Act Number 23 Year 2002 on Children Protection defines Children Protection as any activities to guarantee and protect children and their rights to live, grow, thrive, and participate optimally according to their human dignity and get protection from violence and poverty. The victims of child trafficking are usually used in prostitution and exploitation. The protection for the victims of child trafficking is regulated in Act Number 1 Year 2007 on The Eradication of The Criminal Act of Trafficking in Persons. Chapter V paragraph 43 stated that the protection for the witness and victim is conducted based on Act Number 13 Year 2007 on the protection of witness and victim. The protection model based on Act Number 1 Year 2007 on The Eradication of The Criminal Act of Trafficking in Persons does not differentiate between children and adults, article 44 stated that the victims are given the right of confidential identity for the victims, witnesses, and their family until the second degree. Article 47 gives the police the duty to provide protection before, during, and after the process of case review.

2. The Ideal Law Protection Model for The Victims of Child Trafficking

Trafficking victims do not only have the right to get law protection, but to get rehabilitation as well because they suffer economically, physically, and psychologically. Rehabilitation can be attempted by conducting mentoring by the non-governmental organizations or the child-protection-related organizations. The rehabilitation is expected to return and heal victims’ condition both physically and psychologically. The mentoring conducted by the NGOs in attempting the rehabilitation for the victims of child trafficking has the same purpose, but there are differences in terms of the technique of socialization based on the needs of child trafficking victims. The act on human trafficking has been enacted, but the local legal protection in city / regency level is highly expected since the local regulations will be very helpful in stimulating the effectiveness of the central legislation implementation. The implementation of the local regulations have 5 (five) purposes: 1) Prevent all forms of violence and trafficking in persons against women and children; 2) Protect women and children victims of violence and human trafficking; 3) Punish the perpetrators of violence and trafficking of women and children; 4) Provide security for women and children victims of violence and trafficking in persons; 5) Heal the physical, psychological and economic conditions of women and children victims of violence and trafficking, as stated by Absor.(7) Act Number 23 Year 2014 on Local Government supports that child protection becomes regional obligatory affairs, as quoted from Sindonews.(8) Although the legal instruments have been owned, on its progress, the Act Number 23 Year 2002 on Child Protection as amended by the Act Number 35 Year 2014 still cannot work effectively since there are some overlaps between sectoral legislations regarding to the definition of child. The amendment of Act Number 23 Year 2002 on Child Protection also confirms the need for punishment and fines for the perpetrator of criminal action against children, in order to give a deterrent effect, and stimulate concrete actions to heal the physical, psychological, and social condition of the victims of child trafficking and/or the children of the criminals. Integrative efforts are the responsibility of the society and state to realize the better survival of the victims of child trafficking, in which these efforts involve all components of the society and family. This step makes the victims of child trafficking feel that chances exist in their society and family. The importance of child trafficking victim’s protection, in order to observe the victim – offender relationship for the sake of judicial process, both to seek for the perpetrators’ responsibility, and to determine the form / amount of restitution and/or compensation for the victims. The state takes over the responsibility of the security of all its citizens because when a crime happens to a victim, it is as if the crime destroys the system of trust, so the function of law is to return the trust to the victim. The reformation of policy formulations is expected to overcome the social problems so that a prosperous society can be realized. Legislation emerges regarding to the protection of witnesses and victims to cover the lacks
of KUHAP (Criminal Code Procedure), for example Act of The Republic of Indonesia Number 31 Year 2014 on Witness and Victim Protection, and Act of The Republic of Indonesia Number 11 Year 2012 on Child Criminal Justice System. The legal aid attempts to give solution in developing the legal protection for the victims of child trafficking by accommodating the children’s experience of being victims of child trafficking, especially those who experience sexual exploitation. In which it shows the correlation process between the authorities that handle law protection for the victims of child trafficking and the easy-and-effective service techniques for the process of law protection for the victims of sexual exploitation in child trafficking.

The law protection is realized in various ways such as those existing in the concept of integrated law protection on the victims of child trafficking, for example by: a) Coordinating and working on the mechanism between the authorized agencies in providing legal protection for children of human trafficking victims (child trafficking) and understanding the needs of victims; b) Renewing, developing of ideas and thoughts of revising policy formulations relating to the issues of legal protection for children of human trafficking victims (child trafficking); c) Estimating the budget for dealing with legal protection for child victims of human trafficking (child trafficking), which starts from the process of mentoring, investigating, examining and restoring good names for victims. d) Communities are sensitive and responsive to their environment in monitoring cases of human trafficking (child trafficking); e) Providing human resources assistance, such as psychologists for human trafficking victims (child trafficking) in order to solve the problem of human trafficking crime (child trafficking); f) Providing a special room to conduct examinations, especially in sub-districts, in order to handle human trafficking crimes.

The development of human rights protection principles through children law protection has always been the focus in the International Documents of the United Nations on Human Rights, for example Universal Declaration of Human Rights (UDHR); International Covenant on Civil and Political Rights (ICCPR); International Covenant on Economic, Social and Cultural Rights (ICESCR), The Convention on the Rights of the Child (CRC); Convention Against Torture And Other Cruel, Inhuman or Degrading Treatment or Punishment. The approach used in the judicial system to help the victims of trafficking (child trafficking), such as: the role taken by the law enforcements such as police, prosecutors, court, and correctional institution; through normative approach by implementing the applicable laws; through administrative approach by means of a management organization that has a working mechanism, with vertical relationships based on the prevailing organizational structure; through social approach where an inseparable part of the social system so that the whole community is partially responsible for the success or failure of the law enforcement agencies. The multi-pressure that happens to the victims of child trafficking and the perception of human trafficking (child trafficking) in the society shall result in the enforcement of policy formulations of child trafficking, the perpetrators of child trafficking will be given severe punishment such as death sentence or castration for those who commit sexual crime. Synergy of regulation is needed to protect the victims of child trafficking. In its implementation, the national legislation regulations do not give deterrent effects to the perpetrators of human trafficking (child trafficking). Local regulations are initiated by mapping the problems of child trafficking through stakeholder workshops from the government, NGOs, labor union, college, etc. The forum involves all stakeholders such as from social authorities, police, labor offices, family planning office, education authorities, regional development agency, public health agency, labor and migrant union, NGO, society, mass organization, college, and public education center. Those forums are useful in overcoming children trafficking because those forums act as a place to solve various problems and coordinate for the action to overcome trafficking, as stated by Absor. Some forms of children protection such as placing them in social homes are funded by Jamkesmas (public health insurance) which sources are the State Budget, Budget Implementation List, Local Government Social Work Unit, Local Government Work Unit on Transmigration and Labor, NGO which coordinates with the Local Government Social Work Unit, by attaching a certificate as resident of a hall, halfway house, foundation, or social homes, where the victims can get treatment (Act Number 11 Year 2009 on Social Welfare). If the social rehabilitation is done by the NGO, then the funding can be obtained from the State Budget which coordinates with the Ministry of Social Affairs or the Local Government Budget which coordinates with the Local Government Social Work Unit. It needs capability and capacity to make local regulation, especially regarding to the prevention
and protection of the victims of child trafficking. When making the regulations, the local government needs to refer to the Act Number 21 Year 2007 on the Eradication of the Criminal Act of Trafficking in Persons and Government Regulation Number 9 Year 2008 on National Action Plan for the reference for their activity. The positive expectation for the eradication of trafficking emerges when utilizing the established conditions that leads to the removal of trafficking that is supported by 1) Government’s commitment, as shown by the ministry of woman empowerment; 2) The growth of community-based services that can be utilized to eliminate women and children trafficking; 3) Availability of community service facilities in terms of education, social and health; 4) Regional autonomy will be more efficient and effective in eliminating trafficking; 5) The existence of community organizations or non-governmental organizations that care about women and children; 6) The development of human rights enforcement; 7) Openness; 8) Democratization; 9) International commitment; 10) The existence of international institutions that support the eradication of trafficking; 11) Involvement of international NGOs observing women and children; 12) The information technology that supports the eradication of women and children trafficking, as quoted from Abdussalam. To get optimum results in conducting those duties, some actions need to be taken, for example creating strategic alliance with the related sectors and stakeholders to build collective commitment as the framework of policy-making in all sectors; harmonizing international law instruments into the national law that strengthen the efforts to eradicate children trafficking; make an agreement with the legislature so that each Laws and Regional Regulations drafting considers the importance of children protection from trafficking; strengthening the coordination with local government in preventing and eradicating children trafficking; expanding the source of funds to support the eradication of trafficking; building strong cooperation with all components of the society so that trafficking eradication can become a collective program.


Conflict of Interest : No
Ethical Clearance : Yes
Source of Funding : Authors

Conclusion

1. The law and human rights protection to the victims of child trafficking is regulated in the national legislation system. The implementation of law protection to the victims of child trafficking is not appropriate yet, such as the appropriateness to the principles and regulations of children protection against child trafficking, the principles and regulations of children in the perspective of restitution, compensation and rehabilitation and non-legal policies, and the principles and arrangements for child protection in the perspective of regional autonomy.

2. The law protection model is integrated with the formulation of women and children trafficking eradication policies, and by providing special regulations regarding to law protection for the victims of children trafficking. The revisions for future policies do not totally use applicable law, but they are more adjusted to the needs of the child. Strict sanctions need to be given to make deterrent effects, without setting aside the needs of the child.

Reference

1. Act of The Republic of Indonesia Number 21 Year 2007 on the Eradication of the Criminal Act of Trafficking in Persons [Indonesia].


Potential of Hospital Fraud in the Indonesia National Health Insurance Era (A Descriptive Phenomenological Research)

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Abstract

Results of the Public Research Anti Corruption Clearing House The Corruption Eradication Commission submitted on December 2, 2016 that until mid-2015 there was a potential of 175,774 hospital claims of fraud that had been detected with a value of Rp. 440 M. In 2016 found an indication of 1 million fictitious claims from the hospital with a value of Rp. 2 trillion. The potential for fraud in hospitals in the era of National Health Insurance (NHI) in Indonesia will have an impact on health financing inefficiencies and at the same time a threat to the sustainability of the NHI program which is expected to reach Universal Health Coverage in 2019. This phenomenological study aims to explore understanding and meaning of the concept of fraud for parties who has had the potential to commit fraud at the hospital. The research method used qualitative research with a Descriptive Phenomenology Research approach. The informants were officers who served patients in administrative and medical matters and the hospital management was selected by purposive sampling. The focus of the study was the experience felt by informants in running the NHI program and how knowledge and attitudes of informants towards the phenomenon of fraud in hospitals. The results achieved in this phenomenological research were in the form of a reflection of the implementation of NHI in hospitals, especially relating to the phenomenon of potential fraud reflected in the knowledge and attitudes of the hospital about fraud and a description of the occurrence of fraud in the hospital. This is the basis for researchers to formulate indicators of potential fraud that still needs to be tested in a larger population.

Keywords: fraud, hospital, health insurance.

Introduction

Healthcare fraud is intentional deception or misrepresentation that an individual knows, or should know, to be false, or does not believe to be true, and makes, knowing the deception could result in some unauthorized benefit to himself or some other person(s).

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(1) Reforming health care financing is an unavoidable consequence. Gradually the community will switch from out of pocket payments to premium payments paid monthly. Likewise for health service providers must start leaving the old payment mechanism (fee for services) to be claims based on Indonesia Case Based Group (INA-CBG). (2) The Social Security Organizing Body (BPJS) Health as the organizer of National Health Insurance (NHI) has a payment mechanism to health care providers namely capitation for primary outpatient health facilities and claims based on INA-CBG for Advanced Referral Health Facilities both inpatient and outpatient. (3) The change in the payment system will potentially lead to fraud or fraud, where the diagnosis is regulated to obtain the largest CBG amount called upcoding.
(increasing the code with a larger payment). Acts like this are actually acts of corruption that are against the law. The Government of Indonesia has been concerned with the prevention of fraud in the implementation of the Health Insurance Program in the National Social Security System. The Government of Indonesia has given attention and anticipation of fraud in the implementation of NHI.

Definition of fraud (Fraud) in the Implementation of the NHI Program according to the regulation is the action taken intentionally by participants, BPJS Health officers, health service providers, as well as providers of drugs and medical devices to obtain financial benefits from the health insurance program in the National Social Security System through cheat that is not in accordance with the provisions.

The problem of fraud in Indonesia that is of concern today is illustrated by an article posted by the Public Research Anti Corruption Clearing House of the Corruption Eradication Commission (KPK) on December 2, 2016 which stated that up to mid-2015 there were 175,774 claims of fraud, or FKRTL with a value of Rp. 440 M. In 2016 found an indication of 1 million fictitious claims from the hospital with a value of Rp. 2 trillion. This fraud potential is only from a group of health service providers, not from other actors such as BPJS Health staff, patients, and suppliers of medical devices and drugs. The biggest form of fraud potential is done by upcoding which reaches 50%, then another 25% is done by unbundling, and then the third is by reading with a value reaching 6%. Also stated in the article that INA CBG rates that are considered low by clinicians and the high workload make them think of unnatural efforts to defend themselves (coping strategy) so as not to lose money.

The potential for fraud is also a concern of the one district in east java which was stated directly by the Regent to fight it. This Regency has 3 regional hospitals, 1 provincial-owned hospital, 2 state-owned hospitals, and 6 private hospitals. Based on the results of interviews with the Head of Health BPJS Branch on November 13, 2017, information was obtained about the potential fraud reported in the form of potential claim fraud from hospitals detected through intelligence business in the form of applications developed to assist in the claim audit process. The menus provided include DeFraida (data fraud detection). Through this application display, a warning system in the form of red flag is provided for claim transactions that are indicated as potentially fraud. This red flag is the basis for BPJS verifier officers to clarify and trace data to ascertain whether there is an element of error and intentions in filing claims that are indicated by fraud. This is what underlies the selection of the Jember Regency as a place of research.

Phenomenology study according to Packer is a reflective study of the essence (core) of the awareness experienced from the perspective of the first person, namely the perspective of people who experience an event or event directly. The event referred to in this study is the potential for fraud in the implementation of the NHI program which has changed the health care and financing system in Indonesia. Phenomenological studies are widely used for policy implementation research so that it can describe the experience of implementing policies that determine the success or failure of a policy.

**Method**

The research method used qualitative research with a Descriptive Phenomenology Research approach because what is the object of research is the experience of informants in running the NHI program as an event or transition event of health care and financing policies. The informants were officers who served patients in administrative and medical matters and the hospital management who were willing to fill out informed consent and were selected by purposive sampling. The confidentiality of informants and institutions where research was conducted was the responsibility of the researcher.

The focus of the study was the experience felt by informants in carrying out the NHI program and how the knowledge and attitudes of informants towards the phenomenon of fraud in hospitals. Research transcripts are the basis for processing and analysis using the Descriptive Phenomenological Analysis (DPA) approach. According to Kahija that DPA moves from all the informants’ words in the transcript to the core meaning of all the informants’ words.

**Results**

The informants were chosen based on their involvement in the implementation of JKN policies and the phenomenon of potential fraud in hospitals. After conducting interviews with research informants, the results of the interviews are presented in the transcript. Research transcripts form the basis for processing and analyzing with the Descriptive Phenomenological Analysis (DPA) approach. The results will be divided
Knowledge of Fraud

This study of knowledge aims to understand the most fundamental aspects of the phenomenon of fraud in hospitals. Knowledge about fraud will provide an overview of the extent to which this potential fraud is understood by hospital practitioners. Descriptions of knowledge are needed considering that the implementation of national health insurance in Indonesia has only begun in 2014. The potential for fraud as one of the problems that arise in the implementation of fraud is the concern of the government and health practitioners today.

The results showed that the informants have had enough knowledge about fraud that might occur in the hospital. This is indicated by the participation of informants in the dissemination of regulations on fraud in the NHI era held by hospitals, BPJS, as well as from professional organizations. The results of the interview indicated an expression of disagreement, especially from the clinician informants on the concept of fraud as outlined in government regulations. The informant mentioned “…the term “fraud version of BPJS” as a form of rejecting the concept of fraud as what informants understood and felt while providing services…” (Informant TR06, lines 8-9). Informants try to provide a rationalization of the potential for hospital fraud. Rationalization is an act that seeks justification by people who feel themselves trapped in a bad situation.

Situation Awareness

Implementation of national health insurance will have an impact on the situation in the hospital. The hospital is required to make changes and adjustments in order to carry out its functions in the new regulations. The potential for fraud as one of the negative consequences of implementing national health insurance must be fully realized by the hospital. Fraud actions, in addition to being contrary to moral values, also have the potential to act against the law. Hospitals need to identify points that have the potential to cause fraud so that planning, monitoring and evaluation activities can be carried out to prevent potential fraud.

The results of the interview indicated that there was an awareness of the informants about the risk of fraud, namely in the form of criminal sanctions. Therefore, informants are uncomfortable when their activities are often associated with potential hospital fraud. This discussion of fraud must be discussed in depth so that when the regulation on fraud sanctions is applied, it does not harm the parties who actually greatly contribute to the implementation of the NHI program.

Perception of Fraud

One of the themes that emerged in all informants was an increase in workload during the NHI era. This is a logical consequence of increasing public access to hospitals which is characterized by high visits, both outpatient and inpatient care. Along with the increase in workload, the main issue that should be considered by hospitals is the provision of fair rewards. Remuneration as an instrument for the distribution of rewards must be arranged as well as possible to avoid job dissatisfaction due to negative perceptions of the reward received. The emergence of attempts to commit fraud is possible because of the influence of dissatisfaction with NHI actors on the rewards received.

Potential fraud in health services during the NHI era has been aware by informants (risk awareness). But there was informant who argue “… maximizing claims is not fraud, but efforts to rationalize costs to meet medical needs …” (Informant SPG01, lines 12-13). The theme of the potential for fraud in these hospitals deserves attention in an effort to succeed in NHI implementation. The potential for fraud in hospitals is the subject of the KPK’s publication. So that matters relating to the causal factors, the mechanism of prevention and control, and the mechanism of action are the themes that arise from informants, especially from DPJP.

Discussion

The Government of the Republic of Indonesia seeks to fulfill the constitutional mandate for the implementation of National Health Insurance (NHI) which started on 1 January 2014 and established the achievement of Universal Health Coverage (UHC) in 2019. This means that all communities must obtain guarantees for their health needs (preventive, promotive, curative, and rehabilitative) with a health insurance mechanism.

One of the fundamental policies in the NHI program is the change in hospital payments from fee for services to claim INA CBGs as Minister of Health Regulation concerning the Indonesian Case Based Groups (INA-CBG’s) guidelines NHI. This has put pressure on the
policy implementers at the hospital level. Not to mention the problem with the difference between hospital rates and the value of INA CBGs given. This is considered to trigger the potential for fraud in hospitals as FKRTL.

Fraud in health services usually refers to false statements or false claims, complicated schemes, cover-up strategies, misrepresentations of value, misrepresentations of service.\(^{(1)}\)\(^{(13)}\) The subjective experience of individual implementing policies plays a very large role for the success of policy implementation.\(^{(14)}\) There are three elements of implementing responses that can affect their abilities and desires to implement policies, namely: cognition (comprehension, understanding) about policies, kinds of responses to policies (acceptance, neutrality, rejection), and the intensity of those responses.\(^{(15)}\)

Based on the conceptual framework of the policy implementation process, the attitude of acceptance or rejection of the implementing agent (disposition of implementers) will greatly affect the success or failure of the performance of public policy implementation.\(^{(16)}\)\(^{(17)}\) Disposition or attitude of the implementer will cause real obstacles to policy implementation if the existing personnel do not implement the policies desired by the policy holders.

Based on the phenomenological studies that have been carried out, the three elements triggering the occurrence of fraud appear in the experience of the informants. The pressure appears from the information conveyed by the informant in the form of dissatisfaction with the reward received compared to the perceived workload. Rationalization appears in an informational statement stating that maximizing a claim is not fraud. The third element, opportunity, is reflected in the experience of informants who stated that the hospital’s antifraud team was not yet effective.\(^{(9)}\)\(^{(10)}\)\(^{(11)}\)

Fraud prevention needs to be done both from the internal aspects of the hospital and external hospitals on health services covered by NHI, so that there is no dispute with BPJS and does not invite civil or criminal prosecution from legal apparatus. Thus, the substance of the policy and guidelines for preventing NHI fraud is an arrangement that wants to be applied along with the implementation procedures. These include the standards of behavior and discipline, monitoring and evaluation that ensure compliance with implementation, and the implementation of sanctions against violations.\(^{(18)}\)

**Conclusion**

An increase in workload is an experience that arises in each informant’s theme. Job dissatisfaction marked the implementation of NHI program at the hospital. The informant acknowledged that the potential for fraud was present, but not to be labeled with one particular profession or organization. Some concepts that are considered to be the triggers of fraud that need to be tested in a wider population, such as: increased workload, job satisfaction, acceptance or rejection of health service financing policies in NHI era (disposition of implementers), risk awareness of fraud behavior, and effectiveness of internal and external monitoring.

**Acknowledgment:** Our gratitude goes to all those who have supported the implementation of the research, in particular: The team of dissertation promoters, hospital directors, respondents, enumerators, and the Education Fund Management Institution (LPDP) of the Republic of Indonesia who have provided financial support for successful research.

**Conflict of Interest:** There is no conflict of interest with any party related to the process or research results.

**Ethical Clearance:** The ethical test for this research was conducted at the Health Research Ethics Commission (KEPK) at the Faculty of Dentistry, University of Jember in the form of the Ethic Committee Approval No. 348/UN.25.8/KEPK/DL/2019 issued on 6 February 2019.

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Breast Feeding Practice Prevention for Nutritional Stunting of Children In Buginese Ethnicity

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Abstract

Background. The practice of breastfeeding is very important to determine the quality of nutrient intake in children under two years. In ethnic Bugis. The purpose of this study was to determine the effect of breastfeeding on stunting prevention in ethnic Bugis.

There is a cross-sectional study in this study. The sample size in this research is 300 mothers and children. The enumerators in this study were applied to undergraduate students of nutrition & dietetic programs in the Makassar Department of Nutrition Health Polytechnic, Indonesia. Research ethics was obtained at the Makassar Health Polytechnic Ethics Commission. Stunting risk factor data analysis with logistic regression test.

The results showed that 32% of children were breastfed, with a frequency of 5-8 times / 24 hours breastfeeding. The reason for not breastfeeding a child is over 2 years old, the child refuses to breastfeed (10%), has 17.3% formula milk. Statistical analysis showed that breastfeeding (frequency of breastfeeding), p = 0.013, or 1.99 (1,148-3,173) was significant as stunting prevention. The conclusion is breastfeeding habits in ethnic Bugis can prevent stunting.

Key words: Breast Feeding, Nutritional, Stunting, Bugis.

Introduction

Two variables that are always related to improving the nutritional status of children are breastfeeding and supplementary feeding of breast milk. Stunting is a condition of failure to thrive characterized by short, recurrent infections and low psychosocial stimulation. The 2017 Indonesia stunting prevalence is 36.4% and the determinant factor stunting is multifactors 1,2,3,4. Stunting in Makassar City as a red zone area (prevalence> 40%) at the same time Makassar City is the largest Metropolitan city in Eastern Indonesia and the development center of eastern Indonesia 5.

A systematic review determinant factor stunting in Indonesia is caused by various factors factor Households and Families, insufficient food addition to breastfeeding, infection and and factors of social6,7,8.

The practice of breastfeeding is also a variable that is studied in this research because. The population of Makassar City is 50% Buginese. This means that the prevalence of stunting in Makassar City is also related to Buginese. And having uniq character in the economic field and the ability to survive anywhere. The study required to find breastfeeding ethnic Buginese and its effect on the prevention of stunting.

Method

The subjects of this study were obtained from Bugis Ethnic who live in Makassar City. The study sites were three Puskesmas working areas in the North of Makassar City. Tamalanrea Health Center, Health Center, Paccerakkang, and Sudiang Raya Health Center. The reason for choosing the northern area of the city is because the Bugis ethnic population inhabits the north of the city more than any other location, due to
geographical proximity to the Bone, Soppeng, and Wajo (Bosowa) Regencies as the Bugis ethnic base in South Sulawesi.

The population is all mothers who have children aged 6-59 months in Makassar City. Criteria for inclusion of Buginese ethnic samples in Makassar City

1. The mother is from the ethnic Bugis and the husband is also from the ethnic Bugis
2. Having children aged 6-59 Months in September 2019
3. Have lived for at least the past 6 months in Makassar City
4. Willing to participate in this research

The sample size in this study is 300 people, based on the estimated prevalence of stunting in Makassar City as a Bugis ethnic center that is 35.7%, using 80% power test with 95% confidence, design effects 1 and 5 with the addition of 10% additional data estimated not to participated in this research because they refused or were not present at the time of screening

Data collection in this study uses a list of questions that have been tested with good reliability. The questionnaire was tested using structured questions using official data on children aged 0-59 months (data mom and household data) Data collected included age, gender, weight and height/length; mother level, education level and participation in household decisions; breastfeeding practices, supplementation, and washing hands; children’s access to health and nutrition services (growth monitoring, micronutrient supplementation, and immunization); maternal access to health services (antenatal care, assistance during labor and place of delivery); household water, sanitation and hygiene; and social economy

My child’s weight is measured using electronic SECA scale with an accuracy of 0.1 kg and a length of the child (for children aged 0-23 months) or height (for children aged 24-59 months) was measured using high board / long local made with an accuracy of 0, 1 cm. SECA scales are calibrated every morning, before data collection, using a standard weight of 5 kg. Duplicate anthropometric measurements were carried out for 10% of the sample; the coefficient of variation in subjects from duplicate measurements in children and women is less than 5%. All enumerators receive training at least two days before data collection, and those responsible for taking anthropometric measurements receive one additional training day. Supervisors are tasked with supervising the work of enumerators and facilitating good relations with community members. Stunting is defined as Z-score for height <<2. In the 2006 WHO Anthropometry standard.

Results and Discussion

Demographic Characteristics

Based on the results of this research it is known that the main occupation of mothers is as housewives as many as 243 people (83.3%), and private employees as many as 26 people (8.7%). Father’s occupation is as a private employee and laborer, 153 people (51.1%) and 85 people (28.6%).

Distribution of Stunting Children on Ethnic Bugis

<table>
<thead>
<tr>
<th>Status</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stunting</td>
<td>68</td>
<td>22.7</td>
</tr>
<tr>
<td>Normal</td>
<td>232</td>
<td>77.3</td>
</tr>
<tr>
<td>Total</td>
<td>300</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Based on the results of this study it is known that the percentage of stunted children in the Bugis ethnic group in Makassar City is 22.7%.

Breastfeeding Factor

Factors for breastfeeding are breastfeeding status, frequency of breastfeeding and current reasons for not breastfeeding (Table 2)
Table 2 . Factors of Buginese Ethnic Breastfeeding

<table>
<thead>
<tr>
<th>Breastfeeding Factor</th>
<th>Category</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current breastfeeding status (n = 300)</td>
<td>a. Yes</td>
<td>97</td>
<td>32.3</td>
</tr>
<tr>
<td></td>
<td>b. No</td>
<td>203</td>
<td>67.7</td>
</tr>
<tr>
<td>Frequency of breastfeeding (n = 300)</td>
<td>a. 1-4 times</td>
<td>16</td>
<td>5.3</td>
</tr>
<tr>
<td></td>
<td>b. 5-8 times</td>
<td>36</td>
<td>12.0</td>
</tr>
<tr>
<td></td>
<td>c. 9-12 times</td>
<td>27</td>
<td>9.0</td>
</tr>
<tr>
<td></td>
<td>d. &gt; 12 times</td>
<td>18</td>
<td>6.0</td>
</tr>
<tr>
<td>Reasons for Not Breastfeeding (n = 300)</td>
<td>a. &gt; 2 years old</td>
<td>114</td>
<td>38.0</td>
</tr>
<tr>
<td></td>
<td>b. refuse breastfeeding</td>
<td>31</td>
<td>10.3</td>
</tr>
<tr>
<td></td>
<td>c. working mother</td>
<td>6</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>d. prefer formula milk</td>
<td>52</td>
<td>17.3</td>
</tr>
</tbody>
</table>

Based on the results of this research it is known that the breastfed children today are 97 people (67.7%). The frequency of breastfeeding in general is 5-8 times in 24 hours of 36 people (12%). The reason for those who stopped breastfeeding during the study was because children were > 24 months or 2 years old.

Breastfeeding and stunting risk factor

Table 3 . Analysis of Determinants of Buginese Ethnic Stunting Factors

<table>
<thead>
<tr>
<th>Determinant Factor</th>
<th>Code Variable *</th>
<th>P. Value</th>
<th>OR **</th>
<th>95.0% CI for EXP (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
</tbody>
</table>

*) variable code, you can see the attached question list.

***) based on logistic regression analysis, with stunting as the dependent variable.

Based on the results of risk factor analysis various variables that influence stunting are breastfeeding factors (frequency of breastfeeding), p = 0.013, OR 1.99 (1.148-3.173). Factors breastfeeding by reference are 1-4 times, above 4 times a day be a protective factor against stunting.

Determinant analysis of factors against all variables that are strongly suspected is a stunting risk factor. Variable groups consisted of household factors, child factors and MP-ASI, breastfeeding factors, hygiene and sanitation, infectious diseases, child care, feeding style, and caring practices.

Discussion

The prevalence of ethnic Buginese stunting is 22.7%, where this percentage is still above the threshold set by WHO as a threshold for health problems with a prevalence of <20%9. Based on these parameters, it can be proven that the ethnic Buginese made a significant contribution to the percentage of stunting in South Sulawesi in 2018. The province of South Sulawesi ranks the fourth highest percentage of stunting in Indonesia. Various factors were analyzed in this study in accordance with the conceptual framework published by Unicef in 200610.
In this research, it is known that breastfeeding habit is a positive factor that is able to provide prevention to children not to stunting. The most critical period is 0-24 months. In this period if the child is breastfed completely and supported by quality additional food after the age of 6 months to 24 months, then the child’s nutritional status is good. If the child is not perfectly breastfed then the risk, stunting becomes greater11,12,13,14,15,16.

Buginese ethnic habit is the same as other ethnic groups, where the marketing of formula milk which is quite large in the community causes the practice of breastfeeding to decrease. Indonesia’s experience in regulating the marketing of formula milk is not good. There is no strict supervision of formula milk sellers at small kiosks throughout the region not only in cities but also in villages. Buginese are ethnic peddlers and busy working outside the home. This causes the position of the child can be left out while working outside the home. Parenting practices entrusted to neighbors are not common except for close relatives 17,18.

The breastfeeding factor theoretically determines the quality of macro and micro nutrient intake, especially in the period of 1000 HPK19. If the support of maximum breastfeeding, the child’s height will be normal and vice versa. This is due to many biological and psychological beneficial factors obtained by breastfed children compared to children who are not breastfed. This study examines the variables of lack of frequency breastfeeding is risk factors for stunting. The reference used is breastfeeding > 12 times in 24 hours and frequencies lower than that are at risk for stunting. This proves that in the period of breastfeeding which is the age of 0-24 months, it is important to breastfeed properly with the right frequency20.

**Conclusion**

The practice of breastfeeding children aged 0-24 months in ethnic Buginese is able to prevent stunting. It is recommended that social marketing of breastfeeding practices be carried out at all levels, so as to strengthen the community that breast milk is the best food for children aged <6 months and continued until the child is 24 months old.

**Conflict-of-Interest Statement**

Between researchers and investigated there was no conflict of interest in the conduct of this study.

**Source of Funding:** The funding in this study came from the overseas collaboration research scheme through the Makassar Health Polytechnic based on the operational costs of state universities in 2019.

**Ethical Clearance:** The Makassar Health Polytechnic Health Research Ethics Committee has issued research ethics under number 1123 / KEPK-PTKMKs / X / 2019.

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Assessment of Undergraduate Critical Care Nursing Students’ Knowledge and Attitudes toward Caring of Dying Patients In Colleges of Nursing at Baghdad University

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Abstract

Nurses have played various roles in the development of palliative care, offering leadership, support and focus for the movement. Experiences of death on a clinical placement by nursing students were a major cause of anxiety and sadness.

Objectives: To assess of students’ knowledge toward care of dying patient and to find out the relationship between students’ knowledge and their demographical characteristic such as age, gender, post level of education.

Methodology: A descriptive study was conducted in the period of December 10th 2018 up to the end of 5th May 2019. A non-probability (purposive) sample of (100) student at college of nursing from different post educational levels, both sexes (males and females), were selected. The data collected was analyzed using SPSS version 17.0.

Results: the majority of the study were male who accounted for (58%) of the total participants while female constituted (42%). Most of the study participants (98%) were ages (21-30) years old. (90%) of the student were secondary school graduate. Nanty three percent of the student were married and sixty nine percent were sufficient.

Conclusions: The undergraduate critical cares nursing students were adequately prepared to care for terminally ill and dying patients as they had deficiency in some knowledge about palliative care but their knowledge towards palliative care was good.

Keywords: Assessment, Undergraduate Critical Care Nursing Students Knowledge, Attitudes, Dying Patients

Introduction

Palliative care is considered, and will remain, a vital part of the duties of nursing. Nurses are members of the most respected computer team who are involved in physical, functional, social and spiritual care areas. Usually, when working in the field of health care, it is the face of the death of the patient, and specifically, most of the patients in critical care units die. Therefore, critical care nurses play (CCNs) a key role in palliative care and end of life, and they are responsible for knowing how to take care of patients who die properly (1). Although there is an indication of the value of PC support, and a number of workers in the field of health care available to provide PC are insufficient to meet the needs of patients and their families through a lifetime, adjust the course of the disease and health care. One important factor affecting the success of the delivery of your computer is to know the attitudes of nurses and provide care for patients who are dying (2). As part of the American Basics Association of Colleges of Nursing (AACN) for the education of baccalaureate and peaceful death document, it has been identified specific objectives and guidelines to ensure

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efficiency in the computer before graduation. There is no doubt that the value of personal computers in CCN networks that provide the majority of care for patients with diseases do not end, studies have been conducted in the past to study the attitudes of nurses towards the care of death, but only a little is not made of research focused specifically on CCNs. Moreover, a number of authors discussed the lack of research in the attitudes of nurses towards students with disabilities. Therefore, there is a need to support education and nursing students in critical care (UCCNS) to provide high-quality computers.

Methodology

A cross-sectional descriptive and analytical study: Assessment of Undergraduate Critical Care Nursing Students’ Attitudes toward Caring of Dying Patients In colleges of Nursing at Baghdad University. This study was conducted at college of nursing between December 8th 2018 up to the end of 10th May 2019. A tool of knowledge questionnaire was developed and distributed to the participants in this study. The sample consisted of (100) student at four stage college of nursing. A questionnaire-interview format was designed and developed by the researcher for the purpose of the study; such development was employed through the available literature, clinical background and interview with student. All the items were measured on scale of (2) indicates that the know 1, don’t know 0. The questionnaire consisted of (3) parts. Part I: Demographic Information Sheet. Part II: Undergraduate Critical Care Nursing Students’ knowledge Sheet. Part III: Undergraduate Critical Care Nursing Students’ Attitudes Sheet. Rating scale was used to rate the frequency and extension of the problems. The content validity of the instrument was established through a panel of (10) experts. The data were collected by using the questionnaire structured format through interview and inspection technique for nursing student Attitudes toward Caring of Dying Patients. Each student was interviewed personally by the researcher. Throughout each interview explanation of the study was held up with student in order to accept participation. The determination was conducted during the period from January 29th to the 9th April 2019. The data were analyzed through descriptive data analysis and inferential data analysis the data were analyzed through the use of Statistical Package of Social Sciences (SPSS) version (17).

Results

Table (1) Mean of Score of Nursing student knowledge domain concerning of Dying Patient.

<table>
<thead>
<tr>
<th>No</th>
<th>Items</th>
<th>True</th>
<th>False</th>
<th>SD</th>
<th>MS</th>
<th>A.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Palliative care is only appropriate if there is evidence of deterioration of the patient’s health status</td>
<td>66</td>
<td>34</td>
<td>.476</td>
<td>.66</td>
<td>G</td>
</tr>
<tr>
<td>2</td>
<td>Morphine more widely used compared to other sedatives and opioid</td>
<td>69</td>
<td>31</td>
<td>.465</td>
<td>.69</td>
<td>G</td>
</tr>
<tr>
<td>3</td>
<td>The duration of the disease determines the methods of treatment for pain</td>
<td>73</td>
<td>27</td>
<td>.446</td>
<td>.73</td>
<td>G</td>
</tr>
<tr>
<td>4</td>
<td>Treatments help in the task of dealing with pain</td>
<td>93</td>
<td>7</td>
<td>.256</td>
<td>.93</td>
<td>G</td>
</tr>
<tr>
<td>5</td>
<td>Keep family members next to the patient until death</td>
<td>79</td>
<td>21</td>
<td>.409</td>
<td>.79</td>
<td>G</td>
</tr>
<tr>
<td>6</td>
<td>The fluid imbalance in the body reduces the patient’s need for sedatives</td>
<td>42</td>
<td>58</td>
<td>.496</td>
<td>.42</td>
<td>p</td>
</tr>
<tr>
<td>7</td>
<td>Giving morphine for a long time causes addiction</td>
<td>84</td>
<td>16</td>
<td>.368</td>
<td>.84</td>
<td>G</td>
</tr>
<tr>
<td>8</td>
<td>People who take sedatives need a diet</td>
<td>80</td>
<td>20</td>
<td>.402</td>
<td>.80</td>
<td>G</td>
</tr>
<tr>
<td>9</td>
<td>Palliative care requires separation of side feelings from work</td>
<td>64</td>
<td>36</td>
<td>.482</td>
<td>.64</td>
<td>G</td>
</tr>
<tr>
<td>10</td>
<td>Medications that cause stop breathing are suitable for acute respiratory distress</td>
<td>56</td>
<td>44</td>
<td>.499</td>
<td>.56</td>
<td>G</td>
</tr>
<tr>
<td>11</td>
<td>Palliative care philosophy is compatible with the philosophy of aggressive therapy</td>
<td>37</td>
<td>63</td>
<td>.485</td>
<td>.37</td>
<td>P</td>
</tr>
<tr>
<td>12</td>
<td>The use of sedatives appropriate some types of pain</td>
<td>85</td>
<td>15</td>
<td>.359</td>
<td>.85</td>
<td>G</td>
</tr>
</tbody>
</table>
High dose of codeine causes more nausea and vomiting compared to morphine. 

Suffering and physical pain are synonymous. 

Demerol is not an effective analgesic in controlling chronic pain. 

Chronic pain signs differ from acute pain. 

The loss of someone far from the family is less sad than losing a family member. 

Men are more sad than women when they lose a person. 

It is necessary to bring man of religion to the patient dying. 

A.D: Assessment Degree, M.s=mean of score [(0 - .4.49) = poor (P); (5.0 – 1) = good(G)]. 

<table>
<thead>
<tr>
<th>No</th>
<th>Items</th>
<th>Agree</th>
<th>Disagree</th>
<th>SD</th>
<th>MS</th>
<th>A.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>14</td>
<td>Suffering and physical pain are synonymous</td>
<td>86</td>
<td>14</td>
<td>.349</td>
<td>.86</td>
<td>G</td>
</tr>
<tr>
<td>15</td>
<td>Demerol is not an effective analgesic in controlling chronic pain</td>
<td>56</td>
<td>44</td>
<td>.499</td>
<td>.56</td>
<td>G</td>
</tr>
<tr>
<td>16</td>
<td>Chronic pain signs differ from acute pain</td>
<td>83</td>
<td>17</td>
<td>.378</td>
<td>.83</td>
<td>G</td>
</tr>
<tr>
<td>17</td>
<td>The loss of someone far from the family is less sad than losing a family member</td>
<td>87</td>
<td>13</td>
<td>.338</td>
<td>.87</td>
<td>G</td>
</tr>
<tr>
<td>18</td>
<td>Men are more sad than women when they lose a person</td>
<td>53</td>
<td>47</td>
<td>.502</td>
<td>.53</td>
<td>G</td>
</tr>
<tr>
<td>19</td>
<td>It is necessary to bring man of religion to the patient dying.</td>
<td>75</td>
<td>22</td>
<td>.435</td>
<td>.75</td>
<td>G</td>
</tr>
</tbody>
</table>

Total 1324 555 .425 .70 G 

Table (2) Mean of Score of Nursing student Attitudes domain concerning of Dying Patient. 

<table>
<thead>
<tr>
<th>No</th>
<th>Items</th>
<th>Agree</th>
<th>Disagree</th>
<th>SD</th>
<th>MS</th>
<th>A.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Giving care to the dying person is a worthwhile experience</td>
<td>90</td>
<td>10</td>
<td>.328</td>
<td>.88</td>
<td>P</td>
</tr>
<tr>
<td>2</td>
<td>The nurse should not be the one to talk about death with the dying person</td>
<td>85</td>
<td>15</td>
<td>.465</td>
<td>.69</td>
<td>P</td>
</tr>
<tr>
<td>3</td>
<td>Death is not the worst thing that can happen to a person.</td>
<td>64</td>
<td>36</td>
<td>.402</td>
<td>.80</td>
<td>P</td>
</tr>
<tr>
<td>4</td>
<td>It is beneficial for the dying person to verbalize his/her feelings.</td>
<td>84</td>
<td>16</td>
<td>.499</td>
<td>.44</td>
<td>N</td>
</tr>
<tr>
<td>5</td>
<td>The dying person should not be allowed to make decisions about his/her physical care</td>
<td>47</td>
<td>53</td>
<td>.494</td>
<td>.41</td>
<td>N</td>
</tr>
<tr>
<td>6</td>
<td>I would be uncomfortable talking about impending death with the dying person</td>
<td>89</td>
<td>11</td>
<td>.328</td>
<td>.88</td>
<td>P</td>
</tr>
<tr>
<td>7</td>
<td>I would not want to care for a dying person</td>
<td>74</td>
<td>26</td>
<td>.465</td>
<td>.69</td>
<td>P</td>
</tr>
<tr>
<td>8</td>
<td>The length of time required giving care to a dying person would frustrate me</td>
<td>32</td>
<td>68</td>
<td>.402</td>
<td>.80</td>
<td>P</td>
</tr>
<tr>
<td>9</td>
<td>It is difficult to form a close relationship with the dying person</td>
<td>53</td>
<td>47</td>
<td>.499</td>
<td>.44</td>
<td>N</td>
</tr>
<tr>
<td>10</td>
<td>Caring for the patient’s family should continue throughout the period of grief and bereavement</td>
<td>75</td>
<td>25</td>
<td>.328</td>
<td>.88</td>
<td>P</td>
</tr>
<tr>
<td>11</td>
<td>The family should be involved in the physical care of the dying person</td>
<td>66</td>
<td>34</td>
<td>.465</td>
<td>.69</td>
<td>P</td>
</tr>
<tr>
<td>12</td>
<td>Educating families about death and dying is not a nurse responsibility</td>
<td>39</td>
<td>61</td>
<td>.494</td>
<td>.41</td>
<td>N</td>
</tr>
</tbody>
</table>

Total 798 402 .430 .667 p
A.D: Assessment Degree, M.s=mean of score (0 –4.9) = negative (N); (5.0 – 1) =positive (P)

Table (3): Association between (Gender, Age, Past Level of Education,) and student knowledge domain.

<table>
<thead>
<tr>
<th>Nurses knowledge</th>
<th>Poor</th>
<th>Good</th>
<th>Total</th>
<th>c2-obs.</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>male</td>
<td>8</td>
<td>34</td>
<td>42</td>
<td>3.406a</td>
<td>NS</td>
</tr>
<tr>
<td>female</td>
<td>4</td>
<td>54</td>
<td>58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>88</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

c2criti.=3.841 df=1 p ≤ 0.05

<table>
<thead>
<tr>
<th>Nurses knowledge</th>
<th>Poor</th>
<th>Good</th>
<th>Total</th>
<th>c2-obs.</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21- 30</td>
<td>12</td>
<td>86</td>
<td>98</td>
<td>0.278a</td>
<td>NS</td>
</tr>
<tr>
<td>31- 40</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>12</td>
<td>88</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

c=3.841 df=1 p ≤ 0.05

This table shows that there is no significant difference between (Gender, Age, and Past Level of Education) and student knowledge domain.

Discussion

Through the course of the data analysis of the present study the finding showed that the majority (58%) of the study were female while the remaining was male. The highest percentage of age group in present study (98%) were (21-30) years old and lowest percentage (2%) were (31- 40) years old .Concerning Marital status and past level of education, (93%) from the sample were single, most of them are (90%) secondary school graduate. monthly income for study sample were (69%) barely sufficient income.

This finding supported by Paolo and Lorys, (2014). who shows that the 82 participant students, 22 (26.8%) were males and 60 (73.2%) were females. The mean age was 21.46 (SD = 1.13) (5).

The result of accurate study that show of dying patient domain in table (2) for student nurses knowledge are poor in items(The fluid imbalance in the body reduces the patient’s need for sedatives and Palliative care philosophy is compatible with the philosophy of aggressive therapy).The mean of score is good at all dying patient domains.

This finding is disagrees by Chari, et al, (2016), which that that 48.48% of students had average knowledge prior to the workshop while 6.06% had good knowledge, whereas, 45.45% had poor knowledge. After the intervention, none of the students were with poor or average knowledge (6).

The result of accurate study that show Table (2) the total nursing student’ attitude toward caring of patient dying, which indicated that nursing student’ had positive attitude , with respect to the total mean of score (MS) which was (.667).

The findings of the study disagree with result obtained from other study who reported that Findings from the present study suggest a need for end-of-life care nursing education in Italy. The preliminary results concerning the psychometrics of the scale suggest that the Italian version of the FATCOD-B could be in need of revision. The implications for practice are discussed. (7).
Age, gender and Level of education in comparison of the respondents total Student Nurses knowledge domain in table (3), there was non-significant between Age (c² obs=.519, df=2, p ≤ 0.05), gender (c² obs=.519, df=2, p ≤ 0.05), past Level of Education (c²-obs=5.886 df=2, p ≤ 0.05) with Student nurses knowledge domains.

This finding is supported by Paolo and Lorry’s, (2014), who reported that no significant differences (p = .857) were found between male (114.93 ± 7.78) and female (115.28 ± 7.97) students (12).

Another study agreement by suad, (2017). Show that no significant differences were found between the studied UCCNSs’ age and sex and their total knowledge score (P = 0.422 and 0.70 respectively) (8).

Conclusions

This study demonstrates that, despite good nurse’s student knowledge and positive attitudes regarding caring of dying patient. Based on the results and conclusions of the present study; the researcher recommends To integrate palliative care education within critical care nursing course to better prepare novel graduates for the inevitable care prepare the best graduates of the novel to take care of the inevitability of a patient of a terminally ill patient.

Acknowledgement: This research was funded by Authors. Moreover, we would like to thank the study participants and data collectors for their fully participation and responsible data collection.

Conflict of Interest: None declared.

Ethical approval: The study was approved by the Institutional Ethics Committee.

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Toxopathological and Cytogenetic Effects of Commercial Sweetener Aspartame after Chronic Oral Administration in Rat Pups

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Abstract

Objective: This study was done to evaluate the potential toxic effect of aspartame (APS) artificial sweetener after chronic oral administration in rat pups as a model for children that consumption high quantities of different types of sweets and juices from the peddler, regularly and daily.

Methods: Twenty-four rat pups were divided equally into three groups. Therapeutic dose group (T1) and double dose group(T2) received 0.08, 0.16 g/kg. body weight(BW), respectively, while control group (C) received distilled water orally for 90 (d)ays.

Results: The result of present study revealed that there was an increased consumption of food, water and arising nervous signs(aggressive) in T1 and T2 groups comparing with control. The cytogenetic study includes the mitotic index and blast index showing a substantial decline relative to the control one in both treated groups. While the blast index showed a significant reduction(P<0.05) in T2 relative to T1 and the control group. No chromosomal aberration observed in all groups exposed to aspartame. Different histopathological lesions were recorded in the liver of T1 group represented by inflammatory cell (neutrophil & mononuclear cell) aggregation around the blood vessels. While noted in a double dose group (0.16g/ kg.bw), a granulomatous lesion with mild change in fat is shown.

Conclusion: Used daily for lengthy periods ASP has cytogenetic and pathological risks.

Keywords: Aspartame, chronic toxicity, pups, cytogenetics.

Introduction

The passion of human beings of sweet foods is inborn, the studies proved a preference for sweet-tasting nutrition in newborns, human beings draw near to caves, even ancient cave paintings show a Neolithic man taking honey from a bee’s nest(1). It’s a dipeptide artificial sweetener that is widely used in all ages as a non-nutritive sweetener in foods and drinks, a high intensity sweetener most commonly found in low calorie beverages, chewable multi-vitamin, breakfast cereals, dessert mixes, diet Soda, tabletop sweeteners added to tea or coffee and food products, and pharmaceuticals which has been approved as a sweetener for liquid carbonated beverages(2). ASP has fair acid stability but poor heat stability(3) After ingestion, aspartame is immediately absorbed from the intestinal lumen and metabolized to phenylalanine, like aspartic acid, and methanol(4). ASP is metabolized by digestive esterase and peptidases in the intestinal lumen to methanol and its constituent amino acids phenylalanine and aspartic acid or absorbed by intestinal mucosal cells were hydrolyzed to its components(5).Followed by absorption into the systemic circulation, phenylalanine enters the plasma free amino acid pool from the portal blood after
partial conversion to tyrosine by hepatic phenylalanine hydroxylase(6). Methanol has previously been shown to result in the generation of ROS(7).

**Materials and methods:** Twenty-four (24) pups of the albino rat, aged 30-40 d with weight range (100-150g), supplied from the animal house of the College of veterinary medicine of Al-qasim green university, according to the ethical standard of working on laboratory animals. They were housed and maintained in a conventional animal facility, with controlled conditions of temperature (20 ± 5ºC). The animals were fed on special formula feed pellets and given water *ad libitum*, throughout the experiment, each group of rats was housed in a plastic cage containing hard-wood chip as bedding.

**Chemicals:** Aspartame obtained from NutraSweet–Monsanto company _ America.

**Preparation of concentration for chronic toxicity study:** Dose of Aspartame measured according to(8). When approved it as a sweetener.

**Therapeutic dose (T1):** (0.08g/ kg.BW): to obtain 80mg/kg.bw of Aspartame dissolve 8g in 100ml distilled water, and dosing 1 ml for each 100g (rat) daily for 90 d.

**Double dose (T2):** In the same way in therapeutic dose but in double dose give 2 ml for each 100g (rat) daily for 90 d to obtain 0.16g/kg.bw of ASP.

**The control group(C):** Was given 1ml of distilled water for each 100g (rat) orally daily.

**Histopathological examination:** The samples prepared according to(9).

**Cytogenetic analysis:** According to(10).

Mitotic index(MI) = \[ \frac{\text{Cells in metaphase}}{1000} \times 100 \]

Blast index (BI) = \[ \frac{\text{Number of lymphoblast}}{1000} \times 100 \]

**Statistical analysis:** Statistical analysis was applied by one-way ANOVA and the mean difference is significant at the 0.05 level in using statistical package for social sciences (SPSS), Version 10.

**Results**

**Chronic toxicity:** After 90 days of oral administration the animals of T1 and T2 groups showed some physiological and neurological signs listed in table (1).

<table>
<thead>
<tr>
<th>Groups</th>
<th>Signs</th>
<th>Time of appearance</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>1-increase in consumption of feed and water. 2-increase weight gain. 3-Nervous signs (aggressiveness).</td>
<td>14 d 32 d 81 d</td>
</tr>
<tr>
<td>T2</td>
<td>1-increase in consumption of feed and water. 2-increase weight gain. 3-Nervous signs (aggressiveness).</td>
<td>12 d 23 d 72 d</td>
</tr>
</tbody>
</table>

Table (1): Clinical signs of rat pups exposed to 0.08, 0.16g/kg.BW of the ASP.

<table>
<thead>
<tr>
<th>Periods Groups</th>
<th>Zero time Mean± SEM</th>
<th>After chronic exposure Mean± SEM</th>
<th>Weight gain(g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>130.3±2.1 Ab</td>
<td>159.6±2.3 Ca</td>
<td>29.3</td>
</tr>
<tr>
<td>T1</td>
<td>122.4±1.6 Bb</td>
<td>223.1±3.7 Ba</td>
<td>100.7</td>
</tr>
<tr>
<td>T2</td>
<td>127.6±1.9 Bb</td>
<td>254.7±4.0 Aa</td>
<td>127.1</td>
</tr>
</tbody>
</table>

-Different capital letters denote significant differences (p<0.05) between groups.
Different small letters denote significant differences (p<0.05) within groups.

-L.S.D=6.4

Cytogenetic analysis:

**Chromosomal Aberration:** The results of the chromosomal analysis revealed there was no chromosomal aberration in stem cells of bone marrow in all groups (Fig.1).

![Fig(1): stem cells of the bone marrow of male albino rats received (0.08 and 0.16g/kg.BW) of ASP for 90 d (Giemsa stain \*100, \* 40).](image)

Table (3): The effect of chronic exposure of deferent doses of ASP on the blast index and mitotic index in rat pups.

<table>
<thead>
<tr>
<th>parameter groups</th>
<th>M. I Mean± SEM</th>
<th>B. I Mean± SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>6.28±3.6</td>
<td>4.49±20.9</td>
</tr>
<tr>
<td></td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>T1</td>
<td>3.21±1.8</td>
<td>4.34±21.1</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>T2</td>
<td>2.39±0.8</td>
<td>3.20±12.2</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>L.S.D =0.4</td>
<td>L.S.D=0.5</td>
</tr>
</tbody>
</table>

-Different capital letters denote significant differences (p<0.05) between groups.

-N=8
**Blast index and Mitotic index:** The results revealed a significant decrease ($P<0.05$) of mitotic index (number of cells in mitosis/1000 in cells of the bone marrow) of exposed groups (T1 and T2) comparing with the control group and in a dose-dependent manner. While the blast index (number of lymphoblasts/1000 in cells of the bone marrow) showed a significant decrease in T2 group comparing with T1 and C groups.

**Histopathological finding:**

The histological examining of the liver section in the control group of rat pups showed normal tissue. Furthermore, in sections of the liver of animal received 0.08g / kg.bw of ASP for 90 d there was inflammatory cell (neutrophile & mononuclear cell) aggregation around the blood vessels. While in double dose group (0.16g/kg.bw) observed shows granulomatous lesion with moderate fatty change.

**Fig(2): Histopathological finding of the liver of rat pups after chronic exposure to ASP.**

**Discussion**

The results showed that ASP increases the consumption of food and water, the appetite increase through ASP metabolites by different mechanisms one of these mechanisms is that an increased phenylalanine concentration releases cholecystokinin(12).Which is an endogenous anorectic agent(11). As a precursor of catecholamine neurotransmitters(13). Phenylalanine may facilitate intake via the hypothalamic adreno-receptors implicated in the central appetite control mechanisms, stimulating appetite(14). Increased fluid intake can be associated with the intensive sweet taste of ASP and its hedonic impact. ASP is about 200 times sweeter than sucrose(6). On the other hand, the result showed there was an increase in weight gain of animals exposed to as this is the natural result when you have increase in food consumption and that’s who recorded (16).When reported increased body weight and fluid intake in a group treated with ASP. There are opposing opinions about the effect of ASP on body weight changes. Some studies reported increased body weight caused by ASP(15,2). While others showed that ASP is efficient in body weight loss(16,17).We observed predicted increased appetite and high weight gain in ASP-treated rats. From the foregoing it is clear that the methanol, which is a by-product of aspartame, may be responsible for the alteration observed in the free-radical-scavenging system. Since methanol is freely permeable through membranes and lipids, it also gets distributed in the brain tissues and may cause damage. Increased production of free radicals and increased oxidative damage to proteins in distinct brain regions, retina and optic nerve after methanol administration(18,19).

Also, we agree with(20), who was reported that the aspartame intake has been reported to be responsible for neurological and behavioral disturbances in sensitive individuals. Oxidative stress is an imbalance between the elevated level of ROS and the impaired function of the antioxidant. Overproduction of ROS can induce the death of immature cultured cortical neurons(21). And DNA damage(22). Marko D, et al have reported that increased ROS can trigger cell damage. The increase in ROS level may be due to methanol that is released during aspartame metabolism in the GI tract, as the pathway leads to formaldehyde and format production by the catalase enzyme. Cell death could occur in response to high oxidative stress(23,24). The result of the cytogenetic study revealed there are significant decreases ($P<0.05$) in MI of animals exposed to a therapeutic and double dose of ASP comparing with control which received DW. In contrast, the result of BI showed significant decrease ($P<0.05$) in the T2 group comparing with T1 and C groups. Aspartame is hydrolyzed to several products including methanol, which can be further metabolized to formaldehyde, which is a DNA cross-linking agent, known to induce chromosome damage in mammalian cells(25).We thought that metabolites (methanol, formaldehyde, formic acid, and acetic acid) that respectively released when ingestion of Aspartame play a vital role in inhibition of MI and BI, and that agrees with Rencuzogullari, et al 2004(2). when they reported that aspartame showed cytotoxic effect by decreasing the mitotic index at all concentration and treatment periods. Furthermore, the present study showed no chromosomal aberration in stem cells of exposed pups, on the opposite to AISuhaibani who observed that aspartame induced a significant increase of chromosome aberration frequencies in mice compared to control(26).

Rencuzogullari et al(2), studied the genotoxic effects of aspartame on human lymphocytes in vitro using chromosomal aberration test, SCE test, and micronucleus test. They found that aspartame induced a significant increase in chromosomal aberrations(27). Other authors evaluated the effect of blends of aspartame and acesulfame-k on induction of chromosomal aberration in bone marrow cells of male mice. The authors observed an increase in the percentage of cells with chromosomal
aberrations with increasing doses of the two sweeteners(28). Also, our results are supported by(29), who tested the possibility of micromolar formaldehyde, a metabolite of methanol derived from aspartame exerts cytotoxicity. Strachan and Read explained the occurrence of numerical aberrations through two main mechanisms after aspartame exposure(30). The result of histological sections of the liver of rat pups received 0.08 g/kg.bw of ASP for 90 d showed there was inflammatory cell (neutrophile & mononuclear cell) aggregation around the blood vessels. While in double dose group (0.16g/kg.bw) observed shows granulomatous lesion with moderate fatty change . that’s maybe due to increase the ROS in the tissue of liver and other vital organs due to long term exposure to aspartame. Hydroxyl radicals oxidize polyunsaturated fatty acids in an increased in biological membranes to induce the formation of lipid peroxides(31). The results indicated that exposure to ASP increased lipid peroxidation in the liver and other organs, this idea supported by Mourad IM and Noor NA 2011 When recorded that ROS increase in long-term ASP treatment in brain, liver and kidney tissues. The high level of ROS may be due to methanol formation during ASP metabolism and formaldehyde release as part of methanol metabolism(32). This has been well confirmed by Parthasarathy, et al who observed an increase in the LPO level in the lymphoid organs after methanol administration(33).The present study with an agreement with Abdel-Salam, et al who reported that increase aspartame concentrations than Acceptable daily intake (0.04g) the effects begin to appear on many vital organs like liver, brain and kidney(34).

Conclusion

According to our results, we can conclude that aspartame has a genotoxic risk. Therefore, it is necessary to be careful when using it in food and beverages as a sweetener.

Conflict of Interest: The authors declare no conflicts of interest.

Ethical Clearance: Permissions for carrying out the study were obtained from the Research Ethics Committee at Al-Qasim green university Babylon province-Iraq.

Acknowledgment: This work was supported by the department of physiology and pharmacology college of veterinary medicine Al-Qasim green university Iraq

References


Examining The Forensic Toxicity of Ricin Using Lc/Ms Techniques

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Abstract

As one the naturally occurring toxins, Ricin is classified among the deadliest poisons available. Ricin and Ricinus communis agglutinin (RCA120) are derived from the castor bean plant. Ricin and its related activities can be detected using either mass spectrometric (MS) assay or Liquid Chromatography (LC). Further, the two methods can be to differentiate ricin from RCA120 because it is less toxic of the two. The sequence of Amino acid is identified by monitoring the active ricin using mass spectrometric. This study discusses how LC and MS methods can be applied to quantify, detect, and differentiate ricin from RCA120 in test samples. On the overall, the two methods were applied to tell aside ricin samples from RCA120. The study concluded that mass spectrometry is the most efficient approach in identifying ricin from RCA120.

Keywords: Ricin; Chromatography; Peptide; Castor Bean; Protein; Toxin Peptide; Liquid Chromatography; RCA120; Mass Spectrometric.

Introduction

As one of the most toxic substances, ricin is primarily obtained from the castor bean plant (Ricinus communis). Castor bean plant grows naturally in subtropical and tropical regions. Since the plant is easily available, ricin is easy to prepare, therefore, it can be argued that the substance can be used as a biological weapon by malicious people [1]. This makes it the only protein classified as Schedule 1 chemicals [2]. Since ricin is a protein, it is made up of both A and B chain subunits [3]. The primary responsibility of chain B lectin is binding lectors with galactose on the surface of the eukaryotic cells. By so doing, they trigger endocytosis of ricin. Chain B lectin is responsible for initiating all the deadenylase activities that are responsible for initiating an irreversible depurination reaction of 28S rRNA which terminates protein synthesis in the cell. Therefore, the fact that ricin is readily available should be a major concern because it could be either knowingly or unknowingly to contaminate global and domestic food supplies [4]. For prevention purposes, there need is develop an effective approach that can be applied to detect ricin in foods and avoid possible deaths from the same.

Ricin can get into the body through inhalation or ingestion of materials that contain the same. However, the substance can also be directly injected into the bloodstream [4]. An injection is an unlikely method because the victim must be present for the chemical to be injected into their bloodstream. In a situation where a person is attacked using the chemical, it important for the toxin to be detected as soon as possible. Detection of this chemical includes sampling of materials such as foodstuffs and soil where a case of food poisoning is suspected [5]. In regards to the nature of risk in ricin, a lot has been invested in research to help identify the most accurate and effective method that can be used to detect ricin that might be in a range of substrates. The main aim of this article, therefore, is to examine the forensic toxicity of ricin using the methods attempted and the extent of their achievement.

Materials and Method

Safety

As one of the most poisonous known substances, all the experiments and extraction processes involving ricin should be conducted in a biosafety cabinet [6]. However, the samples coming from the digestion process are not considered toxic. Therefore, when dealing with ricin, safety measures should be considered.

Preparation of Antibody-Coated Beads

Biotinylated Anti-Ricinus Communis Agglutinin
(RCA) antibodies were purchased by the researcher from Somatco in Jeddah. The antibodies were employed as intermediates to localize lectin receptors [7]. 5 mg lyophilized aliquots were bought and later restored using distilled water with a density of water of 1 mg/mL. To add to that, the researcher also bought MyOne T1 streptavidin-coated beads from ThermoFisher. The instruction of the manufacturer was used when preparing the beads. Ideally, principle of using magnetic beads is that they have an immobilized affinity to the isolated structure of ricin as the target compound [7].

**Extracting Ricin and RCA120**

5 mg/mL purified solutions of ricin and RCA120 agglutinin were purchased by the researcher from Somatco. The matrix sample with agglutin and toxin was incubated for 30 min and then a magnetic capture was used to recover the components. The capture beads were removed from the mixture after an hour and washed using distilled water, 0.5 mL of PBS, 1 mL of 0.05% PBST, and 1 mL of 0.01% PBST [8].

**Extraction of Castor Bean**

The researcher purchased castor beans with approximately the same weight from M.A.B.M. Trading Est. To facilitate the process of extraction, the beans were crushed using pestle and mortar a then put in the sample matrix. The mixture was then left to incubate for 18 hours and later centrifuged to settle the particles. The beads coated with antibody were used to extract 0.5 mL aliquot of the supernatant. The analysis was then carried out using relevant methods [9].

**Digestion of Protein**

To facilitate the process of protein digestion during the study, the researcher purchased Rapigest SF from Somatco. Rapigest SF acted as enzymes to speed up the reactions within the solution. The enzymes were purchased in 1 mg lyophilized aliquots. These quantities were then converted in 0.1% solution using 100 mM ammonium bicarbonate. Further, the process of protein digestion was carried out using buffer exchanging magnetic beads which contained ricin in the Rapigest SF solution [8].

**Preparation of Peptide**

Ricin quantification peptides that combined both A and B chains were chosen by the researcher. This also helped to distinguish ricin form RCA120. However, the researcher was very keen to avoid all the peptides that contained tryptophan, methionine, and cysteine. Further, all the glycosylated peptides were omitted. Finally, the peptides that passed all the criteria were selected for synthesis [7].

**Liquid Chromatography**

The process is very critical in separating a sample matrix into sub-components. Ideally, the separation process is initiated by various interaction of the matrix while in both mobile and stationary phases. Further, a 1200 capillary pump was used in the chromatographic separation. All the solvents were developed by Jackson and Burdick [8].

**Mass Spectrometric Quantification**

The method was very effective both in sensitively and selectively detecting and assigning a signal to a particular chemical even when it was in low concentrations. LTQ module was used by the researcher to actively perform mass spectrometric quantification. The sample was later put to LTQ through electrospray for ionization purpose. The process recovered all the productions that were within the mass and not exceeding a certain low mass cutoff during the Collision-induced dissociation (CID) [8].

**Activity Assay**

Various methods can be employed to detect ricin protein, however, the majority of these approaches in practice cannot differentiate between active and inactive ricin. The primary objective of this study was to come up with a selective and sensitive method that can be used to completely analyze ricin by taking into considerations both the structural components and biological activities of the chemical. Both MS and LC-based methods use three layers to detect ricin activities that might be present in a mixture. Therefore, the process involved various activities which include separation of ricin from the lab samples by use of antibody-coated beads. Ricin was then digested and the analyzed using MS and LS methods to identify the toxin.

**Results**

Ricin substrate was detected in the sample matrix spiked with 15 pmol ricin in the activity assay. However, the same did not happen in similar pure samples. Both MS and LC-based methods were effective in detecting ricin peptides and further helped to distinguish them
from RCA which has a less toxic homolog. Even though both methods were effective in detecting ricin substrates in the matrix, the main challenge was to differentiate toxic and less toxic forms. The researcher found that including four more peptides as confirmation ions did not increase ambiguity. The four additional peptides were very critical in confirming the presence of both A and B chain as well as distinguishing ricin from RCA120. The process of quantifying took into account four tryptic peptides with T7 peptide which empirically yielded charge ion and resulted in the best sensitivity. T18, T10, and T11 peptides were also unique in the experiment and they produced quantitative results similar to those from T7. Use of T7 as while quantifying the peptides lead to low limit of detection for the protein.

Differentiating Ricin form RCA120

Both substances share more than 85% sequence homology [9]. In addition to that, there are no known antibodies with a potential of binding to ricin over RCA120 [10]. Mass spectrometry method effectively and selectively differentiated the two type of toxics based on the natural sequence of proteins. Quantitative measures that employ MS/LC technique are limited because they can only be use on few tryptic peptides. Further, T7 peptide obtained from ricin can be used to tell apart ricin from a sequence of amino acids [11]. In this context, the amount of ricin produced using LC/MS experiments was constant throughout the process regardless of the amount of RCA120 employed. This was a clear indication that only ricin was being quantified and the quantity of RCA120 did not play any role in the perceived protein.

Contamination of Castor Bean

During the experiment, four sample matrixes with already crushed castor beans were evaluated for ricin after they incubated in LC and MC methods. Since a castor bean is off 1.5% toxic of weight, the researcher estimated the maximum amount of ricin in a castor bean to be about 10 mg. Further, this was because the limit of ricin recovery for LC and MS method is approximated to be about 10 mg. However, to ensure that the collected ricin was within the established range, the tryptic samples were split to form several aliquots and then LC and MS analysis were carried out. After the dilution process, the matrixes were passed through an immune purification process and LC/MS analysis processes. The amount of ricin present in the sample was then evaluated using ricin T18, T 7, T10, and T11 peptides. Despite all the sample containing some significant amount of ricin, the amount varied from one sample to another. As the same sample of extracted ricin was used in all the matrices, pH level and complexity of the matrix did not have a significant impact on the recovery of ricin [13].

Discussion

Most methods used in forensic toxicology of ricin can be classified into three categories [14]. To begin with, the first category of the methods utilizes immunogenic interactions when detecting the presence of ricin. For example, the enzyme-linked immune-sorbent assay is one of the methods that fall under this category. Secondly, the second group makes use of the enzymatic activity of ricin. The final category of methods used to detect castor bean DNA is based on the assumption that they would contain ricin toxic as well. For instance, the polymerase reaction falls under this category. Further, these methods are very fast but have a low limit of detecting ricin [15]. In addition to that, these methods also require cheap instruments to set them up. However, despite being effective, none of the three methods represents a comprehensive assay. Further, despite polymerase chain reaction being quantitative and sensitive, the presence of toxic ricin is indirectly carried out. In addition to that, enzymatic activities in the mixture can be inefficient in scenarios when the sample contains other toxic proteins.

Almost all the biotechnology and bioscience separate, isolate and purify both peptides and proteins and other molecules in the cell. Therefore, the use of technology and separation process is very critical; this calls a further investment in the biotechnology field [16]. Hence, there is need for the stakeholders to develop a more accurate and advanced technique of separating the two toxic substances. Further, the new technique should have the capability of treating dilute solutions containing a minimum amount of the target proteins mixed in other compounds. This research was advantageous over other methods used in the separation of ricin and RCA120 because it made the use of peptides corresponding to both proteins. Therefore, LC/MS methods enable analysts to quantify ricin independently from RCA120 depending on the quantification peptide used.

Importance of Ricin Activity Measurement

Given the toxic level of ricin, it is critical for public health investigators to effectively react to any contamination cases involving ricin. Currently, various analytical methods are available to facilitate the analysis
of proteins [17]. Since the mass spectrometric techniques have been found to offer direct evidence on the structure of molecules by measuring the mass of the molecules, identifying possible modifications, and determining the sequence of amino acids, it is useful in determining whether the protein toxins is a risk factor to a certain disease [18].

**Conclusion**

The study analyzes the ability of MS/LC methods to detect the presence of ricin in laboratory samples. Further, the research explores selectivity and specificity of such methods in examining and quantifying the amount of ricin in a substrate. Analysis carried out using chromatography and mass spectrometry is advantageous over other methods in different ways. To begin with, they offer a direct approach to the measurement of ricin. Secondly, the approach is not easily influenced by other proteins in the sample. Further, LC/MS can successfully be used in quantifying ricin and RCA peptides. Even though LTQ approach can be used to tell apart ricin from other proteins, immune purification approach was used in the experiment because it enables the analyst to maintain a low detection limit. Further, it also ensures that a second layer is available. Finally, the choice of tryptic peptides for forensic toxicity of ricin makes it possible for the analysts to accurately and independently quantify ricin from RCA120.

**Acknowledgment:** I would like to acknowledge my university department for being supportive when conducting the research. Further, I am grateful to the University for providing their database and resources for use in the research.

**Ethical Clearance:** There were no ethical issues involved as the study was analytical and did not include any human participants or animals.

**Source of Funding:** Nil

**Conflict of Interest:** Nil

**References**


Nurses knowledge about Management Extravasation Intravenous Cytotoxic Medication At Amal National Hospital in Baghdad City

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²Trained Technician, Commnunity Health Department, Institute Medical Technology, Baghdad, Middle Technology University

Abstract

Background: Extravasation, the unintentional leak of an anticancer agent from a vessel into the close tissues, is an uninvited and difficult problem that can lead to permanent local harms and severe disability.

Objectives: To assess nurse’s knowledge about management extravasation vesicant intravenous cytotoxic medication.

Methodology: Descriptive design using a self-administered questionnaire was employed. At al-Amal national hospital for tumor treatment in Baghdad city from 2nd December 2018 to 10th February 2019. Random sampling method. The sample size was 45 nurses completed a questionnaire about management extravasation vesicant intravenous chemotherapy. Instruments: developed by the researcher consist of three sections the first section to assess the demographic data. And the second section questionnaire consists of 20 items divided into two parts to measure the information of team nurses on vesicant drug and management extravasation Vesicant intravenous chemotherapy. Data analysis by using the Statistical Package for Social Sciences version (SPSS) 23.0 included. (Frequency, percentage, Kruskal Wallis H test, Chi-square test, and Mann-Whitney U test). The level of significance was the threshold at p<0.05.

Results: shows that the high percentage (42.2%) of oncology nurses ages (30-39 years old). Most of them (57.8 %) were female. The education level represents (42.2%) of nurses were from nursing institute graduates, the high percentage (46.7%) of them their experience in oncology unite were (5-9) years. Mostly no training session. Inferential there are statistically significant between education levels groups the nursing college showed a higher mean knowledge score than other levels. also, a higher significantly difference was observed between mean knowledge and participate with Training courses by mean (36.40) The researcher decide that nurse’s knowledge is the poor component about vesicant cytotoxic and management extravasation according to of assessment result

Conclusion: there is a need for structuring a permanent education program due to the poor scientific of nurse’s knowledge about the vesicant and management of extravasation by chemotherapeutic drugs. Therefore, the issue of training courses should be highlighted for it is an effective role in improving the performance of nurses.

Keywords: Nurses, knowledge Vesicant, Cytotoxic, Management Extravasation

Introduction

Broad chemotherapy works an essential part in curative therapy for patients with hematological
neoplasms and numerous categories of advanced fixed tumors. Most anticancer agents are managed intravenously. Extravasation, the unintentional leak of an anticancer agent from a vessel into the close tissues, is an unwelcomed and difficult problem that can lead to permanent local harms and severe disability (1, 2). Extravasation follows when a vesicant chemotherapeutic agent that has a possibility to cause burning leaks external the vein into the around tissues. This leakage could lead to management delays Finish of chemotherapy, tissue necrosis, a loss of Extremity deep tissue toxicities, and maybe a loss (3). The rate of extravasation in adults is approximate to be in the range from 0.1 to 6% (4). Then few findings report the prevalence on the origin of fixed data with an overall number of patients who received chemotherapy (5). Extravasation can reason a diversity of non-specific symptoms, the severity of which can vary broadly. Any delays in discovering and treating extravasation may raise the chance of developing tissue harm and necrosis (6,7). The extravasation as indicated by Erythema, swelling or hardening, the absence of blood return, increased resistance when managing a bolus, a decline in the infusion rate and Ulceration Vesicants can cause pain, edema, and erythema and potentially lead to blister and tissue necrosis when injected outside the vein or into the tissue. (7,8,9) Classification of Anti-cancer drugs is grouped into three classifications according to their capability to cause tissue harm after being extravasated vesicants, irritants, and non-irritants (10).

Material and Method

A descriptive design study was conducted to measure staff nurse’s information about management extravasation vesicant intravenous cytotoxic medications. At. Al-Amal National Hospital for tumors treatment in Baghdad city from 2nd December 2018 to 10th February 2019. Purposive sampling technique will be used in this study. Consist, 45 nurses, Moral issues: An agreement for research procedure was achieved from the Al-Amal National Hospital for the treatment of tumors, Health Department of the Medical City. Before data collection. The privacy of participants’ information was confident, and the access to the information taken from the participants was controlled and not revealed outside the research panel. A questionnaire was established. To evaluate the information of team nurses concerning management extravasation vesicant intravenous cytotoxic medication, by using the broad publication of the literature. A scientific source was directed by using the search of the scholar, “PubMed and the Cochrane library database” for published clinical articles in professional and academic journals, including literature reviews, Systematic Reviews inclusively. Only literature published in English was considered from The period covered was from 20 September to (1st November 2018). The instrument used in the current study involves three sections. The primary section is socio-demographic variables involving nurse’s gender, age, level of learning, Number of years working in oncology units and participated in a training course related to chemotherapy. And the second section is related to knowledge consists tow axis each axis consist of 10 items which covering knowledge about. Vesicant cytotoxic medication and management extravasation. The participants are requested to select one the following answer (correct, incorrect, or I don’t know ) and recoding answer, the true answer in the information axis taken (2) point while incorrect was (0) and don’t know carried (1) mark. This gave a total score range of 0 - 40 for information questioners. The Validity was an evaluation by a panel of (10) Experts they are (5 faculty members from the College of Nursing University of Baghdad, (4) experts from Al- Amal National Hospital, and (1) expert from College of Medicine University of Baghdad. The reliability was (.819) assure through the pilot study by Cronbach’s alpha test. For analysis of data, Statistical Package for Social Sciences software, version 23.0 (SPSS) was used. Initially, all information gathered via questionnaire was Coded into variables and answers coded were incorrect (0) don know (1) correct (2). The normality of data was tested using the Kolmogorov-Smirnov test. Descriptive used Frequency, mean, Sander deviation and percentage. And inferential statistics involving Chi-square test, Mann-Whitney U test, Kruskal Wallis H test.

Results

The outcomes descriptive statistics for each demographic data were shows that the high percentage (42.2%) of oncology nurses ages (30-39 years old). Most of them (57.8%) were female. The education level represents (42.2%) of nurses were from nursing institute graduates, the high percentage (46.7%) of them their experience in oncology unite were (5-9) years. The table also shows most of the nurses had no training session by (77.8%).
Table (1): Nurses’ Knowledge and Management about Vesicant Cytotoxic Drugs.

<table>
<thead>
<tr>
<th>Axis one</th>
<th>No.</th>
<th>Questions</th>
<th>Correct F %</th>
<th>Incorrect F %</th>
<th>Don’t know F %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>Vesicant drug uses to treat different type of, cancer</td>
<td>9 (20.0%)</td>
<td>8 (17.8%)</td>
<td>28 (62.2%)</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>vesicant cytotoxic is a drug that causes ulceration and necrosis of tissues when they leak out of the vein</td>
<td>9 (20.0%)</td>
<td>14 (31.1%)</td>
<td>22 (48.9%)</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>vesicant anticancer can be divided according to binding to DNA</td>
<td>18 (40.0%)</td>
<td>14 (31.1%)</td>
<td>13 (28.9%)</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Cisplatin is considered to be a vesicant when its concentration is more than 4%</td>
<td>4 (8.9%)</td>
<td>16 (35.6%)</td>
<td>25 (55.6%)</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>When doxorubicin leaks out of the blood vessel, permanent deformation may occur</td>
<td>5 (11.1%)</td>
<td>27 (60.0%)</td>
<td>13 (28.8%)</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>doxorubicin type drugs that cause problems and complications of cardiac toxicity</td>
<td>6 (13.3%)</td>
<td>14 (31.1%)</td>
<td>25 (55.6%)</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Knowledge about vesicant extravasation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Knowledge about anthrac cline vesicant chemotherapy drug</td>
<td>14 (31.1%)</td>
<td>15 (33.3%)</td>
<td>16 (35.6%)</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>Knowledge about anthrac cline group</td>
<td>13 (28.9%)</td>
<td>13 (28.9%)</td>
<td>19 (42.1%)</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>Knowledge about anthrac cline group</td>
<td>16 (35.6%)</td>
<td>19 (42.2%)</td>
<td>10 (22.2%)</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td>Knowledge about anthrac cline group</td>
<td>21 (46.7%)</td>
<td>10 (22.2%)</td>
<td>14 (31.1%)</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td>Knowledge about anthrac cline group</td>
<td>11.5(25.58)</td>
<td>15(33.33)</td>
<td>18.5(41.12)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Axis tow</th>
<th>No.</th>
<th>Questions</th>
<th>Correct F %</th>
<th>Incorrect F %</th>
<th>Don’t know F %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>First step management is stop the infusion, but leave cannula in place</td>
<td>11 (24.4%)</td>
<td>7 (15.6%)</td>
<td>27 (60.0%)</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Use of warm compresses in the case of extravasation vincristine</td>
<td>14 (31.1%)</td>
<td>10 (22.2%)</td>
<td>21 (46.7%)</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Use of cold or warm compresses when extravasation depends on the type of vesicant chemotherapy drug.</td>
<td>12 (26.7%)</td>
<td>15 (33.3%)</td>
<td>18 (40.0%)</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>The nurse must guide the patient to exposure to the sun and avoid lifting the affected party after vesicant chemotherapy extravasation</td>
<td>16 (35.6%)</td>
<td>22 (48.9%)</td>
<td>7 (15.6%)</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Before you starting vesicant chemotherapy IV infusion most</td>
<td>14 (31.1%)</td>
<td>15 (33.3%)</td>
<td>16 (35.6%)</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Forarm is the suitable place for insertion of peripheral cannula</td>
<td>16 (35.6%)</td>
<td>9 (20.0%)</td>
<td>20 (44.4%)</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Successful cannulation at the primary stab decrease the chance of extravasation</td>
<td>12 (26.7%)</td>
<td>17 (37.8%)</td>
<td>16 (35.6%)</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>patients with diabetic are a famous chance than others to formed extravasation</td>
<td>10 (22.2%)</td>
<td>18 (40.0%)</td>
<td>17 (37.8%)</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>Patients ought to instructed to directly notify the staff</td>
<td>14 (31.1%)</td>
<td>8 (17.8%)</td>
<td>23 (51.1%)</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>give antidote with needle size 25 or 27around extravasation around the e area subcutaneous at an angle 45c</td>
<td>15 (33.3%)</td>
<td>12 (26.7%)</td>
<td>18 (40.0%)</td>
</tr>
</tbody>
</table>

S. D= standard deviation: F = frequency: % = percent
Table (2): Chi-square test Distribution and the associated level of nurse’s knowledge and their demographic data

<table>
<thead>
<tr>
<th>Variables</th>
<th>Level of knowledge</th>
<th>c2-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Poor no.</td>
<td>Good no.</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>7</td>
<td>12</td>
<td>1.910</td>
</tr>
<tr>
<td>Female</td>
<td>15</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-29</td>
<td>4</td>
<td>6</td>
<td>1.431</td>
</tr>
<tr>
<td>30-39</td>
<td>9</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>40-49</td>
<td>6</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>50-More</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Level education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intermediate school</td>
<td>4</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Secondary nursing school</td>
<td>8</td>
<td>4</td>
<td>9.389</td>
</tr>
<tr>
<td>Nursing institute</td>
<td>8</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Nursing college</td>
<td>2</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Years’ work in oncology units</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less Than 5 Years</td>
<td>6</td>
<td>8</td>
<td>3.055</td>
</tr>
<tr>
<td>5 To 9 Years</td>
<td>13</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>10 And More</td>
<td>3</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Training courses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>21</td>
<td>14</td>
<td>7.782</td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
<td>9</td>
<td></td>
</tr>
</tbody>
</table>

**: Highly Sig. at P<0.01; S: Sig. at P<0.05; NS: Non Sig. at P>0.05; Testing based on a chi-square test Assessments Intervals Scales: poor = (0– 20) good = (21 – 40) p= probability value Χ² = chi-square test

Table (3) Mean of score of Nurses’ knowledge with Respect to Demographic Data

<table>
<thead>
<tr>
<th>Variables</th>
<th>Categories</th>
<th>K. score M± SD 19.24±7.202</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean Rank</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>26.03</td>
<td>.85 NS</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>20.79</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>20-29</td>
<td>21.20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30-39</td>
<td>25.03</td>
<td>.766 NS</td>
</tr>
<tr>
<td></td>
<td>40-49</td>
<td>22.83</td>
<td></td>
</tr>
<tr>
<td></td>
<td>50-More</td>
<td>18.38</td>
<td></td>
</tr>
<tr>
<td>Level education</td>
<td>Intermediate school</td>
<td>6.00</td>
<td>.001** HS</td>
</tr>
<tr>
<td></td>
<td>Secondary nursing school</td>
<td>16.83</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nursing institute</td>
<td>24.79</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nursing college</td>
<td>33.80</td>
<td></td>
</tr>
<tr>
<td>Years’ work in oncology units</td>
<td>Less Than 5 Years</td>
<td>20.93</td>
<td>.108 NS</td>
</tr>
<tr>
<td></td>
<td>5 To 9 Years</td>
<td>20.71</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 And More</td>
<td>30.70</td>
<td></td>
</tr>
<tr>
<td>Training courses</td>
<td>No</td>
<td>19.17</td>
<td>.000 **HS</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>36.40</td>
<td></td>
</tr>
</tbody>
</table>

(** HS) = Highly Significance. At P<0.01, S= Sig. at P<0.05, NS= Non-Significance. At P>0.05, Testing based on a Mann-Whitney test and Kruskal Wallis H test. p= probability value, K-score = average knowledge score, M=mean, SD=standard deviation
Dissection

The total outcome of the study indicated that the participants have poor information; this paper is the initiative to evaluate the information concerning vesicant cytotoxic drugs extravasation between nurses. But there is one search for the general cytotoxic extravasation the current study differs from previously conducted studies in certain respects. First, knowledge specific for vesicant cytotoxic drugs. Secondly, a scoring system was developed and scores of participants for each domain were analyzed and correlated with various demographic factors. This finding is risk for quality nursing care to patients cancer because if oncology nurses did not have logical knowledge and not capable in their skills will be reflected as unsafe nursing care to patients with cancer and chances for practical errors can be high as various studies in past already highlighted these points. Nurses’ awareness and information about the management vesicant of cytotoxic drugs remains a concern linked to improvement in safety standards. On the other hand, the result of the study indicated the ineffective function of continuing education in the hospital and the lack of interest in updates with scientific developments.

From result of present study, the characteristics of the demographic variables described that the participants were, mostly participation female (57.8%), and male (42.2%) it disagree with study was all participation female (1) with high percentage level 30-39 (42.2%). The level of education included in the present study was (42.2%) of study group graduated from nursing institute included in their study which was conducted on 16 nursing team professionals who work in a hospital in the interior of the state of, Brazil hospital conduct to measure information of the nursing team about the prevention and management of extravasation of chemotherapy. it study different by classified sample according to Professional category. There are Nursing assistants (6.25%), Nursing Technician (31.2%) and Nurse (62.5%). The present study has the Years of working in the oncology unit high present(46.7%) which is of (5-9) years due to the new appointment in the nursing career of nurses who participated in the study sample. (1) in this study, the majority of the study sample have (0-10) years of experience Time of work in oncology. While another study was (71.7%) 20–25 years of age group (2). Concerning participation in training courses in the field of chemotherapy treatment, showed Low percentage of the group study which selected from Al-Amal center who participated in training courses is (22.2%). This result agrees with point of view who presented that (56.2%) of nurses had no participation in training courses with chemotherapeutic agents. This may be indicated lacking the role of continuing education units in center and some of the nurses do not interest to participate in training courses in their center (1). Regarding Association of The Nurses Information and their Demographic Data, The outcome showed that there was no statistical significant associated between Nurses’ Knowledge and their demographic data (age-gender Number of years working in oncology wards) at p-value > 0.05, thus Demographic variables have no influence on the level of knowledge of the staff nurses on management of extravasation this result is supported by (2) who assess the existing knowledge and practice of staff nurses on prevention and management of extravasation among Infant receiving I.V. Therapy, at hospital in India He found that there was no statistical significant associated between nurses Information and their demographic data (age gender and years’ working in oncology wards) at p-value 0.05.

About demographic variables (level education and training courses) there are high statistical significant education level and training courses and nurses knowledge about management extravasation intravenous. it because of attending continuous nursing education courses and training have the advantages of preservation nurses up-to-date and refining their knowledge in oncology wards.

The total result of the current study shown that the participants have deficient knowledge, this result supported by (1). Point of view that lack of technical and scientific knowledge about the prevention, identification, and treatment of extravasation by cytotoxic drugs. And study (3) conduct of the nursing staff in Barisal hospital. The review results show an information insufficiency, on the other hand, disagree with study (2) the study conducted in India to assess staff nurses of information and Practice on avoidance and treat of extravasation among Infant receiving I.V.

Conclusion

The present study indirect that the majority of the nurses need essential information about extravasations of non-cytotoxic drugs. This study prescribes that nurse’s attendants need to take an interest in the additional inside and out instructive projects, given that learning lessons that can assist nurses to completely comprehend
distinguish the danger, avoid in addition manage the extravasations of no cytotoxic drugs.

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Conflict of Interest: None declared.

Ethical approval: The study was approved by the Institutional Ethics Committee.

References


Correlation between BMI and Thyroid Hormones in Infertile Groups

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Abstract

Infertility is the failure to become pregnant after 12 months of copulation without contraception. Thyroid defeat in function can caused to the: menstrual disorder, an ovulatory phase and lower fertility. This search formed to assess the importance of thyroid syndromes in infertility women and importance the autoimmunity by assessing value of TSH, T3, T4, & anti Thyroid peroxidase antibody in infertile woman comparison the consequences with women controls. The direction in this search started from March 2015 to September 2015 at Karbala Maternity Hospital, infertility unit, and some private clinics. Showed significant relation between TPO and BMI in controls and patients p-value (<0.002, <0.0001) respectively, and significant relation between BMI and T4 in patients and controls p-value (<0.0001), and shows significant relation between, the relation between BMI and sex hormones shows no significant relation with LH in patients but significant in controls p-value (<0.0001) and relation with FSH was not significant in patients and controls, and relation with E2 shows significant relation in patients p-value (<0.01) but no significant in controls. This search directed to estimation the relationship between thyroid function and sex hormones with BMI. Where the height of BMI affects the body to increase TPO and T4 and affect estradiol, we recommend that women maintain the body weight within normal

Keywords: BMI, T3, T4, TSH, TPO, E2, infertility, thyroid syndromes

Introduction

Infertility (clinical definition) is currently defined as 1 year of unwanted non-conception with unprotected intercourse in the fertile phase of the menstrual cycles. Infertility (clinical definition) is defined as 1 year of unwanted non-conception with unprotected intercourse in the fertile phase of the menstrual cycles

Hormonal disturbance of women reproductive system are involve of a numeral of troubles generating from disorder of hypo-thalamic-pituitary ovarian axis. These comparatively communal disorders often caused infertility[1]. Infertility (clinical definition) is defined as 1 year of undesirable non-conception with unprotected copulation in the fertilization phase of the menstrual cycles [2]

It is classified into: Primary infertility: in female whose gestation suddenly miscarry, or whose gestation produced in a still born child, without always having had a live birth. Second infertility: in women that frequently involuntary miscarriage or the pregnancy come in a still birth next the preceding pregnancy or a previous portability to a pregnancy to a live birth[3]. Thyroid disorder are the major common endocrine disease in women at generative age. Due to above mentioned features of thyroid hormones, estimation of thyroid functions during both pregnancy and treatment of infertility and treating related pathologies become important. In primary stage of pregnancy thyroid hormones are actively involved in the step of placentation; because it was detect that T3 and epidermal growth factor have synergistic effect inthe culture media [4]. Pituitary hormones such as TSH, prolactin or growth hormone may doing Supporting with FSH and

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LH to improve the pass of non-growing follicles into the growth phase[5]. The correlation between fatness and procreative function has been famous for a lot of years and it is still being research. Obesity may weaken or damage generative system by Impacting both the ovaries and endometrium, this harmful effects of fatness on generative consequence are well known [6]. But, it is not easy to refer to the exactly how action of the fatness affects to the generative system due to it is complicated. Increased the fat in female heightens polycystic ovarian syndrome (PCOS), and anovulation and may cause hypothalamic hypogonadism[7,8].

Infertility (clinical definition) is currently defined as 1 year of unwanted non-conception with unprotected intercourse in the fertile phase of the menstrual cycles.

Infertility (clinical definition) is currently defined as 1 year of unwanted non-conception with unprotected intercourse in the fertile phase of the menstrual cycles.

Material & Method

Study design: The study is case-control, based study designed to determine thyroid disorders in infertile female. We directed through the time from March 2015 to September 2015 at Karbala Maternity Hospital, infertility unit, and some private clinics. The search consisted of a whole number of 143 females at procreative stage, the age range was among (15-43) years. The patients were 92 infertile women and 51 fertile women. Control samples were collected from the community and some of the staff in the hospital and the university. Diagnosis of infertility and patient selection were done by gynecologist present in infertility unit at Karbala Maternity Hospital. Blood samples were collected from all participants; sera were separated and frozen for measurement of T3, T4, TSH, & Anti-TPO using ELISA device in Imam Hussein Teaching Hospital.

Result

Statistical analysis in table(1) of BMI in relation with thyroid hormones test shows significant relation between BMI and TPO in patients and controls p-value (<0.0001, <0.002) respectively, and no significant relation between BMI and T3 in patients but significant in controls p-value (<0.01), and significant relation between BMI and T4 in patients and controls p-value (<0.0001), and shows significant relation between BMI and TSH in patients p-value (<0.0001) but no significant in controls, the relation between BMI and sex hormones shows no significant relation with LH in patients but significant in controls p-value (<0.0001) and relation with FSH was not significant in patients and controls, and relation with E2 shows significant relation in patients p-value (<0.01) but no significant in controls.

Table (1): relation between BMI with thyroid hormone test and hormonal female in patients and controls.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Group</th>
<th>R-seuqar</th>
<th>correlation</th>
<th>P value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI &amp; TPO</td>
<td>Patients</td>
<td>0.02973</td>
<td>0.152**</td>
<td>&lt;0.0001</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Controls</td>
<td>0.0402</td>
<td>0.025</td>
<td>0.338</td>
<td>Yes</td>
</tr>
<tr>
<td>BMI &amp; T3</td>
<td>Patients</td>
<td>0.0894</td>
<td>0.024</td>
<td>0.243</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Controls</td>
<td>0.916</td>
<td>-0.059*</td>
<td>0.019</td>
<td>Yes</td>
</tr>
<tr>
<td>BMI &amp; T4</td>
<td>Patients</td>
<td>0.788</td>
<td>-0.013</td>
<td>&lt;0.0001</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Controls</td>
<td>0.802</td>
<td>0.175*</td>
<td>&lt;0.0001</td>
<td>Yes</td>
</tr>
<tr>
<td>BMI &amp; TSH</td>
<td>Patients</td>
<td>0.8822</td>
<td>0.086**</td>
<td>&lt;0.0001</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Controls</td>
<td>0.8998</td>
<td>-0.007</td>
<td>0.794</td>
<td>No</td>
</tr>
<tr>
<td>BMI &amp; LH</td>
<td>Patients</td>
<td>0.794</td>
<td>0.004</td>
<td>0.828</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Controls</td>
<td>0.842</td>
<td>0.173**</td>
<td>&lt;0.0001</td>
<td>Yes</td>
</tr>
<tr>
<td>BMI &amp; FSH</td>
<td>Patients</td>
<td>0.824</td>
<td>0.026</td>
<td>0.195</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td>Controls</td>
<td>0.8006</td>
<td>-0.014</td>
<td>0.584</td>
<td>No</td>
</tr>
<tr>
<td>BMI &amp; E2</td>
<td>Patients</td>
<td>0.1092</td>
<td>0.052*</td>
<td>0.016</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Controls</td>
<td>0.4102</td>
<td>-0.167**</td>
<td>&lt;0.0001</td>
<td>Yes</td>
</tr>
</tbody>
</table>
** significant in (0.01) level
* significant in (0.05) level

Discussion

Infertility is a medical, publicly and physically problems in Iraqi society[10]. Most of patients in this study were with primary infertility; this agrees with previous studies[9,11]. Most newly married couples seek pregnancy and attend health services more frequently than those who already have a child. Moreover; Iraqi families take primary infertility much more seriously than secondary infertility.

Twenty percent increased or decreased from typical body mass can have impact on ovulation. Correlation between increased lipid and ovulatory disorders show for early-onset fatness[12]. Abnormal Thyroid functions is related to the increased in body mass, clinical hypothyroidism are commonly related with : mass increase, low temperature , and metabolism speed[13]. Results of the present study BMI in relation with thyroid hormones test shows significant relation between BMI and TPO in patients and controls p –value (<0.0001,<0.002) respectively this result, Results of the present study BMI in relation with thyroid hormones test shows significant relation between BMI and TPO in patients and controls p –value (<0.0001,<0.002) respectively, and no significant relation between BMI and T3 in patients but significant in controls p-value(<0.01) , insignificant relationship between BMI with T4 in patients but significant in controls p-value (<0.0001) , this consequence are compatible with earlier search made by [15] and not compatible with a earlier search done by [14], The reason for the difference with the researcher may be that he compared men and women while in our research the comparison between the patient and control, when relation between T3 and BMI the result shows no significant in patients but significant in controls p-value(<0.01) , and shows significant relation between BMI and TSH in patients p-value (<0.0001) but no significant in controls our results are consistent with a precedent searches done by [14,16] and not compatible with a precedent search done by [15].Results of the present study the relation between BMI and sex hormones shows no significant relation with LH in patients but significant in controls p-value (<0.0001) and relation with FSH was not significant in patients and controls ,our results are consistent with a previous study done by [17,18] and relation with E2 shows significant relation in patients p-value (<0.01)our results are consistent with a precedent search done by [18] , but no significant in controls. our results not correspond to a precedent search done by [18].

Conclusion

At our search was conducted to research the relationship or correlation between thyroid function as well as sex hormones with BMI women . Where the height of BMI affects the body to increase TPO and T4 and affect estradiol , we recommend that women maintain the body weight within normal.

Ethical Clearance: The project plan displayed on the scientific committee and scientific ethical committee and get approval

Source of Funding: There is no funding source and it is completely covered by authors

Conflict of Interest: There is no conflict of interest

Reference

13. Åsvold BO, Bjøro T, Vatten LJ. Association of serum TSH with high body mass differs between smokers and never-smokers. The Journal of Clinical Endocrinology & Metabolism. 2009 Dec 1;94(12):5023-7.
Effectiveness of an Educational Program on Primary School Teachers’ Knowledge about Attention -Deficit/Hyperactivity Disorders

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Abstract

The child is one of the most important assets of the nation, the future of mankind, the source of its true power, the promotion and enhancement of the child’s life and welfare is also anchored on the moral supervision and support given by his parents or guardians in order for a child to succeed, parents exert a lot of influence on their child’s cognitive development in the early years, the investigator made an insight into the aim of the study as follows: To determine the effectiveness of the teaching program on teachers knowledge. The study was conducted on at governmental primary schools in Al-Najaf City/ Iraq. A total of the (10) governmental primary schools selected randomly from total (253) governmental primary schools in Al-Najaf City. A purposive (non- probability) sample of (70) primary school teachers’ were selected from the candidate schools were included in the present study. During the period of 1st September 2018 to 20th February 2020. The data was collected by questionnaire which consisted of two main parts, first part consists socio demographic sheet. Second part is about knowledge which consist of (31) items scale of teachers’ knowledge about children with ADHD . Findings revealed confirmed that the teachers who not attended for program about ADHD have poor level of knowledge pupils with attention -deficit/hyperactivity disorder among elementary school teachers. While the teachers who attended for program about ADHD have improve and increase knowledge about ADHD in phase two, and three. Thus, it is recommended for responsible parties to notes the need for greater efforts to teachers should trained to recognize students with behaviors problems / disorders in their classes to provide them with proper and timely education as well as necessary referral for their assessment.

Keyword: Attention deficit/ hyperactivity disorder ,Teachers, knowledge , perception; Elementary school.

Introduction

ADHD is a chronic neurodevelopment condition which is often associated with disturbed classroom behavior that can result in a range of functional difficulties for the childhood and social problems , learning disorders, externalizing behavior problems, psychological difficulties, problems with peer relations, reduced self-esteem. AD/HD can occurs without a clear cause. Some theorists suggest the possibility of neurological dysfunctions as the main cause, whereas others point to family stress as the main reason for its development. Given the uncertainty about its origins, most researchers are now of the opinion that it has multiple and interactive causes. AD/HD is characterized by inattentiveness, over activity, and impulsiveness. ADHD is a common disorder, especially in boys, and probably accounts for more child mental health referrals than any other single disorder. Symptoms include difficulty with sustained attention, being unable to complete tasks, and inability to complete chores and school. The onset of the disorders is hard to diagnosis in kids younger than four-year-old because their characteristic behavior is much more variable than that older children. Teacher can be monitoring and knows child behaviors in the classrooms and other school contexts, so the teacher with parents can pay attention to the child behavior , practitioners rely on teachers to provide information to assist in establishing to observe of ADHD ,more than half of the pediatricians- on information from school reports to diagnose ADHD. Because children with ADHD put great demands on family life, they may
be at higher risk for punitive responses from parents and teachers, which can increase their distress. The presence of ADHD puts the child at risk for a lifetime of maladaptive behaviors and impaired social relationships, so early identification and treatment will be important. Every day, five days a week, children spend the majority of time in schools and interact with teachers, teachers play a vital role in the assessment of student behavior and their academic performance; therefore, they need to possess an adequate level of knowledge and understanding of the various disorders that may occur during childhood. School is the unique setting for the early detection and effective management of ADHD children to function successfully within the classroom setting, appropriate and efficient intervention strategies are required, teachers need a broad knowledge about this condition in order to understand the needs of the children and to plan effective behavior modification strategies, studies show that interventional programs promise an increase in knowledge of teachers regarding, improved awareness and understanding by the teachers allow for a better performance of these children in the classroom, the success of these children largely resides in the hands of their teachers. This study was conducted with an aim to determine the effectiveness of the teaching program on knowledge toward ADHD to help in the early detection and effective management of children with ADHD.

**Material and Method**

"quasi-Experimental study “ was carried throughout the application of test-retest approach of pre-test, post-test I, and post-test II; for the both groups from the period (1 September 2018 to 20th February 2020) through implementation the educational program on primary school teachers’ knowledge towards primary school pupils with ADHD in Al-Najaf Al-Ashraf city. A purposive (non- probability) sample of (70) primary school teachers’. The selected teachers were distributed equally into study and control groups. The study group were selected from 7 schools and the control group selected from the remaining three schools and this selection because: All the selected schools and teachers are from the same geographical area so there is no diversity in their characteristics in a degree which affect the study results. The questionnaire has been constructed and developed as a tool for data collection. Such development was employed through an extensive review of literature, related studies, related books, on the study program. The final copy of the study instrument consists of the following parts: Part I : Covering letters to obtain the subjects’ agreements. Part II: Demographic information. Part III: Knowledge of Attention Deficit Disorder Scale. The third part is the consists of 31 items distributed into three domains of knowledge (general information domain(15 items), signs and symptoms / diagnosis (8 items), and the treatment (8 items).). The researcher adopted and developed the scales based on previous studies such as . Some modifications are needed to complete the study instrument as the experts suggestions. After review and evaluation by the experts, reveal that the instrument has adequate content and major changes have been done such as number of alternative become multiple selection questions to all items according to their suggestions. The most important part in this study is the program and how it meets the needs of primary school teachers. The construction of the education program is based on the results of assessment of teachers’ needs and extensive review of related literatures, the program was constructed to achieve the objectives of the study from the period of 1st December 2018 throughout 1st January 2019. Data collection carried out from 21st /April to 24th /April 2019. The self-report measurement are used as a data collection measurement. The pre-test instrument is distributed for both the study and control groups participants. Second .Implementation phase: this phase conducted to implement the program for the study group participants only. Educational program is implemented throughout six sessions, all sessions are presented in AL-Masoudi primary school in Al-Najaf City. Two lectures every week on Sunday and Thursday. Third . Evaluation phase: this phase is conducted through applying post-test1 and post-test 2. The post-test 1 conducted after application of the program for both study and control groups. While the post-test2 is conducted after three months from the post-test1 for both study and control groups. Before that the researcher distribute a booklet for the study group participants. The post-test1 is conducted in 30/May/2019. While the post-test 2 conducted in 29/ August/2019.
Results

Table 1. Distribution of (study and control group) according to their knowledge over three tests.

<table>
<thead>
<tr>
<th>Test</th>
<th>Study</th>
<th></th>
<th>Control</th>
<th></th>
<th>total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Poor</td>
<td>%</td>
<td>Fair</td>
<td>%</td>
<td>Good</td>
</tr>
<tr>
<td>Pre-test</td>
<td>F.</td>
<td>%</td>
<td>F.</td>
<td>%</td>
<td>F.</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>40</td>
<td>6</td>
<td>8</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>29</td>
<td>41</td>
<td>5</td>
<td>7</td>
<td>1</td>
</tr>
<tr>
<td>Post-test-I</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>5</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>17</td>
<td>24</td>
<td>18</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>Post-test-II</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>10</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>22</td>
<td>19</td>
<td>27</td>
<td>0</td>
</tr>
</tbody>
</table>

This table shows the level of knowledge between study and control groups over three trials. The level of knowledge about ADHD at pre-test is 40% of teachers have poor level in control group and (41%) of teachers have poor level from study group. Concerning post-test I the table shows that 42% of study group have good level of knowledge while (25%) of control group have fair level of knowledge. Finally, the post-test II indicates that the teacher’s knowledge about ADHD between study and control group were similarly at post-trial I.

Table 2. Comparison of total knowledge between study and control group.

<table>
<thead>
<tr>
<th>Test</th>
<th>Study</th>
<th></th>
<th>Control</th>
<th></th>
<th>Independent t-Test (df)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean±SD</td>
<td></td>
<td>Mean±SD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td>0.33±0.129</td>
<td></td>
<td>0.34±0.124</td>
<td></td>
<td>-0.255 (68)</td>
<td>0.78</td>
</tr>
<tr>
<td>Post-I</td>
<td>0.53±0.114</td>
<td></td>
<td>0.35±0.123</td>
<td></td>
<td>6.244 (68)</td>
<td>0.0001</td>
</tr>
<tr>
<td>Post-II</td>
<td>0.57±0.090</td>
<td></td>
<td>0.35±0.089</td>
<td></td>
<td>10.166 (68)</td>
<td>0.0001</td>
</tr>
</tbody>
</table>

This table indicates highly significant differences between the study group and control group at (post-trial- I and post-trial- II), (p value ≤ 0.05), in same table, there is a non statistically difference between study group and control group regarding their teacher’s knowledge about ADHD at (pretest).

Table 3. Repeated Measures ANOVA Tests for teacher’s knowledge about ADHD (Total Knowledge).

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Repeated Measures ANOVA Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
</tr>
<tr>
<td>Main time effect</td>
<td>48.328</td>
</tr>
<tr>
<td>Between groups effect</td>
<td>40.336</td>
</tr>
<tr>
<td>Groups Interaction overtime</td>
<td>41.655</td>
</tr>
</tbody>
</table>
The results of table 3 show that: 1- The within subjects test indicates that the interaction of time and group is significant (F= 48.328, p= 0.00). 2- The main effect of time is significant (F= 40.336, p= 0.00). 3- The between groups test indicates that there the variable group is significant F= 41.655, p= 0.00). The significant interaction indicates that the control group and study group are changing over time.

Discussion

Shows the level of knowledge between study and control groups over three test. It’s clear that the level of knowledge about ADHD at pre-test was poor in study and control groups. Concerning post-test I the table (1) reveals that most of the study group (42%) .They have good level of knowledge in comparison with control group (25%), they have fair level of knowledge. in comparison with control group which, are having a fair level of knowledge. While post-test II indicates that the teacher’s knowledge about ADHD between study and control group after three months from education program were similarly at post-trial (study group were 40% compare with control group 22%) . This finding were consistent with 1, under the tattle ‘Effect of AD/HD training program on the knowledge and attitudes of primary school teachers”, who found that the intervention group had significantly higher post-intervention scores on knowledge of ADHD, compared with the control group. As our expectation the result of present study shows not significant differences between study group and control group at (pre-test) for knowledge (t= (-0.255) and t= (1.303), P. value was more than 0.05), because both of them do not attend the educational program about ADHD. The result of the present study indicate highly significant differences between study group and control group at (post-test I and post test-II) for knowledge ( t= 6.244) and t=(10.166), both P. values were less than 0.05). our result enhanced the implementation of education program about ADHD. The result of the present study indicate highly significant differences between study group and control group at (post-test I and post test-II) for knowledge ( t= (-0.255) and t= (1.303), P. value was more than 0.05), because both of them do not attend the educational program about ADHD. The result of the present study indicate highly significant differences between study group and control group at (post-test I and post test-II) for knowledge ( t= (6.244) and t=(10.166), both P. values were less than 0.05). our result enhanced the implementation of education program about ADHD among school age (table2). So, their responses have been improved directly post the complication of the education program in the classroom. The results of the present study are supported by the study of 16, who found significant differences between the pre-test and post-test knowledge of ADHD among teachers who attended education programs on ADHD, also the study of the17, found before and after the training program, and 35 of them filled it out at the 6-month interval. Mean scores of these tests were compared using an a paired t-test. The authors found the difference of mean score of 1.48 ± 2.95, and this was statistically significant (p < .005),authors conclude that the workshop improved the knowledge of the school teachers regarding ADHD symptomatology, and it remained significant even after 6 months of training. (Table 3). With regard to the repeated measures of ANOVA, the study results indicate that there is a significant difference in teachers’ knowledge regarding ADHD between the three levels of measurements (pre-test, post-test I, and post-test II) among the study group (F=48.328, p.value =0.001) which indicate that the study group participants exhibit a good knowledge at the post-test I and post-test II compared with pre-test. This may be because the teachers’ length of exposure to educational programs and presentations on behavioral disorders of pupils with ADHD, however, the booklet was given to each teacher for the study group to help with reviewing and support teaching at home, was more effective in improving knowledge of behavior management of students with ADHD ,it had a positive impact and a strong relationship with accepted useful teacher knowledge. These results agree with 18. The studied the Hispanic teachers’ perception toward child with ADHD, their results indicate that there is a statistically difference through using the repeated measure of ANOVA between the study and control groups. i.e. the study group present a good knowledge at the post-test compared with the control group participants. Conclusion:. Findings revealed confirmed that the teachers who not attended for program about ADHD have poor level of knowledge to pupils ADHD among elementary school teachers. While the teachers who attended for program about ADHD have improve and increase their knowledge about ADHD in phase two, and three. Thus, it is recommended for responsible parties to notes the need for greater efforts to teachers should trained to recognize students with behaviors problems / disorders in their classes to provide them with proper and timely education as well as necessary referral for their assessment. The nurse and the family of children as well as their teachers should be cooperate to detect what exact problems are facing child with ADHD and give proper intervention and relying more on observational methods than on subjective reports by the parents. Arrange an orientation programme for teachers to on various behavioral problems among primary school children is needed.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.
Ethical Clearance: “After the administrative arrangements are completed, acceptance of teachers participants was sought for after explaining to them the aim of the study and inform them that all the information taken will be treated confidentially and it is for research purposes only, then taken the consent from them to participate in this study. Also, an ethical approval was obtained from ethical committee of research in Faculty of Nursing University of Babylon regarding confidentiality and anonymity of participants”.

References

Anatomical and Immunohistochemical Variations Regarding the Epidermal Stem Cell among Different Traumatic Fingers of Hands in Iraqi Male Workers

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Abstract

Background: The role of stem cell during the whole life of human constricted into two stages. First stage occurred during prenatal life when stem cell take part in formation of organ in process called embryogenesis. Second stage occurred in postnatal life when these cells contribute in regeneration of damaged or old tissue as repairing or substituting cell in adults.

Patient and Method: 150 male volunteers who work in different industries with traumatic finger of the right or left hand (33 right thumb, 25 right middle finger, 22 right little finger, 28 left thumb, 26 left middle fingers, 16 left little finger) were taken on from the Department of surgery, Baghdad Hospital, Baghdad; Iraq from February 2019 to October 2019.

Results: Anatomical results showing that The grip was affected only in case of traumatic thumb. Vimentin rich-stem cells were highly positive in the proximal epidermal areas of traumatic fingers more than the stem cells in the distal areas of the same fingers.

Conclusion: there is a little hope in the near future that the injured or even amputated finger or any part of the body could be replaced by new one made by culturing stem cells in laboratories.

Keyword: - Anatomical immunohistochemical, epidermal stem cell, traumatic.

Introduction

The hands of the human and some apes had significant manual functions in nearly most of human daily manual works. Hand injury without doubt will affect the life style of manual workers as well as affect the social life too. So study of anatomy and histology of the hand will gave the scientists the clue to solve many problems that occurred during hand injury. Any part of the hand which include bone or muscle or nerve will cause tremendous hand dysfunction, therefore the main goal of hand treatment was restoring the main hand functions depend on the knowledge of hand anatomy which represented by griping function (¹).

In present day, plastic surgeons repair and reconstruct many tissue damage and defect. Technological improvements in plastic surgery department increase the rate of success in repair fingers injuries. Despite the availability of many high centers of hand surgery, permanent hand dysfunction could occurred till now (²).

Tissue transplantation being the second choice for limb injures but this part of management need immunosuppressive therapy because there was a chance of tissue rejection (³, ⁴).

Another solution for compensate tissue loss was the Cosmetic prostheses in this case, patient couldn’t use all

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of his skills in daily manual wok (5). Therefore, to solve this dilemma, researchers suggest regenerative methods by aid of tissue engineering (6,7,8).

Tissue engineering now consider as a hopeful field that in future can generate and construct limbs, fingers in the clinical laboratories (9).

Salamanders as a good example of urodeles had wondrous ability to substitute any injured or even amputated part in their bodies. Human as example of mammals had no this ability except in prenatal life (10).

In postnatal life, this ability will be limited for some organs like liver or skin (11,12,13).

Ability of substitution of body parts depend on regeneration of stem cells. This kind of cell had major function in keep the biological balance in human body in addition to developing of the body during life (14,15).

The role of stem cell during the whole life of human constricted into two stages. First stage occurred during prenatal life when stem cell take part in formation of organ in process called embryogenesis. Second stage occurred in postnatal life when these cells contribute in regeneration of damaged or old tissue as repairing or substituting cell in adults (16).

**Patients and Methods**

150 male volunteers who work in different industries with traumatic finger of the right or left hand (33 right thumb, 25 right middle finger, 22 right little finger, 28 left thumb, 26 left middle fingers, 16 left little finger) were taken on from the Department of surgery, Baghdad Hospital, Baghdad; Iraq from February 2019 to October 2019. Their age and jobs were recorded. Age of the male volunteers rounded between 20 to 38.

They didn’t complain from any dermatological or systemic diseases. Skin specimens was obtained under local anesthesia by making superficial surgical excision of an epidermal graft from distal and proximal areas (proximal area which was near the traumatic area of finger and the distal which was far from traumatic area of the finger), fixed in 40% formalin and as soon as possible embedded in paraffin section. Histochemical staining were performed in the laboratory of department of anatomy in the medical college of Baghdad university on skin samples.

After immersion of all samples throughout the night in a fixative with 3.5% paraformaldehyde in saline solution. Samples dehydrated in ethanol toward xylene successions then embedding was made as a paraffin wax.

Staining by aid of a streptavidin -biotin technique. Sections with thickness about 2 to 5 mm sliced and putted on positive charged - slides. At last all of the sections were stained for vimentin and putted in autoclave for 13 min.

Treatment of sections with 6% H2O2 mixed with methanol for 12 minutes. Again incubation was done all over the night at degree of about 50 C with diluted anti-vimentin antibody (Bio Connect, USA).

The positive cell mean that vimentin protein was appear in the cell as brown color and , the negative cell means that the stem cell had no vimentin which appear blue in color. The vimentin protein found in cytoskeleton of stem cell cytoplasm, so the cytoplasm appear as brown (17)

Estimation with light microscope at X10,X20,X40 and X100 was done in optimal conditions. Recording of percentage scores were based on the amount of positive signals tacked by the protein. Counting of cell depend score categories: Score(1)=1-25% , Score(2)=26-50% , Score(3)>50% (18).

**Result**

Anatomical results showing that The grip was affected only in case of traumatic thumb which represent the highest percentage among cases while other fingers not showing any affect even if they were injured all regardless which type of finger was injured .

Histochemical results showing that vimentin, the cytoskeleton marker of skin stem cells was detected in this study in order to recognized the stem cell which contained this protein . As appeared during the laboratory work ,vimentin staining was clear in the basal layer as showed in table (1) and figures (1,2and 3). Vimentin rich-stem cells were highly positive in the proximal epidermal areas of traumatic fingers more than the stem cells in the distal areas of the same fingers .Proximal and distal was decided according to the site of injury. Vimentin-histochemical stain clearly showing cytoskeleton staining. No differences were appeared regarding the side of limb(right or left) , age and the type of fingers between the samples of volunteers.
Table(1): Number of stem cell in different type of fingers injury.

<table>
<thead>
<tr>
<th>Type of finger</th>
<th>Number of stem cell</th>
<th>Proximal</th>
<th>%</th>
<th>Distal</th>
<th>%</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thumb (Rt. &amp;Lt.)</td>
<td></td>
<td>48</td>
<td>79%</td>
<td>13</td>
<td>21%</td>
<td>61</td>
</tr>
<tr>
<td>Middle finger (Rt. &amp;Lt.)</td>
<td></td>
<td>41</td>
<td>80%</td>
<td>10</td>
<td>20%</td>
<td>51</td>
</tr>
<tr>
<td>Little finger (Rt. &amp;Lt.)</td>
<td></td>
<td>29</td>
<td>76%</td>
<td>9</td>
<td>23%</td>
<td>38</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>118</td>
<td>79%</td>
<td>32</td>
<td>21%</td>
<td>150</td>
</tr>
</tbody>
</table>

Figure(1): Epidermal layer of injured middle finger in proximal (A) and distal (B) areas X20.

Figure(2): Epidermal layer of injured thumb showing basal stem cell in proximal (A) and distal (B) areas. X100.

Figure(3): Epidermal layer of injured thumb showing the thickness of epidermal layer in proximal (A) and distal (B) areas. X40.
Discussion

In the hand of the human, thumb is considered as the most significant part. Significances of thumb came from its important role in a grip.

First anatomist called Napier in 1956 was interested in understanding the mechanism of grips. Napier was tried to understand the biomechanical anatomy of the hand in order to increase his knowledge more about compensation of hand injuries. This anatomist divided the grips into two types, precision and power grip. Power grip done by using the fingers, thumb as well as the palm together like grip the hammer. The precision grip done by using only the distal parts of thumb and fingers like writing with a pen (19).

Clearly, there was no doubt that the thumb had the major role in control the function of griping in both types. Therefore, any kind of trauma to the thumb which may complicated or not or sometimes leading to amputation of thumb will lead to dysfunction of this vital and significant part of the hand (20,21).

Traumatic injuries to the hand increased with increasing the age with frequency ranged from 2nd to fifth decade. Controversially, some epidemiologists conveyed that most of the trauma occurred during the early decades of life (2nd to 4th decades) who works manually in factories (22).

Other epidemiologists believed that the higher risk was founded in the late decades (6th to 8th decades) (23).

All of these decades from 2nd to 8th were workers while, in non-worker people also observed high risk of hand trauma among children and aging people (24).

In worker group, 60% of them worked in industries or farms (25). Boyle et al, Onuba and and Stanbury et al agree with this percentage (26,27,28).

In non-worker group most of causes of trauma were by car or motor vehicle accident (24%) (29, 24).

Many trials in the last decades try to minimize or even terminate the dysfunction or paralysis of fingers especially the thumb that result from trauma to the hand or any part of the body. This was done by made many public programs all over the world for education of the people who works in farms or factories by making them aware about the most precautions that help them to be save during the time of work (25).

The usual period of epidermal turnover was nearly (311 hour more or less) depend on optimal conditions. Mitosis of cells usually happened by stem cells located in the most basal part of epithelial layer of skin. Usually in most of cases the stem cells had a growth rate which might consider as slow rate, in addition to their capacity to made different type of cells (differentiation processes) (30,31,32).

The aim of existing such type of stem cell was to make balance between the lost and newly formed cells as a compensatory mechanisms to maintain the layers of skin within usual manner in case of injury to tissues. So, it’s very important for the scientists to look for the good conditions and optimal mechanisms that may help in developing or even accelerate the proliferation and differentiation of his kind of cells after creating a simple and good manner to isolate these cells in laboratories (33).

Franssen et al, suggested different type of markers that may be useful in detecting the stem cell in their tissues one of these markers was the vimentin (34).

In spite of the huge and tremendous development in different branches that have to do with detection and isolation of stem cells, working in such branches carry many and unexpected difficulties (35).

Unfortunately, regeneration in case of amputated finger was restricted only in distal part rather than proximal and some experiment done on mice showing that complete regeneration not happen if the percentage of remaining proximal tissue was less than 60% after amputation (36).

Many studies demonstrate that regeneration came after period of healing injury by aid of epidermal stem cells (37).

The motivation of fibroblastic and neural cells in remaining parts also had significant role in regeneration of smooth muscle, blood vessel and nerves (38).

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: None

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Gene Expression and Levels of Plasma Protein Tyrosine Phosphatase Non-Receptor Type 22 (PTPN22) in Pulmonary Tuberculosis Patients and Their Household Contacts in Makassar, Indonesia

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Abstract

Background: The protein tyrosine phosphatase non-receptor type 22 (PTPN22) gene has been involved in the immune response to tuberculosis infection by affecting the inflammatory response and subsequent antimicrobial immunity. This study aims to determine the PTPN22 expression and differences in the levels of PTPN22 in pulmonary TB patients (PTB) with household contacts and healthy control.

Methods: We analyzed PTPN22 expression and the level of plasma PTPN22 from pulmonary tuberculosis patients (PTB), household contacts and healthy control using real time PCR and ELISA method.

Results: Thirty PTB, 30 household contacts and 30 control were involved in this study. Analysis of the association of PTPN22 gene expression against TB showed that PTPN22 gene expression was 7.3 times upregulated compared to household contact and 12.1 times upregulated compared to healthy controls. Levels of plasma PTPN22 in PTB: 10.0620 ng/ml, in Household contact: 6.7923 ng/ml and in control: 4.4293 ng/ml. These values did not differ significantly between the patients, household contact and control.

Conclusion: Our study results found that PTPN22 gene expression is significantly increased in PTB than household contact and control. Levels of plasma PTPN22 in PTB patients did not differ significantly than in household contact and control.

Keywords: PTPN22, Pulmonary tuberculosis, Gene expression, Real time PCR, ELISA, Level of plasma.

Introduction

Pulmonary tuberculosis (TB), an infectious disease caused by Mycobacterium tuberculosis (Mt). TB remains a major cause of morbidity and mortality in humans worldwide. One-third of the population worldwide is infected by Mt. About 5-10% of them manifest clinically to be active TB1,5,10,15. World Health Organization in Global Tuberculosis Report 2019 revealed that there were an estimated 10 million new TB cases worldwide in 2018. TB is the top infectious killer in the world. There were 1.5 million people died from TB2,3,11,12,18. TB is the leading killer of people with HIV and a major cause of deaths related to antimicrobial resistance. Indonesia is one of the countries with the highest TB burden in the world. There were 845 thousands TB incidence (316 per 100 thousands population) and 98.3 thousands (37 per 100 thousands population)4,6,7,8,21.

Studies in United States revealed that 20-30% of the household contacts occurred latent infection and about 10% became active TB9,10,13,14,28. A person susceptibility to TB infection and developing active TB is influenced by several factors including host
genetics, host immunity, mycobacterium virulence and environment. The prevalence rate of TB was significant different among several ethnic minorities, therefore, the differences in susceptibility to TB may be related to a genetic predisposition. Genetic predisposition as one of the host factors influencing risk factors for the development of TB\textsuperscript{15,16}.

Studies revealed the pivotal function played by cellular immunity in Mycobacterium tuberculosis (Mtb) infection. The immune responses are implicated to control the infection through cytokine production and specific surface molecules interactions. T-cell activation is a crucial step in the immune response against Mtb. Several genes are reported to have been associated with TB pathogenesis, one of them is protein tyrosine phosphatase nonreceptor type 22 (PTPN22)\textsuperscript{17,18,23}. The PTPN22 gene were involved in maintaining the T cells in the resting stage. PTPN22 were also responsible for bringing back the activated T cells to the resting phenotype in the absence and presence of antigen. Phosphotyrosine phosphatases are involved in reversion of T lymphoblastic proliferation Tyrosine phosphorylation in T cells is regulated by phosphatase activity.

Several transmembrane molecules, like PD-1 (programmed death 1) and CTLA-4 (cytotoxic T-lymphocyte antigen 4), play an important role in downregulating signalling through the T-cell receptor (TCR). The PTPN22 is a cytosolic inhibitor of TCR signalling. The PTPN22 gene is located on chromosome 1p13.3-p13.1. This gene product is the intracellular protein tyrosine phosphatase known as Lyp and expressed in cells of the immune system, including dendritic, T and B cells. Lyp is expressed in cells of haematopoietic origin and has a variety of substrates, including Lck, Zap70, Valosine containing protein (VCP), Vav and TCRzeta, all of them are important players in T-cell signalling. The dephosphorylation of these substrates by LYP negatively modulates T-cell activation. Lyp forms a protein complex with the intracellular tyrosine kinase (protein tyrosine kinase) Csk. The Csk protein tyrosine kinase is a potent suppressor of T cell activation due to its ability to phosphorylate tyrosine residue at Src family kinases, thereby antagonizing the action of CD45, that mediates dephosphorylation of the inhibitory C-terminal SH2 domain of Lck.\textsuperscript{19,1,4}

Numerous studies from several countries result, suggest that the PTPN22 gene affect susceptibility to TB. However, no research has been conducted in Indonesia about PTPN22 and TB.\textsuperscript{4,7,12} The purpose of this study was to compare gene expression and levels of plasma PTPN22 in pulmonary tuberculosis patients and their household contacts in Makassar, Indonesia. The results of this study are expected to provide a better understanding of the relationship gene expression and levels of plasma PTPN22 with susceptibility TB.

**Materials and Method**

**Research design and study subjects**

We analyzed gene expression and the levels of plasma PTPN22 from pulmonary tuberculosis patients (PTB), household contact and control samples using real time PCR and ELISA method. QuantiFERON-TB Gold Plus (IGRA) was used to screening latent TB infection among household contacts. A total of 90 samples were collected in this study, consisting 30 pulmonary tuberculosis patients, 30 household contacts and 30 control. Pulmonary TB patients who were participants in this study were recruited from the Community Center for Lung Health Makassar, Indonesia, which is one of the referral health facilities for tuberculosis.

All TB patients were diagnosed based on clinical manifestations, chest radiograph, microscopic smear which was further confirmed through TB culture with MGIT medium. Inclusion criteria for TB patients in this study included new TB cases (no history of anti-tuberculosis drugs treatment), ages 18 years and over, willing to participate in this study by giving written consent and having positive smear results. The exclusion criterion was HIV-positive (SD Bioline). The inclusion criteria for household contact are those aged 18 years and over, have no clinical symptoms of TB, have no history of TB or anti-tuberculosis drugs, and stay at home with TB patients for at least 6 months and are willing to participate by giving written consent. We collected blood and sputum samples from 30 TB patients, blood samples from only 30 household contacts that met the criteria and 30 blood samples from healthy control. Positive sputum samples were decontaminated and continued with the culture process at the Tuberculosis Unit of the HUM-RC Laboratory (Hasanuddin University Medical-Research Center), Makassar, Indonesia. Blood samples were centrifuged at 4,400 rpm for 10 minutes at 250°C to separate plasma samples. Plasma samples were stored at -200°C before ELISA. Specifically from the contact sample, we examined IGRA with the QuantiFERON Gold Plus TB Test (Qiagen, Germany) according to the
Measurement levels of plasma PTPN22

Concentration PTPN22 was determined by the ELISA method using an ELISA Human PTPN22 kit (Diagnostics Biochem Canada Inc., Ontario, Canada) according to manufacturer’s instructions. Linear curves are used to determine the concentration of PTPN22 samples from a calibration curve. Measurement gene expression of PTPN22 by real timePCR

Amplified comementary DNA (cDNA) from RNA extracted blood sample by Reverse Transcriptase-PCR based on the method of Invitrogen. Using SuperScript First-Strand Synthesis System for RT-PCR. This cDNA strand stored in -20°C until used for real time PCR. Measurement gene expression (up regulation or down regulation)PTPN22 bySYBR Green Dye using the real time PCR (qPCR) method according to manufacturer’s instructions. Before amplified, a master mix was prepared by mixed 12.5 ml SYBR green dye, 0.5 ml cDNA and 0.5 ml forward primer (5’-ACAACTGTCGCTGAAGCCCA-3’), 0.5 ml reverse primer (5’-GTAGCTGGAATCCTCATCAGG-3’)(each primer 5 pmol/ml) and 11.3 ml H2O. The same procedure was carried out for the GAPDH gene as a control but using a different primer sequence. GAPDH forward primer (5’-CCTGCACCACCAACTGCTTA-3’) and GAPDH reverse primer (5’-GGCCATCCACAGTCTCTGAG-3’). The qPCR cycle with a condition of 50°C for 2 minutes, 95°C for 1 minute each1 cycle, denaturation 95°C for 15 seconds then followed by aneling 60°C for 30 second and extension 72°C for 30 seconds was repeated 40 times (cycles). The last cycle was the final extension at 72°C for 10 minutes.

Statistical analysis

All experimental data were analyzed using SPSS software (version 21.0, Chicago, IL, USA). P values <0.05 were considered statistically significant. Data obtained from ELISA results were analyzed and assessed for differences between the three groups (pulmonary TB patients, household contacts and control). The Chi-square test is used for the comparative analysis of nominal variables.Data (parametric) will be presented as mean ± SD (median) and will use statistical analysis to distinguish values between the three groups. Data were analyzed using the One-way ANOVA test which compared levels of plasma PTPN22 in the three groups.

Results

We analyzed a total of 30 TB patients, 30 household contacts and 30 healthy control for the PTPN22 gene expression and levels of plasma.

Table 1. Distribution of study participants according to the demographic characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>TB patients n=30</th>
<th>Household contact n=30</th>
<th>Healthy control n=30</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>17 (56.7%)</td>
<td>6 (20%)</td>
<td>15 (50%)</td>
<td>0.009*</td>
</tr>
<tr>
<td>Female</td>
<td>13 (43.3%)</td>
<td>24 (80%)</td>
<td>15 (50%)</td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17-30</td>
<td>7 (23.3%)</td>
<td>9 (30%)</td>
<td>3 (10%)</td>
<td>0.475*</td>
</tr>
<tr>
<td>31-45</td>
<td>10 (33.3%)</td>
<td>13 (43.3%)</td>
<td>12 (40%)</td>
<td></td>
</tr>
<tr>
<td>46-60</td>
<td>11 (36.7%)</td>
<td>7 (23.3%)</td>
<td>13 (47.2%)</td>
<td></td>
</tr>
<tr>
<td>&gt; 60</td>
<td>2(6.7%)</td>
<td>1 (3.3%)</td>
<td>2 (6.7%)</td>
<td></td>
</tr>
</tbody>
</table>

* Chi-square test.
Table 1 shows the gender and age of study participants. There was a gender difference between groups (p=0.009). There were more male subjects (56.7%) than female (43.3%) in the TB patients group. However, more female subjects (80%) than male (20%) in household contacts group. It can be seen that there was no age difference between the three groups (p=0.475).

PTPN22 levels were measured using ELISA. The lines on the boxplot indicate the median and the points show extreme values. PTPN22 levels in TB patients group: mean 10.06 ng/ml with standard deviation 15.98 ng/ml. PTPN22 levels in household contacts group: mean 6.79 ng/ml with standard deviation 10.24 ng/ml. PTPN22 levels in control group: mean 4.43 ng/ml with standard deviation 6.68 ng/ml. Data were analyzed using the One-way ANOVA test which compared PTPN22 levels in the three groups.

The mean value PTPN22 levels in TB patients compared to household contacts and control, did not differ significantly (p = 0.175).

Gene expression of PTPN22 in TB patients group: 12.11629, household contacts group: 1.65801 and control 1.00000. Analysis of the association of PTPN22 gene expression against TB showed that PTPN22 gene expression was 7.3 times upregulated compared to household contact and 12.1 times upregulated compared to healthy controls.

Discussion

In this study, from 90 participant, there were more male subjects in TB patients group. This was in accordance with the theory. We found that PTPN22
gene expression is significantly increased in PTB than household contact and control. Several studies analyzing the role of PTPN22 in TB show an association between PTPN22 and susceptibility to active TB disease. Some of the earlier studies reported a significant association between PTPN22 and TB. These studies results suggest that PTPN22 gene may affect susceptibility to TB like in Colombian population, Moroccan population, Brazilian Amazon population and Chinese Uygur population.

The mean of levels plasma PTPN22 gene on TB patients group was higher than mean of levels plasma PTPN22 gene on household contacts and healthy control. But these values did not differ significantly levels plasma of the PTPN22 gene between the three groups. Several studies results also found that PTPN22 gene is not associated with the susceptibility to TB, such as in Iranian population and Indian population.

There were differences in terms of genetic predisposition and serum levels in TB and non-TB subjects. It was likely due to geographical location, genetic differences and the presence of other disease conditions. A person susceptibility to TB infection and developing active TB is influenced by several factors including host genetics, host immunity, mycobacterium virulence and environment. Several factors were increased susceptibility TB, such as malnutrition, Diabetes mellitus and age by suppressed the immune system.

Conclusion

The PTPN22 gene expression is significantly increased in pulmonary TB patients than household contact and control. Patients with active TB have higher levels of plasma PTPN22, but did not differ significantly compared to household contacts and control.

Acknowledgments: The authors would like to thank the patients, household contacts and healthy subjects who willingly participated in the study, and all the partners and staffs who help us in the process of this study.

Source of Funding - Self-funding

Conflict of Interest - None of the authors has competing interests.

Ethical Clearance - This research was approved by the Research Ethics Commission of the Faculty of Medicine, Hasanuddin University Makassar, South Sulawesi, Indonesia (No. 583/H4.8.4.5.31/PP36-KOMETIK/2018), and all research subjects gave written informed consent.

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Quantitative and Histological Study of the Effect of Cadmium Oxide on Both Body and Kidney of Mice

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Abstract

The present study was conducted using 24 normal male of Swiss white mice weighing (36-40 gm), 70 days old. The mice were divided into four groups of six mice each. The mice of control group were fed pellet and given tap water during the entire period of the experiment (30 days). The other three groups of mice were given cadmium oxide orally at doses of (7.0 mg / kg body wt., 14.1 mg / kg body wt., and 22.3 mg / kg body wt.) consecutively every day for 30 days and weight in gm was taken once a week. With standard histological techniques, samples were obtained from kidney of the mice. The body weights along with kidney weights were decreased with increase of doses. Also it has been concluded that cadmium oxide caused damages in renal corpuscle (Bowman’s capsule and glomerulus) and renal cortical tubules as well as decrease in body weight and kidney weight (wt.).

Key words: cadmium, body weight, histological alteration, kidney, mice.

Introduction

The mammalian kidney both anatomically and functionally is extremely complex organ and it plays an important role in the control and regulation of homeostasis. Heavy metals occur naturally in the environment and are found in varying levels in the ground. Cadmium is ubiquitous environmental pollutant, toxic element; enter the human body via food (¹, ²). Cadmium is absorbed rapidly, toxic to several tissues and accumulated in the liver and kidney (³, ⁴), which resulted in the reduced availability of cadmium to such organs as the kidney (⁵).

Therefore, the present study was designed to examine the effect of cadmium oxide on male mice body weight along with kidney weight quantitatively and to determine whether or not cadmium oxide can cause histological alterations which may affect kidney functions.

Materials and Method

Twenty four normal male of Swiss white mice were used in this experiment. They were 70 days old, weighing (36-40gm), and divided into four groups of six mice each. The mice of control group were fed pellet and given tap water during the entire period of the experiment (30 days). The other three groups of mice were given cadmium oxide orally at doses of (7.0 mg / kg body wt., 14.1 mg / kg body wt., and 22.3 mg / kg body wt.) consecutively every day for 30 days and weights in gram of the mice body were taken once a week. After the end of the experiment (30 day), the initial and final weights of mice in each group were taken, and, then, the mice were sacrificed and the kidney was removed and perfused with normal saline and the weights of kidney of treated groups along with control were also taken. Kidney was excised, fixed in 10% formalin. After fixation, the kidney was processed; wax block and slides were prepared then stained in Hematoxylin / Eosin for histological studies (⁶).

Results and Discussion

The mice kidney of the second group which was given a dose of 7.0 mg / kg body wt. of cadmium oxide, showed histological alterations but there was no significant (p > 0.05) change in body weight and kidney weight while there was a significant (p < 0.05) loss in body weight and kidney weight treated with (14.1 mg / kg body wt. and 22.3 mg / kg body wt.) as shown in Tables (1 and 2). The intake of fed and water by treated group reduced as compared to control and the decrease was dose dependent.
Table 1: Showing the effect of cadmium oxide on body weight of male mice.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (First)</td>
<td>36.1 ± 1.9</td>
<td>38.3 ± 2.1</td>
<td>-</td>
</tr>
<tr>
<td>7.0 mg / kg body wt. (Second)</td>
<td>36.7 ± 2.2</td>
<td>35.1 ± 2.5</td>
<td>P &gt; 0.05</td>
</tr>
<tr>
<td>14.1 mg / kg body wt. (Third)</td>
<td>36.3 ± 3.1</td>
<td>33.2 ± 2.6</td>
<td>P &lt; 0.05</td>
</tr>
<tr>
<td>22.3 mg / kg body wt. (Fourth)</td>
<td>37.1 ± 2.7</td>
<td>29.3 ± 2.9</td>
<td>P &lt; 0.05</td>
</tr>
</tbody>
</table>

Table 2: Showing the effect of cadmium oxide on kidney weight of male mice.

<table>
<thead>
<tr>
<th>Group</th>
<th>Kidney weight/gm.</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control (First)</td>
<td>0.63 ± 0.02</td>
<td></td>
</tr>
<tr>
<td>7.0 mg / kg body wt. (Second)</td>
<td>0.61 ± 0.01</td>
<td>P &gt; 0.05</td>
</tr>
<tr>
<td>14.1 mg / kg body wt. (Third)</td>
<td>0.52 ± 0.01</td>
<td>P &lt; 0.05</td>
</tr>
<tr>
<td>22.3 mg / kg body wt. (Fourth)</td>
<td>0.43 ± 0.01</td>
<td>P &lt; 0.05</td>
</tr>
</tbody>
</table>

Histological observations of kidney after different doses of cadmium oxide treatment showed degenerative alterations. The kidney of control group of mice showed normal architecture (Figure 1). With a dose of 7.0 mg / kg body wt., the observations of the kidney of the second group of mice showed congested glomerulus and blocked lumen of renal cortical tubules due to some necrosis (Figure 2) as compared to control. With a dose of 14.1 mg / kg body wt., the observations of the kidney of the third group of mice showed damaged glomerulus and dark appearance of renal cortical tubules (Figure 3), whereas with a dose of 22.3 mg/kg body wt., the observations of the kidney of the fourth group of mice showed disappearance of the kidney glomerulus due to destruction and the lumen of renal cortical tubules was widened, besides, the cells of renal cortical tubules were damaged that they were hardly distinguishable due to negative effects of cadmium oxide (Figure 4).

Metal can enter proximal tubular cells by endocytosis following binding of metal itself or a metalloid protein complex to the brush border membrane (7). Once inside the cell, the metal can be released from the protein metal complex by lysosome degradation. The intracellular distribution of the metal then depend on the presence of various high – affinity binding sites or sinks within the cell (8). The binding of metal glomerular basement membrane has been reported by (9). Ionic blocking of these site leads to the loss of selectivity infiltration of albumin (10). The cytosolic protein might be a fragment of the renal basement membrane and the determination of acute toxicity is usually an initial screening step in the assessment and evaluation of toxic characteristics of all compounds (11). Lastly, we have presented evidences that necrotic is an important and predictable event of effect of cadmium. In conclusion, it seems reasonable to consider that the present study provided evidences
regarding degenerative changes in the architecture of the mice kidney due to harmful effects of cadmium oxide.

Figure 1: Showing normal architecture of kidney in control group of mice. H&E., 40X

Figure 2: Showing congested glomerulus and blocked lumen of renal cortical tubules due to necrosis at a dose of 7.0 mg / kg body wt. cadmium oxide H & E., 40X.

Figure 3: Showing damaged glomerulus and dark appearance of renal cortical tubules, at a dose of 14.1 mg / kg body wt. cadmium oxide H&E., 40X.

Figure 4: Showing disappearance of the kidney glomerulus due to destruction and both widened lumen and damaged cells of renal cortical tubules at a dose of 22.3 mg / kg body wt. cadmium oxide H&E., 40X.
Conflict of Interest: The authors declare that they have no conflict of interest

Source of Funding: Self–funding

Ethical Clearance: The researchers already have ethical clearance from College of Dentistry, University of Baghdad, Iraq.

References
Clove (Syzygium aromaticum) Effect on Growth *Malassezia furfur* and *Aspergillus sp* on Media

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**Abstract**

**Background:** Malassezia furfur and Aspergillus sp are fungi associated with infection in humans. One of the plants that can use as anti fungi is clove (Syzygium aromaticum).

**Aim:** The purpose of this study was to determine the growth barriers of Malassezia furfur and Aspergillus sp on media with the addition of Clove Powder (Syzygium aromaticum).

**Material and Method:** The equipment used by cloves (Syzygium aromaticum) is a part of the reddish-green flower. The samples used in this study were Malassezia furfur and Aspergillus sp. Specimens planted on Saboraud Dextrose Agar media with the addition of clove powder (Syzygium aromaticum) in various concentrations.

**Results:** Malassezia furfur in media with clove powder concentration of 0%; 0.05%; 0.1% shows the number of colonies 1330; 1135; 765. Aspergillus niger, Aspergillus flavus, Aspergillus fumigatus on media with clove powder concentration of 0%; 0.05%; 0.2% indicates colony diameter of 6.8 cm; 5 cm; 3.7 cm (Aspergillus niger), 6.7 cm; 5 cm; 4.3 cm (Aspergillus flavus), 7 cm; 5 cm; 2.3 cm (Aspergillus fumigatus).

**Conclusion:** Media with Addition of Clove Powder (Syzygium aromaticum) can inhibit the growth of Malassezia furfur and Aspergillus sp.

**Keywords:** Malassezia furfur; Aspergillus sp; Clove (Syzygium aromaticum).

**Introduction**

The development of fungal infections in Indonesia strongly supported by a tropical climate with high humidity, sanitation, and an unhealthy lifestyle. Indonesia has a problem with bacterial and fungal infections. Bacterial infections such as tuberculosis¹,²,³ and Staphylococcus aureus⁴,⁵ are significant obstacles. There are also environmental contaminant bacteria and fungal⁶ such as Salmonella², E Coli⁸, Staphylococcus aureus⁹,¹⁰ and Bacillus¹¹,¹². Fungal infections such as Malassezia furfur which cause Pityriasis Versicolor often found in the community of children and adults.

Fungi can cause disease not only by infecting the body but also creating mycotoxin contaminated food. Foods contaminated by fungi have a potential danger to human health. Aspergillus flavus, Aspergillus fumigatus, and Aspergillus niger produce aflatoxin which is harmful to health.

Handling fungal infections and contamination in food can use natural ingredients. Indonesia is a country rich in herbal plants such as Anredera cordifolia¹³, Cananga odorata (Lamk). Hook¹⁴, lime¹⁵, Syzygium polyanthum¹⁶, Carica papaya Linn¹⁷, Jatropha curcas¹⁸, Kaempferia galanga L.¹⁹, Cinnamomum burmannii²⁰, Eleutherine palmifolia (L) Merr²¹, Hibiscus sabdariffa L.²² Since ancient times herbal plants have been widely used as antimicrobials²³. These herbaceous plants contain essential oils with antibacterial and antifungal activity²⁴. Some essential oils show important antifungal activity, namely yeast, dermatophytes fungi, and Aspergillus strains. This therapy is mainly used in mucosal, skin, and respiratory tract diseases²⁵.

Syzygium aromaticum is a plant that widely cultivated in Indonesia. Clove and eugenol oils from
Syzygium aromaticum have antiseptic, analgesic and anesthetic effects\textsuperscript{26}. And have been tested in experimental animals as an antifungal\textsuperscript{27,28}. Clove oil and Eugenol also have activities against filamentous fungus of food\textsuperscript{29} and pathogenic fungi in humans\textsuperscript{30}. Pinto et al. (2009) proved that clove oil and Eugenol had considerable antifungal activity against Candida, Aspergillus, and Dermatophytes fungi. Clove oil and Eugenol from clove flowers (Syzygium aromaticum) have been shown to inhibit the growth of Malassezia furfur and Aspergillus. But clove flowers (Syzygium aromaticum) which processed into powder have not been shown to inhibit the growth of these fungi. The clove powder material is expected to contain still essential oils which function as antifungals. Although this essential oil is not removed directly from the powder, it is possible to diffuse it on the media and thus inhibit the growth of Malassezia furfur and Aspergillus fungi. This study aims to describe the growth of Malassezia furfur and Aspergillus fungi on media with the addition of clove powder (Syzygium aromaticum) and determine the concentration to prevent the growth of fungi effectively\textsuperscript{31}.

Subjects and Methods

The population in this study was Clove flowers obtained at Jalan Meratus Kemuning Village, Banjarbaru Selatan District, South Kalimantan, Indonesia. The sample used is a fresh clove flower, which is reddish-green.

The independent variable of the study was SDA media with the addition of clove powder with a concentration variation of 0%, 0.05%, 0.1%, 0.2%, 0.5%, 1%, 2%. The dependent variable of the study was the growth of Malassezia furfur and Aspergillus sp as measured by colony diameter/number of colonies.

The cloves used are part of the fresh reddish flower. The flowers are washed first and dried in oven Hock at 45 °C for 6 hours until the cloves are dry. Cloves are blended to powder and sieved on 40 mesh sieves. Making each concentration in 100 ml of Sabouraud Dextrose Agar (SDA) so that the concentration is 0.05%: 0.05gr, 0.1%: 0.1gr, 0.2%: 0.2gr, 0.5%: 0.5gr, 1%: 1gr, 2%: 2gr.

Planting Malassezia furfur used a suspension that conformed to the MacFarland Standard 0.1. Spread to Sabouraud Dextrose Agar as much as 10µl then count the number of colonies on the 7th day after incubating room temperature.

Planting Aspergillus sp at Sabouraud Dextrose To use the ose at one point with a diameter of 1 cm, the width of the colony measured at the 7th-day room temperature incubation.

Results

The results of the description of the growth of Malassezia furfur on media by adding clove powder to each concentration can see in table 1.

**Table 1. Number of Malassezia furfur colonies in media with clove powder**

<table>
<thead>
<tr>
<th>Concentration of clove powder</th>
<th>The number of Malassezia furfur colonies at 7th day incubation</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>1330 colony</td>
</tr>
<tr>
<td>0,05 %</td>
<td>1135 colony</td>
</tr>
<tr>
<td>0,1 %</td>
<td>765 colony</td>
</tr>
<tr>
<td>0.2%</td>
<td>-</td>
</tr>
<tr>
<td>0.5 %</td>
<td>-</td>
</tr>
<tr>
<td>1 %</td>
<td>-</td>
</tr>
<tr>
<td>2 %</td>
<td>-</td>
</tr>
</tbody>
</table>

Calculation of the number of colonies of Malassezia furfur using the Colony Counter tool obtained the average number of colonies on the 7th day with 3 repetitions can be seen in table 2.

**Table 2. Diameter of Aspergillus sp colonies in media with clove powder**

<table>
<thead>
<tr>
<th>Concentration of clove powder</th>
<th>Colony diameter of Aspergillus sp at 7th day incubation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspergillus niger</td>
<td>Aspergillus flavus</td>
</tr>
<tr>
<td>0%</td>
<td>6.8 cm</td>
</tr>
<tr>
<td>0,05%</td>
<td>5 cm</td>
</tr>
<tr>
<td>0,2%</td>
<td>3.7 cm</td>
</tr>
<tr>
<td>0.5%</td>
<td>-</td>
</tr>
<tr>
<td>1%</td>
<td>-</td>
</tr>
<tr>
<td>2%</td>
<td>-</td>
</tr>
</tbody>
</table>
Figure 1. Malassezia furfur in media with clove powder 0% (a), 0.05% (b), 0.1% (c).

Figure 2. Aspergillus niger on media with the addition of clove powder 0% (a), 0.05% (b), and 0.2% (c)

Figure 3. Aspergillus niger on media with the addition of clove powder 0% (a), 0.05% (b), and 0.2% (c)
Discussion

Based on the results in table 1, Malassezia furfur can inhibit by growth in media containing clove powder. This result is by Alharisy’s research (2018), which proves that 1% clove extract (Syzygium aromaticum) can inhibit the growth of Malassezia furfur.22

The results in table 2 show that there are differences in the diameter of the colonies of Aspergillus niger, Aspergillus flavus, Aspergillus fumigatus, each concentration of clove powder (Syzygium aromaticum). This study proves that clove powder can inhibit the growth of fungi. The same thing was confirmed by Utami’s research (2010) that clove powder (Syzygium aromaticum) could hinder the growth of microbes and fungi at concentrations of 0.2% and 0.6% on pineapple jam.33 According to Pinto et al. Research, clove oil can also inhibit the growth of Aspergillus sp.31

Clove oil tends to cause interference with bacterial cell membranes and fungi.24 This activity occurs in the lipid bilayer of cell membranes resulting in changes in permeability and leakage of cell contents.34 Recent antimicrobial studies from several essential oils have shown disruption to bacterial membranes and fungi.35

The effectiveness of inhibition of fungi by clove powder is also likely due to the eugenol compound found in clove plants. Eugenol is one of the main elements of clove oil (Syzygium aromaticum). Eugenol also shows excellent antimicrobial activity against fungi and Gram-positive. And Gram-negative bacteria.36

According to Park et al. (2007), the mechanism of growth inhibition of fungi caused by compounds of Eugenol, which can damage misellia. Which have smooth cell walls with a long section of hyphae, Eugenol will damage the inner mitochondrial membrane of cells and damage cell walls. Mitochondria functions to produce energy and food because mitochondrial cells destroyed, so the energy and food sources in fungi cells are blocked so that the fungi will die. In Conclusion Media with Addition of Clove Powder (Syzygium aromaticum) can inhibit the growth of Malassezia furfur and Aspergillus sp.37

Conclusion

Media with Addition of Clove Powder (Syzygium aromaticum) can inhibit the growth of Malassezia furfur and Aspergillus sp.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Taken From Health Research Ethics Committee Politeknik Kesehatan Banjarmasin Indonesia

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Assessment of Aggression among High Schools Students

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¹University of Kufa, ²University of Babylon, College of Nursing - Family and Community Health Nursing

Abstract

Background: Aggression is a behavioral characteristic that refers to forceful actions or procedures (such a deliberate attack) with intentions to dominate or master. It tends to be hostile, injurious, or destructive, and is often motivated by frustration for an individual, aggressive behavior is considered understandable and normal under appropriate circumstances, but when it is frequent, intense, lasting, and pervasive, it is more likely to be a symptom of a mental disorder. Likewise, aggression between groups, can be in the form of healthy competition, but can become harmful when unfair or unjust disadvantage or frustration is perceived, leading to hostility. Objectives: assessment aggression among high school students. Methodology: A descriptive cross-sectional study was carried out in order to achieve the stated objectives. The study has begun from 1st September 2018. Settings of the Study: The settings of the study include (41) High secondary schools which are distributed in (3) Districts of Al-Najaf Governorate, urban (23) schools and rural (18) schools, these schools are systematic randomly selected. Results: most majority was moderate aggressive. Conclusions: this study show which included an overall assessment of Aggressive, where the study showed that the most majority was moderate aggressive. Recommendations: Supporting educational methods by the Educational Committee that limits aggressive behavior of adolescents in schools, such as (moving away from scenes of an aggressive nature, beating, violence, fighting, quarrels, and blood scenes). And The teacher devotes part of the lesson time to clarifying issues and harms of aggression, and to show the benefits of tolerance and contentment. and The school administration cooperated with the teenager’s family to identify the causes of his aggression. Finally, The Ministry of Education is working to create posters that reject aggression and suspend it throughout the school.

Key word: Assessment. Aggression. High Schools Students

Introduction

Aggressive behavior is an associated symptom of many psychiatric disorders and can manifest throughout the life span, from attention-deficit hyperactivity disorder (ADHD) in children and adolescents, to domestic violence in adults, to dementia in older adults. While much of the aggression literature has focused on adolescents and adults, less attention has been given to understanding the etiology of aggressive behaviors across the entire developmental spectrum. The purpose of this paper is to provide an overview of the manifestation and causes of aggressive behavior across the life span as well as provide suggestions for the roles that nurses, who frequently interact with patients from all age groups, can play in preventing and intervening in aggressive behavior. Potential consequences to both the victims and aggressors are also outlined. Aggression is a highly studied area in the psychosocial literature, particularly adolescent aggression and developmental theories, adult aggression and violence, aggression and criminal behavior, and psychopathology. These discussions have been detailed elsewhere¹.

Methodology

Design of the Study:

A descriptive cross-sectional study was carried out in order to achieve the stated objectives. The study has begun from 1st September 2018.

Settings of the Study:

The settings of the study include (41) High secondary schools which are distributed in (3) Districts of Al-Najaf Governorate, urban (23) schools and rural (18) schools,
Results

Table (1) Total Statistics of the Study showing adolescent responses to Sub-Domain Aggression by Observed Mean and Std. Deviation.

<table>
<thead>
<tr>
<th>No.</th>
<th>Sub-domain Aggression</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Physical aggression</td>
<td>2.268</td>
<td>1.410</td>
</tr>
<tr>
<td>2.</td>
<td>Verbal aggression</td>
<td>2.936</td>
<td>1.527</td>
</tr>
<tr>
<td>3.</td>
<td>Anger</td>
<td>3.081</td>
<td>1.587</td>
</tr>
<tr>
<td>4.</td>
<td>Antagonism or hostility</td>
<td>2.940</td>
<td>1.563</td>
</tr>
</tbody>
</table>

*when the mean increase the aggression also increase and Vice versa. i.e. when the mean equal to 1.75 and less (no aggression), while when the mean is more than 1.75 (present of aggression).

Through this table, we find the sub-domain called (Anger) with a mean (3.081), we find higher than the rest of the sub-domains (Antagonism or hostility, Verbal aggression, and Physical aggression) with a mean (2.940, 2.936 and 2.268) respectively.

Table (2) overall assessment for Aggression in the study sample.

<table>
<thead>
<tr>
<th>Aggressions Scores</th>
<th>Frequency Total 1606</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>272</td>
<td>16.9</td>
</tr>
<tr>
<td>Moderate</td>
<td>847</td>
<td>52.7</td>
</tr>
<tr>
<td>High</td>
<td>487</td>
<td>30.3</td>
</tr>
</tbody>
</table>

This table show which included an overall assessment of Aggressive, where the study showed that the most majority was moderate aggressive by 52.7%

Discussion of the Results

Table 1, which includes the sub-domain of Aggressive, which comprises four axes, where most of the axis (Anger) was compared to the other axes.

Pullen, and et.al., 2015, in United Kingdom, the Anger is a common factor in two causes of death in adolescence: homicide and suicide.2

In Colorado, a number of researchers conducted a study on aggression among adolescents in secondary schools, where the results of the study showed that the sub-field anger was the highest response and then verbal aggression came. 3

In the same topic in Nepal, a study was conducted on the sub-domains of aggression for adolescent students at the secondary level, where the results of the research found that the predominant sub-domain is physical aggression and anger comes after it. 4

Table 2, which included an overall assessment of Aggressive, where the study showed that the most majority was moderate aggressive.

In United States A research report on the origin of antisocial behavior was conducted for adolescents and found that they have moderate aggression 5

In the state of Oklahoma, and the same context, a survey study was conducted on the aggressive behavior of adolescents, and the study aimed to know the level of aggression they had, and the results of which they reached were that they had moderate aggression. 6

Gaza also conducted a study on a group at a similar teen in high school where he used a special aggression questionnaire, showed research that they have a high aggression results, and attributed the reason to the Zionist occupation of their country is going through conditions. 7

Returning to the aforementioned about violence where the results showed a low level of violence, unlike what appeared in the results of the aggression where the results showed a moderate aggression, and the sub-response (anger) was the dominant and then verbal aggression comes, and this indicates that people or adolescents in particular, in Conflict and quarreling, do not leave the matter worse until it reaches the stage of excessive violence, but rather remains at the level of verbal aggression, anger, and hatred, and they are aware
that in the event that the matter develops into physical violence or using injurious tools such as (a knife or a firearm) it may have the matter Dangerous consequences for the person, but awareness and commitment to the principles Religious, moral and tribal prevent this matter, and to resort to peaceful solutions satisfy the parties to the conflict.

**Conclusion**

The sub-domain in anger in aggression was predominant and Most of the study sample had moderate aggression.

**Recommendations:**

1. Supporting educational methods by the Educational Committee that limits aggressive behavior of adolescents in schools, such as (moving away from scenes of an aggressive nature, beating, violence, fighting, quarrels, and blood scenes).

2. The teacher devotes part of the lesson time to clarifying issues and harms of aggression, and to show the benefits of tolerance and contentment.

3. The school administration cooperated with the teenager’s family to identify the causes of his aggression.

4. The Ministry of Education is working to create posters that reject aggression and suspend it throughout the school.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the College of Nursing, University of Kufa, Iraq and all experiments were carried out in accordance with approved guidelines.

**References**


Correlation of Anthropometry Characteristics and Six-Minute Walking Test Distance In Children Aged 7-8

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Abstract

Background: The six-minute walk test (6MWT) is a useful test for measuring functional capacity and predicting morbidity and mortality. The 6MWT is not widely used in children because the exact reference data are often not known, and the test requires concentration and co-operation from the participants, which is harder to manage in children. The anthropometry characteristic influences the 6MWT distance.

Objective: This study aimed to investigate the correlation between anthropometry characteristic and 6MWT distance in children aged 7-9 years old.

Methods: This research was an observational analytic study using cross-sectional design that was conducted on August 2013. Weight, height and body mass index were measured according to the Decree of Ministry of Health Republic of Indonesia. The 6MWT was performed according to American Thoracic Society (ATS) in a 15m indoor walkway. The data were analyzed using several tests, including Kolmogorov-Smirnov test for data normality test and Pearson’s correlation test.

Results: The average 6 MWT distance in all subjects was 390.45±50.05 meters, with the average 6 MWT distance in subjects aged 7 and 8 were 370.15±45.64 and 410.75±46.47 meters, respectively. Pearson’s correlation test showed a positive correlation between height and 6 MWT in all subjects, but there was no correlation between height, weight and body mass index with 6 MWT distance in each age group.

Conclusion: The anthropometry characteristic was not correlated with the 6MWT distance in children aged 7 and 8 years old.

Keywords: anthropometry characteristic, children, six-minute walking test

Introduction

Decreased children’s physical activities have become a growing health problem in recent years. Outdoor physical activity has been replaced with many indoor activities. Children’s participation in sports begins to decline as they prefer watching television and playing video games. Epidemiological studies suggest that sedentary lifestyle is associated with early onset and progressivity of cardiovascular disease and doubling the risk of premature death 1,2.

Functional training capacity assessment is necessary to determine human body’s physical fitness, particularly cardiovascular, respiratory, metabolic and musculoskeletal systems 3. The gold standard for determining objective functional capacity is by testing incomplete cardiopulmonary training using either a treadmill or an ergometer bike. The implementation of maximum training test requires facilities, tools and trained people. This makes health centers with minimal facilities difficult to conduct such trainings 4. The use of a six-minute walking test (6MWT) as a submaximal test has been proved to be an alternative to the functional capacity assessment in adults 5.

The reliability of 6MWT in children aged 5-14 has been demonstrated by studies in China and Belgium...
by investigating bilateral, knee dominant, knee joint alignment (tibio-femoral angle and Q angle), body mass index, pain and quadriceps muscle activity on the incidence of body swing disorders dynamically in patients with knee osteoarthritic. Some studies also found that 6MWT was easy, safe and cheap, and it could reflect daily activities compared to other types of walking tests.

The 6MWT is useful in clinical use, but has not been widely used in pediatric practice due to lack of data reference in healthy children. In addition, this test requires concentration and co-operation of the participants, which is harder to manage in children. Some studies investigated a standard value reference of 6MWT in children as well as the correlation of anthropometric characteristics, including age, sex, weight, height, body mass index (BMI) and heart rate, with 6MWT distance. The 6MWT study in 1,455 healthy children aged 7-16 in China suggested the first standard value reference in international literature. Some studies aiming to obtain standard value references of 6MWT have been conducted in various countries, including Austria, United Kingdom, Brazil, Tunisia and Thailand. A study aiming to obtain 6 MWT average distance was also conducted in Indonesia in 2010. The study conducted in Jakarta was only investigating 6 MWT average distance in healthy children aged 9-10. To date, there has been no data available in Indonesia that examine 6 MWT distance in healthy children outside that age group. Anthropometry characteristics affect 6 MWT results. Therefore, demographic, anthropometric and nutritional differences in different ethnic groups should be taken into account in 6 MWT results. Shorter individual and woman have shorter stride length that subsequently shortens travel distance. Bulgarian children, who are taller and heavier, have a superior cardiopulmonary function compared to Romanian children.

Different anthropometric characteristics also appear in ethnic differences. It was found in a study conducted in Malaysia as the results found anthropometric differences in ethnic Malays, Indian and Chinese. Therefore, we were interested in investigating correlation of anthropometric characteristics and 6MWT distance in children aged 7-8.

**Methods**

This observational analytic study using cross sectional design was carried out from August 2013 at Department of Physical Medicine and Rehabilitation, Dr. Soetomo Teaching Hospital, Surabaya, Indonesia. The subjects were Muhammadiyah 4 elementary school students aged 7-8 who met the inclusion criteria. They were taken using cluster sampling method. One cluster that met the minimum sample size was taken from each stratum.

Subjects must meet the following inclusion criteria:
1) Muhammadiyah 4 elementary school students aged 7-8 who had no contraindication to undergo 6MWT; 2) Having wide joint motion and level 5 muscle strength on manual muscle testing (MMT) examination. We excluded subjects with following criteria: 1) Having cardiorespiratory, neuromuscular and other diseases affecting gross motor skills and walking capabilities as evidenced by anamnesis and clinical examination; 2) Having been ill in the last two weeks and taking medications that may affect walking ability. On the other hand, the drop criteria was subject who could not complete 6 MWT for any cause.

This research began with subjects declaring their willingness to participate in this study by signing the informed consent and filling in the questionnaire. The subjects were determined in accordance to the inclusion and exclusion criteria as evidenced by the results of anamnesis and physical examination. We used One Med digital weighing device, One Med height meter, Riester tensimeter, Littman stethoscope, Oxyone pulse oximeter, stopwatch, calculator, cone, markers, bright-colored tape, gauge, chair, rating sheet, informed consent and emergency kit. Furthermore, we prepared a 15-meter walkway. The walkway was marked with a cone placed on the starting line and at the end of the track (15 meters) as a turning point. The line was marked with a bright-colored tape as a marker for the subjects to walk straight alongside the mark. Black-colored tape was placed at a distance of 5, 10 and 15 meters.

We asked the subjects to have enough rest before the test. The test was carried out for at least 2 hours after breakfast. The subjects must use sportwear and training shoes, and they were not allowed to perform any exercise prior to the test. The subjects waited for their turn by sitting in a chair near the track. The subject’s primary data were collected before the test. The data included subject’s name, age, sex, weight, height, body mass index, vital signs (pulse, blood pressure and oxygen saturation). The researcher/assistant prepared the equipment and walkway. The subjects were given instructions and examples of how to perform the
6MWT. We marked the distance obtained by the subject with markers. Afterwards, we immediately measured the subject’s vital signs.

All data were statistically processed using SPSS (SPSS., Inc., Chicago IL). The data were analyzed using several tests, including Kolmogorov-Smirnov test for data normality test and Pearson’s correlation test.

Results

Subjects’ Characteristics

Table 1 showed subjects’ basic characteristics. The subjects’ average weight was 29.49±9.10 kilograms. The subject’s average weight in age group 7 and 8 were 26.88±7.58 kilograms and 32.10±9.85 kilograms, respectively. The subject’s average height was 129.11±7.49 centimeters. The subject’s average height in age group 7 and 8 were 125.68±6.70 centimeters and 132.55±6.69 centimeters, respectively. The subjects’ average BMI was 17.42±4.06. The subjects’ average BMI in age group 7 and 8 were 16.81±3.59 and 18.03±4.45, respectively (Table 1).

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean±SD</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>Total</td>
<td>60</td>
<td>29.4867 ± 9.10397</td>
<td>15.90</td>
</tr>
<tr>
<td></td>
<td>7 years old</td>
<td>30</td>
<td>26.8767 ± 7.58373</td>
<td>15.90</td>
</tr>
<tr>
<td></td>
<td>8 years old</td>
<td>30</td>
<td>32.0967 ± 9.84964</td>
<td>17.50</td>
</tr>
<tr>
<td>Height</td>
<td>Total</td>
<td>60</td>
<td>129.1133 ± 7.48797</td>
<td>112.20</td>
</tr>
<tr>
<td></td>
<td>7 years old</td>
<td>30</td>
<td>125.6767 ± 6.70238</td>
<td>112.20</td>
</tr>
<tr>
<td></td>
<td>8 years old</td>
<td>30</td>
<td>132.5500 ± 6.68693</td>
<td>119.50</td>
</tr>
<tr>
<td>BMI</td>
<td>Total</td>
<td>60</td>
<td>17.4213 ± 4.05603</td>
<td>11.85</td>
</tr>
<tr>
<td></td>
<td>7 years old</td>
<td>30</td>
<td>16.8150 ± 3.59440</td>
<td>12.29</td>
</tr>
<tr>
<td></td>
<td>8 years old</td>
<td>30</td>
<td>18.0277 ± 4.44857</td>
<td>11.85</td>
</tr>
</tbody>
</table>

Based on anthropometry characteristics by sex, the boys’ and girls’ average height in age group of 7 were 125.04±7.67 centimeters and 126.16±6.06 centimeters, respectively. The boys’ and girls’ average weight were 26.19±9.66 and 27.40 ± 5.79 kilograms, respectively. The average BMI in both groups were 16.36±4.22 and 17.16±3.13, respectively.

Table 2. Anthropometry Characteristics in 7-Year Age Group by Sex

<table>
<thead>
<tr>
<th></th>
<th>Height</th>
<th>Weight</th>
<th>BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>Mean</td>
<td>125.0384</td>
<td>126.1647</td>
<td>26.1923</td>
</tr>
<tr>
<td>SD</td>
<td>7.67198</td>
<td>6.05743</td>
<td>9.65889</td>
</tr>
</tbody>
</table>

N for M = 13, F= 17
The boys’ and girls’ average height in age group of 8 were 132.99±6.65 centimeters and 131.89±6.98 centimeters, respectively. The boys’ and girls’ average weight were 32.06±10.42 kilograms and 32.16±9.37 kilograms, respectively. The average BMI in both groups were 17.88±4.71 and 18.25±4.21 (Table 3).

Table 3. Anthropometry Characteristics in 8-Year Age Group by Sex

<table>
<thead>
<tr>
<th>Height</th>
<th>Weight</th>
<th>Body Mass Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Female</td>
<td>Male</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>132.9989</td>
</tr>
</tbody>
</table>

Results of Six-Minute Walking Test

We measured 6MWT distance after obtaining anthropometry characteristics. Of 60 subjects who participated in the 6MWT, no one dropped out. The subjects’ average 6MWT distance was 390.45±50.05 meters. The subjects’ average 6MWT distance in 7-year age group was 370±45.64 meters, with the shortest and longest distance were 300 meters and 462.8 meters, respectively (Table 4).

Table 4. Subjects’ Six-Minute Walking Test Distance

<table>
<thead>
<tr>
<th>Distance</th>
<th>N</th>
<th>Mean ± Std. Deviasi</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>60</td>
<td>390.4500 ± 50.04545</td>
<td>300.00</td>
<td>514.60</td>
</tr>
<tr>
<td>7 years old</td>
<td>30</td>
<td>370.1500 ± 45.64013</td>
<td>300.00</td>
<td>462.80</td>
</tr>
<tr>
<td>8 years old</td>
<td>30</td>
<td>410.7500 ± 46.47404</td>
<td>333.50</td>
<td>514.60</td>
</tr>
</tbody>
</table>

The average 6MWT distance achieved in the 8-year age group was 410.75 ± 46.47 meters, with the shortest and longest distance were 333.5 meters and 514.6 meters, respectively.

Correlation between Anthropometry Characteristics and Six-Minute Walking Test Distance

Kolmogorov-Smirnov test found normal distribution of all data in both groups. Pearson’s correlation test showed a significant correlation between height and 6MWT distance, with r = 0.256 and p = 0.049 (p <0.05). On the other hand, there was no significant correlation between weight (p = 0.585) and BMI (p = 0.829) with 6MWT distance (p >0.005; Table 5).

Table 5. Subjects’ Anthropometry Characteristics with Distance

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Distance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R</td>
</tr>
<tr>
<td>Height</td>
<td>0.256</td>
</tr>
<tr>
<td>Weight</td>
<td>0.072</td>
</tr>
<tr>
<td>Body Mass Index</td>
<td>-0.029</td>
</tr>
</tbody>
</table>

r: correlation coefficient

p: p value shows significant level, significant if p <0.05
Discussion

The anthropometric characteristics observed in this study were height, weight and BMI. The basic anthropometric measurements in this study were in accordance with the standards used by the Ministry of Health of the Republic of Indonesia based on World Health Organization (WHO) regulation in 2005. The anthropometric data of children reflect the general health status, nutritional adequacy, growth and development.

Based on the growth table of children aged 2-20 from the Center for Disease Control (CDC) in 2000, indicates that the subjects’ average body weight, height and BMI are normal. The 6MWT distance illustrates the walking ability and individual abilities in daily activities, as the energy used in daily activities matches the submaximal level.

The 6MWT is one of submaximal exercises used to assess training capacity in patients with chronic disease. This practice test has been widely used in adult and child population, including for estimating the physical fitness of children with severe illness. The 6MWT in this study used a 15-meter indoor walkway. The procedure was in accordance with American Thoracic Society (ATS) standards. Subjects were instructed to walk as far as possible within 6 minutes without running.

Subjects were asked to rest for 10 minutes before undergoing the test. The subjects spent more time resting to keep doing the activity without control (rolling, jumping, running and so on). Vital sign monitoring, including blood pressure, pulse rate and oxygen saturation, was performed before and after the test. In this study, the average 6MWT distance was 390.45±50.05 meters, with the average distance in the age group of 7 and 8 were 370.15±45.64 meters and 410.75±46.47 meters, respectively. We found an increase in the average 6MWT distance as much as 40.6 meters between the age groups. Lammers et al. found an increase in 6MWT distance based on age. They found that distance increased by 37 meters at the age of 4-5, 43 meters at the age of 5-6 and 25 meters at the age of 6-7, while they not investigated increase in the age group 7-8.

The average distance in this study was lower than two studies conducted by Goemans and Ulrich in the same age group. Goemans’ studies were conducted in Caucasian boys aged 5-12 years. They divided the subjects’ age into 4 groups. The 7-8-year group achieved average distance of 547 ± 68.9 meters.

Li argued that anthropometric character that mostly influences distance is height. Li’s study found that subjects with a height of 120 centimeters had average distance of 550 meters and 595 meters for female and male, respectively. This indicated the comparison between average distance and height in this study was below the 25 percentiles in accordance with Li’s standard. Lower average distance obtained in this study might be caused by various reasons, including motivation factor and child’s cognitive level. According to Enright, walkway distance, motivation and cognitive levels are factors influencing child’s 6MWT distance.

Age, height, weight and gender factors affect the average 6MWT distance in healthy children. These factors should be taken into consideration when interpreting the results of 6MWT conducted in one time. We found a significant positive correlation between height and 6MWT distance in all subjects. It indicated that the higher the child, the further the distance achieved.

Nevertheless, we found no significant correlation between height and distance in each age group. We also found a negative correlation between weight and BMI with 6MWT distance in all subjects. These findings were consistent with a study of 6MWT distance based on gender in the age group of 9-10 conducted by Munadia in Jakarta. Munadia found no correlation between height, weight and BMI in boys aged 9-10. There was a correlation between distance and height in girls aged 9-10.

Conclusion

We found a positive correlation between height and 6MWT distance in children aged 7-8. There was no correlation between weight and BMI with 6MWT distance in both groups. In this study, the average 6MWT distance in children aged group 7-8 years was lower than the studies conducted in other countries.

Ethical Clearance: The study protocol was approved by the Ethical Commission to conduct basic science/clinical research in Dr. Soetomo General Hospital Surabaya, Indonesia. This study implemented the basic principle ethics of respect, beneficence, non-maleficence, and justice.
Conflict of Interest: The authors report no conflict of interest of this work.

Source of Funding: This study is done with individual funding.

References
2. Fjørtoft I, Pedersen AV, Sigmundsson H, Vereijken B. Measuring physical fitness in children who are 5 to 12 years old with a test battery that is functional and easy to administer. Phys Ther. 2011;91(7):1087–95.
Ultrasound Characterization of Abdominal Wall Endometriosis

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Abstract

Background: Aim: Our aim in this study is to define the ultrasound finding in the patients have abdominal wall mass proven by postoperative histopathology as abdominal wall endometriosis.

Patients & Methods: A cross sectional study was done from first of August 2016- first of September 2019 in Baghdad governorate. The study included 32 patients. Diagnosis done by superficial ultrasound examination.

Results: 32 female have done at least 1 Cesarean section the commonest presenting symptom was pain in 90% of patients , all the lesions were hypoechoic in texture , with heterogeneity and small foci of echogenisity in 75% of our population , the consistency of the lesions was purely solid in 93.8% of lesions ,on color Doppler only 18.7% was avascular, the resistive index of the arterial flow was below 0.70 in 31 % of patients ,on elastography 78.5% of lesions was hard , the accuracy of assessment of muscle infiltration was 71% ,the ultrasound was the only imaging required preoperatively in 85% of our patients , the ultrasound was able to discriminate between endometrioma and collection or hernias in all patients and was the in the differential diagnosis list in about 90% of our population

Conclusion: the ultrasound characteristics of abdominal wall endometriosis if combined with clinical features and symptoms of the patients is excellent preoperative imaging modality to reach the diagnosis and exclude other lesions and accurately assessing muscle invasion in most of cases for proper surgical planning

Key words: cesarean section, abdominal wall, endometriosis, ultrasound, elastography.

Introduction

Endometriosis is a term describing any abnormal presences of endometrial stromal tissue outside the normal outlines of endometrial cavity\(^1\), endometriosis considered one of the common gynecological problem its incidence reaching to about 15% of women at productive age \(^2\) the most common site of this entity is the pelvic region \(^3\), it is rarely found in extra pelvic region. the abdominal wall endometriosis (AWE) considered one of the rare sites of endometriosis its incidence is about 0.3-3.5 % of population \(^4\).Although its predisposing factor is previous surgery mostly CS or other gynecological surgical interventions but it may include other abdominal wall endometriosis without any previous surgery \(^5\).Many theories are sets to describe the cause of this condition but the most accepted one is the implantation of endometrial tissue during surgery , which subsequently proliferate under hormonal effect \(^6,7\). the clinical symptoms of abdominal wall endometriosis include, periodic abdominal wall pain mainly during menses and palpable lump \(^8\). This entity of disease is misdiagnosed as granuloma or abdominal wall hernia, or malignant soft tissue tumors \(^1,3,9\). That’s why AWE is underestimated as its clinical and radiological signs are non specific \(^1,3\).
Aim

Our aim in this study is to define the ultrasound characteristics of the abdominal wall endometriosis as rare entity and to emphasis the importance of ultrasound in its diagnosis.

Patients and Method

*Ethical consideration:* The researchers consider taking the permission from patients before data collection and explaining the aim of the study for them. The study included patients who agree to participate, and assure of them about the confidentiality and privacy of their information.

*Study design:* The current study is prospective study performed from first of August 2016- first of September 2019 in Baghdad governorate.

*Sampling:* There were 32 patients included in current study. The patients were referred to ultrasound privet clinic to perform abdominal ultrasound examination complaining form pain along the scar of previous cesarean section scar. All cases are undergo surgical resection and all lesions are proved by histopathological study as abdominal wall endometriosis. All of the patients included in this study have been examined by ultrasound prior to surgery by expert radiologist. The ultrasound examination including gray scale, Doppler scans and elastography.

*Machine & Scan protocol:* The abdominal ultrasound examination was done using E-CUBE 11 ultrasound machine of high-density single crystal linear transducer (3-12MHz) (SC3-12H).

Result

The age of the patients included in this study ranging from 17-41 year old the mean is about 30.4 year with standard deviation (SD) of 2.1 years, all patients have previous SC, 78% are multiparous women with average CS is (2.7). The commonest presenting symptoms are pain at menses and lump. About 90% of our population are presented with abdominal pain, from those about 82% the pain is related to menstrual period, and about 18% have non specific or continues pain, while the 65% of patients presented with a lump at lower abdominal region.

*Sonographic Characteristics of AWE:*

**B mode** all the lesions was hypoechoic although about 75% of lesions was heterogeneous with small echogenic foci, the lesions borders was irregular in about 87% of our population, and ill defined in about 65.6%, the consistency of the lesion is solid in 93.5% of our patients and cystic changes seen in 6.5% only. The length of the lesions was ranging from 11.7 -41 mm with average 20.8 mm mean round index was 1.7.

**Doppler US:** the lesions show internal vascularity in about 71.8%, peripheral vascularity seen in about 9.37%, while avascular lesions were seen in 18.75.

The use of power Doppler didn’t change this ratio of internal vascularity detection in regard to our study.

The Resistive index of the lesion ranging from 0.54-1 and it measured above 0.70 in 50% of patients and its below 0.70 in 31.25% of patients, the other lesions was avascular on color Doppler.

Fig (1) color and spectral Doppler ultrasound in a 33 year old female, an ill defined border heterogeneous hypoechoic oval shape mass measured 18 x 9 mm invading the muscle with internal vascularity.
Elastography

The lesions show significant increase of tissue strain in comparison to surrounding tissue, the lesions were hard in 87.5% of our population, the elast/o B ratio is more than 1 in 41% while lesions were similar in size or the hard tissue is smaller than the lesion in 59% of the lesions. The radiological findings of AWE are listed at Table (1).

**Table 1: ultrasound findings of abdominal wall endometriosis.**

<table>
<thead>
<tr>
<th>Lump characteristics</th>
<th>Number (total=32)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>By ultrasound</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well defined margins</td>
<td>4</td>
<td>12.5</td>
</tr>
<tr>
<td>Ill defined margins</td>
<td>28</td>
<td>87.5</td>
</tr>
<tr>
<td>Echogenicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypoechoic</td>
<td>32</td>
<td>100</td>
</tr>
<tr>
<td>Echogenic</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Homogeneity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heterogeneous</td>
<td>24</td>
<td>75</td>
</tr>
<tr>
<td>Homogenous</td>
<td>8</td>
<td>25</td>
</tr>
<tr>
<td>Cystic changes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2</td>
<td>6.3</td>
</tr>
<tr>
<td>No</td>
<td>30</td>
<td>93.8</td>
</tr>
<tr>
<td>By Doppler</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peripheral vascularity</td>
<td>3</td>
<td>9.4</td>
</tr>
<tr>
<td>Internal vascularity</td>
<td>23</td>
<td>71.9</td>
</tr>
<tr>
<td>No vascularity</td>
<td>6</td>
<td>18.7</td>
</tr>
<tr>
<td>Spectral Doppler</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High RI &gt;70</td>
<td>16</td>
<td>50</td>
</tr>
<tr>
<td>Low RI &lt;70</td>
<td>10</td>
<td>31.25</td>
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<tr>
<td>Avascular</td>
<td>6</td>
<td>18.75</td>
</tr>
<tr>
<td>Elastography</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hard</td>
<td>28</td>
<td>87.5</td>
</tr>
<tr>
<td>Soft</td>
<td>4</td>
<td>12.5</td>
</tr>
</tbody>
</table>

Assessment of Depth and Wall Invasion

The detection of muscular and fascial involvement is mandatory for proper operative planning, the assessment of muscle involvement is assessed by B mode the muscle involvement proved by surgery in about 53% of patients while, the accuracy of muscle involvement was 71.8%, the negative predictive value was 60% as seen in Table (2).
Table 2 : Assessment of depth and abdominal wall invasion.

<table>
<thead>
<tr>
<th>Depth of the lesion- Number (total=32)</th>
<th>By Ultrasound</th>
<th>n</th>
<th>Percent</th>
<th>True negative</th>
<th>False negative</th>
<th>True positive</th>
<th>False positive</th>
</tr>
</thead>
<tbody>
<tr>
<td>Superficial</td>
<td>12</td>
<td></td>
<td>37.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muscular</td>
<td>20</td>
<td></td>
<td>62.5</td>
<td>9</td>
<td>3</td>
<td>14</td>
<td>6</td>
</tr>
<tr>
<td>By surgery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superficial</td>
<td>15</td>
<td></td>
<td>46.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Muscular</td>
<td>17</td>
<td></td>
<td>53.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Diagnosis of the Lesion

The radiological findings of endometriosis was not specific but the endometriosis was one of the differential diagnosis in 90.6% of the patients in our study. The other differential diagnosis was granuloma, soft tissue sarcoma and desmoid tumors.

Ultrasound was very sensitive exclude all the patients that was clinically suspected to be hernias or collections. The CT scan and MRI was used to confirm US findings and to exclude malignancy and muscle extension in some patients only. CT sac used in about 6% and MRI used in about 9% of our patients.

Fig (2) : longitudinal section view shows 11.7 x 8 mm subcutaneous endometrioma in a multiparous 27 year old woman. The nodule is irregular margins hypoechoic in texture dose not infiltrating the muscle fascia, the lesion is hard on elastography.

Discussion

The most common presenting symptom is pain in about 90% mainly related to menstrual cycle in about 75% while felling of lower abdominal mass was described in about 65% of our population. The cyclical pain is the presenting symptom in most of studies [3,5,6,10], this finding was compatible with this study the cyclical pain was presenting symptom in 75% while [3], found that the pain the commonest presenting symptom in about 80% but the cyclical pain was seen in 44% only [11], in other study the first presenting symptom was mass and lump feeling in 98.5% and cyclical pain was less frequent in about 86.9% according to [12].

Cesarean section was the predisposing factor for development of AWE in our population, this was agreed by [1,3,12], that all the patients in their studies doing CS or
other gynaecological surgery [6] spontaneous abdominal wall endometriosis was emphasis in many studies [11], 2 of 72 patient have no previous surgery, [13] reported 9% of his patients was not associated with previous surgery , and the comments site of this lesions was the umbilicus, this was compatible with [10], who found 17% of niliparous , female with no previous surgery developed abdominal wall endometriosis , all are located at umbilical region 14 and in some series spontaneous endometriosis was high reaching to 20%.

the ultrasound the first choice of imaging exam in evaluation of abdominal wall endometriosis [7,3,15], the ultrasound was able to identify all the lesions in our patients this was clos to the finding the sonography was able to show the endomtrioma in 92% of his patients [1].

although the ultrasound findings of AWE is not specific but it can exclude some of the lesions that may mimic endometriosis such as hernia ,abscess collection or hematoma [1,16].

all the patients in our study do at least one ultrasound examination ,some patient with high suspicion of malignancy or difficult examination such as in obese patients

the sonographic findings in B mode in most of the lesions was an ill defined irregular heterogeneous hypoechoic solid mass with multiple small echogenic focuses inside the lesions these findings are similar to many studies [1,3,5,7,15,16], although some of our patients shows some atypical finding as cystic component was seen in 6% of our population ,the cystic changes in endometriosis is rare findings and it reported in many literature [1,3,5,15, 16], our result was compatible to L. SAVELLI et al who found small cystic changes in 2% of patients [5].

on color Doppler 81.2 % of our population shows peripheral or central vascularity this was relatively comparable to result of other studies [3], which found internal and peripheral vascularity in about 83% and avascular in only 2 patients. while other studies [1], found all the lesions was vascular on color Doppler.

no vascularity can be seen in about 18.8% . the avascular lesions was small in size < 2 cm in widest diameter and located within SC the explanation of this could be due to small vessels which can not be detected by Doppler US or due to its growth within hypovascular SC tissue .16) in one of the studies the internal vascularity can not be seen in all lesions smaller than 15 mm [17].

, the Resistive index was high in about 62.5% of vascular lesion and the with average of RI is about 0.71 the high impedance this was compatible to many literatures [5,19,17,18].

Elastography : to our knowledge few literatures write about the characteristics of abdominal wall endometriosis , we found that elastography was hard in 87.5% of patients , the elast/o/B ratio in assessment of size was more than 1 in about 59% of patients with average 1.1 which can be interpreted by the histopathological findings of inflammatory cells infiltration in the subcutaneous tissue which alter the normal elastograpic characteristics of the surrounding fatty tissue [5].

In one study the use of elastography to assess fascia and muscle involvement shows improvement from 33% to 87.9% by elastography .20 ,the accuracy of ultrasound in detection of muscle involvement was 71% with negative predictive value about 60%.

Conclusion

The Presence of an ill defined oval shape hypoechoic mass near the cesarean section scar with internal or peripheral vascularity on Doppler ultrasound which significantly increase tissue strain on elastography if combined with repeated cyclical aggravated pain are strong evidences of suggesting endometriosis. the ultrasound is excellent preoperative imaging modality to reach the diagnosis and exclude other abdominal lesions and it accurately assessing the muscle and fascia involvement in most of the patients

Conflict of Interest : Nil .

Source of Funding : No Source of funding : the researchers them self .

Ethical Clearance: Committee members are approved to perform a study about:

“ULTRASOUND CHARACTERIZATION OF ABDOMINAL WALL ENDOMETRIOSIS”

After discussion of study plan with researchers:

Mohammed Bader Hassan
Omar Muayad Sultan
Adnan Mohammed Brayyich
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Gene Polymorphism Vitamin D receptor BsmI in Thalassemia Children in Al-Muthanna Province

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Abstract

Introduction: Vitamin D is crucial for calcium, phosphate homeostasis and mineralization of the skeleton, particularly through growth time developments. Vitamin D deficiency lead to rickets in children and osteoporosis in adult. The activity of vitamin D receptors (VDR) are responsible for the vitamin D so that the single nucleotide polymorphism was detected using BsmI. Material and methods: In this study, the vitamin D3 level were measured using enzyme-linked sorbent assay (ELISA) technique, followed by detection of the polymorphism VDR- BsmI gene using PCR and BsmI restriction enzyme assay (PCR-RFLP). Results: Vitamin D, alkaline phosphate and others biochemical were performed in 50 patients beta-thalassemia were divided into 25 males and same number females. The biochemical results demonstrated no significant difference p<0.05 between males and females according gender, whereas showed high significant serum calcium p value 0.048 according body mass index. We using RFLP-PCR technique to amplify VDR gene BsmI, DNA ladder molecular weight was 1000-2500 base pair and BsmI digestion showing predicted product in 823 to 175 pb in all lane. Conclusions: BsmI digestion was showing heterozygous mutant (Bb) and homozygous (BB). These result gene polymorphism VDR BsmI effected on vitamin D levels and related with bone diseases and process metabolism.

Key words: BsmI, VDR, thalassemia, gene, vitamin D, polymorphism.

Introduction

Beta thalassemia syndrome are one of the most popular autosomal recessive hereditary defects diffuse global, with high dominance in the populations of the Mediterranean, Middle East, Central Asia, Indian subcontinent and Far East1. Thalassemia bone disease has increased as the major morbidity rate associated with thalassemia transfusion-dependent. Bone disease including of low bone mineral density (BMD), bone pain and fractures are private features of thalassemia2. The vitamin D receptor (VDR) gene is by far of the most widely investigated osteoporosis marker. The chosen polymorphism was a BsmI and FokI3. Few studies have described an associated between the BsmI polymorphism of VDR and thalassemia children4, and with skeletal and non-skeletal parameters in thalassemia major5. The receptors of both VDR and calcitonin genes polymorphisms are linked with osteoporosis5. The VDR polymorphism and decrease BMD has been linked also amongst patients with the BB VDR genotype7.

In this contextual relationship, the fundamental interaction of the active form of vitamin D (1,25-dihydroxyvitamin D3) and its nuclear receptor VDR has been known as an important mediator of the innate immune response. The mechanism of action of VDR is by promoting the expression of multi antimicrobial peptides, consist of cathelicin and by the activation of autophagy of the infected cell, consequently limiting the intracellular growth of Mycobacterium tuberculosis in macrophage8,9.

The human VDR gene four common SNPs that have been conducted an investigation extensively: ApaI (rs7975232), BsmI G>A (rs 1544410), Taq T>C(rs 731236) and FokI T>C(rs2228570). The polymorphism BsmI and ApaI are both situated in intron 8 and TaqI is a wordless SNP in exon 9, and all are associated with in regulating the stability of the VDR mRNA10,11. The VDR FokI gene polymorphism causes a constitutional amendment. This SNP is a T/C transition at the translation initiation site of exon 2 at the 5’coding region of the gene. The change makes a new start codon (ATG to ACG), which
leads to the expression of a shorter VDR protein 424 amino acids, which has higher transcriptional action as compared to the full length VDR protein of 427 amino acids.

The aim of the current study conducts an investigation into the rate of occurrence of VDR gene polymorphism BsmI (rs1544410) in a group of Iraqi populations. In thalassemia children patients inspect the relationship between VDR and the conservation bone health and metabolism.

Materials and Methods

Subject

The participants to the case study were enlisted with a future effect between September 2018 and September 2019 in the Samawa City (SC). A total of 50 patients. All entrant signed acquainted documentary approval previous to providing a blood sample and data privacy was protected according to the protocol Helsinki Declaration.

Parameters measurement

Five milliliters of blood outgoing under optimal status by venous blood from every child, 3ml on EDTA and 2ml on DNA extraction, thereafter VDR gene polymorphism whereas the other portion was centrifuged and sera were gotten and stocked under -20°C for measure of serum 25 hydroxy vitamin D3 with Enzyme Linked Immunosorbent Assay (ELISA). Serum vitamin level was assayed based on the manufacturer’s directives. Currently accepted standards for diagnosed vitamin D values in thalassemia children are:

1- VD deficiency < 10 ng/ml
2- VD insufficiency 10-30 ng/ml
3- VD sufficiency 30-100 ng/ml

Other laboratory criteria by utilizing Fujifilm clinical biochemistry (FUJIDRI-CHEM 4000i) inspections including: Alkaline phosphate(U/L), potassium(mmol/L), total protein(g/dL) and calcium(mmol/L), in addition computation body mass index(BMI) for all genders.

Genotyping

Genomic DNA was isolated by utilizing the phenol chloroform extraction method. Genotypes were uncovered by using PCR, followed by the BsmI restriction

fragment length polymorphism (rs 1544410) and carried out (PCR-RFLP). The BsmI upstream primer is 5’AAGACTACAAGTACCGCGTCAGTG-3’ and reverse downstream primer is 5’ AACCAGCGGGAAGAGGTCAAGGG-3’. The primers are in figure 1 A.823 pb fragment BsmI in the start codon of the VDR. DNA was extract by utilizing an axis column kit (Qiagen kit) polymerase chain reaction (PCR) amplification and enzymatic digestion with BsmI.

The BsmI genotypes were revealed by utilizing electrophoresis of the DNA samples 1.5% agarose gels and were named as followers: BB (not present restriction site); bb (not present restriction site); Bb (heterozygous of the restriction site). The PCR products for the BsmI polymorphism was 823pb and the restriction fragments were 175pb.

Statistical analysis

The data were analyzed by using SPSS version 22 for windows (SPSS, Chicago, IL, USA). The mean of data was predestined by one- way ANOVA and t-test. Moreover, frequency results were analyzed by pearson chi-square and Fisher exact test. The variations were indicated significant at p>0.05.

Results

This study was executed on 50 patients infected with thalassemia, 25 males (50%) and 25 females (50%) their ages extending between 1 to 12 years old. An allocation of the studied vitamin D3 according to the genders both were 15.6±3.9 in female and 15.5±4.2 in male that was less in females in table 1. P. value was 0.976, as well biochemical criteria were less in females except alkaline phosphate was higher registered 76±27.9 and 72.5±27 in males p-value was 0.650.
Table (1): Distribution of the studied parameters values according to the gender for patients with thalassemia:

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Gender</th>
<th>Reference Range</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Female</td>
<td>Male</td>
<td></td>
</tr>
<tr>
<td>Vitamin D3 (ng/mL)</td>
<td>15.6±3.9</td>
<td>15.5±4.2</td>
<td>&lt;10 Def. 10-30 Ins. 30-100 Suff.</td>
</tr>
<tr>
<td>ALK. Phosphate (U/L)</td>
<td>76±27.9</td>
<td>72.5±27</td>
<td>32-111</td>
</tr>
<tr>
<td>Potassium (mmol/L)</td>
<td>4.3±0.7</td>
<td>4.4±0.8</td>
<td>3.5-5.3</td>
</tr>
<tr>
<td>T. Protein (g/dL)</td>
<td>7.3±0.76</td>
<td>7.5±0.79</td>
<td>6.7-8.3</td>
</tr>
<tr>
<td>Calcium (mmol/L)</td>
<td>1.85±0.5</td>
<td>1.89±0.5</td>
<td>1.9-2.1</td>
</tr>
</tbody>
</table>

* represents a significant difference at $P \leq 0.05$. Data are expressed as Mean±SD.

Regarding gender groups (female and male), the studied parameters were distributed and statistically analyzed. The results showed no significant difference $p>0.05$ for all studied parameters (Vitamin D3, ALK. Phosphate, Potassium, T. Protein and Calcium).

Table (2): Distribution of the studied parameters values according to the age for patients with thalassemia:

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Age Groups</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-4 Y</td>
<td>5-8 Y</td>
</tr>
<tr>
<td>Vitamin D3 (ng/mL)</td>
<td>15±4</td>
<td>15.8±4</td>
</tr>
<tr>
<td>ALK. Phosphate (U/L)</td>
<td>77.8±25.5</td>
<td>71.4±29.6</td>
</tr>
<tr>
<td>Potassium (mmol/L)</td>
<td>4.39±0.77</td>
<td>4.36±0.79</td>
</tr>
<tr>
<td>T. Protein (g/dL)</td>
<td>7.2±0.75</td>
<td>7.4±0.79</td>
</tr>
<tr>
<td>Calcium (mmol/L)</td>
<td>2±0.59</td>
<td>1.7±0.5</td>
</tr>
</tbody>
</table>

* represents a significant difference at $P \leq 0.05$. Data are expressed as Mean±SD.

Regarding age groups, the results revealed there are no significant differences $p>0.05$ among all the studied age groups for all studied parameters (Vitamin D3, ALK. Phosphate, Potassium, T. Protein and Calcium) in children with thalassemia.
thalassemia.

Table (3): Distribution of the studied parameters values according to the BMI for patients with thalassemia:

<table>
<thead>
<tr>
<th>Parameters</th>
<th>BMI Groups</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;14.5</td>
<td>14.5-16.5</td>
</tr>
<tr>
<td>Vitamin D3 (ng/mL)</td>
<td>15±4.3</td>
<td>15.9±4.6</td>
</tr>
<tr>
<td>ALK. Phosphate (U/L)</td>
<td>72.5±26.8</td>
<td>87±33.2</td>
</tr>
<tr>
<td>Potassium (mmol/L)</td>
<td>4.3±0.7</td>
<td>4.6±0.9</td>
</tr>
<tr>
<td>T. Protein (g/dL)</td>
<td>7.41±0.7</td>
<td>7.46±0.8</td>
</tr>
<tr>
<td>Calcium (mmol/L)</td>
<td>1.8±0.47</td>
<td>2.3±0.58</td>
</tr>
</tbody>
</table>

* represents a significant difference at $P \leq 0.05$. Data are expressed as Mean±SD.

Regarding BMI groups, the results Calcium revealed a strong significant differences $p<0.05$ among all the studied BMI groups, where $p$ value is 0.048. In addition, the results of other parameters (Vitamin D3, ALK. Phosphate, Potassium and T. Protein) showed no significant differences $p>0.05$ among all the studied BMI groups in children with thalassemia.
Figure 1: PCR-RFLP analysis of the VDR gene polymorphism, using BsmI restriction enzyme. A. Agarose gel of the VDR gene amplification, showing predicted product of 823 bp. B. Agarose gel of BsmI digestion, heterozygous mutant (Bb), showing predicted product of 823 bp and 175 bp for the all lane. DNA ladder: molecular weight: 1000–2500 bp.

Figure 2: PCR-RFLP analysis of the VDR gene polymorphism, using BsmI restriction enzyme. C. Agarose gel of the VDR gene amplification, showing predicted product of 823 bp. D. Agarose gel of BsmI digestion, homozygous (BB), showing predicted product of 823 bp for the all lane. DNA ladder: molecular weight: 1000–2500 bp.

Discussion

Until now, there are four restriction fragment length polymorphism (Taq1, ApaI, FokI and BsmI) of VDR which have been studied related with thalassemia disease. Over the years, the interaction between VDR polymorphism and genetic diseases sensibility is still unclear. Several factors are responsible for the conflicting results, like racial variation, different genotyping methods, sample sizes, lifestyle features of people. The human VDR gene be composed of 11 exons that jointly with related introns. Exon1A,1B, and 1C make up the 5' noncoding region, and eight supplemental exons (2-9) encode VDR structural component14. BsmI situated in intron VIII. All of them were observed at the 3’ end of the VDR in the during 1990s. In spite of, none of the effect the action of the VDR protein expression15. Our study demonstrated that a deficiency of hydroxylase vitamin D (25 OH D) is common in thalassemia children. Vitamin D mean level were no significantly at $P \leq 0.05$. Studies of serum vitamin D have shown harmonious with our results16. Prevalence of the vitamin D deficiency was found in children thalassemia patients. Level of serum vitamin D were low to normal, according with previous studied17,18. The 25-OH-vitamin D to be had in these patients should be sufficient for a normal 1- hydroxylation in the kidney to make 1,25-OH-vitamin D. Serum 25-OH vitamin D concentrations are a lot of time higher (ng/ml) than those of the product of the
kidney enzyme, 1,25-OH-vitamin D (pg/ml).

In figure 2-C gene polymorphism BsmI in relation to thalassemia patients showed homozygous (BB) while in fig 1 showed heterozygous (Bb) and absent allele (bb) in this study that was conflicting with19. Actually it is not clear whether the BsmI polymorphism has an impact on the expression level or actin of the translated VDR protein20, but it is in strong related imbalance with the poly(A) microsatellite located in the 3 untranslated region21 of the VDR gene, that evidence to effect VDR messenger RNA constancy and VDR translation activity22, demonstrated23 observed a decrease VDR expression while, at the mRNA level24 found an up-regulation. Likewise, to detect a clinical pertinent phenotype is prospect needful to contain in the analysis other genes implicated in the vitamin D metabolism as the linking the binding protein (GC) and the anabolism and catabolism enzymes25,26. Vitamin D has a significant role in multiple myeloma (MM) patients because of the mutual relations with calcium homeostasis bone metabolism27 closely connected to calcium and phosphorus homeostasis.

**Conclusion**

Vitamin D is a steroid hormone which plays an important role in calcium homeostasis and skeletal metabolism. The vitamin D receptor (VDR) mediates the action of its linked and results in normal bone mineralization and reconstructing. Subsequently, the gene that encodes for the VDR is taken into consideration a nominee gene for osteoporosis. This study revealed that the (BB) of the BsmI polymorphism was related with increased bone loss, whereas in (Bb) had decreased rates of bone loss.

**Acknowledgement:** The authors desire to thank the management of thalassemia centre in Al- Children Teaching Hospital in AL-Muthanna for submitting facilities.

**Conflict of Interests:** No.

**Ethical Clearance:** Take from Thalassemia Centre by approval ethical committee.

**Funding:** Self

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Role of Interleukin-36 in Response to *Pseudomonas Aeruginosa* Infection

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**Abstract**

**Background:** One of the causative agents of the lower respiratory tract (LRT) is *Pseudomonas aeruginosa* which can lead to severe infection associated with a lung infection. Many cytokines are secreted in response to bacterial infection, in particular, interleukin IL-36 cytokine in response to *P. aeruginosa* infection. IL36 promotes primary immune response via binding to the IL-36 receptor (IL-36R). Indeed, an over activity of IL-36 might be an initiating factor for many immunopathologic sceneries in pneumonia.

**The aims of Study:** the involvement of IL-36 in the *P. aeruginosa* infection could be a clue to find a specific way for treatments of different inflammatory and degenerative lung diseases.

**Methodology and Results:** we used manual and VITEK2 system to isolate and purify all the species, also using qPCR real-time to demonstrate that the involvement of IL-36 cytokine in response *P. aeruginosa* infection which is isolated from (LRT). We found that one of the most common pathogens is *P. aeruginosa* after *Klebsiella pneumonia*, and more resistance bacterium against antibiotics is *P. aeruginosa* (P4). Furthermore, we found that IL-36 cytokine increased in response to *P. aeruginosa* infection.

**Conclusion:** *P. aeruginosa* is one of the main causative agents in LRT in many hospitals in Iraq, and the contamination and antibiotics resistance for these nosocomial pathogens is increased. Also, IL-36 expression significantly upregulated in human lung epithelial (A549 cells) after infected by *P. aeruginosa* at the mRNA level.

**Key words:** IL36, *Pseudomonas aeruginosa*, LRT infection and A549 cells

**Introduction**

One of Gram-negative bacterium is *Pseudomonas aeruginosa*, which is the main causative agent of LRT infection. It can lead to nosocomial infection and chronic infection in immunocompromised patients. The most serious cases are sepsis and pneumonia (¹). Due to virulence factors of *P. aeruginosa* lead to increase the proportion of multidrug resistance (MDR) in *P. aeruginosa* (², ³).

In recent publication, IL-36 is classified as one of members of IL-1 family (⁴). IL-36 binds with IL36 receptor complex and IL-1 receptor accessory protein (IL-1RAcP). Receptor of IL-36 could bind to the IL-33 and the IL-1 receptor (⁵). The IL-36 induces primary immune response and contributes to neutrophil accumulation or/ and dendritic cell activation (⁴-⁶). During early stage of *P. aeruginosa* infection, many immune cells are activated (⁷, ⁸). Interestingly, it has been reported that IL-36 mRNA is unregulated during *P. aeruginosa* infection in human bronchial cells (⁹).

Taken together, these clarifications suggest that IL-36 are involved in host defense against *P. aeruginosa*. This involvement could be because inflammatory cells recruitment and/or activation. The involvement of IL-36 in response to *P. aeruginosa* infection is still unclear. We hypothesized that IL-36 is involved in acute *P. aeruginosa* lung infection. In this study, we also demonstrate that IL-36 produced by A549 cells during *P. aeruginosa* infection which is isolated from LRT.
Methodology

Bacterial strains:

*P. aeruginosa* (P4) was chosen based on the antibiotics resistance and virulence factors. *P. aeruginosa* (P4) was used for all experiments, and grown in lysogeny broth medium or agar. *P. aeruginosa* were grown an overnight culture and were cultured at 37 °C to reach OD_{600} 0.4. It was equal 1x10^8. *P. aeruginosa* was 2x washed and diluted by DMEM medium with 10% heat-inactivated foetal calf serum to achieve an appropriate MOI.

Culturing of human lung cell line

The incubation conditions for A549 cells was 37ºC and 5% CO₂. Trypsinisation was used to harvest A549 cells. Briefly, A549 cells were washed with 5ml HBSS without Ca++ and Mg++. Then 2.5ml of 1x trypsin (Lonza) was added and keep the flask in incubator for 8min. 10ml of DMEM medium was added to pellet. The pellet was spent down at 300xg for 5min and then re-suspended with 5ml DMEM. An appropriate number of A549 cells were counted for seeding to next experiments.

Antibiotics sensitivity test

The Kirby-Bauer standardized single disk method was performed according to Kirby method (10). Briefly, Mueller Hinton medium plates were prepared. Using an L-shape sterile spreader, *P. aeruginosa* is evenly seeded throughout the plates. The bacterial cells density was approximately 1×10⁸ cell/mL. This density was compared with OD_{600} about 0.4. The antibiotic disks were used with standard concentration. The antibiotics disks are evenly dispensed and placed onto the medium and then incubated at 37 °C 24h in an incubator. Using a ruler, inhibition zone was measured to the nearest millimeter (mm) Therefore, the susceptibility of bacteria to an antimicrobial agent was detected as compared to the zones of inhibition determined by formerly NCCLs (2014) (11).

Statistical Analyses

GraphPadd prism.8 was used to make all graphs and analyse the data statistically. The significant differences between samples were determined using one and two-way ANOVA for multiple comparisons. Results are shown as mean ± SEM.

Results

Isolation of bacteria

The aim was to examine which species are the most virulent pathogen in lower respiratory tract infection. We collected 50 specimens from different hospitals in alnajaf province. We diagnosed form all samples depending on phenotyping, biochemical tests, morphology shape and selective media. Findings showed that only 21 specimens have bacteria but other samples have no bacteria. The highest number is *Klebsiella pneumonia* 9 (42.86%). The lower number is *Staphylococcus aureus* 3 (14.28%). However, our interest pathogen *P. aeruginosa* 5 (23.81).
% and other bacteria were about (19.05), as demonstrated in Fig 1. It seems that the main our interested bacterium from the main pathogen in lower respiratory tract infection.

![Percentage of different types of bacteria isolated from lower respiratory tract infection (LRT). Data shows number and percentage of isolates from 50 sample of LRT infection from different hospitals in Alnajaf province (Alsadar Medical city and Alforat hospital). Pure colonies were isolated and placed in VITEK2 microbial identification. To more validation, manual diagnostic methods have been performed included biochemical and culturing tests.

Antibiotics sensitivity test

As shown in Fig 1, the percentage of P. aeruginosa seemed more correlate to be the main causative agent of LRT infection. These strains were selected to closely study to determine which strain has the highest antibiotics resistance. This section aimed to select the highest species to antibiotics resistance. All isolates were screened for antibiotics sensitivity. The finding shows that there is a variation of antibiotics resistance for isolates. P. aeruginosa (S-4) has highest antibiotics resistance than other samples, as demonstrated in Fig 2.

![Antibiotic profiles of P. aeruginosa used in this study. P. aeruginosa of bacteria are purified and plated on Muller Hinton agar using sterile swap, different types of antibiotics disk were placed on the plates, and bacteria were incubated for 24hr to measure the inhibition zone. The findings are mean of 3 independent experiments with duplicates.

Infection efficiency of P. aeruginosa in A549 cells

This section was to test a different multiplicity of infection to determine which MOI can attach to A549 cells. This cell line was infected with P. aeruginosa to measure the total bacterial infection after 2hr, and to detect the best MOI to the further experiments. The CFU equation was used to count how many bacteria per host cells at 2hr. The MOI was used 10, 50, and 100 bacteria per each mammalian cell. The finding shows that the number of bacterial per host cells was increased related with MOIs (Fig 3). The MOI 100 was statistically significantly different than other MOI. It was suggest that this MOI can use to further experiments.
IL-36 induced in A549 cells during *P. aeruginosa* infection

The aim of this section was to test whether IL-36 is changed in the A549 cells infected *P. aeruginosa* clinical strain. In brief, we tested a mRNA expression during 3 time points during bacterial infection. To do this, mRNA from A549 cells is extracted before and after infected by *P. aeruginosa*. Complementary DNA (cDNA) were made for all samples during 3-time points. The PCR products were quantified by using the SYBR green pigment. The $C_\text{t}$ was used to quantify the findings. Also, $\Delta \Delta C_\text{t}$ method to calculated the fold change using the $2^{-\Delta \Delta C_\text{t}}$ equation. IL-36α mRNA level was significantly up regulated in response to *P. aeruginosa* infected A549 cells during all the time points included: 4, 6 and 24hrs post infection (Fig 2).

Figure 3 *P. aeruginosa* infection in A549 cells at different MOI of infection. A549 cells were infected at MOI 10, 50, 100. The total number of *P. aeruginosa* was counted after 2hr using CFU methods. Using one-way ANOVA to test the significant differences, where ** $p<0.01$ meant significant. The findings are the means of 3 experiments performed in 3 replicates ($\pm$ S.E.M).

Figure 4 IL36 expression during *P. aeruginosa* infection in A549 cells over-time.
Both infected and non-infected A549 cells were harvested at 2, 6 and 24hr post-infection. Using qPCR to determine the mRNA level post infection. The significance of differences were analysed using two-way ANOVA, where ** p<0.01; **** p<0.0001 significant compared to non-infected A549 cells. The results are the means (± S.E.M) of 3 experiments in 2 replicates.

**Discussion**

The aims were to select the highest bacterial antibiotics resistance and to determine that IL-36 plays a role in *P. aeruginosa* infection. We found that *K. pneumonia* and *P. aeruginosa* are the main causative agents in LRT infection (Fig 1). This finding is in agreements with the previous findings of (12, 13). Zhou et al. have found that *P. aeruginosa* percentage was about 25.2% and *K. pneumonia* was 31% (14). Ramana et al. also found that *K. pneumonia* is the most common pathogens in LRT infection (12). This does not support our findings that revealed *P. aeruginosa* has a sensitivity to Ampicillin. Another study supported our result, which demonstrated *P. aeruginosa* to have resistance to erythromycin and sensitive to gentamicin (Fig 2) (15). Taken together, it seems that *P. aeruginosa* is one of main the causative agents of LRT infection, and it must be taken seriously. It is probably that the mechanism of antibiotics resistant is upgraded and that are not likely updated in Iraq, in particular, alnajaf hospitals. The reason for that could be the clinician staff have a lack of awareness to avoid contamination. We strongly suggested that using antibiotic randomly must be avoided; otherwise, the problem will be increased. In the (Figs 3 and 4), we demonstrated that the bacterial efficiency in A549 cells and the role of IL-36 in *P. aeruginosa* infection. Interestingly, we showed that IL-36 mRNA level appeared to increase in A549 cells. Significant induction of IL-36 mRNA level was observed between 2 and 6h (p ≤ 0.001) in A549 cells, while IL-36 mRNA was highly increased at 24h (p ≤ 0.0001) relative to uninfected controls, as demonstrated in Fig 4. Some studies report that IL-36 plays a positive role in bacterial infection. In particular, it has a positive role in *P. aeruginosa* infection (12). This observation was in agreement with our data that shows IL-36 increased during *P. aeruginosa* infection. Interestingly, Vos et al have reported that IL-36 mRNA is unregulated in human bronchial cells during *P. aeruginosa* infection (Vos, van Sterkenburg *et al.* 2005). Ultimately, this explanation suggests IL-36 induces as primary immune response of host defense against *P. aeruginosa*.

**Conclusions:** IL-36 could contribute in early stage of immune response to *P. aeruginosa* infection. It is likely that the bacterium induced the inflammatory cell recruitment, and induced the cells to activate during infection. Our observation could approve our understanding for the mechanisms of bacterial pathogenesis in the epithelial cells, and also could identify a new therapeutic target in lung diseases using antibodies, or block material to this cytokine.

**Acknowledgement:** Research facilities provided by different hospitals in alnajaf city acknowledged. My thanks also to Professor Monk and Dr. Partridge from University of Sheffield, for providing me with cell line.

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**Funding:** The source of funding is by myself.

**Ethics Clearance:** This article does not contain any studies with human participants or animals performed by any of the authors.

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37.


Study of Mean Platelet Volume When Exposed to Ultrasound Waves for Hypertension Patients

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Abstract

Platelets are one of the most important cells in human blood, and help control bleeding. Mean platelet volume (MPV) play a vital role to indicate the activation of platelets. any significant changes of mean platelet volume will effect on platelet activity. Vibration-stimulates changes in the platelets activity as a type of stress upon MPV. This study aimed to investigate the impact of ultrasound waves on MPV of healthy and hypertension subjects in vitro model study. Venous blood samples obtained from healthy subjects (n=43) and hypertensive patients (n=61) have been exposed to ultrasound waves for two periods (5-10) minutes. The MPV was measured using the Coulter electronic count (Complete blood Count). The results have been shown that ultrasound waves caused a significant changes MPV in healthy subjects and hypertensive patients. The changes in the MPV are dependently related to the exposure time. In healthy subjects, the MPVs have been significantly increased by 12.6% for 10-min exposure while in hypertensive are significantly decreased by 9.1% for 10-min. It concludes that ultrasound induced an increase of the MPV, and this effect is tended to be less in patients with hypertension indicated that the responses of platelets are reduced in chronic diseases. It is clearly indication that the cellular response of MPVs in hypertension patients were very weak may because of hypertension. Whereas, MPVs response of healthy subject remained normal and effective.

Keywords: Vibration, Platelets, Hypertension, Mean platelet volume (MPV), Ultrasonic waves.

Introduction

Platelets are the most important vital cells in human blood. which are small nucleate cells play a critical role by helping the body form clots to stop bleeding. If one of the blood vessels is damaged, the body sends signals that are captured from the blood platelets to stop the bleeding by adhesion process, because when the platelets reach the site of infection, they grow sticky claws that help to adhere, and they send chemical signals to attract more Platelets to accumulate on the thrombus. Human body consist of 1×1011 of plateletswhich formed every day as the result of complex processes of differentiation, maturation and fragmentation of megakaryocytes [1]. Platelets are different in volume, density and reactivity individually [2]. The range of normal platelet counts is 150–400×109/L. Naturally, platelets spread in blood stream for 8–10 days while upon vascular injury, platelets instantly adhere to the exposed extracellular matrix resulting in platelet activation to form hemostatic plug. If the platelet number is low, the risk of bleeding is high [3].

Mean platelet volume (MPV) is a signal for platelet activity. Furthermore, altitude of MPV values is important, To be considered as a vital indicator for detect chest pain that is due to myocardial infarction, from that of non-cardiac one [4]. In addition, MPV is predictor marker for ventricular dysfunction and clinical outcome of acute myocardial infarction [5].

In case of hypertension, studies found that MPV being an independent factor which related with morning blood pressure rise also high sensitivity C-reactive protein and therefore, which may serve as a predictor atherothrombotic cardiovascular event [6]. Numerous studies noted that the workers who exposed to local vibration have a significant low of lipid profile involving triglycerides, serum cholesterol and high density lipoprotein at the same time the viscosity of blood will increase [7]. Studies related with animals which exposed to vibration exercise for short period in-vivo have been noted that there is no significant changes in hematological indices [8].
One types of mechanical energy form is Ultrasound waves which is a mechanical vibration, longitudinal waves composed of compression and rarefaction areas. Particles of a material which exposed to a ultrasound wave will fluctuated around a fixed point rather than move with the wave itself. When the energy within the sound wave is transfered to the material, it will lead to oscillation of the particles of that material. Clearly any increasing in the molecular vibration in the tissue can result in heat generation, furthermore, ultrasound can used to produce thermal changes in the tissues, although current usage in therapy does not focus on this phenomenon [9],[10].

Of general principles that the temperature expands biological material [11]. Based on this rule our study has been conducted to investigate in mean platelet volume response when exposed to ultrasound waves for healthy as a control and hypertension patients in-vitro model because the ultrasound waves may cause altering in MPV when exposed to the physical injury like vibration sound.

Materials and Method

This study was done in University of Diyala/college of medicine from october 2019 to january 2020. An agreement form has been obtained from each patient before starting our study. This study has been conducted according the ethical guidelines constructed by the Scientific Committee of the Institute. The patients were recruited from the hospital. A total number of 102 patients were enrolled in the study; 61 patients with essential hypertension and 43 healthy patients. 3ml of peripheral venous blood have been drawn and putted into EDTA-tubes then each tube was exposure to ultrasound vibration (sonoscope s50 )for 5 minutes and for 10 minutes. The blood was used directly after its withdrawal. Initially the blood was examined before it was exposed to ultrasound, then the blood model was exposed to ultrasound in a precise way where the probe covered all the area of blood which exist in EDTA tube. The platelet number (per cubic millimeter) and the mean platelet volume (fl) were measured for each sample before and after exposure to the vibration using Coulter (diagon Ltd, D-Cell 60) AUTO HEMATOLOGY ANALYZER apparatus.

Statistical Analysis

Data of current study were analyzed by using Chi-square ($X^2$) test to compared between percentages. Also, measured sensitivity and specificity of mean platelets volume (MPV). Numeric data were described by (Mean ± SD). T test used to compare between two numeric variables, while F test (ANOVA) used to compared between three numeric variables or more. A level of significance of $\alpha=0.05$ was applied to test. (SPSS v.22 and Excel 2013) programs used to analyze current data.

Results

104 volunteers was participated in our study grouped into two groups ( 43 subjects were healthy as a control and 61 subjects was hypertension). The mean age of study volunteers was significantly 34.30±11.34 year for control individuals and 53.59±15.31 with range of 1-80 years. Mean and standard deviation values of the BMI for control individuals 26.90±4.78 and 27.33±4.59. According to residence 77% of hypertention individuals were urban and 61% of healthy individuals were urban as show in (Table1).
Table (1) comparison between anthropometric characters between study groups by using $X^2$ test.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Controls (43)</th>
<th>Patients (61)</th>
<th>Total</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age_periods</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-20</td>
<td>N 3</td>
<td>1</td>
<td>4</td>
<td>$X^2=33.34$</td>
</tr>
<tr>
<td></td>
<td>% 7.0%</td>
<td>1.6%</td>
<td>3.8%</td>
<td>Df=5</td>
</tr>
<tr>
<td>21-40</td>
<td>N 30</td>
<td>12</td>
<td>42</td>
<td>$X^2=1.840$</td>
</tr>
<tr>
<td></td>
<td>% 69.8%</td>
<td>19.7%</td>
<td>40.4%</td>
<td>Df=2</td>
</tr>
<tr>
<td>41-60</td>
<td>N 9</td>
<td>29</td>
<td>38</td>
<td>$X^2=4.717$</td>
</tr>
<tr>
<td></td>
<td>% 20.9%</td>
<td>47.5%</td>
<td>36.5%</td>
<td>Df=93</td>
</tr>
<tr>
<td>61-80</td>
<td>N 1</td>
<td>17</td>
<td>18</td>
<td>$X^2=8.235$</td>
</tr>
<tr>
<td></td>
<td>% 2.3%</td>
<td>27.9%</td>
<td>17.3%</td>
<td>Df=93</td>
</tr>
<tr>
<td>&gt;80</td>
<td>N 0</td>
<td>2</td>
<td>2</td>
<td>$X^2=3.499$</td>
</tr>
<tr>
<td></td>
<td>% 0.0%</td>
<td>3.3%</td>
<td>1.9%</td>
<td>Df=93</td>
</tr>
</tbody>
</table>

| BMI_periods | | | | |
| <25 | N 14 | 14 | 28 | $X^2=1.840$ |
| | % 32.6% | 23.0% | 26.9% | Df=2 |
| 25-29 | N 17 | 23 | 40 | $X^2=4.717$ |
| | % 39.5% | 37.7% | 38.5% | Df=93 |
| ≥30 | N 12 | 24 | 36 | $X^2=8.235$ |
| | % 27.9% | 39.3% | 34.6% | Df=93 |

Befor starting with our investigation, MPV have been checked for controls and hypertension cases as shown in (Table 2), MPV values in heathy subjects and Hypertension cases nearly the same and no difference appear in statistics. after that, the blood have been exposed to ultrasound for 5min and MPV checked again. We found that mean platelets volume started to significantly increasing in controls and decrease in patients with (hypertensive) groups (T=4.717 Df=93 P=0.001). then, the blood exposed again to ultrasound for 10min, surprisingly, MPV response for healthy subject showed significantly increasing comparing with hypertension values(T=8.235 Df= 93 P=0.001). Moreover, the MPV of hypertension patients have been noted a significantly decreasing.

Table (2) :-Mean platelets volume(MPV) Before and After exposure to Ultrasonic Waves in study groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before</td>
<td>Controls</td>
<td>43</td>
<td>8.64</td>
<td>0.89</td>
</tr>
<tr>
<td></td>
<td>Patients</td>
<td>61</td>
<td>8.45</td>
<td>1.01</td>
</tr>
<tr>
<td>After_5_minutes</td>
<td>Controls</td>
<td>43</td>
<td>9.04</td>
<td>0.86</td>
</tr>
<tr>
<td></td>
<td>Patients</td>
<td>61</td>
<td>8.19</td>
<td>0.96</td>
</tr>
<tr>
<td>After_10_minutes</td>
<td>Controls</td>
<td>43</td>
<td>9.40</td>
<td>0.91</td>
</tr>
<tr>
<td></td>
<td>Patients</td>
<td>61</td>
<td>7.80</td>
<td>1.05</td>
</tr>
</tbody>
</table>

Interestingly, MPV response in hypertension patients was different during the time periods Where the response was inversive compared to a MPV response in healthy subjects, there was a significantly decreasing when increasing time periods of exposure to ultrasound waves. as shown in (Figure 1).
Discussion

The results of our study showed that ultrasound has severe adverse impacts on mean platelet volume (MPV) regardless of weight and age, particularly on hypertension patients.

There are many researches undertaken in the past indicating the bioeffects of ultrasound waves and its benefits in can promote satellite cell proliferation, achieve collagen supra-molecular myoregeneration phase, increase the differentiation of muscle lineage, reduce oxidative stress and treatment of idiopathic thrombocytopenic purpura [12-15].

On the other hand, many studies indicating the hematological changes due to exposure to ultrasound [16, 17] and this in agreement with the results of the present study that show the MPV of hypertensive patients affected by ultrasonic waves rather than healthy individuals as the platelets decrease in size and this goes with other studies who demonstrated that hypertensive patients exposed to ultrasound at work have an increase in platelets aggregation with increased generation and activity of von Willbrand factor.

Study undertaken on discoid platelets suspension when exposed to ultrasound waves, changes in platelets orientation and damage to platelets occurs after 5 minutes of exposure and damage to the cells is directly proportional to the intensity and duration of time exposure [18-20] and this also in agreement with our study results as the MPV of hypertensive patients decreases when exposed to US waves for 5 and 10 minutes.

Conclusions

It concluded that there is a lack response within hypertension patients which is lead to poor activation of the platelet when exposed to ultrasound, furthermore ultrasound considered as a kind of stressor may has a negative effect on platelets by increasing of mean platelet volume (MPV) which is make to be highly in healthy cases Unlike the response of hypertension patients.

Conflict of Interest: (Nil – There Are “No Conflict of Interest”).

Source of Funding: By researchers (THEM SELF).

Ethical Clearance: Committee members are approved to perform a study about:

References

Objective: The study aims to: 1. Identification and isolation of candida spp in Patients with renal dialysis. 2. To identify the relationship between some important parameters (age, gender, other disease) associated with chronic kidney disease and oral candidiasis. 3. Study of antifungal susceptibility profile for *C. albicans* in oral candidiasis. This study was performed in AL-Zahraa Teaching Hospital (Kidney Center) Wasit Governorate during the period from the first of December 2018 to the end of July 2019. The samples were collected from oral swabs, then cultured on sabouraud dextrose agar (SDA), examined under microscope to show hypha and pseudohypha of Candida spp and cultured on chrom agar for identifying the *Candida* spp. The molecular methods that used in this study were vitek 2 system and Polymerase chain reaction (PCR). The results showed that from 50 oral sample from Patients with renal dialysis 24 (48%) infected with Candidiasis 20 (83.3%) was *C.albicans* and 4 (16.7%) other *Candida* spp (*C. Famata*, *C. Prosabilosis* and *C. Tropicalis*), while 26 (52%) non infected. There is not relationship between the age, gender and other disease in chronic kidney disease and the infections with oral candidiasis.

Keywords: Oral candidiasis, Chronic Kidney diseases, Candida albicans

Introduction

Patients with chronic kidney failure have disturbances of immune function involving both innate and adaptive systems. These result in both immunodepression which increases susceptibility to infection and immunoactivation leading to a chronic inflammatory state. Dialysis treatment may further aggravate aspects of this, especially the induction of inflammation. In addition, there is a growing number of patients who have returned to dialysis programmes following transplant failure. Many of these will have been intensively immunosuppressed, often over years or decades. These patients are at particular risk [1]. The colonization can cause oral candidiasis, which can progress to its more invasive form, esophageal candidiasis. Moreover, if the immunosuppression continues or becomes stronger, it will continue to be a risk factor for systemic candidiasis [2]. Renal failure can cause defects in cellular and humoral immunity by affecting T-lymphocyte subsets. Uremia causes a decrease inphagocytic activity of macrophages, [3].

Immunocompromised are a condition where the mechanism of host defenses are impaired (weakened or absent) by primary (congenital) or secondary (acquired) causes [4] and these Immunocompromised hosts include diabetes, neutropenia, burns, persons with intravascular catheters, patients undergoing hemodialysis, abdominal surgery, persons with parenteral nutrition, immunocompromised individuals can frequently suffer from recalcitrant infections of the oral cavity. These oral infections with Candida species are termed “oral candidiasis” (OC). Such infections are predominantly caused by *C.albicans* and can affect the oropharynx and/or the esophagus of persons with dysfunctions of the adaptive immune system [5]. Diagnosis of Candida in the laboratory is done by simple microscopy, culture or antigen detection assays. The wet mount microscopy detects budding yeasts cells and hyphal or pseudo hyphal forms. They also grow well on routine culture medium and on gram-stain, appear gram positive and oval in shape. The culture media that used is sabouraud
dextrose agar with chloramphenicol (antibiotic) are used. Creamy colored colonies are seen on the agar; making the slide from these colonies and examine, the yeast cell and pseudohyphae under the microscopes seen [6]. Then use several techniques for confirmation like the The Vitek 2 system, first introduced a fluorometric and then a colorimetric card for the rapid identification of yeast species. The performance of both cards has been evaluated in several studies [7-11]. In contrast, during routine diagnostics, yeasts are also commonly isolated on other media, including CHROMagar Candida [12]. PCR is a crucial tool in the diagnosis of human pathogens. This molecular method is based on nucleic acid amplification, and hybridization has been rapidly adapted to reliably detect a broad range of infectious agents. The use of PCR to diagnose medical mycoses has been challenging, however, because fungi have cell walls that impede the efficient lysis of organisms and liberation of DNA (which can lead to false-negative PCR results) and because some human pathogens are also ubiquitous in the environment (leading to false-positive results [13]).

**Material and Method**

**Study design:**

This prospective study was performed in AL-Zahraa Teaching Hospital (Kidney Center) Wasit Governorate during the period from the first of December 2018 to the end of July 2019. 50 patient of CKD (male and female, age ranged from 17-80 years, have been randomly selected from dialysis center in AL-Zahraa teaching hospital According to following inclusion criteria.

- (Blood uria > 50 mg/ dc, creatinin >1.2 mg /dc, duration of illness ranged from few months to 7 years).

- Exclusion criteria: negative medical history with normal blood uria and serum creatinin.

- physician diagnosis.

**Procedure of samples collection:**

Mouth swabs were collected by using a sterile disposable cotton swabs and rubbed over the tongue palate and buccal mucosa as outlined in appendix (1) Figure (1). Cotton swabs were aseptically dipped in sterile culture tubes containing transport medium and were transported as soon as possible to the laboratory and incubated at 37 °C for 24 hours [14].

Isolation and identification of Candida species:

After taking swaps from the suspected patients, the swap samples were cultured immediately on SDA with chloramphenicol and incubated aerobically at 35-37°C for 24-48 hours, the agar plates were examined for visible growth after the incubation period [15]. Identification of Candida was done based on the colony morphology of the isolates, and then staining with gram stain and examined under the microscope to show the morphology of Candida spp. Then use several techniques for confirmation like the The Vitek 2 system, first introduced a fluorometric and then a colorimetric card for the rapid identification of yeast species (BioMérieux, France), CHROMagar Candida medium and the molecular method Polymerase chain reaction technique (PCR) technique was performed for detection Candida albicans based on 18SrRNA.

**Statistical Analysis**

All results obtained from the present study were entered and analyzed statistically by the statistical package for social science (SPSS) version 21 for Windows Software and Microsoft Excel 2007. Chi-square test and one way Analysis of variance (ANOVA) with least significant were used for the assessment of association between the variables studied. A value of P < 0.05 was considered statistically significant.

**Results**

**Table 1 : Distribution of oral candidiasis in renal dialysis patients according to age**

<table>
<thead>
<tr>
<th>Age</th>
<th>Infected</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>Young &lt;30 year</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

| % within age | 40.0% | 60.0% |
| % of Total   | 4.0%  | 6.0%  | 10.0% |
Cont ... Table 1: Distribution of oral candidiasis in renal dialysis patients according to age

<table>
<thead>
<tr>
<th>Moderate 31-50year</th>
<th>Count</th>
<th>8</th>
<th>8</th>
<th>16</th>
</tr>
</thead>
<tbody>
<tr>
<td>% within age</td>
<td>50.0%</td>
<td>50.0%</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>% of Total</td>
<td>16.0%</td>
<td>16.0%</td>
<td>32.0%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Aged 51&lt; year</th>
<th>Count</th>
<th>14</th>
<th>15</th>
<th>29</th>
</tr>
</thead>
<tbody>
<tr>
<td>% within age</td>
<td>48.3%</td>
<td>51.7%</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>% of Total</td>
<td>28.0%</td>
<td>30.0%</td>
<td>58.0%</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total</th>
<th>Count</th>
<th>24</th>
<th>26</th>
<th>50</th>
</tr>
</thead>
<tbody>
<tr>
<td>% within age</td>
<td>48.0%</td>
<td>52.0%</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>% of Total</td>
<td>48.0%</td>
<td>52.0%</td>
<td>100.0%</td>
<td></td>
</tr>
</tbody>
</table>

(P value > 0.05)

Table 2: Distribution of oral candidiasis in renal dialysis patients according to gender

<table>
<thead>
<tr>
<th>Infected</th>
<th>Gender</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Positive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Count</td>
<td>17</td>
<td>7</td>
</tr>
<tr>
<td>% within infected</td>
<td>70.8%</td>
<td>29.2%</td>
</tr>
<tr>
<td>Negative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Count</td>
<td>17</td>
<td>9</td>
</tr>
<tr>
<td>% within infected</td>
<td>65.4%</td>
<td>34.6%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Count</td>
<td>34</td>
<td>16</td>
</tr>
<tr>
<td>% within infected</td>
<td>68.0%</td>
<td>32.0%</td>
</tr>
</tbody>
</table>

Table 3: Distribution of oral candidiasis in renal dialysis patients associated with other disease

<table>
<thead>
<tr>
<th>Other disease</th>
<th>Infected</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>Healthy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Count</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>% within other</td>
<td>50.0%</td>
<td>50.0%</td>
</tr>
<tr>
<td>% of Total</td>
<td>4.0%</td>
<td>4.0%</td>
</tr>
<tr>
<td>Blood pressure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Count</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>% within other</td>
<td>45.5%</td>
<td>54.5%</td>
</tr>
<tr>
<td>% of Total</td>
<td>30.0%</td>
<td>36.0%</td>
</tr>
<tr>
<td>Diabetic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Count</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>% within other</td>
<td>100.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td>% of Total</td>
<td>2.0%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>
Cont. Table 3: Distribution of oral candidiasis in renal dialysis patients associated with other disease

<table>
<thead>
<tr>
<th>D.M &amp; blood pressure</th>
<th>Count</th>
<th>6</th>
<th>6</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>% within other</td>
<td>50.0%</td>
<td>50.0%</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>% of Total</td>
<td>12.0%</td>
<td>12.0%</td>
<td>24.0%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>24</td>
<td>26</td>
<td>50</td>
</tr>
<tr>
<td>% within other</td>
<td>48.0%</td>
<td>52.0%</td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>% of Total</td>
<td>48.0%</td>
<td>52.0%</td>
<td>100.0%</td>
<td></td>
</tr>
</tbody>
</table>

(P value > 0.05)

Table 4: *Candida* species of current study

<table>
<thead>
<tr>
<th>Study group</th>
<th>C. albicans Numbers . and percentage</th>
<th>Other Candida Spp Numbers . and percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Renal dialysis</td>
<td>20 (83.3%)</td>
<td>4 (16.7%)</td>
</tr>
</tbody>
</table>

Discussion

The present study states that the age of renal dialysis patients infected with candidiasis showed that there was no significant differences (P value > 0.05) between the 3 age groups, and the high percent were in moderate age patients (31-50 years) as shown in Table 1, this result agreed with Godoy et al., (2013) [16] when he mentioned that the more significant infected patients were over 45 years. But still no correlation due to various population samples and races. Uremia is associated with a state of immune dysfunction characterized by immunodepression that likely contributes to the high prevalence of infections among these patients as well as by immunoactivation resulting in inflammation (Kato et al., 2008)[11]. According to gender of infected patients,17 (70.8%) of them were males and 7 (29.2%) were females, as clarified in Table 2, this result disagreed with Godoy et al., (2013) [16] when he mentioned that 53% of samples were females and 47% were males, this might be counting on other factors like the number of dialysis sessions and immune states. The most common underlying diseases in renal failure patients infected with oral candidiasis were hypertension and diabetes mellitus as Godoy et al., (2013) [16] stated. but in current study there was no clear relationship between underlying diseases and *Candida* infection as clarified in Table 3. Diabetes and hypertension diseases that strongly predispose people to renal failure (Bakris et al., 2000)[17] but not necessary associated with oral Candidiasis as showed in current study. *Candida albicans* is the most dominant *Candida* spp. In Patients with renal dialysis, as clarified in Table 4, this result agreed with Kerawala et al., (2010)[18] when he mentioned that 60% of *Candida* isolate is *Candida albicans*. *C. albicans* is the most common fungal species isolated from biofilms either formed on implanted medical devices or on human tissue (Kumamoto, 2002)[19]. A mortality rate of 40% has been reported for patients with systemic candidiasis due to *C. albicans* [20].

Conclusion

*Candida albicans* is the most dominant *Candida* spp. In Patients with renal dialysis. There is not relationship between the age, gender and other disease in chronic kidney disease and the infections with oral candidiasis.

Ethical Clearance: The project plan displayed on the scientific committee and scientific ethical committee of Department of Microbiology, College of Medicine and Wasit health directorate and get approval

Source of Funding: There is no funding source and it is completely covered by authors

Conflict of Interest: There is no conflict of interest
References


The Effect of Boiling Time on the Concentration of Nitrite in Sausages

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Abstract

Background : Nitrite is often used as a preservative as well as curing to brighten foods made from raw meat such as sausages. Excessive use of nitrite can cause symptomatic methemoglobin, tumors to cancer in humans. One method that can be used to reduce nitrate levels in sausages is by boiling.

Aim : The study aimed to determine the effect of boiling time on the nitrite content of sausages.

Material and Method : This type of research is an experiment with a one group pretest-posttest design. The research material is sausages obtained from distributors, Banjarbaru. The research material treatment was carried out by boiling sausages with distilled water for 5, 10, 15, 20, and 25 minutes at 80-90°C.

Results : There was a decrease in the level of nitrite in sausage after boiling, which is consecutive at 1.44 ppm (5 min); 1.17 ppm (10 minutes); 0.98 ppm (15 minutes); 0.83 ppm (20 minutes) and 0.7 ppm (25 min). The linear regression test found that R square was 0.574 or 57.4%.

Conclusion : Meat sausage boiling process can lower nitrite levels in sausages, the longer the boiling process is increasing the amount of nitrite being eliminated from the sausage with the highest number of boiling for 25 minutes there is a decrease of 70%.

Keywords: Sausage, nitrite level, boiling time

Introduction

Meat is one source of animal protein that is needed by humans protein functions for cell growth, replacement of damaged cells, and as fuel in the human body. In addition to protein, meat has other components such as minerals, carbohydrates, and fats that cause meat easily damaged, especially by microorganisms such as fungi and bacteria. To maintain the freshness of meat-based foods such as sausages, nitrite preservatives often added by producers. The nitrite preservation mechanism is using nitrite binding to the sulphhydryl group to form salts which are challenging to metabolize by microbes in anaerobic conditions¹,².

Nitrite is one of the preservatives that is allowed to use based on Republic of Indonesia Minister of Health Regulation No. 1168/Menkes/Per/X/1999 concerning Food Additives, with a limitation of the maximum use of nitrite preservatives in processed meat products of 125 mg/Kg. Nitrite is widely used in meat because in addition to preventing microbial growth it can also function as curing or improving the color of meat. But the risk of nitrite use limits its use. Nitrite in the beef will react with oxygen to form nitroxide which will then respond with pigments in the flesh to build nitrosomyoglobin, which gives a bright color to the flesh. Furthermore, in the body of the nitrite can also bind to amino or amide in the body to form derivatives of nitrosamines, which are toxic and carcinogens³.

As the food and beverage industry develops, more food products from meat are produced, sold and consumed in forms that are more durable, attractive and more practical than fresh products such as bread, meatballs, nuggets, sausages and corned beef. There are still many food products currently circulating that do not
meet the hygiene requirements and food safety quality standards. In terms of microbiological safety, some food products are still found to be fungal contamination, Salmonella, Staphylococcus, Bacillus. In terms of chemical safety of many foods and beverages in circulation that still use food additives that not permitted for food and the use of doses that exceed the required threshold for permitted food additives such as the use of nitrite.

The case of nitrite poisoning in sausages had occurred in 2008 at Sukosewu 1 Gandusari Blitar elementary school. The students poisoned after eating sausages sold at the school. Nur’s HH reported that five sausage brands examined all positively contained nitrites and there was one brand of sausage with nitrite levels of 208.19 mg/Kg which exceeded the quality standard according to Permenkes No.1168/Menkes/Per/1999 which is equal to 125 mg/Kg.

The use of nitrite compounds in processed meat products such as sausages seems to have become a necessity of the community because nitrite compounds in meat besides acting as preservatives also provide a distinctive color of fresh red meat. However, the use of nitrites in food must remain vigilant because if consumed excessively and repeatedly it can adversely affect health either directly or indirectly, among others, can result in methemoglobinemia, teratogenic, tumors to cancer through a reaction between secondary or smear amines contained in the body.

One way that can be done to minimize nitrite content in doses is by boiling before consumption — this theory supported by the results of research conducted by Li. The results of Li’s research proved to be able to reduce nitrite levels in sausages by 19.47% after boiling for 60 minutes at 80°C. Study of the effect of boiling time on nitrite levels in sausages by spectrophotometry using the Griess method.

Methods and Materials

This type and design of the study were experiments with the study design one group pretest-posttest. The research material is unbranded sausage from processed beef, which is known to have positive nitrite content after a preliminary qualitative test was carried out using the Griess method. The research instruments consisted of UV-Vis spectrophotometer. The reagent used was Natrium nitrite, Sulfanilic acid, Naphthylenediamine, 30% Acetic acid, Glacial acetic acid, quads.

Sausages treated with five sausages each cooked with 500 ml of water with variations time of 5 minutes, 10 minutes, 15 minutes, 20 minutes, and 25 minutes at a temperature of 80-90°C. After that, the sausages are taken to check each nitrite level with four repetitions. Analysis of nitrite examination carried out qualitatively and quantitatively. A qualitative study using Griess reagent based on the formation of the color of azo substances. Quantitative analysis using spectrophotometric methods.

The sausage weighed and then it is heated as much as 5 grams in a 50 ml glass beaker, add 50 ml of hot distilled water, stirring and strain. The filtrate was taken as much as 25.0 ml and put in a 50 ml volumetric flask, diluted with distilled water until the boundary mark. Add 4.0 ml of Griess reagent. Leave it for 15 minutes, put it in the cuvette, and read the absorbance on the spectrophotometer with a wavelength of 548 nm. Nitrite levels at doses are calculated based on the line equation $Y = bX + a$. It repeated for variations time of sausage 10, 15, 20, and 25 minutes.

The making of the standard sodium nitrite curve solution is each with a concentration of 0.2; 0.6; 1.0; 1.4; 1.8 and 2.2 ug/ml into 50.0 ml volumetric flasks then advert with distilled water. Then 10.0 ml of each solution was taken, and then 2.0 ml of Gress reagent was added to each 50 ml volumetric flask and the boundary mark. The answer was left operating time for 30 minutes then read the absorbance value using a UV-Vis spectrophotometer at a maximum wavelength of 548 nm. The absorbance result data is made a standard curve so that the line equation $Y = bX + a$ obtained. This line equation is used to determine sodium nitrite levels in sausages. 2). Determination of nitrite levels in doses, namely as much as 5 grams of mashed sample put into a glass beaker plus 50 ml of distillate water temperature 80oC, strain. The 25.0 ml filtrate was put into a 50.0 ml volumetric flask and then diluted with distilled water to the boundary mark, plus 4.0 ml Griess reagent, homogenized, the solution left for 30 minutes and measured the absorbance by a spectrophotometer at a wavelength of 548 nm.

Result and Discussion

Data on the results of the examination of nitrite levels in sausages that have boiled for 5, 10, 15, 20, and 25 minutes with four repetitions can be seen in table 1 and figure 1.
Table 1. Nitrite Level in Sausage

<table>
<thead>
<tr>
<th>Boiling Time</th>
<th>Nitrit (ppm)</th>
<th>Average (ppm)</th>
<th>Reduction in nitrite levels (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I</td>
<td>II</td>
<td>III</td>
</tr>
<tr>
<td>0</td>
<td>2.64</td>
<td>2.64</td>
<td>2.64</td>
</tr>
<tr>
<td>5</td>
<td>1.60</td>
<td>1.33</td>
<td>1.11</td>
</tr>
<tr>
<td>10</td>
<td>1.15</td>
<td>1.06</td>
<td>1.01</td>
</tr>
<tr>
<td>15</td>
<td>1.05</td>
<td>0.99</td>
<td>0.69</td>
</tr>
<tr>
<td>20</td>
<td>0.93</td>
<td>0.77</td>
<td>0.47</td>
</tr>
<tr>
<td>25</td>
<td>0.77</td>
<td>0.71</td>
<td>0.38</td>
</tr>
</tbody>
</table>

Based on Figure 1, it is known that the longer the sausage boiled, the less the amount or level of nitrate in sausages. This result is somewhat different from the research conducted by Li6 on sausages, namely the reduction of nitrite in sausages only by 19.47% after boiling for 60 minutes at 80°C.

The difference in nitrite levels in each treatment in this study caused by the difference in the length of sausage boiling. The longer the boiling time, the more nitrite is eliminated from the sausage. The highest percentage of nitrite reduction in sausages occurred at 25 minutes of boiling time, which is 70% and the lowest in sausages with a boiling time of 5 minutes, which is equal to 40%.

This study using the Griess method spectrophotometer. The principle is the Griess method based on the diazotization reaction, which is between the nitrite ion in the sample and sulfanyl acid in an acidic atmosphere to form benzene diazonium ions. Furthermore, benzene diazonium ions coupled with N-1-Naphthylen-diammonium dihydrochloride (NEDA) which will create a purple-red azo compound which can be measured absorbance at the maximum wavelength obtained in this study is 548 nm\textsuperscript{13,14}.

![Figure 1. Nitrit level reduction in sausages after boiling with different temperature variations](image-url)
the use of excess nitrite is carcinogenic and mutagenic because nitrite in the body can bind to secondary and tertiary amines to form derivatives of nitrosamines, especially at low pH and salt levels. Carcinogenic and mutagenic properties of nitrosamines are thought to be the cause of necrosis, which is the death of some cell tissues of living creatures as an early stage of cancer attack. One of the advantages of nitrosamines is its capacity to cause tumors in several organs, including liver, kidney, stomach, bladder, esophagus, and SSP[10]. Other than that, nitrite can also bind to Fe (II) contained in blood hemoglobin, which then forms methemoglobin which cannot carry oxygen, which can cause the body to experience oxygen deficiency. If this is allowed to continue, it can have fatal consequences primarily if it occurs in infants and pregnant women with symptoms of pallor, cyanosis, vomiting, shortness of breath to shock.

Taking into account the negative effects of nitrites in processed meat foods such as sausages, several ways can be done to reduce nitrite content before consumption, one of which is to boil sausages using water for a certain amount of time before consumption. In this study, boiling sausages for 5-25 minutes with a temperature of 80-90OC was shown to show different variations in nitrite reduction according to the length of boiling (see table 1). In another journal, it also reported that the use of nitrite in sausages eliminate by adding various combinations of ingredients such as celery, carrots, broccoli and ingredients that contain vitamins C and E during boiling sausages. In addition to boiling methods, the use of several types of natural dyes can also be an alternative as a red coloring in meat without causing health problems, such as angkak, bits (Beta vulgaris), the skin of red dragon fruit. Cochineal 0.015% can also be used as a substitute for nitrite in meat because it can develop the color of meat and is quite stable to light and pH. Some spice plant extracts such as cloves, lemons, licoric are also known to have antibotulinin activity in processed meat. Celery powder with a concentration of 10% can protect sausages from deterioration during storage as a substitute for nitrite. With several alternatives that can be used to replace nitrite as curing as a preservative in sausage meat it is hoped that food producers who still use nitrite could replace it with natural, safer and friendlier materials for the body.

Measurement of sample levels in this study using the calibration curve method, namely the standard curve of the standard solution of sodium nitrite. The purpose of making this standard curve is to get more accurate results because it uses more than one concentration of different standard solutions, which commonly referred to as standard series solutions. In this study using 6 standard series solutions each 0.2; 0.5; 1.0; 1.4; 1.8; and 2.2 ug / mL or (ppm). Based on the results of measurements of the absorbance of standard solutions obtained by absorbance in a row 0.125; 0.186; 0.217; 0.312; 0.384 and 0.481. From the results of the calibration curve, the linear regression equation \( y = 0.1763x + 0.0725 \) with \( R^2 \) is 0.9788. Furthermore, this line equation is used to determine the nitrite level in the sausage sample by entering the absorbance of the measured sample. The results of the calculation of nitrite levels in sausages that have undergone boiling with various variations of boiling time can see in table 1.

To find out whether there is an influence of the old boiling variable (independent variable) on nitrite levels (dependent variable) on sausages and how much influence the regression test linear. Previously, a regression test conducted before the normality test was carried out on the data to find out whether the data were normally distributed or not. From the test results, it knew that the significant value is higher than \( \alpha \) (0.05) so that the data usually distributed. Furthermore, the ANOVA test was carried out to find out the differences between the data groups and obtained a significant value of 0,000 which means that it was higher than \( \alpha \) (0.05) so that there were significant differences between the data groups. Based on the linear regression test, the R Square value is 0.574 or 57.4% so that it can say that the length of sausage boiling has an effect of 57.4% on nitrite levels in doses.

**Conclusion**

Based on the results of the study it can be concluded that the boiling process of meat sausages can reduce nitrite levels in sausages, the longer the boiling process increases the amount of nitrite eliminated from sausages with the highest number of boiling for 25 minutes a decrease of 70%.

**Conflict of Interest:** Nil

**Source of Funding:** Self

**Ethical Clearance:** Taken From Health Research Ethics Committee Politeknik Kesehatan Banjarmasin Indonesia
References


Platelet Counts Analysis of Platelet-Poor Plasma (PPP) Produced by Several Centrifugation Techniques

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Abstract
Platelet-poor plasma (PPP) can be obtained by various centrifugation techniques. This study aims to analyze platelet count in PPP produced by three different centrifugation techniques. Samples came from a healthy adult who underwent medical check-up and had been given informed consent. A total of 2.7 mL of blood samples were collected using three citrated tubes. Samples were centrifuged by three different techniques to obtain PPP: 1,500 g for 15 minutes twice, 3,000 g for 15 minutes, and 3,260 g for 10 minutes. The platelet count of each PPP was examined using a hematology analyzer. All three centrifugation techniques produced <10,000/µL platelets in all PPP from 31 samples. The twice centrifugation of 1,500 g for 15 minutes produced a median number of platelets which was $1 \times 10^3$/µL (0-3). The 3,000 g centrifugation for 15 minutes produced a median number of platelets which was $1 \times 10^3$/µL (0-5). The 3,260 g centrifugation for 10 minutes produced a median number of platelets which was $2 \times 10^3$/µL (0-5). A comparison of platelet count showed a significant difference ($p<0.05$) among the three centrifugation techniques. The three centrifugation techniques in this study were able to produce PPP. The centrifugation technique of 1,500 g for 15 minutes twice produced the lowest number of platelets.

Keywords: centrifugation, platelet-poor plasma, platelet count

Introduction
Clinical laboratory testing plays an essential part in the detection, diagnosis, and treatment of diseases. Laboratory results contribute around 60-70% in determining the decision for patients to undergo hospitalization and receive treatments[1]. Effective and efficient laboratory services are characterized by three factors: precision, accuracy, and timeliness which is assessed by turnaround time (TAT)[2,3]. TAT is often used by clinicians as a performance guide or key performance indicator in laboratory services. It was reported that the preanalytic phase contributes around 75% of the total TAT[2].

In addition, one of the pre-analytical processes commonly done is the centrifugation process. Centrifugation is the separation process of solid particles and their solvents. This process is often used in laboratories to separate blood cells from their plasmas to produce PPP. PPP is a plasma with a platelet count of less than 10,000/µL used for coagulation study[4,5].

The preparation of PPP recommended by the Clinical and Laboratory Standart Institute (CLSI) is to use a tube with sodium citrate anticoagulant and centrifugation processes at a speed of 1,500 g for at least 15 minutes[5]. Different results were obtained in a study conducted by Kristoffersen which stated that the number of platelets after a single 1,500 g centrifugation results in a platelet count <22,000/µL[6]. Magnette et al. recommend a repeat of centrifugation to ensure platelet residue is less than 10,000/µL. The remaining platelet in plasma has been known to affect phospholipid-dependent coagulation tests such as those on Lupus Anticoagulant (LA)[7]. This repeating centrifugation process must be prepared for all coagulation parameters if there is a possibility that the measurement is not carried out immediately after centrifugation, or if the sample will be frozen[6-10].
A study conducted by Sicard showed that the amount of platelet residue in PPP produced at a speed of 3,260 g in 10 minutes was \(<10,000/\mu L^{[1]}\). PPP preparation in Dr. Soetomo Hospital used 3,000 g centrifugation for 15 minutes. There has been no prior research that confirmed this technique will produce less than 10,000/\mu L platelet residues. This centrifugation technique requires a long time in the preanalytic stage. An updated technique is needed to speed up this process without reducing the quality of the coagulation\[^{[4]}\].

This study aimed to examine the differences in the number of platelets in PPP produced in the 1,500 g centrifugation technique for 15 minutes twice, 3,000 g for 15 minutes, and 3,260 g for 10 minutes. The results that are accurate, fast, and precise are hopeful to help improve the laboratory services quality in Dr. Soetomo Hospital.

**Materials and Method**

The study was an analytic study with a cross-sectional design. The sample was obtained by conducting consecutive sampling during April-May 2019. The inclusion criteria in this study were healthy adult patients aged >21 years who underwent a medical check-up, were in good health and were willing to take part in the study. The exclusion criteria in this study were the history of drug consumption in the last 10 days that interfere with platelet function.

Becton-Dickinson Vacutainer tubes (Rutherford, New Jersey, United States of America) with sodium citrate anticoagulant were used in this study. The concentration of sodium citrate used was 0.109 M (3.2%). Venous blood samples were taken and put in 3 tubes of 2.7 cc each with a ratio of 9:1. Slow inversion 3-6 times was done to make blood and anticoagulants homogeneous. Then, the samples were centrifuged with Sorvall ST 8R (Thermo Scientific small benchtop centrifuges) at 24 °C that was calibrated with a tachometer twice a year. Three samples were centrifuged with three different speeds and times: 1,500 g for 15 minutes twice (Technique 1), 3,000 g for 15 minutes (Technique 2), and 3,260 g for 10 minutes (Technique 3). After the initial centrifugation, plasma in technique 1 was carefully transferred to an inactive plastic centrifugation tube using an automatic pipette, and then centrifuged again for about 15 minutes. Centrifugation in technique 2 and technique 3 was only done once. The plasma was carefully transferred to the aliquot with a pipette, leaving 1 cm to remain above the buffy coat. This was done to avoid the removal of the remaining platelet in the area around the buffy coat. The plasma of each sample was assessed by platelet count using a Sysmex XN 1000 hematology analyzer.

Statistical analysis was done using SPSS version 17.0. The collected data was carried out by cleaning, coding, tabulating, and entry into the computer. The median was also calculated. A paired T-test was done for data with a normal distribution. For data that were not normally distributed, a Wilcoxon test was performed. \(p\)-value \(<0.05\) was considered statistically significant.

**Results**

Participants who were willing to take part in this study were 31 people who came from Medical Check-Up (MCU). Samples consisted of 12 men and 19 women. All the 31 samples from the three centrifugation techniques have platelet count below 10,000/\mu L. The centrifugation technique of 1,500 g for 15 minutes twice produced a median number of PC which was \(1\times10^3/\mu L\ (0-3)\). The centrifugation technique of 3,000 g for 15 minutes obtained a median number of PC which was \(1\times10^3/\mu L\ (0-5)\). The centrifugation technique of 3,260 g for 10 minutes resulted in a median number of PC which was \(2\times10^3/\mu L\ (0-5)\) (Table 1).

Comparison analysis of the platelet count between groups of centrifugation techniques showed a significant difference between Technique 1 and Technique 2 (\(p = 0.004\)). Comparison analysis of platelet count from Technique 1 and Technique 3 showed a significant difference (\(p = 0.0005\)). Comparison analysis of platelet count from Technique 2 and Technique 3 also showed a significant difference (\(p = 0.004\)) (Table 2).

**Table 1. Data of Platelet Count from the Three Centrifugation Techniques**

<table>
<thead>
<tr>
<th>Centrifugation Technique</th>
<th>n</th>
<th>Platelet Count ((\times10^3/\mu L)) Median (min-max)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,500 g for 15 minutes twice</td>
<td>31</td>
<td>1 (0-3)</td>
</tr>
<tr>
<td>3,000 g for 15 minutes</td>
<td>31</td>
<td>1 (0-5)</td>
</tr>
<tr>
<td>3,260 g for 10 minutes</td>
<td>31</td>
<td>2 (0-5)</td>
</tr>
</tbody>
</table>
Table 2. Comparison Result of Platelet Count among Centrifugation Techniques

<table>
<thead>
<tr>
<th>Variables</th>
<th>Centrifugation Techniques</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Platelet Count (×10³/µL)</td>
<td>Technique 1 compared with Technique 2</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>Technique 1 compared with Technique 3</td>
<td>0.0005</td>
</tr>
<tr>
<td></td>
<td>Technique 2 compared with Technique 3</td>
<td>0.004</td>
</tr>
</tbody>
</table>

Note: 1,500 g for 15 minutes twice (Technique 1)
3,000 g for 15 minutes (Technique 2)
3,260 g for 10 minutes (Technique 3)

Discussion

The centrifugation parameters for removing platelets depend on the duration, speed, and radius of the centrifuge arm. The speed and radius of the centrifuge arm determine the “g” value. Each centrifuge produces different values of g and varies the time of centrifugation to obtain the desired PPP[10,12,13].

However, CLSI recommends that tubes with anticoagulants should be centrifuged at a speed of 1,500 g no less than 15 minutes to obtain PPP[5]. A study conducted by Favaloro et al. suggested that using a centrifugal force relatively greater than 1,500 g was not recommended because it could cause platelet activation, hemolysis, or other undesirable effects[14]. Higher speed (greater than 1,500 g) and shorter time (less than 10 minutes) in an emergency could be used to prepare PPP for coagulation examination[4,7]. Several studies that evaluated the impact of higher speed centrifugation on platelet count concluded that fast centrifugation did not change results and contributions by reducing preanalytic duration[4,11,15].

This study compared the platelet count in the 1,500 g centrifugation technique for 15 minutes twice, 3,000 g for 15 minutes, and 3,260 g for 10 minutes to obtain PPP. The Sorvall ST 8R centrifuge uses a swinging bucket rotor for high-speed horizontal processing. This centrifuge accommodates a maximum speed of up to 3,260 g (4,500 rpm)[12]. A study conducted by Magnette et al. demonstrated that a centrifuge with a swinging bucket rotor is easier to separate plasma from cellular components and minimize re-mixing of plasma with red blood cells[7].

Samples with hemolysis cannot be processed because clotting factor activation can occur and interfere with the clot detection by optical devices that use the principle of changing plasma turbidity[16-18]. Those samples will also cause spectral interference in devices using photometric methods. It can affect the examination of the coagulation study[19]. Fortunately, there were no samples with hemolysis in this study. Plasma from each sample was taken to assess the platelet count with a Sysmex XN 1000 hematology analyzer.

The lowest platelet count (<3×10³/µL) was obtained from the 1,500 g centrifugation technique for 15 minutes twice. This result was similar to a previous study conducted by Kristoffersen and Sicard which showed that the number of platelets of PPP produced by doing 1,500 g of centrifugation for 15 minutes twice and 3,260 g of centrifugation in 10 minutes was <10,000/µL[6,11]. This study was the first study to examine the centrifugation of 3,000 g for 15 minutes.

A comparison of platelet count among centrifugation techniques showed significant differences (p<0.05). These results differ from a study conducted by Sultan in 2010 which showed no significant differences between the PPP platelet count produced at 2,000 g centrifugation for 20 minutes and 3,000 g centrifugation for 5 minutes. This difference result is possibly due to the differences in the tools used and research procedures. Research conducted by Sultan used a Centurion-K40 centrifuge model with a fixed angle rotor[15].

In addition, Sultan showed no significant difference in the PT and APTT examination between PPP produced by 2,000 g centrifugation for 20 minutes and 3,000 g
centrifugation for 5 minutes\textsuperscript{15}. The limitation of this study was no evaluation of the high acceleration impact of centrifugation conditions on routine coagulation study (including PT, APTT, and fibrinogen) in each PPP resulted from each centrifugation techniques.

**Conclusion**

In sum, the three centrifuge techniques in this study were able to produce PPP because platelet count obtained was less than 10,000/μL. The resulting PPP was compliant with the CLSI standard despite the statistically significant differences in platelet count among the three different centrifugation techniques. The twice 1,500 g centrifugation for 15 minutes each was the technique that produced the lowest number of platelets. The difference in results obtained from this study was due to the different types and techniques of the tools used.

**Conflict of Interest**: The authors declare that they have no conflict of interest.

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**Ethical Approval**: This study was approved by the Dr. Soetomo Hospital, Surabaya, Indonesia.

**References**


Feeding Style for Children Aged 0-59 Months of Buginese Ethnicity

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Abstract

Background. The study of Feeding Style of children in ethnic Buginese was focused on caregiver styles to feeding practices that influences nutritional stunting. The purpose of this study was to determine feeding style of Bugis ethnicity. Method. The cross sectional study and the sample size is 300 subjects, selected by random sampling. Located in in Makassar City, South Sulawesi Province Indonesia (starting January-December 2019). Enumerators in this study were students of the Applied Nutrition & Dietetic in Nutrition Department of the Health Polytechnic Makassar. Research ethics was obtained at the Makassar Health Polytechnic Ethics Commission. The results showed that stunting prevalence for children in Bugineses ethnicity was 22.7% and Feeding Style consists of four groups namely caring (indulgent), compromise (authoritative), free (uninvolved) and completely regulating (authoritarian). The conclusion is that the style of Bugis ethnic child feeding style consists of four groups namely indulgent, authoritative, uninvolved, and authoritarian.

Key words: Buginese, Feeding Style, Children.

Introduction

Stunting prevalence data collected by the World Health Organization (WHO), Indonesia is included in the third country with the highest prevalence in the Southeast Asia/South-East Asia Regional (SEAR) region. The average prevalence of stunting toddlers in Indonesia in 2005-2017 was 36.4%. The determinant factor of nutritional problems is multidimensional¹². The five factors are based on the conceptual framework of the causes of household and family factors include the low quality of nutritional intake during pre-conception, pregnancy and the breastfeeding phase. Besides, the nutritional status of the mother during pregnancy determines the height status of the child being born³⁴⁵.

Inadequate complementary feeding and breastfeeding are real phenomenon in urban communities in Makassar. Factors are the lack of knowledge about complementary feeding, and the occupation status of mothers outside the home so that they lack of attention to giving feeding their children⁶⁷. Feeding style lead to quality and quantity of micro and macronutrient intake for children. Feeding style depends on the family resources and type care givers by the gate keepers⁸. Ethnic Buginese is a very strong ethnic character in the economic field and the ability to survive anywhere, but others thins remains to height stunting prevalence across region their lives⁹¹⁰¹¹¹². Objectives of these studi to investigate nutritional stunting and feeding style for children in Bugineses ethnicity.

Research Method

The subjects of this study were obtained from Bugis Ethnic who live in Makassar Indonesia. The population is all mothers who have children aged 6-59 months in Makassar City. Criteria for inclusion of Buginese ethnic samples in Makassar City. (1) The mother is from the ethnic Bugis and the husband is also from the ethnic Bugis (2) Having children aged 6-59 Months in September 2019 ; Have lived for at least the past 6 months in Makassar City, willing to participate in this
research, mother comes from ethnic Bugis descent and husband is also Bugis descent. The sample size in this study is based on the estimated prevalence of stunting in Makassar City as a Bugis ethnic center that is 35.7%, using 80% power test with 95% confidence, design effects 1 and 5 with the addition of 10% additional data estimated not to participate in research this is because they refuse or are not present at the time of screening.

The questionnaire was tested using structured questions using official data on children aged 0-59 (age, gender, weight and height/length; parental occupation, education level and feeding style). Child’s weight is measured using electronic SECA scale with an accuracy of 0.1 kg and a length of the child (for children aged 0-23 months) or height (for children aged 24-59 months) was measured using high board/long local made with an accuracy of 0, 1 cm. SECA scales are calibrated every morning, before data collection, using a standard weight of 5 kg. Duplicate anthropometric measurements were carried out for 10% of the sample; the coefficient of variation in subjects from duplicate measurements in children and women is less than 5%. All enumerators receive training at least two days before data collection, and those responsible for taking anthropometric measurements receive one additional training day. Supervisors are tasked with supervising the work of enumerators and facilitating good relations with community members. Stunting is defined as Z-score for height Z-scores for age <−2 SD.

Statistical analyses used to exploratory factor of feeding style instrument by Kaiser Meyer-Olkin (KMO) Measures of Sampling Adequacy and Bartletts’s Test of Spericity.

Results

Demographic Characteristics

Table 1. Demographic Characteristics of Buginese Ethnicity Families

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Categories</th>
<th>Mother</th>
<th></th>
<th>Father</th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Occupation</td>
<td>Officials Goverment</td>
<td>7</td>
<td>2.3</td>
<td>17</td>
<td>5.7</td>
</tr>
<tr>
<td></td>
<td>Private employee</td>
<td>33</td>
<td>11.0</td>
<td>168</td>
<td>56.5</td>
</tr>
<tr>
<td></td>
<td>Labor/internship</td>
<td>9</td>
<td>3.0</td>
<td>100</td>
<td>32.7</td>
</tr>
<tr>
<td></td>
<td>Housewife</td>
<td>249</td>
<td>83.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>others</td>
<td>3</td>
<td>1.0</td>
<td>4</td>
<td>2.3</td>
</tr>
<tr>
<td>Education</td>
<td>0-6 years</td>
<td>32</td>
<td>10.6</td>
<td>33</td>
<td>11.1</td>
</tr>
<tr>
<td></td>
<td>7-12 years</td>
<td>214</td>
<td>71.4</td>
<td>211</td>
<td>70.3</td>
</tr>
<tr>
<td></td>
<td>College</td>
<td>54</td>
<td>18.0</td>
<td>56</td>
<td>18.7</td>
</tr>
</tbody>
</table>

Based on the results of this research it is known that the main occupation of mothers is as housewives as many as 249 people (83.3%), Father’s occupation is as a private employee and laborer, 168 (56.5%).
Distribution of Stunting Children on Ethnic Bugis

Table 2. Distribution of Buginese Ethnic Stunting Children

<table>
<thead>
<tr>
<th>Status</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stunting</td>
<td>68</td>
<td>22.7</td>
</tr>
<tr>
<td>Normal</td>
<td>232</td>
<td>77.3</td>
</tr>
<tr>
<td>Total</td>
<td>300</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Based on the results of this study it is known that the percentage of stunted children in the Bugis ethnic group in Makassar City is 22.7%.

Style of Child Feeding Ethnic Bugis

The style of child feeding of ethnic Bugis in this study was originally designed in 18 question items. Based on all of these items later, a confirmation analysis of the indicators was carried out and the results left 16 realiable question items. The factor analysis is carried out to group the parenting style variables into the parenting style groups according to the Buginese ethical practice. Based on the results of the factor analysis, then four groups of parenting styles on child feeding of Bugineses ethnicity. In accordance with the terms in the previous study of parenting style, there are four types, namely (1) indulge (2) Authoritative (3) Uninvolved and ( 4 ) Authoritarian. Variable style parenting based on the four types above are as follows:

Parenting style indulgence has the characteristic features as follows (1) giving opportunities for children to choose which foods he will eat (2) Not specify how many snacks should be eaten children (3) giving opportunities for children to try foods that have not been he has ever felt (4) Letting the child do anything in his food when he eats (5) If the child, is bored with certain foods, offers other foods (6) the child’s food is the same type of side dish as family food and (7) The family has eating habits, mealtime. Authoritative parenting style has several main characteristics namely ; (1) Encourage the child to eat food (2) If the child has wrong eating habits, then forbid it (3) Encourage the child to enjoy his food.

Uninvolved parenting style has characteristics (1) Providing interesting food for children, (2) If the child is sad, he entertains with food (3) Provides something to the child, if he has good eating habits. The authoritarian parenting style is characterized by feeding the child after the father eats.

Discussion

The prevalence of stunting children in Buginese ethnicity is 22.7%, where this percentage is still above the threshold set by WHO as a threshold for health problems with a prevalence of <20%. Based on these parameters, it can be proven that the ethnic Bugis made a significant contribution to the percentage of stunting in South Sulawesi in 2018. South Sulawesi Province ranks fourth in the highest percentage of stunting in Indonesia. Various factors were analyzed in this study by the conceptual framework published by Unicef in 2006.13,14 Based on the concept map of the occurrence of stunting compiled by Unicef 2006 consists of several factors that affect stunting, namely household and family factors, child factors and complementary foods for breastfeeding, breastfeeding factors, hygiene sanitation factors, infectious disease factors, health-seeking behavior, parenting feeding style or style of care for child feeding, and caring practices or stimulation of child development. All of these variables are included in the scheme of the conceptual framework of determinants of global stunting factors15,16 In this study, an analysis of risk factors is by the empirical evidence in the city of Makassar, especially in the ethnic Bugis.

Household and family factors in this study were tested with child stunting status and it is known that the mother’s age, father’s age, mother’s education, and father’s education did not have a significant effect on stunting of children under five. The number of family members and the number of children under five in one household as an economic burden variable also does not consistently affect stunting. In this study, several variables cannot be proven except for the work status of parents. Permanent employment with wages that can meet food and clothing needs is a protective factor while other jobs are a risk factor. This proves that the father’s work status has a very strong influence on the incidence of child stunting.

Factors child and complementary feeding breast milk in this study were tested against the risk of stunting and discovered some facts that status pre-lacteal feeding...
did not affect stunting, as well as several other variables; child food forms, frequency of eating, who makes food for children, who feeds children. All of these variables do not differentiate a child’s height status. The only variable that is very influential today is the child’s appetite as a protective factor.

Feeding Style is one of the variables that have a risk of stunting. This study has grouped ethnic Bugis childcare styles into four categories. This category is based on the same study in Turkey on Feeding Style by Sibel Oztruk, 2018\(^ {17}\). The study in Turkey took the location of the Turkic ethnic group with 19 items that had been tested for validity and reliability. The condition of Indonesia, especially the buginese ethnicity, is culturally different from Turkey, so this study carried out modifications and adjustments to the context of Indonesian culture in general and specifically the Bugis culture. Parenting style indulgence has the characteristic features as follows: (1) giving opportunities for children to choose which foods he will eat (2) Not specify how many snacks should be eaten children (3) giving opportunities for children to try foods that have not been he has ever felt (4) Letting the child do anything in his food when he eats (5) If the child, is bored with certain foods, offers other foods (6) the child’s food is the same type of side dish as family food and (7) The family has eating habits, mealtime\(^ {18,19}\).

**Authoritative** parenting style has several main characteristics namely ; (1) Encourage the child to eat food (2) If the child has wrong eating habits, then forbid it (3) Encourage the child to enjoy his food (4) avoid himself or process his child’s food Parenting style uninvolved own traits - traits (1) M giving eat interesting for children, (2) If the child was sad, he entertained with food (3) giving something to the child if he has good eating habits. The **authoritarian** parenting style is characterized by feeding the child after the father eats\(^ {20,21}\).

Caring practice or social psycho stimulation in this study, shows the maximum parameters ranging from play opportunities, time together with children, play equipment, gross motor exercises, and fine motor skills. This fact proves that the exposure to social psycho stimulation in children is homogeneous in all subjects so that its effects on population stunting cannot be known. This study found no strong evidence that caring practice is a risk factor for stunting\(^ {22,23,24,25}\).

**Conclusion**

The percentage of stunted children with ethnic Bugis as much as 22.7%. The way of feeding Buginese ethnic children is consisting of four groups namely caring (indulgent), compromise (authoritative), free (uninvolved) and completely regulating (authoritarian).

**Conflict-of-Interest Statement:** Between subjects and researchers there is no conflict of interest.

**Source of Funding:** This research received funding from the government of the Republic of Indonesia Ministry of Health, a foreign cooperation research scheme.

**Ethical Clearance :** Research ethics number 1123/KEPK-PTKMKS/X/ 2019 obtained from the Makassar Health Polytechnic Research ethics committee.

**References**


Renal Protective Effects of Gamma-Mangostin in Streptozotocin-Induced Diabetic Mice

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Abstract

This study was aimed to investigate the ability of gamma-mangostin to reduce plasma blood urea nitrogen (BUN) and creatinine and ameliorates the impaired renal proximal tubular cells in diabetic mice. Antioxidant assay was conducted by using male BALB/c mice. Mice were divided into two groups, they were normal control (KN) and streptozotocin-induced diabetic mice. Streptozotocin (STZ) induction was performed using multiple low-dose of 30 mg/kg body weight injected for five consecutive days. Diabetic mice have divided into three subgroups; diabetic control (KD), diabetic mice treated with acarbose (KA), and diabetic mice treated with gamma-mangostin. The gamma-mangostin treatment group was categorized based on the dose given; P1 (1 mg/kg BW), P2 (2 mg/kg BW), and P3 (4 mg/kg BW). Interestingly, gamma-mangostin administration was found to be able to lower plasma BUN and creatinine and ameliorate the impaired renal proximal tubular cells in diabetic mice significantly. Therefore, gamma-mangostin has demonstrated high antioxidant activity. The proof suggests that gamma-mangostin is a lead compound candidate for clinical management or prevent diabetes mellitus.

Keywords: antioxidant activity, diabetes mellitus, gamma-mangostin.

Introduction

Diabetes mellitus (DM) is a multifactorial disease characterized by a chronic hyperglycemia syndrome and an impaired metabolism of carbohydrates, fats, and proteins caused by insulin secretion insufficiency and endogenous insulin activity. Insulin insufficiency can occur due to a body’s cells irresponsiveness to insulin caused by the impaired insulin production in Langerhans beta cells of the pancreatic gland[¹,²]. Indonesia is currently the sixth biggest DM patients in the world, which is 5.8% of its population or around 10 million people. The number of DM patients at the national and international levels from year to year continues to increase[³]. Type-2 DM is the most common type of DM in Indonesia. Type-2 DM is caused by a decrease in the insulin sensitivity or an increase in the insulin resistance[², ⁴].

Hyperglycemia is a condition of the increasing blood glucose levels above normal due to insulin deficiency, damage of beta cells, and the presence of insulin resistance in the liver and muscles. Chronic hyperglycemia in DM has an important role in various organs damages including the heart, eyes, bones, kidneys, liver, nerves, and vascular system, which can cause complications in the body system. Complications
of DM are associated with non-enzymatic glycation reactions in the hyperglycemia called glycosylation. Glycosylation is a reaction that occurs between protein and glucose at high concentrations, this reaction is also called the Maillard reaction. Maillard reactions form an advanced glycation end products (AGEs) and advanced oxidation protein products (AOPP) which show an oxidative stress that disrupts the balance of oxidants and antioxidants in the body resulting in an increase in free radicals\[5,6,7\].

Antioxidants are substances that inhibit the negative effects of free radicals by giving the electrons so that the damage of lipids, cell membranes, blood vessels, DNA, and others caused by the reactive compounds such as ROS could be prevented\[8\]. To reduce the adverse effects of these free radicals, exogenous antioxidants are needed, such as vitamin E, vitamin C, and other antioxidants obtained from consuming various types of fruits and vegetables that contain high antioxidants. One of them is gamma-mangostin\[1\]. The gamma-mangostin compound is a pigment from \textit{Garcinia mangostana} which is able to donate hydrogen atoms and stabilize free radicals in resonance. In addition to neutralizing free radicals, these antioxidants are expected to reduce the oxidative stress, especially in various affected cells due to the prolonged hyperglycemic conditions, such as hepatocytes and renal proximal tubular cells\[4,6,7,8\]. Thus, this study was designed to answer the problem of whether the administration of gamma-mangostin can reduce BUN levels and blood plasma creatinine as well as repair the renal proximal tubular cells damage in diabetic mice.

**Materials and Method**

This experimental study was conducted at the Animal Laboratory and Animal Histology Laboratory, Faculty of Science and Technology, Universitas Airlangga and also at the Institute of Tropical Diseases (ITD), Universitas Airlangga. The used sample was adult male mice, strain BALB/C, 3-4 months old, weight ranged from 25-40 g. The study materials consisted of gamma-mangostin (purchased from Sigma). Other materials consisted of streptozotocin (purchased from Sigma), buffer citrate solution pH 4.5, and phosphate-buffered saline (PBS), solvent extract of carboxymethylcellulose (CMC), standard antidiabetic drug (Acarbose, 100 mg/kg body weight), ketamine hydrochloride/xyazine hydrochloride (purchased from Sigma), and D-glucose (purchased from Sigma)\[7\].

The study samples consisted of 24 male mice, distributed to the normal control group (KN) and the diabetic group which was induced by STZ. The grouping of experimental animals was performed as follows; non-diabetic mice were used as normal control group (KN), diabetic mice which were induced by STZ were divided into two control groups; they were diabetic control group (KD), diabetic control group which were given Acarbose of dose 100 mg/kg body weight (KA), and, the last one was gamma-mangostin treatment group. Furthermore, the gamma-mangostin treatment group was divided into 3 subgroups in which the treatment group 1 (P1) was given 1 mg/kg body weight gamma-mangostin, group 2 (P2) was given 2 mg/kg body weight gamma-mangostin, and group 3 (P3) given was 4 mg/kg body weight gamma-mangostin. Each group consisted of 4 mice and those treatments were administered for 14 days\[7\].

Blood glucose of diabetic mice was measured on 1st, 7th, and 14th day after gamma-mangostin treatment to make sure the mice were successfully in the hyperglycemic condition. On the 15th day, blood was taken from the intracardial and the measurement of BUN and blood plasma creatinine were done using Pentra C200 (Horiba Medical) in 510 nm wavelength. The damage on the kidney structure was determined from the histological sections stained with hematoxylin-eosin (HE). Furthermore, data with normal distribution and homogenous variation was analyzed using one-way variance analysis continued by Duncan test. Data with normal distribution and non-homogenous variation was analyzed using Brown Forsythe test continued with a t-test. All statistical test was conducted at $\alpha = 0.05$.

**Results**

The mean of mice’s blood glucose level before and after the STZ induction are presented in Figure 1. The data of BUN and creatinine level is presented in Figure 2. The mean data of swollen cells and necrotic cells in renal proximal tubules is shown in Figure 3. Photomicrographs of renal proximal tubular cells are presented in Figure 4.
Figure 1. Fasting blood glucose (mg/dL) before and after STZ induction. The different letter indicated a significant difference.

Figure 2. BUN and creatinine level changes in each mice group after treatments. The different letters indicated a significant difference.

Figure 3. The renal proximal tubular cells damage of each mice groups after treatments. The different
letters indicated a significant difference.

Figure 4. Histological structure of renal proximal tubular cells of mice after gamma-mangostin treatment.

N = normal cell, CS = swollen cell, Ne = necrotic cell. Bar: 100 µm.

Discussion

A condition of hyperglycemia in patients with DM causes a glucose autoxidation, resulting in the activation of protein kinase C, protein glycation, and the activation of the polyol metabolic pathway which further accelerates the formation of ROS or the oxidative stress conditions. The presence of ROS causes free radicals in the body to increase. Free radicals can damage the structure and function of various body tissues, one of them is the kidney tissue[9,10]. In patients with DM, the condition of hyperglycemia causes an increase in the production of ROS and RNS due to the increased oxidation of NADPH on endothelial tissue. ROS and RNS are highly reactive molecules that can directly oxidize and damage DNA, proteins, lipids, and cause an oxidative stress. An oxidative stress occurs when there is an imbalance between the number of highly reactive molecules (ROS and RNS) and the existing antioxidants[4, 6].

STZ is a free radical that can increase ROS and RNS, very reactive, especially for hepatocytes and renal tubule cells. In the group of mice induced by STZ, it showed an increase in BUN levels and plasma creatinine in the diabetic control group (KD). KD was significantly different from the normal control group (KN), KM, P1, P2 or P3. This is because the diabetic condition triggers the formation of ROS through the glucose autoxidation pathway, the formation of advanced glycation end products (AGEs), and the polyol pathway mechanism. ROS can trigger lipid peroxidation in the cell membranes and cause damage to these cells. Free radicals can cause lipid peroxidation, which can damage the structure of cell membranes, and damage to the structure and function of renal proximal tubular cells which is characterized by the increased BUN and plasma creatinine levels in the diabetic control group compared to the KN, KM, P1, P2, and P3. The data analysis on BUN and creatinine levels showed that the average BUN in the diabetic group was significantly different compared to KN, KM, P1, P2, and P3. This indicated that the injection of multiple low-dose STZ was able to significantly increase the plasma BUN levels and creatinine plasma levels. The plasma creatinine levels of diabetic group also showed the significant differences compared to KN, KM, P1, P2, and P3.

The kidneys are organs that play a role in regulating the body’s balance, maintaining body fluids, and regulating the disposal of metabolic waste and toxic substances such as urea, uric acid, ammonia, creatinine, inorganic salts, as well as the drugs that are not needed by the body[8]. BUN and creatinine are urea protein and creatine metabolites which are excreted through glomerular filtration and are actively secreted by the proximal renal tubules[11]. A damage to the kidney’s proximal tubular cells of the kidney is an indicator of disease progression. BUN and creatinine excretion
are the results of two physiological processes, namely glomerular filtration and proximal renal tubular secretion. If there is a disruption in BUN and creatinine secretion by the proximal renal tubules, then BUN and plasma creatinine levels will increase[12].

Creatinine excretion in the kidneys is relatively constant and is not affected by outside factors. Creatinine is an effective indicator of kidney damage because creatinine levels in the blood are more stable[8]. The increased creatinine levels in the blood can be caused by kidney damage mainly due to glomerular filtration disorders, acute tubular necrosis, glomerulonephritis or the damage to glomeruli and tubular apoptosis[13,14]. Normal plasma creatinine levels in mice (Mus musculus) are 0.2 to 0.9 mg/dL[8]. The results of research conducted by Husen et al.[15] showed that diabetic mice that had been injected with STZ experiencing an increase in the serum creatinine levels compared to the normal group. This is due to the result of kidney’s histology structural damage that occurs in the diabetic mice which causes the kidney’s work in eliminating creatinine is disrupted.

STZ is capable of generating a reactive oxygen which has an important role in cell damage[16,17]. ROS and RNS can interfere the physiological function of a tissue and then cause a kidney damage[6,8]. Lee et al.[18] stated that an increase in ROS and proinflammatory cytokines play an important role in the damage of glomeruli, tubules and blood vessels. The results of research from Zafar et al.[19] stated that diabetic Rattus norvegicus mice were injected with single dose STZ at a dose of 45 mg/kg of body weight can cause tubular necrosis, glomerulosclerosis, tubular atrophy, and thickening of the glomerular membrane. Other studies conducted by Hou et al.[20] found that an increase in BUN and creatinine levels in the diabetic group indicates the damage to kidneys. The biochemical parameters correlate with the renal histology studies. STZ causes a significant damage of kidney histological structure, including glomerulus and tubules. Thus, STZ injection is able to interfere in the structure and function of renal tubular epithelial cells.

The kidneys are not dependent on insulin for glucose absorption, so an increase in blood glucose levels in a diabetic condition will produce a high glucose at the intracellular level and could cause a severe and sustained hyperglycemia. Increasing the amount of glucose filtered by the glomeruli under hyperglycemia conditions will increase the workload of renal proximal tubular cells. In addition, the proximal tubular cells cannot reduce the glucose transport levels to prevent excess intracellular glucose in hyperglycemia. Excessive glucose uptake to the proximal tubule can inhibit the reabsorption and secretion in proximal tubular, thus, the creatinine levels increase[21]. Mohora et al.[5] states that hyperglycemia conditions can cause glucose metabolism disorders, as well as the direct reactions to other molecules in the cell which lead to the high formation of body’s oxidants. This condition heads to an oxidative stress, which is a condition where there is an increase in the production of oxidants in the body, while the endogenous antioxidants which play a role in neutralizing the oxidant’s performance are disrupted. This is supported by Winiarska et al.[22] which states that hyperglycemia is associated with the increased ROS production and oxidative stress condition which perform a key role in the pathogenesis of this disorder. In addition, study conducted by Li et al.[23] stated that PKC activation can induce the renal tubular epithelial cell damage.

Conclusion

Interestingly, gamma-mangostin administration was found to be able to lower plasma BUN and creatinine and ameliorate the impaired renal proximal tubular cells in diabetic mice significantly. Therefore, gamma-mangostin has demonstrated high antioxidant activity. The proof suggests that gamma-mangostin is a lead compound candidate for clinical management or prevent DM.

Conflict of Interest : The authors declare that they have no conflict of interest.

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Ethical Approval: This study was approved by the Animal Care and Use Committee, Faculty of Veterinary Medicine, Universitas Airlangga, Surabaya, Indonesia.
References


Complementary Feeding Practices Influences of Stunting Children in Buginese Ethnicity

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Abstract

Background. Breast milk and complementary foods are very influential variables in the nutritional status of children. The purpose of this study was to determine the risk factors for stunting in the Bugis ethnic group in Makassar based on breastfeeding factors, complementary foods for breast milk

Method. There is a cross-sectional study in this study. The sample size in this research was 300 subjects in Makassar City. Enumerators in this study were students of the Applied Nutrition & Dietetic Bachelor Program in the Nutrition Department of the Health Polytechnic Makassar, Indonesia, and the Nutrition Department Students at Science University Management. Research ethics was obtained at the Makassar Health Polytechnic Ethics Commission. Stunting risk factor data analysis with logistic regression test. Reliability and validity analysis of Bugis ethnic feeding style care with explanatory factor analysis, and Content Validity. Confirmatory factor analysis with Bartlett’s and The KMO Coefficient.

The results of the study note that the risk factor for stunting is a child factor that is good appetite being a protective variable with a significance value of \( p = 0.000 \), OR 0.289 (0.185-0.480). Factors for breastfeeding (frequency of breastfeeding), \( p = 0.013 \), OR 1.99 (1.148-3.173). The conclusion is that the risk factor for stunting is breastfeeding. The suggestion is that education about good breastfeeding practices among ethnic Bugis caregivers needs to be done at the family level.

Key Words: Feeding Practices, Stunting, Buginese.

Introduction

Stunting prevalence data collected by the World Health Organization (WHO), Indonesia is included in the third country with the highest prevalence in the Southeast Asia / South-East Asia Regional (SEAR) region. The average prevalence of stunting toddlers in Indonesia in 2005-2017 was 36.4%. The determinant factor of nutritional problems is multidimensional1,2,3,4.

Stunting, is a public health problem at all levels (National, Province, City), including Makassar City as a red zone area (prevalence> 40%) at the same time Makassar City is the largest Metropolitan city in Eastern Indonesia and the development center of eastern Indonesia5. Based on the results of the descriptive analysis above, nationally stunting is a very serious nutritional and health problem, because the trend has increased since the last five years 25.7% to 30.8% between 2013 and 2018. There has been an improvement for South Sulawesi and Makassar City by which is very slow with down from 40.9 to 35.7%5.
Inadequate complementary food for breast milk is a real phenomenon in urban communities in Makassar. The contributing factors are the lack of knowledge about complementary foods, and the work status of mothers outside the home so that they do not pay enough attention to eating children\(^{10,11,12}\).

Breastfeeding practice is also an interesting variable examined in this research because Indonesia’s experience in improving breastfeeding practices still needs to be improved. The challenge is marketing formula milk. Although there are regional regulations regarding the method for marketing formula milk, the results have not improved significantly\(^{13,14}\). The purpose of this study was to investigate the factors of breast milk and complementary foods for the stunting of children aged 0-59 months.

**Research Method**

The subjects of this study were obtained from Bugis Ethnic who live in Makassar City. The study sites were three Puskesmas working areas in the North of Makassar City. Tamalanrea Health Center, Health Center, Paccerakkang, and Sudiang Raya Health Center. The reason for choosing the northern area of the city is because the Bugis ethnic population inhabits the north of the city more than any other location. Criteria for inclusion of Buginese ethnic samples in Makassar City

1. The mother is from the ethnic Bugis and the husband is also from the ethnic Bugis
2. Having children aged 6-59 Months in September 2019
3. Have lived for at least the past 6 months in Makassar City
4. Willing to participate in this research

The sample size in this study is based on the estimated prevalence of stunting in Makassar City as a Bugis ethnic center that is 35.7%, using 80% power test with 95% confidence, design effects 1 and 5 with the addition of 10% additional data estimated not to participate in research. This is because they refuse or are not present at the time of screening. Based on the calculation results above, the sample size of 300 is determined. Data Collection

Data collection in this study uses a list of questions that have been tested with good reliability. The questionnaire uses structured questions which are tested using official data on children aged 0-59 months (mother’s data and household data). Data collected includes the child’s age, sex, weight and height/length; mother level, education level and participation in household decisions; breastfeeding practices, supplementary feeding. Child weight was measured using an electronic SECA scale with an accuracy of 0.1 kg and the length of the child (for children aged 0-23 months) or height (for children aged 24-59 months) was measured using a locally made height/length board with an accuracy of 0, 1 cm. SECA scales are calibrated every morning, before data collection, using a standard weight of 5 kg. All enumerators receive training at least two days before data collection, and those responsible for taking anthropometric measurements receive one additional training day. Supervisors are tasked with supervising the work of enumerators and facilitating good relations with community members. Stunting is defined as Z-score for height \(<<2\). The HAZ -core matches 2006 WHO growth standards.

**Results**

**Demographic Characteristics**

<table>
<thead>
<tr>
<th>Demografi</th>
<th>Categories</th>
<th>Mother</th>
<th></th>
<th>Father</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupation</td>
<td>Officials government</td>
<td>7</td>
<td>2,3</td>
<td>17</td>
<td>5,7</td>
</tr>
<tr>
<td></td>
<td>non officials goverment</td>
<td>293</td>
<td>97,7</td>
<td>283</td>
<td>94,3</td>
</tr>
<tr>
<td>Education</td>
<td>0-9 years</td>
<td>79</td>
<td>26,3</td>
<td>98</td>
<td>32,7</td>
</tr>
<tr>
<td></td>
<td>10-15 years</td>
<td>221</td>
<td>73,7</td>
<td>202</td>
<td>67,3</td>
</tr>
</tbody>
</table>
Based on the results of this research it is known that the work of parents is not a civil servant and the education of parents is generally between 10-15 years.

Breastfeeding Factors

The complementary breastfeeding factors in this research are presented in Table 2

<table>
<thead>
<tr>
<th>Tabel 2. Complementary Feeding Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complementary Feeding</td>
</tr>
<tr>
<td>Prelactal food (n=300)</td>
</tr>
<tr>
<td>a. Yes</td>
</tr>
<tr>
<td>b. no</td>
</tr>
<tr>
<td>Food Consistency (n=300)</td>
</tr>
<tr>
<td>a. liquid</td>
</tr>
<tr>
<td>b. soft</td>
</tr>
<tr>
<td>c. semi-solid</td>
</tr>
<tr>
<td>d. solid</td>
</tr>
<tr>
<td>e. filter</td>
</tr>
<tr>
<td>Frequency (n=300)</td>
</tr>
<tr>
<td>a. 1-2 times</td>
</tr>
<tr>
<td>b. 3-4 times</td>
</tr>
<tr>
<td>c. &gt;4 times</td>
</tr>
<tr>
<td>d. No fixed</td>
</tr>
<tr>
<td>Feeding care givers n=300</td>
</tr>
<tr>
<td>a. Mothers</td>
</tr>
<tr>
<td>b. babysitter</td>
</tr>
<tr>
<td>c. Fathers</td>
</tr>
<tr>
<td>d. grandmothers</td>
</tr>
<tr>
<td>e. commercial food</td>
</tr>
<tr>
<td>Feed the Children (n=300)</td>
</tr>
<tr>
<td>a. Mothers</td>
</tr>
<tr>
<td>b. Babysitter</td>
</tr>
<tr>
<td>c. Fathers</td>
</tr>
<tr>
<td>d. grandmothers</td>
</tr>
<tr>
<td>Children’s appetite (n=300)</td>
</tr>
<tr>
<td>a. very good</td>
</tr>
<tr>
<td>b. good</td>
</tr>
<tr>
<td>c. not bad</td>
</tr>
</tbody>
</table>
Based on the results of data analysis, it was found that 69 children (23%) were given prelactal food, 227 people (75.7%) solid food forms, and 3-4 times the frequency of feeding, in general, was 182 times (60.7%), the main caregiver for children in feeding is 265 people (88.3%). The children were fed by mothers as many as 272 (90.7%), children’s tastes were generally good 144 people (48%) but found children whose appetite was lacking as many as 82 people (27.3%).

Stunting Determinant Analysis

The risk factor of stunting consisted of household factors, child factors and complementary feeding, breastfeeding factors, hygiene and sanitation, infectious diseases, child care, feeding style, and caring practices.

<table>
<thead>
<tr>
<th>Determinant factors</th>
<th>Variabel Code</th>
<th>P Value</th>
<th>OR **</th>
<th>95.0% C.I for EXP(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child characteristic and complementary feeding</td>
<td>Sex</td>
<td>.155</td>
<td>1.546</td>
<td>.848 2.821</td>
</tr>
<tr>
<td></td>
<td>Birth weight</td>
<td>.179</td>
<td>1.001</td>
<td>1.000 1.001</td>
</tr>
<tr>
<td></td>
<td>Birth Leangh</td>
<td>.477</td>
<td>1.033</td>
<td>.945 1.128</td>
</tr>
<tr>
<td></td>
<td>Prelactal</td>
<td>.319</td>
<td>1.424</td>
<td>.710 2.854</td>
</tr>
<tr>
<td></td>
<td>Food consistency</td>
<td>.551</td>
<td>1.121</td>
<td>.769 1.635</td>
</tr>
<tr>
<td></td>
<td>Food Frequency</td>
<td>.091</td>
<td>.694</td>
<td>.455 1.059</td>
</tr>
<tr>
<td></td>
<td>Feeding care Giver</td>
<td>.963</td>
<td>1.012</td>
<td>.601 1.704</td>
</tr>
<tr>
<td></td>
<td>Feed the children</td>
<td>.938</td>
<td>.978</td>
<td>.555 1.722</td>
</tr>
<tr>
<td></td>
<td>Children’s appetite</td>
<td>.000</td>
<td>.298</td>
<td>.185 .480</td>
</tr>
</tbody>
</table>

*) based on logistic regression analysis, with stunting as the dependent variable;

Based on the results of the risk factor analysis of various variables that influence stunting is that the child factor is good appetite being a protective variable with a significance value of $p = 0.000$, $OR=0.289$ (0.185-0.480). In reference to the standard appetite, then a good appetite becomes protective against stunting. This means that children whose appetite improves can avoid stunting, while normal appetite or no appetite will cause children to risk stunting.

Discussions

Based on these parameters, it can be proven that ethnic Bugis contributed significantly to the percentage of stunting in South Sulawesi in 2018. South Sulawesi Province ranks fourth in the highest percentage of stunting in Indonesia. Various factors were analyzed in this study in accordance with the conceptual framework published by Unicef in 2006.

Based on the concept map of the occurrence of stunting compiled by Unicef 2006 consists of several factors that affect stunting, namely household and family factors, child factors and complementary foods for breastfeeding, breastfeeding factors, hygiene sanitation factors, infectious disease factors, health-seeking behavior, parenting feeding style or style of care for child feeding, and caring practices or stimulation of child development. All of these variables are included in the scheme of the conceptual framework of determinants of global stunting factors 7,15, 16, 17, 25, 26, 31.

Household factors and toddlers’ families are the closest factors to children where exposure to these
factors will greatly determine the nutritional status of children including height status. Theoretically, the concept can be easily understood as a very logical causal relationship. Household and family factors in this study were tested with child stunting status and it is known that the mother’s age, father’s age, mother’s education, and father’s education had no significant effect on the stunting of children under five. The number of family members and the number of children under five in one household as an economic burden variable also does not consistently affect stunting. In this study, several variables cannot be proven except for the occupational status of parents. Permanent employment with wages that are able to meet food and clothing needs is a protective factor while other jobs are a risk factor. This proves that the father’s work status has a very strong influence on the incidence of child stunting\textsuperscript{18,31}.

Child and breast milk supplementary factors in this study tested the risk of stunting and found several facts, namely the status of prelactal feeding does not affect stunting, as well as several other variables; child food forms, frequency of eating, who makes food for children, who feeds children. All of these variables do not clearly differentiate a child’s height status. The only variable that is very influential today is the child’s appetite as a protective factor\textsuperscript{20,31}.

The poor appetite of children at risk of stunting and vice versa good appetite, causing children to avoid stunting. Based on these results it can clearly be used as a recommendation that efforts to provide foods that children like or provide ways to improve children’s appetite are key points. Many factors affect a child’s appetite. Mealtime, type of food, and calorie content of food give different dynamics in each child to the quality and quantity of macro and micronutrient intake

The breastfeeding factor theoretically determines the quality of macro and micronutrient intake, especially in the period of 1000 HPK. If the support of maximum breastfeeding, the child’s height will be normal and vice versa. This is due to many biological and psychological beneficial factors obtained by breastfed children compared to children who are not breastfed. This study examined the variable breastfeeding factors and found that the frequency of breastfeeding became a risk factor for stunting. The reference used is breastfeeding $>12$ times in 24 hours and frequencies lower than that are at risk for stunting. This proves that in the period of breastfeeding which is the age of 0-24 months, it is important to breastfeed properly with the right frequency\textsuperscript{31}.

**Conclusion**

Complementary feeding factors for buginese ethnic is that the child’s appetite is an important factor. The better the child’s appetite, the more avoiding stunting. Strengthening of mothers’ groups to improve the quality of breastfeeding practices and children’s food culinary education. Provision of employment opportunities for fathers through related sectors.

**Conflict-of-Interest Statement :** Between subjects and researchers there is no conflict of interest.

**Source of Funding:** This research was funded by the Republic of Indonesia government Ministry of Health.

**Ethical Clearance :** Research ethics were obtained from the Health Ministry Ethics Health Research Ethics committee Makassar No. 1123/KEPK-PTKMKS/X/2019.

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Effect of Purified prodigiosin from *Serratia Marcescens* on the Inhibition of Breast Cancer (MCF-7 and CAL-51 Cell Line)

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Abstract

The prodigiosin pigment was extracted from *Serratia marcescens* bacteria by using different methods such as by using ethyl acetate and acetone and purified by using column chromatography, Detection and characterization of the pigment was done by using Thin layer chromatography and λ max, The purified Prodigiosin was dissolved in DMSO solvent and prepared in four concentration (1000, 500, 250, 125) µg/ml at exposure time 24 hrs so it was used in treating MCF-7 and CAL-51 cell line, the result showed that the inhibition ratio against MCF-7 was significant (p < 0.001) and maximum ratio of inhibition was 83% at conc. of 1000 µg/ml, 78% at 500 µg/ml, 73% at 250 µg/ml and 72% at 125 µg/ml while inhibition ratio against CAL-51 was also significant (p < 0.001) and 78% inhibition ratio was seen at conc. of 1000 µg/ml, 61% at 500 µg/ml, 27% at 250 µg/ml and 14% at 125 µg/ml, effect of the solvent DMSO on tumor cells also was studied and compared to the effect of prodigiosin and result showed that there was no effect or slightly effect of the solvent DMSO on MCF-7 tumor cells. (Inhibition was 6%, 13%, 16%, 22% for conc. 125, 250, 500, 1000 µg/ml respectively) also there was no effect or slightly effect of the solvent DMSO on tumor CAL-51 cells. (Inhibition was 2%, 8%, 21%, 26% for conc. 125, 250, 500, 1000 µg/ml respectively).

Keywords: Prodigiosin, MCF-7, CAL-51, DMSO, λ max

Introduction

* Serratia marcescens are pigmented and produce the red pigment, so the organism has been regarded in medical laboratory experiments as nonpathogenic bacteria (¹), Prodigiosin, is a group of natural red pigments, the scientist who first gave the name Prodigiosin to the red pigment produced by *Serratia spp.* was Kraft in 1902, after his successes in extraction of pigment from this bacteria (²), This pigment is a promising drug therapy due to its reported characteristic of having ant metastatic (³), anti-proliferative and immunosuppressive activit (⁴), Prodigiosin pigment induces apoptosis in hematopoietic cancer cells with no marked toxicity in benign cells (⁵), and has cytotoxicity effects on cancer cell and induces apoptosis in HT-29 and T47D cancer cell lines (⁶), it also induces cell death and morphological changes which is a clear signal of apoptosis in gastric cancer cell line HGT-1 (⁷), which increase the possibility of its therapeutic application as an antineoplastic drug. Prodigiosin appear its content of anticancer compounds (⁸), Prodigiosin pigment was regarded as anticancer agent (⁹), the effect of this pigment was studied on many tumor cell line, the main aspect of this pigment is that its inhibitor effect appears on tumor cells only while not effected normal cells, by its effect on cell cycle arrest and induce programmed cell death that’s the cause behind its use as treatment for tumor cells (¹⁰).

This study aimed to investigate the cytotoxicity effect of prodigiosin pigment on two breast cancer cell line MCF-7 and CAL-51.

Materials and Method

The selected isolate of *S. marcescens*, which isolated and identified in college of science-Mustansiriyah University was inoculated into 250ml flasks containing 50ml of peptone glycerol broth, (pH=8). The culture was incubated at 30 °C for 72 hrs with shaking (160 rpm), and then centrifuged at 10000 rpm for 15 minutes. The
resulting supernatant was taken and ethyl acetate was added in equal volume of the supernatant. The resulting pellet was re suspended in 1 ml of acetone in percentage 1:1 (W/V) and mixed gently. Then it was transferred into small tube to mix with the previously supernatant and concentrated in incubator at 40 °C for 24 hrs. The extract was sterilized using membrane filter (0.22 µm) and stored at 4 °C until purification step (11).

Purification of Prodigiosin by column chromatography

After extraction of prodigiosin by ethyl acetate and acetone from S. marcescens (SKT14) isolate the pigment purified by using column chromatography. The crude extract was dissolved in ethyl acetate and subjected to silica gel (20gm, Merck) column chromatography (2.5×17 cm). The colored fractions were eluted with ethyl acetate, and the individual fractions were evaporated to dryness. Because of the light sensitivity of the pigments, all further purification steps were carried out in the dark. The fraction 7ml were collected and assayed for absorbance at 535nm. The purified pigment was stored at -20 °C. The Prodigiosin peak fraction was pooled and dried at 40 °C to assay pigment concentration (12).

Pigment detection by using thin layer chromatography (TLC)

The TLC plates of silica gel (20×20cm) were used, the developing solvent which contains ethyl acetate. Chloroform and acetone (65:30:5) was standardized and poured into the chromatography tank, that was saturated with a mobile phase. The sample was spotted about 1 cm from the margin of silica sheet then the strip was kept in oven for 5 minutes for drying. then allowed to run up to 3/4th of the gel about 16 cm. After that, the strip was observed under U.V. light for spot observation. The Rf value of chromatography was observed in the TLC plates. The isolated prodigiosin was estimated using the following equation:

\[ R_f = \frac{\text{Distance of sample}}{\text{Distance of mobile phase}} \]

Pigment spot was scraped and dissolved in 5ml of methanol and centrifuged (6000 rpm for 15 minutes) to get rid of silica gel residue. Then measured the optical density at wave length range 200-700 nm and methanol was used as blank.

The purified pigment was stored in clean sterile glass tube and covered with aluminum paper away from direct light exposure at 4 °C (13).

**Determination of λ_max of prodigiosin at different optical density**

The pigment was analyzed for maximum UV–vis absorbance at pH values of 2 and 9 between 200 and 700 nm, using ethyl acetate as blank. The absorbance of pigment at different wavelength and λ max was calculated (14).

**Cell line preparation**

Two type of cell line were using included MCF7 cell line, this line was used from 170 passage, Primary tumor (invasive breast ductal carcinoma that originate from pleural effusion (11). Estrogen receptors present (12), and taken from Iraqi center for medical genetics and cancer research. This line was outgrown in RPMI-1640 supplemented with 10% Fetal calf serum, When single monolayer was formed these cells was treated with Trypsin/Versin solution to divide it into another secondary cell culture. other cell line was CAL- 51 cell line , this line was used from 210 passage, is a new mammary adenocarcinoma cell line derived from the malignant pleural effusion of a patient women with metastatic breast cancer. and taken from Iraqi center for medical genetics and cancer research.

**Cancer cell line**

**Development and growth of cancer cells**

The effect of prodigiosin pigment on cancer cells was done by using two cell lines. In special culture medium in tissue culture falcon 25 cm² at temp. 37 °C, when the confluent monolayer was get Subculture was done by disposal from old culture medium and washing the cells by 2-3 ml of Trypsin/versene solution (Sterilizer and warm) So that it covers the surface of the cells when falcon was put in horizontal mode with shaking gently for 10-15 min. and disposal from it and replace it by another 2 ml from the same solution and falcon was incubated at 37°C for 3-5 min. Then new culture medium was added in quantity about 10-15 ml with homogenization of the cells by mixing with the new medium then cells suspension was distributed in two falcons of the tissue culture falcons in 25 cm size and 5-7 ml in each falcon (15).
Seeding (Cell culture)

Micro titer plates with 96 well were used for cancer cells culture which was obtained after formation of cancer cells monolayer and remove them from falcon surfaces and dismantled by T/V solution, after that completely nutrient culture medium supported by serum (20ml) and incubated at 37°C was added and cells was well mixed with medium, then 0.2 ml was transferred from cells suspension by pipette from each well, every well contain not less than 1x10^5 cell, plate surface was covered with sterilized transparent adhesive paper, then micro titer plate was moved gently stirred and incubated at 37°C over night to allow cells attachment and its growth.

Treatment of cancer cell line by prodigiosin

Serial of half dilutions was prepared to get concentration (125, 250, 500, 1000) μg/ml dissolved in DMSO, culture medium was poured out from the well of falcons after removing of transparent adhesive paper, then 0.2 ml/well from each conc. was added about 3 well per each conc. and one column of wells regarded as negative control by adding 0.2 ml of RPMI free of serum. All plates were incubated at 37°C, Exposure time was 24 hrs only except for plate of Rat Embryo Fibroblast (REF) Exposure time was 72 hrs, after that all plate wells content was poured out and 0.1 ml of crystal violet solutions was added to all wells of the plates, then all plates was incubated at 37°C for 30 minutes. Crystal violet was then poured out then washed by distilled water and turned over and allowed to dryness at room temp. Then O.D was recorded at 492 nm by using ELISA micro plate spectrophotometer and inhibition rate (IR) percentage was calculated as the following equation:

\[
\% \text{Inhibition rate} = \frac{O.D \text{ control} - O.D \text{ test}}{O.D \text{ control}}
\]

Results and Discussion

1. Detection of prodigiosin pigment by Thin layer chromatography (TLC)

Thin layer chromatography method regard the earliest procedure used for detection and also for purification of prodigiosin, it regard as general method for purify of secondary metabolites products.

During Purification of pigment from S. marcescens SKT14, R_f was calculated and the result was about 0.67 as shown in (Figure 1) this result was agree with the result of some researcher which pointed out that the distance between the movement of spot sample to the distance of spot solvent movement was 0.65, while other studies pointed out the R_f was ranged from 0.9-0.95.

Figure 1: Separation and detection of prodigiosin pigment (Purified) from S. marcescens SKT14 isolate using thin layer chromatography (TLC).

2. Determine the λ max (U.V Absorption of prodigiosin at different optical density)

The maximum absorption of prodigiosin at different wave length ranged from (200-700)nm, Figure 2 and Table 1 showed two peak of absorbance (535,539nm), maximum absorbance was at the wave length 539nm at pH values 2 and the color was red, while drop in absorbance was found at pH 9 at 400nm and color was yellow. (p < 0.001).

Figure 2: Determination the Lambda max U.V of prodigiosin
Table 1: lambda max U.V of prodigiosin pigment

<table>
<thead>
<tr>
<th>O.D 200-700nm</th>
<th>U.V Abs pH=2 Mean±SD</th>
<th>U.V Abs pH=9 Mean±SD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>0.17±0.02 e</td>
<td>1.02±0.03 a</td>
<td>0.000</td>
</tr>
<tr>
<td>300</td>
<td>0.31±0.02 d</td>
<td>0.9±0.04 b</td>
<td>0.000</td>
</tr>
<tr>
<td>400</td>
<td>0.54±0.04 c</td>
<td>0.29±0.020 c</td>
<td>0.000</td>
</tr>
<tr>
<td>500</td>
<td>1.08±0.001 b</td>
<td>0.25±0.005 c</td>
<td>0.000</td>
</tr>
<tr>
<td>535</td>
<td>1.158±0.001 a</td>
<td>0.19±0.02 d</td>
<td>0.000</td>
</tr>
<tr>
<td>539</td>
<td>1.19± 0.01 a</td>
<td>0.14±0.01 d</td>
<td>0.000</td>
</tr>
<tr>
<td>600</td>
<td>0.67±0.03 b</td>
<td>0.08±0.02 e</td>
<td>0.000</td>
</tr>
<tr>
<td>700</td>
<td>0.27±0.02 d</td>
<td>0.02±0.005 f</td>
<td>0.000</td>
</tr>
</tbody>
</table>

P value between the groups: F=93.5 / P value 0.000

P value within the groups: F=71.9 / P value 0.000

* LSD test was used to calculate the significant differences between tested mean, the letters (a, b, c, d and e) represented the levels of significant, highly significant start from the letter (a) and decreasing with the last one.

3. Effect of prodigiosin on MCF7 cell line

Prodigiosin pigment in four concentrations at exposure time 24 hrs was used in treating MCF7 cell line. As shown in (table 2) inhibition ratio was significant (p value <0.001) and maximum ratio of inhibition was 83% at conc. of 1000 µg/ml, 78% at 500 µg/ml, 73% at 250 µg/ml and 72% at 125 µg/ml. also the table showed that there was no effect or slightly effect of the solvent DMSO on tumor cells. (Inhibition was 6% ,13%, 16% , 22% for conc. 125 ,250 ,500 ,1000 µg/ml respectively).

As showed by some researchers, staphyloxanthin pigment caused inhibition of MCF-7 cell line and the cell viability was 35% when 400 µg/ml of pigment was used (20), The apoptosis and inhibition of cancer cell is dose dependent and that is agree with the result of other researchers which showed that the apoptosis demonstrated a dose-dependent relationship in the early apoptotic cells (21).

Table 2: Inhibition ratio of MCF7 cell line when treated at 24 hrs with purified prodigiosin .

<table>
<thead>
<tr>
<th>Conc. Mg/ml</th>
<th>IC of prodigiosin %</th>
<th>IC of DMSO%</th>
<th>X2 test/P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>83</td>
<td>22</td>
<td>0.000</td>
</tr>
<tr>
<td>500</td>
<td>78</td>
<td>16</td>
<td>0.000</td>
</tr>
<tr>
<td>250</td>
<td>73</td>
<td>13</td>
<td>0.000</td>
</tr>
<tr>
<td>125</td>
<td>72</td>
<td>6</td>
<td>0.000</td>
</tr>
</tbody>
</table>
Effect of prodigiosin on CAL-51 cell line

Prodigiosin pigment in four concentrations was used in treating CAL-51 cell line tumor. As shown in (table 3) inhibition ratio was significant (p < 0.001) and 78% inhibition ratio was seen at conc. of 1000 Mg/ml, 61% at 500 Mg/ml, 27% at 250 Mg/ml and 14% at 125 Mg/ml. also the table showed that there was no effect or slightly effect of the solvent DMSO on tumor cells. (Inhibition was 2%, 8%, 21%, 26% for conc. 125,250,500,1000 µg/ml respectively). The studies showed that some natural product that extracted from plant exhibited considerable cytotoxicity against Cal-51 triple negative breast cancer cell with even lower IC50 values (11).

Table 3: Inhibition ratio of Cal51 cell line when treated with purified prodigiosin.

<table>
<thead>
<tr>
<th>Conc. µg/ml</th>
<th>IC of prodigiosin%</th>
<th>IC of DMSO%</th>
<th>X2 test/P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000</td>
<td>78</td>
<td>26</td>
<td>0.000</td>
</tr>
<tr>
<td>500</td>
<td>61</td>
<td>21</td>
<td>0.000</td>
</tr>
<tr>
<td>250</td>
<td>27</td>
<td>8</td>
<td>0.001</td>
</tr>
<tr>
<td>125</td>
<td>14</td>
<td>2</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Prodigiosin pigment had significant effect against MCF-7 and CAL-51 and the P values were 0.01 for 125,250,500 µg/ml while non significant for conc. 1000 µg/ml.

The effect of DMSO solvent on MCF-7 and CAL-51 showing Non significant effect for both (p value 0.64, 0.13) respectively, the p value between the two group was significant (p <0.01), the p value between each conc. was also significant (p <0.01) for conc. 125,250,500,1000 µg/ml.

Conflict of Interest: No

Funds: Authors declare there is no fund from any institute

Ethical Clearance: The researchers already have ethical clearance from Department of Biology, College of Science, Mustansiriyah University, Baghdad-Iraq.

References


The Incidence of Hepatitis C Virus Infections among People Screened in Governmental Health Care Facilities in 2018 in Iraq

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Abstract

Background: The HCV the objectives of this study were to estimate the incidence of HCV infection (anti-HCV antibodies) in Iraq. Methodology: The criteria for diagnosis of HCV infection included new seroconversion manifested by the presence of positive HCV antibodies by screening tests and ascertained this result by confirmatory assays in the year 2018. The patients with HCV positive seroconversion recorded before 2018 are excluded from HCV incidence in 2018. The primarily positive cases were tested by anti-HCV antibodies confirmatory test prior to recording as new HCV infected cases. A sample size of 97,290 persons from the all 18 Iraqi governorates was enrolled in this study. Results: Among 97,290 persons screened for HCV antibodies, 576 new HCV infections were recorded as newly infected with incidence rate of 5.9:1000 among all Iraqi governorates in 2018. The highest incidence was reported in Baghdad-Resafa, Diwaniya, and Sulaymaniyah, and they were 15.2:1000, 13.7:1000, and 13.2:1000 respectively; the lowest incidence rates were registered in Erbil, Diyala, and Najaf and the results were zero, 0.32, and 0.53 respectively. In all Iraqi governorates, the highest incidence of HCV infection was at the age group 15–45 years and the lowest was in age group 1-4 years. For the total 576 new HCV recorded infections, 296 were males and 280 were females, with male to female ratio of 1:1.1.

Conclusion: The incidence rate of HCV infection is high among people screened for anti-HCV Abs in Iraq in the year 2018 especially in Baghdad-Resafa, nearly both genders are equally affected and HCV infection is mostly recorded in age group 15-45 years. The HCV screening program should be achieved in all regions of Iraq and for all the required population groups, and it should be a compulsory measure.

Keywords: Hepatitis C Virus, Infections, incidence, Iraq

Introduction

Hepatitis C virus (HCV) is a common cause of chronic hepatitis worldwide and it is an important cause of liver cirrhosis and hepatocellular carcinoma (1). Because HCV is a blood borne disease, it is more common among people exposed to contaminated blood or contaminated blood products (2). Epidemiological measures like the prevalence and incidence of HCV infections are important in understanding the existence of HCV infection and its endimicity among population for future planning to control this infection (3).

Globally, the incidence of HCV infections has been reported in some countries, and it is mostly determined by measuring the seroconversion in a person who is previously negative for anti-HCV antibodies, however, it is difficult to appraise if this is acute or chronic infection (4, 5). Epidemiologically, the prevalence of HCV infections is measured more frequently than incidence because the available laboratory tests cannot distinguished between acute infections, chronic infections, or even the cured infections as these tests are measuring the anti-HCV antibodies rather than HCV antigens (6). The incidence is a fundamental epidemiological measure; it represents

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the number of new cases over a particular time in a given population. The incidence of HCV infection is important in study the susceptibility of people in different periods by comparing the new registered cases; moreover, it can study the risk of HCV infections among different people subgroups (7).

The Incidence of HCV infections in Iraq has not been estimated before, in this study we aimed to measure this valuable epidemiological marker and comparing the susceptibility of different subcategories to HCV infections. The aim of this study is to estimate the incidence of the infections with hepatitis C virus in Iraq in the year 2018.

**Methodology**

In this cross sectional study, we collected data from the files of peoples screened for HCV infections in Iraq in 2018. The governmental health care facilities in the all 18 Iraqi governorates screened 97,290 persons in the year 2018 for HCV antibodies, their screening was for a diverse reasons like preoperative screening, pre-employment health examination, screening before dental procedures, screening of pregnant women before labor, patients with hemodialysis, patients with thalassemia, patients with possible liver diseases, and healthy persons who seek annual screening. The criteria for diagnosis of HCV infection included new seroconversion manifested by the presence of positive HCV antibodies by screening tests and ascertained this result by confirmatory assays. The patients with HCV positive seroconversion recorded before 2018 were excluded from registration as new cases in HCV incidence in 2018. Two parameters, gender and ages are included as risk factors for HCV infections. The capital of Iraq, Baghdad, was divided into two regions, Karkh and Resafa; thus, HCV screening was done in 19 Iraqi regions.

**Results**

The highest record of new HCV infections was registered in Baghdad-Rusafa (n=151), while the lowest was in Erbil governorate (n=zero), the total number of new cases among 97,290 persons screened for anti-HCV antibodies in Iraq in 2018 was 576 (tables 1, 2). The top three regions that recorded the highest incidence rates of HCV infections were Baghdad-Resafa, Diwaniya, and Sulaymaniya, and they were 15.2:1000, 13.7:1000, and 13.2:1000 respectively; the lowest incidence rates were registered in Erbil, Diyala, and Najaf and the results were zero, 0.32, and 0.53 respectively. The overall incidence rate among screened individuals in Iraq was 5.9:1000. Most of HCV infections were recorded in March, July, and November as illustrated in table 1.

<table>
<thead>
<tr>
<th>No.</th>
<th>Province</th>
<th>Jan</th>
<th>Feb</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
<th>Nov</th>
<th>Dec</th>
<th>Grand Total positive cases</th>
</tr>
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<td>2</td>
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<td>0</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
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</table>
Table 1: The monthly reported cases of HCV infection in Iraqi governorates

<table>
<thead>
<tr>
<th>No.</th>
<th>Province</th>
<th>Grand Total</th>
<th>No. of tested people</th>
<th>Incidence of HCV per 1000 tested persons</th>
<th>Incidence in %</th>
</tr>
</thead>
<tbody>
<tr>
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<td>0.072</td>
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</tr>
<tr>
<td>3</td>
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<td>5,943</td>
<td>8.1</td>
<td>0.081</td>
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<tr>
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<td>Diyala</td>
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<td>0.032</td>
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<td>0.036</td>
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<td>1,679</td>
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<td>576</td>
<td>97,290</td>
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</table>

*In this record (table 1), the capital of Iraq, Baghdad was divided into two districts Karkh and Resafa due to its large number of population.

Table 2: The incidence of HCV in 2018 in all Iraqi governorates

<table>
<thead>
<tr>
<th>No.</th>
<th>Province</th>
<th>Grand Total</th>
<th>No. of tested people</th>
<th>Incidence of HCV per 1000 tested persons</th>
<th>Incidence in %</th>
</tr>
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<td>8.1</td>
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<td>97,290</td>
<td>5.9</td>
<td>0.059</td>
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</tbody>
</table>
The age distribution of HCV patients revealed that most of them (n= 343, 60%) are diagnosed in age group 15-45 years, while the least number (n=3, 0.05%) is in age group 1-4 years, table 3.

### Table 3: Age distribution of HCV patients in 2018 in Iraq

<table>
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<tr>
<th>Province</th>
<th>&lt; 1 yr</th>
<th>1-4 yr</th>
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<th>15-45 yr</th>
<th>&gt;45 yr</th>
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<td>2</td>
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<tr>
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</table>

In the year 2018, both genders were affected by HCV infections, for the total 576 new HCV recorded infections, 296 were males and 280 were females, with male to female ratio of 1:1.1, and the differences between both groups are statistically not significant (p>0.05), table 4.
Table 4: Sex distribution of HCV patients in Iraq in 2018

<table>
<thead>
<tr>
<th>Province</th>
<th>Male</th>
<th>Female</th>
<th>Province</th>
<th>Male</th>
<th>Female</th>
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</thead>
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<td>1</td>
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<td>1</td>
<td>Thiqar</td>
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<td>13</td>
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<tr>
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<td>1</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td>Grand Total</td>
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<td>280</td>
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</table>

Discussion

Two major challenges in HCV infections is that it is mostly asymptomatic disease and the absence of vaccine till now, therefore, it can be transmitted from one person to another without being noticed, thus screening of HCV Abs among people consulting health care facilities is a major tool in controlling the disease transmission. The screening for anti-HCV Abs in Iraq is usually part for screening for three viruses: hepatitis B virus (HBV), HCV, Human immunodeficiency virus (HIV), and it is done before any surgical operation, dental procedure, or labor, in addition patients with some chronic diseases and in need for blood or plasma transfusion like thalassemia patients, or patients on hemodialysis are also screened for HCV Abs. However, this screening for HCV Abs is not universal in all health care facilities of all Iraqi governorates, moreover, the private health care facilities like private hospitals and the private dermatological centers, which are in growing more and more in all Iraqi governorates, are not entirely inspected for this screening and we are not sure if anti-HCV Abs are screened in every patient who is consulting these care facilities or not. Thus, we should apply a policy to ensure that anti-HCV Abs are screened in the necessary patients or persons consulting any health care facility as inpatient or outpatient, this will be an important tool for controlling HCV transmission.

In this study, we estimated the incidence rate among people attending hospitals and other health care centers in all Iraqi governorates, this large-scale estimation has not been done previously in Iraq, however, previous local studies described the prevalence of anti-HCV Abs in special groups of people and in limited regions in Iraq, like for example, Turky M. Ataallah, et al, detected the prevalence of hepatitis B and C among blood donors in Baghdad (8), Abdulameer K. Leelo, et al, detect the anti-HCV Abs in hemodialysis patients in Al-Diwaniyah city (9), and Muayad A. Merza and his coworkers detected the anti-HCV Abs among tuberculosis patients in Kurdistan region of Iraq (10).

In the current study, the incidence of HCV infection was 5.9:1000 which is higher than that reported by some abroad studies, for example, the incidence in thalassemia patients in Iran was 4.2/1000 (11). In rural northern Italy, the adult incidence of HCV is approximately 0.5/1000 inhabitants/year in 1996 (12), while in France, an incidence of 0.05% new HCV infections/year was determined in patients undergoing chronic haemodialysis (13). In the current study, The presence of healthy people in addition to risk group in the screening program, and the asymptomatic nature of HCV infection, make it clear that opposite to the total new 576 HCV infections
recorded in 2018 there are more number of cases not recorded in Iraqi governorates.

It is not surprising that Baghdad-Resafa has the highest incidence among Iraqi region due to high population density of this half of the capital Baghdad. In this aspect the high incidence of HCV in that region may be due to unKnowledge of infection status that associated with decreases in high-risk of infection such behaviors of individuals like sharing of injection drug equipment with individuals who have HCV infection status. The current study revealed that 60% of new HCV infections are aged 15-45 and there is an overall increase in HCV infections in adults than in children. The blood product seropositive had not been previously screened for HCV due to not available screening procedure at that time or may be due to longer exposure to risk factors for HCV at older age, this result is in accordance to that of Niu Z et al (14). In the current study, the HCV detection rate in males and females was nearly similar as the differences was statistically not significant with male to female ratio of 1:1.1, unfortunately it is difficult to compare this ration with the incidence in previous years as HCV infection among the gender was not recorded prior to this study.

The HCV screening program should be done before any interventional procedures, premarital, for risk groups like hemodialysis and thalassemia patients, pre-employment, and periodic for medical personnel and others in with continuous contacts with populations; this screening program should be monitored and evaluated continuously.

**Conclusion**

The incidence rate of HCV infection is high among people screened for anti-HCV Abs in Iraq in the year 2018 especially in Baghdad-Resafa, nearly both genders are equally affected and HCV infection is mostly recorded in age group 15-45 years. The HCV screening program should be achieved in all regions of Iraq and for all the required population groups, and it should be a compulsory measure.

**Conflict of Interest:** The authors declare that they have no conflict of interest

**Source of Funding:** Self–funding

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**References**

10. Author links open overlay panelMuayyad A.MerzaSafer M.HajiAbid Mohialdeen HasanAlsharafaniShivan U.Muhammed. Low prevalence of hepatitis B and C among tuberculosis patients in Duhok Province, Kurdistan: Are HBsAg


Study of Gastroesophageal Reflex Disease in adult Type II Diabetes Mellitus Patients with Upper Gastrointestinal Symptoms

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¹Internal Medicine, Lectural/Medical College Kufa University/Iraq, ²Internal Medicine Professor/ Medical College Kufa University/Iraq, ³Internal Medicine / Alsader Teaching Hospital /Iraq

Abstract

Gastrointestinal symptoms are relatively common in clinical practice in patients with type II diabetes mellitus. type II DM has been described as possible risk factor for the development of gastroesophageal reflux disease, in this study we aim to detect the prevalence of GRED in symptomatic patients with type II DM , also to see the accuracy of reflex disease questionnaire (RDQ) in the diagnosis of GERD in patients with type II DM in relation to the esophagogastroduodenoscopy finding and to study the relation of autonomic neuropathy to the prevalence and stages of GERD in diabetic patients .

Method: A ninety patients with upper gastrointestinal symptoms was divided in to tow groups according to whether had type II DM or not and then each group involved in a two stage process (a) – a RDQ , (b) – OGD .

And patients in the DM group underwent another step to detect diabetic neuropathy by a bed side clinical test .

Results: The prevalence of esophagitis in this study was higher in the DM group .

RDQ had a statistical significance in detecting esophagitis in the DM group .

There is no relation of autonomic neuropathy to the prevalence of GERD in diabetic patients .

Conclusion: The prevalence of GERD was high in patients with type II DM , RDQ is a sensitive tool for the diagnosis of GERD in diabetic patients , Autonomic neuropathy did not increase prevalence of esophagitis in diabetic patients .

Keywords: diabetes mellitus , gastro esophageal reflex disease , RDQ, Esophagogastroduodenoscopy, Esophagitis.

Introduction

The current concept of GERD is “symptoms or complications associated with regurgitation from the stomach and or the duodenum to the esophagus”, It is estimated that 15%-30% of the general population are affected by GERD(1,2).

GERD develops when the esophageal mucosa exposed to gastroduodenal contents for prolonged periods of time, resulting in symptoms and, in a proportion of case , esophagitis(2).

Note that some degree of gastroesophageal reflux is normal, physiologically connected with the mechanism of belching (transient LES relaxation), but esophagitis results from excessive reflux, often accompanied by impaired clearance of the refluxed gastric juice. Restricting reflux to that which is physiologically intended depends on the anatomic and physiologic integrity of the oesphagogastric junction, a complex sphincter comprised of both the LES and the surrounding crural diaphragm. Three dominant mechanisms of esophagogastric junction incompetence are recognized: (a) transient LES relaxations (a vagovagal reflex in which LES relaxation is elicited by gastric distention),

(b) LES pressure decease, or (c) anatomic distortion of the esophagogastric junction inclusive of hiatus hernia$^{(1,2)}$.

Transient LES relaxations account for at least 90% of reflux in normal subjects or GERD patients without hiatus hernia, in many studies the first two mechanisms and other factors such as abdominal obesity, delayed gastric emptying, disruption of esophageal peristalsis, autonomic neuropathy, metabolic syndrome were thought to be a possible risk factors for the high prevalence of the typical GERD symptoms in patient with DM, but up to present, the pathogenesis of GERD in type II DM patients has not been fully clarified$^{(3,4,5)}$.

Peripheral and autonomic neuropathy especially has become a research hotspot in recent years, however, the impact of the above factors on the presence of GERD symptoms in type II DM patients is still under debate$^{(3,6)}$.

Patients with GERD may present with heartburn and regurgitation which are the major symptoms of GERD, somewhat less common are dysphagia and chest pain and a variety of other features has been described, and depending on this a clinical system of symptom-based diagnosis of GERD was made the so called reflex disease questionnaire RDQ$^{(7)}$.

RDQ comprises 6 questions assessing the frequency of heartburn, substernal chest pain, acid regurgitation, nausea, need for the medication, and trouble getting a good night sleep because of heartburn or regurgitation, per week, as shown in table 1.

### Table 1: GerdQ Questionnaire

<table>
<thead>
<tr>
<th>SYMPTOM</th>
<th>HOW MANY TIMES DOES THIS OCCUR PER WEEK?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 DAYS</td>
</tr>
<tr>
<td>Burning feeling behind the breastbone (heartburn)</td>
<td>0</td>
</tr>
<tr>
<td>Stomach contents moving up to the throat or mouth (regurgitation)</td>
<td>0</td>
</tr>
<tr>
<td>Pain in the middle of the upper stomach area</td>
<td>3</td>
</tr>
<tr>
<td>Nausea</td>
<td>3</td>
</tr>
<tr>
<td>Trouble getting a good night’s sleep because of heartburn or regurgitation</td>
<td>0</td>
</tr>
<tr>
<td>Need for over-the-counter medicine for heartburn or regurgitation</td>
<td>0</td>
</tr>
</tbody>
</table>

Note: Add the point values for each corresponding answer. Total score of 0 to 2 points = 0 percent likelihood of GERD; 3 to 7 points = 50 percent likelihood; 8 to 10 points = 79 percent likelihood; 11 to 18 points = 89 percent likelihood.

Several investigation used to evaluate patients with suspected having GERD of which endoscopy is the initial investigation of choice, it used for the diagnosis and grading of GERD and to exclude other upper gastrointestential disease that can mimic GERD and to identify complications.
Aim of the Study

To study the prevalence of GERD in symptomatic patients with type II DM in relation to non DM, also to see the accuracy of RDQ in the diagnosis of GERD in patients with type II DM in relation to the OGD finding and to study the relation of autonomic neuropathy to the prevalence of GERD in diabetic patients present with upper gastrointestinal symptoms.

Patients and Method

This study was conducted in Alsader medical city, in Alnajaf center for gastrointestinal and hepatic diseases in which 122 adult patients referred for upper endoscopy because of upper gastrointestinal symptoms suggestive of GERD between March 2014 and March 2015 participate in this study.

Exclusion criteria were type I DM, esophageal motility disorder other than ineffective esophageal motility, patient with hiatus hernia and patient with a RDQ less than 8.

After performing the exclusion criteria a 90 patients were considered eligible for this study. 31 of them were females and 59 were males.

The recruitment patients were divided into two groups according to whether had a type II DM or not, the diagnosis of type II DM based on WHO definition (Defined as fasting blood glucose $\geq$ 7 mmol/l or on glucose medication for raised blood glucose or with a history of diagnosis of diabetes.)

The then every group involved in a two stage process

(a)- Reflux disease questionnaire (RDQ) and patients with at least a minimal score of 8 had been chosen as the (RDQ) likelihood of GERD were as fellow:

1- A total score 0 to 2 = 0 percent likelihood
2- A total score 3 to 7 = 50 percent
3- A total score 8 to 11 = 79 percent
4- A total score 12 to 18 = 89 percent.

(b)- OGD by the use of Olympus or pentax ED-3490 TK 4.2 HOYA corporation endoscopy system, which used in the diagnosis and staging of esophagitis according to Savery-Miller classification in these patients.

(c)- the patients with DM group underwent another step during interview by being underwent a simple clinical test to detect the diabetic autonomic neuropathy (a bedside test for the absence respiration-associated sinus arrhythmia by monitoring the pulse rate by a pulse oximeter while the patient instructed to breathe slowly and deeply at a rate of 6 breaths per minute, heart rate normally increase with inspiration and decrease with expiration, and at a respiratory rate of 6 per minute the difference between fastest and slowest heart rate is usually more than 15 per minute, a difference of 10 beats per minute or less are observed in autonomic dysfunction).

Statistical Analysis:

Statistical analysis were performed using spss 16 program correlation analysis was also performed.

A P value $<$0.05 was considered significant.

Results

Ninety patients were included in this study and divided into two groups: a thirty patients in DM group and sixty patients in the non DM group.

In the non DM group 22 of them were females (36.66%) and 38 were males (63.33%) with a mean age of (46.7 years $\pm$ 8.2).

In the DM group 9 were females (30%) and 21 were males (70%) with a mean age of (51.2 years $\pm$ 9.3). As shown in table 2.

Table-2 the demographic characters of both groups (DM and non DM)

<table>
<thead>
<tr>
<th></th>
<th>Group</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>Non DM</td>
<td>22(36.66%)</td>
</tr>
<tr>
<td></td>
<td>DM</td>
<td>9(30%)</td>
</tr>
<tr>
<td>Male</td>
<td>Non DM</td>
<td>38(63.33%)</td>
</tr>
<tr>
<td></td>
<td>DM</td>
<td>21(70%)</td>
</tr>
<tr>
<td>Mean age years</td>
<td>Non DM</td>
<td>51.2$\pm$9.3</td>
</tr>
<tr>
<td></td>
<td>DM</td>
<td>46.7$\pm$8.2</td>
</tr>
</tbody>
</table>
The prevalence of esophagitis in this study were higher in the DM group as upper OGD results showed esophagitis in 32 patients of the non DM group (53.3%) and in 23 patients of the DM group (76.66%) with a statistical significant results (p value=0.03236) as shown in table 3.

| Group     | Esophagitis | Percentage | P value  
0.03236* |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Non DM</td>
<td>32 of 60</td>
<td>53.33%</td>
<td></td>
</tr>
<tr>
<td>DM</td>
<td>23 of 30</td>
<td>76.66%</td>
<td></td>
</tr>
</tbody>
</table>

Table 3 (the prevalence of esophagitis by OGD in both study groups)

In comparing the RDQ which about 80% in a score level 8-11 and OGD result in detecting esophagitis in both groups the result shows that RDQ had a statistical significance in detecting esophagitis in the DM group as shown in table 4.

<table>
<thead>
<tr>
<th>By QRS 80%</th>
<th>By OGD</th>
<th>P VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients in DM group with esophagitis</td>
<td>24 of 30=80%</td>
<td>23 of 30=76.6%</td>
</tr>
<tr>
<td>Number of patients in non DM group with esophagitis</td>
<td>48 of 60=80%</td>
<td>32 of 60=53.3%</td>
</tr>
</tbody>
</table>

Table 4 comparing QRS and OGD in detecting esophagitis in both study groups.

In the DM group the clinical bedside test for autonomic neuropathy revile an autonomic dysfunction in 16 patients of 30 (53.33%) and 14 patients show not (46.6%).

13 (81.2%) of the 16 patients with DM and autonomic dysfunction were diagnosed with esophagitis by OGD and 3 patients show no sign of esophagitis by OGD (18.7%), while in patients with DM and without autonomic dysfunction there were 10 patients of 14 (71.4%) diagnosed with esophagitis by OGD and 4 patients (28.5%) are not, so there were no statistical significance P value=0.5287 as shown in table 5.

Table 5—prevalance of esophagitis in DM patients with and without autonomic dysfunction

<table>
<thead>
<tr>
<th>Patient in DM group</th>
<th>Patient with esophagitis</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>With autonomic dysfunction no=16</td>
<td>13 of 16 (81.2%)</td>
<td>0.5287</td>
</tr>
<tr>
<td>Without autonomic dysfunction no=14</td>
<td>10 of 14 (71.4%)</td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

Diabetes is a major health problem, as it is an important contributor to various other disease and its incidence still continues to rise. Gastrointestinal symptoms are relatively common in clinical practice in patients with type II DM. Type II DM has been described as possible risk factor for the development of GERD. Several studies reported that the prevalence of GERD symptoms in the type II DM was approximately 25%-40% in different populations, in these studies...
several methods used in the diagnosis of GERD includes; RDQ which had a sensitivity of 79% in the diagnosis of GERD at 8-11 score level in non DM patients, Endoscopic examination which had high specificity but low sensitivity for the diagnosis of GERD with a sensitivity about 55% for detecting esophagitis and other complications\cite{14,15} and ambulatory PH monitoring which is indicated if diagnosis is unclear or surgical intervention is under consideration, although the test yields accurate and reliable information it is inconvenient for the patient and many clinicians do not have access to the appropriate instrumentation and are unable to perform this test\cite{16}.

In this study a combination of RDQ and OGD is used to study the prevalence of GERD in patients with type II DM as a previous study by Lemeneh Tefera, B.A., Martin Fein.\cite{16} shows that this combination had a high proof value 98% and high specificity 97% for the diagnosis of GERD in non DM patients, in this study we found that the prevalence of GERD in adult symptomatic patient with type II DM as diagnosed by OGD were high 76.7% comparing to non DM patients 53.3% with a P value =0.03236.

We also found that the RDQ at level score >8 had a good prediction rate for esophagitis which about 80% in symptomatic patient with type II DM as the OGD result showed esophagitis in 76.66% in patients with type II DM comparing to non DM patients in regard to the sensitivity of RDQ with a P value=0.00244, and this was constant with a study by Yu Bai, Yiqi Du, Duowu Zou, Zhendong Jin and others , that suggest that the RDQ may be used for the diagnosis of GERD\cite{17}.

In previous studies neuropathy were thought of as possible risk factor for the prevalence of the typical GERD symptoms in DM patients \cite{13,20}, for example, in 2008, Wang et al.\cite{13} reported that the prevalence of GERD symptoms was higher in patients with neuropathy than in patients without neuropathy , in this study there were no significant difference in the prevalence of esophagitis in DM patients with or without neuropathy with a P value=0.05287 , this results are similar to the studies of Clouse and Lustman \cite{21} and Lee et al.\cite{19}. In 1989, Clouse and Lustman, through analyzing 114 diabetic subjects with gastrointestinal motor dysfunction symptoms, reported that gastrointestinal symptoms occurring in diabetic patients were poorly related to neuropathic complications. In 2011, Lee et al.\cite{19} studied 119 patients with type II DM and found that there was no significant difference in the proportions of patients experiencing typical GERD symptoms between the two groups of type II DM with and without neuropathy.

**Conclusion**

The prevalence of GERD were high in patients with type II DM, RDQ is a sensitive tool for the diagnosis of GERD in those patients, Autonomic neuropathy did not increase prevalence of esophagitis in diabetic patients.

**Conflicts of Interest**: None of the authors have any conflicts of interest relevant to this research subject.

**Ethical Clearance**: The study was conducted in accordance with ethical principles that have their origin in the Declaration of Helsinki . The study protocol, care of patients and subject information were reviewed and approved by a local Ethic committee.

**Source of Funding**: Self

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Molecular and Phylogenetic Study of Sarcocystis Gigantia from Different Slaughterhouse Regions in Karbala province

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Abstract

Sarcocystis diseases caused a serious illness in sheep flock which inducing decrease of growth conversion rates and complete or partial loss of carcasses at the abattoirs, This article which described an prevalence of parasites Sarcocystis gigantea in sheep slaughtered in a farm in kerbala governorate, Iraq, and performed a phylogenetic analysis by using the Euclidean distances calculation from the Sarcosystis gigntea nucleotide frequencies around the world sarcosystis genomes. Fifty sheep showed multiple nodules in the esophagus that were microscopically characterized as encapsulated cysts filled with elongated, nucleated structures morphologically consistent with S. gigantea bradyzoites. The prevalence and species of Sarcocystis gigantia were revealed as 10% (5 out f 50) for the macroscopic sarcosystis, the shape of these cysts were resembled to oval and pear shape, the sensitivity of Polymerase chain reaction was 75% with 95% of confidence intervals 19.41% to 99.37% and the specificity was 95.65% with 95% confidence intervals 85.16% to 99.47%. Our results suggest that oligonucleotide sequences were useful for estimation of Sarcocystis gigntea phylogenetic relationships for closely related species.

Key words: Sarcocystis gigntea, Phylogenetic analysis, PCR, sensitivity and specificity.

Introduction

Sarcocyst is intracellular cells parasites infect a wide range of domestic animal, some genus of Sarcocystes are pathogenic for animal like cattle and sheep that cause huge economic losses 1, cyst forming coccidiosis parasites with a mandatory two host life cycle which involved Herbivorous as intermediate hosts and carnivores as definitive hosts, an intermediate and final host may harbor more than one species of sarcocysts 2, Sheep are infected by swallowing sporulated cysts in food or water 3. They are numerous Studies in different city of the world suggested that the spread of parasites infestation in slaughtered cattle, sheep were recorded between 60 % to 90% 4-6. They are four species of Sarcocystis that have infected sheep which include Sarcocystis arieticanis, Sarcocystis tenella, S. medosiformis and S. gigantean, S. gigantea are responsible for the formation of cysts generally, in the muscles of the tongue and esophagus, or in the bowels of carcasses of slaughterhouses 7. In the official health control of slaughterhouses, the bodies of infected cysts are macroscopic examination and sometime this cysts are trimmed or removed by veterinarians and doesn’t depended on microscopic examination, these cysts are pathogenic in sheep if we leave without clinical and diagnostic tests, in this sense our study decided to conduct molecular identify macroscopic cysts of Sarcocytis parasites in sheep and study of the evolutionary relatedness among some closed related species around the world.

Materials and Methods

Sample collection:

The study was conducted by collection samples from sheep aged in different slaughterhouse regions of Karbala province, multiple nodules covered with intact mucosa were present and showed in the esophagus of sheep slaughter, the microscopic characterize as multiple cysts have encapsulated and filled with elongated fingers of small, basophilic, nucleated structures which morphologically consistent with S. gigantea bradyzoites.
Macrosopic sacs which visible in the esophagus organ and skeletal muscles were collected by sterile scapel from carcasses, and the samples were keep in sterile petri dish, and sent to the lab as soon as possible. The course of this study was beginning from February 2018 to January 2019, the age of this animals were estimated depending on permanent incisor of their teeth and the gender of each animal was documented. The cysts were excised in the same time the macrocysts samples were detached from the tissues and organs.

**Macrocysts DNA extraction procedure:**

Genomic pellet DNA was extracted from macrocysts samples by using (Geneaid™ DNA Isolation Kit (Tissue). The DNA extraction of macrocysts cells was done according to manufacture company, generally, the extracted DNA was calculated by Nanodrop-spectrophotometer device, and then the extracts were store in -30C at freezing for PCR analysis.

**Polymerase chain reaction assays:**

PCR assays has done for diagnosis sarcosystis spp. Depended on small subunit ribosomal RNA gene by using specific dual primers that used in this study (Bahari et al., 2014). These primers were prepared and made by (Bioneercom.Korea) as following table (1).

**Table(1): The primer used in this study with amplicon product size**

<table>
<thead>
<tr>
<th>Primer</th>
<th>Sequence</th>
<th>Amplicon</th>
</tr>
</thead>
<tbody>
<tr>
<td>small subunit ribosomal RNA gene</td>
<td>5-GCACTTGATGAAATTCTGGCA-3</td>
<td>580bp</td>
</tr>
<tr>
<td></td>
<td>5-CACCACCCATAGAATCAAG-3</td>
<td></td>
</tr>
</tbody>
</table>

The PCR solution mix was prepared by the company called (Bioneer). The PCR solution kept at small tube containing freeze-dried pellet of DNA and the PCR premix mixture products was done according to manufacture instructions then filled to the top by the PCR premix tube by deionized water into 20µl and used vortex centrifuge for good mixing. The reaction was done in a Thermal cycler system (Mygene Bioneer) by orders we can sit it on the control panel the following thermocycler conditions; The products were examined by electrophoresis on a 1% agarose gel under ultraviolet light.

**DNA sequencing method:**

Genetic sequencing of subunit ribosomal RNA gene by using analysis of phylogenetic relationship and study level of alignment by mega multiple sequence software alignment programs. a product was purified from the gel by using (QIAquick Gel Extraction/ Qiagen). The purified PCR product was sent to korea for high quality DNA Sequencing service by Macrogen providing techniques (https://dna.macrogen.com/eng/support/ces/guide/ces_sample_submission.jsp).

**Data Analysis**

The nucleotides’ Sequences were truncated and aligned at both ends using ApE software (A plasmid editor Version 2.0.51); therefore the sequences majority were started and ended at the homologous nucleotide positions. The sequences target was submitted to BLAST (http://www.blast.ncbi.nlm.nih.gov). the nucleotides with diversity index as well as the Euclidean distances calculated were uploaded to the UPGMA (clustering) tree and the Maximum Pairsony phylogenetic tree by using the software MEGA 6 (Molecular Evolutionary Genetics Analysis Version 6.0). Specificity and sensitivity were used in this study to compare between PCR assay with macroscopic examination according to (Altman et al., 2013).
Results and Discussion:

The prevalence and species of *Sarcocystis gigantia* were revealed as 10% (5 out of 50) for the macroscopic sarcocystis, the shape of these cysts were resembled to oval and pear shape as large rice grain ranged between 9 to 11 mm in length (Pereira & Bermejo 1988) this cysts were consist of white capsule with gelatinous translucent substances.

![Figure (1): macroscopic cysts observation of *Sarcocystis spp.*](image)

Our current study was limited to macroscopic examination and sequences analysis of *Sarcocystis gigantea*, otherwise, there are many methods should be consider to confirm this strain by epidemiologic, microscopic findings. The certain risk factors and clinical indicators for infection were the final host connection as well as supply raw meat from sheep to cats, all of them which contribute significantly to the spread of *S. gigantea*, as well as others types of sarcoecysts. Our finding is in agreement with previous studies reporting an epidemiological association with adults sheep; nevertheless Bertero et al. (1980) did not find macrocysts in their epidemiological study in lambs because *S. gigantean* macrocysts are found mainly in adult sheep.

PCR used to determine species of sarcosystosis is (4) out from (50) as (8%) strain isolates, the sensitivity of Polymerase chain reaction was 75% with 95% of confidence intervals 19.41% to 99.37% and the specificity was 95.65% with 95% of confidence intervals 85.16% to 99.47% table 1.

<table>
<thead>
<tr>
<th>Method</th>
<th>Polymerase chain reaction</th>
<th>Total</th>
<th>Sensitivity 95% CI</th>
<th>Specificity 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macroscopic examination</td>
<td>3 True + 2 False +</td>
<td>5</td>
<td>75% 19.41% to 99.37%</td>
<td>95.65% 85.16% to 99.47%</td>
</tr>
<tr>
<td></td>
<td>1 False - 44 True -</td>
<td>45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4</td>
<td>46</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table (2): Sensitivity and specificity of polymerase chain reaction with Macroscopic examination.
The specificity and yielding can be readily determined by running a gel electrophoresis that separated DNA molecules (Fig 1), so this specificity would generate one product of the correct size through using specific double primers (Ghazaei, 2018).

Many studies revealed that Sheep are vector and harbor of parasite to reach definitive host for four Sarcocystis species which include: *S. gigantea*, *S. tenella*, *S. medusiformis* and *S. arieticanis*, both species. *S. tenella* and *S. gigantea* have worldwide distribution phylogenic of *Sarcocystis spp.* has been making Homology sequence identity by use rRNA gene according to NCBI-BLAST site show table (2) highly sensitivity to accuracy of molecular detection.

### Table (4): NCBI-Blast Homology sequence identity for rRNA gene in Trichophyton sp. isolate-1 with NCBI-BLAST Trichophyton spp.:

<table>
<thead>
<tr>
<th>Description</th>
<th>Max Score</th>
<th>Total Score</th>
<th>Query Cover</th>
<th>E value</th>
<th>Per Ident</th>
<th>Accession</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sarcocystis gigantea isolate SC small subunit ribosomal RNA gene; partial sequence</td>
<td>40.1</td>
<td>40.1</td>
<td>100%</td>
<td>0.001</td>
<td>100.00%</td>
<td>MW381949.1</td>
</tr>
<tr>
<td>Sarcocystis gigantea isolate CA small subunit ribosomal RNA gene; partial sequence</td>
<td>40.1</td>
<td>40.1</td>
<td>100%</td>
<td>0.001</td>
<td>100.00%</td>
<td>MW381940.2</td>
</tr>
<tr>
<td>Sarcocystis hominis isolate HRF118 small subunit ribosomal RNA gene; partial sequence</td>
<td>40.1</td>
<td>40.1</td>
<td>100%</td>
<td>0.001</td>
<td>100.00%</td>
<td>MW381951.1</td>
</tr>
<tr>
<td>Sarcocystis hominis isolate S073 small subunit ribosomal RNA gene; partial sequence</td>
<td>40.1</td>
<td>40.1</td>
<td>100%</td>
<td>0.001</td>
<td>100.00%</td>
<td>MW3811206.1</td>
</tr>
<tr>
<td>Sarcocystis hominis isolate S011 small subunit ribosomal RNA gene; partial sequence</td>
<td>40.1</td>
<td>40.1</td>
<td>100%</td>
<td>0.001</td>
<td>100.00%</td>
<td>MW3811207.1</td>
</tr>
<tr>
<td>Sarcocystis heydorni isolate S093 small subunit ribosomal RNA gene; partial sequence</td>
<td>40.1</td>
<td>40.1</td>
<td>100%</td>
<td>0.001</td>
<td>100.00%</td>
<td>MW3811205.1</td>
</tr>
<tr>
<td>Sarcocystis cruzi isolate S088 small subunit ribosomal RNA gene; partial sequence</td>
<td>40.1</td>
<td>40.1</td>
<td>100%</td>
<td>0.001</td>
<td>100.00%</td>
<td>MW3811204.1</td>
</tr>
<tr>
<td>Sarcocystis cruzi isolate S103 small subunit ribosomal RNA gene; partial sequence</td>
<td>40.1</td>
<td>40.1</td>
<td>100%</td>
<td>0.001</td>
<td>100.00%</td>
<td>MW3811203.1</td>
</tr>
<tr>
<td>Sarcocystis cruzi isolate S100 small subunit ribosomal RNA gene; partial sequence</td>
<td>40.1</td>
<td>40.1</td>
<td>100%</td>
<td>0.001</td>
<td>100.00%</td>
<td>MW3811202.1</td>
</tr>
<tr>
<td>Sarcocystis cruzi isolate C170269 small subunit ribosomal RNA gene; partial sequence</td>
<td>40.1</td>
<td>40.1</td>
<td>100%</td>
<td>0.001</td>
<td>100.00%</td>
<td>MW3811201.1</td>
</tr>
<tr>
<td>Sarcocystis bowleri isolate S050 small subunit ribosomal RNA gene; partial sequence</td>
<td>40.1</td>
<td>40.1</td>
<td>100%</td>
<td>0.001</td>
<td>100.00%</td>
<td>MW3811190.1</td>
</tr>
</tbody>
</table>

Figure (2): Basic local sequence alignment analysis of local Sarcocystis gigantea isolate-1 with NCBI-BLAST Sarcocystis 100% identity.

Analysis of Phylogenetic tree has done depend on the clone rRNA, a that used for final detection of *Sarcocystis gigantea* draw atree by Phylogenetic analysis of rRNA gene sequences has become the principal method for knowing parasites phylogeny. Our result show the phylogenetic tree has done according to these strains isolates figure (3), the evolution histories of *Sarcocystis gigantea* were inferred using the Neighbor-Joining method (Saitou, & Nei, 1987). The percentage of replicate trees in which the associated taxa clustered together in the bootstrap test are shown next to the branches, the tree is drawn to scale, with branch lengths in the same units as those of the evolutionary distances.
used to infer the phylogenetic tree.

Our results were found that *Sarcocystis gigneata* in the polygenetic tree diagram with an accession number (MK045326), a species identified in sheep, was the next-highest match at 100% homology with our sequence.

Finally, The host species; the geographical factors and environmental conditions are main causes to formed contract values phenomones. We also found *Sarcocystis gigneata* genomic sequences showed identical with other species sequences that isolates according to the geographical regions, the present study was found identical nucleotides of *Sarcocystis gigneata* similarity with (MN398408) in sheep Erbil city, Kurdistan region.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Department of Biology and all experiments were carried out in accordance with approved guidelines.

**References**


An in Vitro Study to Evaluate Antibacterial Effect Thymus Vulgaris Essential Oil Against Porphyromonas Gingivalis in Kurdistan– Iraq

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Abstract

Purpose: Porphyromonas gingivalis is a keystone among perio-pathogengenic bacteria to initiate periodontitis and treatment is better when the periodontal pathogens including Porphyromonas gingivalis are totally eliminated. The essential oil of Thymus vulgaris has many bioactive constituents having antimicrobial activity against many bacteria. This study investigates the antibacterial effect of this extracts against Porphyromonas gingivalis. Methods: Sub gingival plaque samples were collected from individuals having periodontitis with the probing pocket depth of at least 6mm; Conventional microbiological tests and molecular technique used for confirmation of Porphyromonas gingivalis, hydrodistillation method was used for extraction of essential oil. Antibacterial activity of the extract against Porphyromonas gingivalis has been determined by using two fold serial dilution method to determine minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC). Result: the essential oil extracted from Thymus vulgaris demonstrated antimicrobial effect against Porphyromonas gingivalis growth. Conclusion:The extract was able to demonstrate inhibitory and bactericidal activity against Porphyromonas gingivalis. Further studies should focus on the use of Thymus vulgaris essential oil in the treatment of periodontitis.

Keywords: Porphyromonas gingivalis, Thymus vulgaris, minimum inhibitory concentration, periodontitis.

Introduction

Thymus vulgaris is herb with an evergreen status and it is native to the Mediterranean and southern Europe area 1. The family Lamiaceae consists of approximately 150 plant genera with roughly 2800 species throughout the world, among which Thymus vulgaris, known as common thyme popularly 2. This plant has been used traditionally as a culinary component, to give flavor to cheeses 3,4 and liqueurs and meats 5,6. Now a day is a common ingredient of bouquet garni 7. In addition to its usefulness in foods, this plant is a well-known as a medicinal herb that has been used many years ago in treatment of alopecia, dental plaque, dermatophyte infections, bronchitis, cough, inflammatory skin disorders, and gastrointestinal distress 8. The major constituents of T. vulgaris essential oil are thymol (23%–60%), γ-terpinene (18%–50%), p-cymene (8%–44%), carvacrol (2%–8%), and linalool (3%–4%) 9. T. vulgaris essential oil has antibacterial, antifungal, and anti-inflammatory effects, accounting for the medicinal uses of T. vulgaris 8. The terpenoids and some hydrocarbons that are present in essential oils are responsible for their anti-microbial effect 10. For these purposes, researchers are searching for new antimicrobial agents, through the use of natural plant oils.

Porphyromonus gingivalis is major periodontal pathogens and one of the main etiological factors in the inflammatory episode in initiation and progression of periodontal disease 11. The therapeutic roles of Plant-derived essential oil products have been widely used in
the treatment of periodontitis. The data concerning the efficacy of this extracted oil against periopathogens is limited in Iraq. The objective of this work is to determine the antibacterial activity of the extracted essential oil from T. vulgaris against the growth of clinical isolates of porphyromonous gingivalis.

Materials and Methods

Setting: This study was approved by Ethics Committee Sulimani technical institute, Sulimani polytechnic University, Kursitan, Iraq.

Plant row material and extraction of essential oil

The T. vulgaris was collected in June-July, 2019 from the Piramagron Mountain, 50 km far from Sulimani city in north of Iraq. The plant was identified in College of Agriculture, University of Sulimani. The essential oil was extracted from the herb by hydrodistillation method; 100g of thyme soaked in 350 ml of distilled water in a conical flask and left for 5 hours using a Clevenger apparatus according to 13. The essential oil was collected after decantation and drying of the oils over anhydrous sodium sulfate, the oil stored under refrigeration (−4 °C) until its use.

Tested bacteria

Tested Microorganism was obtained from the Department of Biology, College of Science, University of Sulimani. Clinical strain was previously isolated from plaque of sub gingival deep pockets from patients having periodontitis according to 14.

MIC and MB determination

The antimicrobial effect of essential oil of thyme by detecting MIC was evaluated against a common oral pathogens in initiation of periodontitis by two fold serial dilution method, in which the stock solution of the tested material was prepared (800μL/1 ml) by dissolving the essential oil in (tween-80). For MIC, twelve dilutions of the essential oil were prepared by using Muller Hinton broth medium - two-fold serial dilution method. The procedure done by 1 ml from the stock solution was added into the first tube which contained 1 ml of broth. Then 1 ml of broth from the first tube was transferred into the second tube. The serial dilution was repeated for the tested agent till reach 0.2 μL /ml, thus the concentrations of serial dilution was—400, 200, 100, 50, 25, 12.5, 6.25, 3.12, 1.6, 0.8, 0.4, 0.2 μL /ml respectively.

To each of the above 12 prepared MIC tubes with different concentrations, 100μL of the earlier prepared suspension of bacterial (5*10 CFU/ml) was added to the tubes. Tubes were sealed with cotton and incubated for ≥48 h at 37°C in an anaerobic jar by using AnaeroGen® system Oxoid gas pack and observed for turbidity. The minimum concentration of the essential oil in the tube determined by which does not show any turbidity [Figure 1].

![Figure 1 different concentration of essential oil of thyme](image)
The determination of minimum bactericidal concentration (MBC) of thyme oil was done by choosing the concentrations that showed no bacterial growth during the evaluation of the MIC. Then a sample by micropipette was taken from the chosen tubes and spread on a blood agar plate using a spreader and incubated anaerobically. After 48 h at 37ºC, the plates that showed no growth of bacteria were identified as minimum bactericidal concentration [figure 2].

Results

Essential oil of thyme showed a significant inhibitory effect with mean MIC of 6.25 μL /ml. While, Mean MBC for the extract was 12.5 μL /ml as shown in (Table 1).

Table 1 MIC and MBC of thyme oil

<table>
<thead>
<tr>
<th>Essential oil</th>
<th>MIC against P.gingivalis</th>
<th>MBC against P.gingivalis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thymus vulgaris</td>
<td>6.25 μL /ml</td>
<td>12.5 μL /ml</td>
</tr>
</tbody>
</table>

Discussion

Thymos is the name Greek that means small because of the fragrance of the plant, which belongs to over 300 species herbs and shrubs that are native to Europe and Mediterranean. It is one of the Hippocrates 400 simple remedies. Essential oil of Thymus Spp, vulgaris-Labiatae/ Lamiaceae) is got from the leaves and flowering tops of the herb. Its main constituents include 20-40% thymol and carvacrol with bornol, cineol, linalool, menthone, B-cymene, pinene and triterpenic acid. Thyme oil is a tonic stimulant used in stomachic and digestive system diseases such as gastritis, enterocolitis and mouth thrush. It was used in treatment of respiratory infections like asthma and bronchitis. It was useful in treatment of gout and rheumatic arthritis, for joint pains, backache and sciatica. Thyme oil is also used in urinary and genital
infections such as endometritis, prostrates and vaginitis\textsuperscript{1,2,15}. Thyme oil exhibits antibacterial activity and has been useful in dental practice\textsuperscript{16}. One of the components of thyme, which is thymol, has inhibitory effect on growth of oral bacteria that aid in decreasing dental caries\textsuperscript{17,18}. Study by Sköld-Larsson et al., demonstrated that use of a dental varnish containing thymol aid in reducing the amount of Streptococcus mutans in supragingival plaque near brackets\textsuperscript{19}. Thymol is used in mouthwashes because of its antibacterial activity such as Listerine mouth wash\textsuperscript{20}. Thyme oil also has antimicrobial effect against S. aureus, E. coli and C. albicans\textsuperscript{21-23}. Porphyromonas gingivalis is an anaerobic gram negative rod that is most prevalent etiological bacteria in periodontitis. Data on the inhibitory activity of Thymus vulgaris oil on this periodontopathic bacterium (p. gingivalis) is limited. A study by fani et al., exhibited antibacterial effect of thyme oil against p. gingivalis at (32 mg/mL)\textsuperscript{24}, while another studies showed higher concentration (62.5 mg/mL)\textsuperscript{25}. This study represents the first reported study in determination the antibacterial activity of essential oil of Thymus vulgaris in Kurdistan-Iraq against clinically isolated periopathogenic bacteria (P. gingivalis). In our study the minimum inhibitory concentration was 6.25 μL /ml. This difference with other studies may be due to harvesting time, climatic conditions, geographical origin, and sex of cultivars that affect the chemical compositions of essential oil which are responsible for their medicinal effects or their biological activity which varies from one region to another\textsuperscript{26}. MBC of the extract was 12.5 μL /ml against the P. gingivalis, indicated a bactericidal effect of the essential oil. The difference between bactericidal or bacteriostatic effect is clinically important in that bactericidal agents may be more effective in the treatment of diseases\textsuperscript{27}.

**Conclusion**

In this study, we report for the first time, the antibacterial activity of essential oil of Thymus vulgaris in Kurdistan region –Iraq against periopathogen p.gingivalis which was clinically isolated previously in vitro models. The extract of showed a significant antibacterial activity, therefore, it can be used as a natural adjuvant antimicrobial agent in treatment of periodontitis.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Bakrajo technical institute and all experiments were carried out in accordance with approved guidelines.

**References**


Salivary and Serum Aspartate Aminotransferase and Alanine Aminotransferase in An Uncontrolled Diabetic Patients

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Abstract

Background: Diabetes mellitus (DM) is a metabolic disorder, characterized by a higher level of blood glucose resulted from either abnormality in insulin production (type1 DM) or resistance to insulin action (type 2 DM) or both. Long lasting elevated blood glucose is responsible for chronic damage, defect in function and impairment of various organs including salivary glands. Aspartate aminotransferase (AST) and alanine aminotransferase (ALT) are cellular enzymes found in all animal tissues.

Aims of the Study: to estimate and compare the levels of salivary and serum AST and ALT between un controlled diabetic patients and normal control people.

Subjects, Materials and Method: The study comprised 90 adults of both gender. The patients were divided into 3 groups: 30 patients with type 1 diabetics (D1), 30 patients with type 2 diabetics (D2) and 30 healthy persons as a control group (C). Serum and un stimulated salivary samples were taking for the AST, ALT evaluating using standard spectrophotometer kits. The level of glycosylated hemoglobin (HbA1c) was measured using NycoCard kit to exclude the controlled diabetic patients. Data were analyzed using statistical analysis SPSS version 24.

Results: The results showed a significant increase of salivary enzymes in D1 and D2 compared to salivary enzymes of control group, while there was no significant difference in serum enzymes value among all studied groups.

Conclusions: An elevation in salivary AST and ALT in both types of diabetes compared to healthy group, with higher salivary level of AST and ALT in D1 compared to D2 and to healthy control group. This may suggest that autoimmunological activity in D1 responsible for more salivary gland injury in D1 group.

Key words: alanine aminotransferase, aspartate aminotransferase, diabetes mellitus.

Introduction

Diabetes mellitus is a group of metabolic diseases that are different clinically and genetically but with a common phenotype, defined by prolonged and abnormally high level of blood glucose with abnormal metabolism of carbohydrate, lipid and protein ¹.

The most important feature of DM is a long standing hyperglycemia, as a result of failure of the pancreas to produce insulin or cellular resistance to the insulin action or both. According to American Diabetic Association, diabetes mellitus is divided into 4 types: type1 which is due to damage of B-cells of the pancreas resulting in insulin reduction, type 2 is due to resistance of target organ to insulin cellular metabolic impact and the third type is the gestational DM that occur during pregnancy and another special type of DM due to other reasons ². Prolonged hyperglycemia in DM patients may lead to the formation of advanced glycation end products (AGEs) whose collection in blood and tissues is linked with DM complications ³. Uncontrolled DM increases the danger of complications, with HbA1c is an important plasma marker used to estimate the level of glucose amount in the plasma during the previous 2-3 months ⁴⁶. Cytological enzymes such as AST and ALT
may be considered as potential markers of salivary gland in the patho-mechanism of DM. Aminotransferases or transaminases are set of enzymes that stimulate the conversion of amino acid and oxalo acid by transmitting of amino groups to alpha-keto acid, so they are included in metabolism of protein. These enzymes are found in many body organs such as skeletal muscle, kidney, brain, pancreas, lungs, blood cells with more frequently found in the liver and heart, so any injury to these organs result in output of these enzymes into the extra cellular fluid.

### Subjects, Materials and Methods

This cross-sectional study composed of 90 subjects. The study group consists of 60 diabetic patients who were un controlled depending on the level of HbA1c test which should be above 8 %. All participants were carefully informed about the aim and objective of the study. Patients or their parents were sign a consent form after their agreement.

Patients were recruited from the Endocrinology and Diabetic Centre of AL-Sadder Teaching Hospital in AL Najaf city in Iraq, from December -2018 to March -2019).

The study group was divided into 2 groups; the 1st was 30 Type1DM patients and the 2nd was 30 Type 2DM patients. Control group consist of 30 healthy subjects without any history of systemic diseases, with an age and gender matched with the study group.

#### Inclusion criteria:

1. Patient with type1 and type 2 DM who were diagnosed at least 6 months before the study.
2. Patient without any systemic diseases.
3. Patient who was not taking any medications at least 3 months prior the study.
4. Non-smoker individual.
5. HbA1c test should be >8 %.

#### Exclusion criteria

1 Patients were excluded if they were on medications other than taking for type1 diabetes or type 2.
2. Those with any other systemic disease apart from diabetic mellitus.
3. Patient who will not sign his consent form.
4. Smoking patient.
5. If HbA1c test is below 8%.

### Saliva collection

The collection procedure of the saliva is by spitting method, with the subject was asked to set comfortably. Before collection of the saliva, patients were asked to rinse the mouth with distilled water.

Salivary sample were collected, for all subjects between 8 -11 a.m. to decrease the diurnal differences. Patient was asked not eat 1 hour before the sample collection, then saliva was collected for 10 minute and after that, saliva was placed in the ice box and send for laboratory for centrifuge (3000 rpm for 15 min) and then transferred for biochemical analysis.

### Blood collection

Two milliliters of venous blood was collected from antecubital vein, separated into 2 parts, one part in plan test tube for serum AST and ALT estimation, after centrifuging for 2 minutes, and in another test tube containing anticoagulant for HbA1c estimation. If the level of HbA1c was above 8%, then the collected samples in the plain tube (serum tube) were distributed in the appendrove tubes which then transferred for biochemical analysis.

### Method for AST, ALT determination

Estimation of serum and salivary AST, ALT were done by standard spectrophotometer method (340 nm) with the aid of kinetic spectrophotometer kits from AGGAPE Diagnostic (Switzerland) according to international federation of clinical chemistry (IFCC).

### Statistical Analysis

Descriptive statistic, mean, ANOVA test for variance analysis, post hoc (Dunnett T3) test, student T test and Pearson coefficient tests were used.

### Results

Salivary and serum Aspartate aminotransferase
Using ANOVA test, a highly significant difference was found in salivary AST value among type 1, type 2 and control groups (p=0.000), table (1-1).

**Table (1): Mean salivary AST among studied groups.**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Study groups</th>
<th>No.</th>
<th>Mean AST</th>
<th>SD</th>
<th>Std. Error</th>
<th>F</th>
<th>P- value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salivary AST (IU/L)</td>
<td>Type 1 DM</td>
<td>30</td>
<td>94.17</td>
<td>22.38</td>
<td>4.08</td>
<td>184.9</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Type 2 DM</td>
<td>30</td>
<td>48.60</td>
<td>9.80</td>
<td>1.79</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>30</td>
<td>21.53</td>
<td>7.04</td>
<td>1.05</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Using post hoc (Dunnett T3) test, the result revealed a higher significant difference in the salivary level of AST between type 1 and type 2 (p=0.000) and similarly between the two diabetic and control group (p=0.000), table (1-2).

**Table (2): Post hoc (Dunnett T3) test of salivary AST between studied groups.**

<table>
<thead>
<tr>
<th>Enzyme</th>
<th>(I) Study groups</th>
<th>(J) Study groups</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salivary AST (IU/L)</td>
<td>Type 1 DM</td>
<td>Type 2 DM</td>
<td>45.567*</td>
<td>4.460</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Control</td>
<td>72.033*</td>
<td>4.284</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Type 2 DM</td>
<td>Control</td>
<td>26.467*</td>
<td>2.201</td>
<td>0.000</td>
</tr>
</tbody>
</table>

While no statistical difference was found (p=0.134) in serum AST among studied groups using ANOVA test, table (3).

**Table (3): Mean AST in serum in type 1, type 2 and healthy control group.**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Study groups</th>
<th>No.</th>
<th>Mean AST</th>
<th>SD</th>
<th>Std. Error</th>
<th>F</th>
<th>P- value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AST serum (IU/L)</td>
<td>Type 1 DM</td>
<td>30</td>
<td>22.7</td>
<td>5.91</td>
<td>1.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Type 2 DM</td>
<td>30</td>
<td>19.41</td>
<td>5.31</td>
<td>0.97</td>
<td>0.637</td>
<td>0.134</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>30</td>
<td>16.33</td>
<td>4.81</td>
<td>0.88</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Salivary and serum Alanine aminotransferase (ALT)

Using ANOVA test, a higher significant difference was seen in the level of salivary ALT among type 1 DM, type 2 DM and control group (p=0.000), Table (1-4).

**Table (4): Mean salivary ALT level among studied groups.**

<table>
<thead>
<tr>
<th>Enzymes</th>
<th>Study groups</th>
<th>Mean ALT</th>
<th>SD</th>
<th>Std. Error</th>
<th>F</th>
<th>P- value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salivary ALT</td>
<td>Type 1 DM</td>
<td>86.20</td>
<td>21.78</td>
<td>3.98</td>
<td>162.92</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Type 2 DM</td>
<td>55.17</td>
<td>8.48</td>
<td>1.55</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>20.63</td>
<td>6.84</td>
<td>1.25</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Using post hoc (Dunnett T3) test, the result showed a highly significant difference between type 1 and control group, similarly between type 2 and control group (p=0.000).

Also, a significant difference in the salivary level of ALT between type 1 and type 2 DM (P=0.000) was seen, Table (1-5).

**Table (5): Post hoc (Dunnett T3) test of salivary ALT between studied groups.**

<table>
<thead>
<tr>
<th>Enzyme (I) Study groups (J) Study groups</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salivary ALT (IU/L)</td>
<td>Type1DM</td>
<td>31.03</td>
<td>4.27</td>
</tr>
<tr>
<td></td>
<td>Type2DM</td>
<td>65.47</td>
<td>4.17</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>34.43</td>
<td>1.98</td>
</tr>
</tbody>
</table>

Considering serum level of ALT, there was no significant difference among the study groups (p=0.247) using ANOVA test, Table (1-6).

**Table (6): Mean ALT level in serum of type 1, type 2 DM and healthy control group.**

<table>
<thead>
<tr>
<th>Enzyme</th>
<th>Study groups</th>
<th>Mean</th>
<th>SD</th>
<th>Std. Error</th>
<th>F</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALT serum (IU/L)</td>
<td>Type 1 DM</td>
<td>25.23</td>
<td>5.69</td>
<td>1.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Type 2 DM</td>
<td>23.56</td>
<td>5.75</td>
<td>1.05</td>
<td>0.431</td>
<td>0.247</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>18.77</td>
<td>6.40</td>
<td>1.17</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Regarding the duration of DM, patients were divided into 2 groups: more than 5 years duration and less than 5 years duration.

There was a statistically significant increase in the level of salivary enzymes in group less than 5 years compared to those of more than 5 years in type 1 DM. Considering the level of enzymes in the serum, no significant difference was found in relation to disease duration.

**Discussion**

In the present study, there was statistically significant difference in the salivary AST and ALT levels in type1 and type2 DM as compared to salivary level of the control group. This is in agreement with other studies which found salivary AST and ALT levels was higher in type1 compared with type 2 DM and to healthy control group (3,7,9) as they were found three fold and four fold elevation in salivary level of AST and ALT of type1 DM group as compared to control group, respectively, similar to the result of present study.

Comparing type 1DM to type 2 DM, there was increasing in the salivary mean AST and ALT levels in type1 as compared to type2 DM was seen in the current study as there was twofold increasing in ALT and AST in type1 DM as compared to type2 DM group. This finding is consistent with what was reported in a study of Malicka et al. (2016) who reported twofold elevation in salivary AST and ALT levels as compared to type 2 diabetic group, also in agree with studies of (10,11,12) who found AST and ALT value were higher in type1DM as compared to type 2 DM. So the results of present and past studies support the hypothesis that an auto immunological process in type 1 DM will lead to salivary glands damage and increased level of these enzymes (3,10).

There was no significant difference was seen in serum levels of AST and ALT among study groups although there was slight rising in the value of AST and ALT in diabetic groups which is in parallel with a study that done by Vinod et al. (2018) who reported normal serum value of ALT and AST in diabetic and control groups but no statistically significant. Although the result of a study done by Vinod (2006) found normal value of serum AST and ALT levels in type 1 DM patients, but he was found significant difference regarding serum enzymatic value between type1 DM patients and control group.

Lactate dehydrogenase, aspartate aminotransferase and alanine aminotransferase are widely present in the body tissues and whole cells (cytological enzymes) especially in the cytoplasm of the cells in addition to that, AST is also located in the mitochondria. When there is damaging to the tissue, serum levels of these enzymes will be elevated as a result of their infiltration from the tissues that were damaged. In turn, elevated salivary level of AST and ALT may be attributed to damage to cells of the salivary gland by different way (3,10,13).

Also the study that done by Cinquini et al. (2002) on type1 DM children reported damage in the salivary gland demonstrated by histopathological presentation of lymphocytic cells in the damaged glands cells. So, it was reported that there was an immunological activity in the salivary gland and causing cells damage similar to the action of antibodies to pancreatic B cells as there was particular antibodies against antigens of the salivary gland (10). This demonstrated why level of salivary AST and ALT were higher in type1 DM when compared to type2 DM and to control group.

It was found that inflammatory process of periodontal tissues in the same time of presence of DM causing elevation in the salivary value of AST and ALT (14). The present study reported different periodontal disease in two diabetic groups so this lead to a suggestion that autoimmunological activity plus periodontal inflammation will result in significantly elevated salivary level of AST and ALT in type1 DM as compared to type 2 and healthy groups; also in type 2 when compared to healthy control group.

In addition to that, this study reported a statistically significant difference in salivary levels of AST and ALT in type1 DM regarding different disease durations as their values were higher in 1-5 years duration than in more than 5 years duration of DM. This result consistent with the findings that were reported by (7,10, 11) who found higher levels of AST and ALT in patients discovered with diabetes since 4 years and 5 years clinical duration, respectively.

Although Vinod (2006) and Vinod et al. (2018) found high levels of salivary AST and ALT in 0-5
year clinical duration of diabetes than in more 5 years duration, but was found no significant difference in serum and salivary AST and ALT values in different disease duration, but this study found statistically significant difference in salivary values of AST and ALT regarding different disease durations may be due to size of the sample and patient condition.

On the other hand, it was found no significant difference in serum and salivary enzymes level in different type2 DM duration. This finding is consistent with the study done by Al-Rubaee et al. (2010) (15) who reported no significant difference between salivary enzymes activities and various disease durations.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Dentist in department of oral diagnosis and all experiments were carried out in accordance with approved guidelines.

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Effectiveness of an Educational Program Regarding Postpartum Care on Women’s Practices in Primary Health Care Centers at Amara City /Iraq

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Abstract

Objective: determined the effectiveness of educational program on women’s practices for Mothers’ Care in Postpartum Period in Primary Health Care Centers at Amara City.

Methodology: Quasi-experimental design is accomplish on non-probability (Purposive sample) used to collect the data from 172 multigravida women, (86) study group and(86) control group who were selected from the eight primary health care centers (AL-Uroba Primary Health Care Center, AL Zahraa Primary Health Care Center, AL Hasen AL-Asker Primary Health Care Center, AL-Qudis primary health care center, AL-Ameer primary health care center, AL-Jawideen primary health care center, AL- Amam AL-Husaaan. Primary health care center and Ali AL-Ridha Primary Health Care Center.) These centers are choose randomly from 16 primary health care centers in the first sector. The study was conducted from (1st December, 2018 to 1st December, 2019.).

Results: The findings of the study indicated that (48%), (45%) respectively were in the age group (24-31) years for both study and control groups, a quarter of the both study and control group were primary school graduates, more than three quarter were housewives for both study and control groups, The majority of the women were living in urban area specifically for the study and control group, the majority of women in the study and control group were live equally of nuclear and extended families. Regarding to the reproductive characteristics more than a fifth women had five-six pregnancies for study group and quarter of the control group were had three pregnancies, and around a quarter of the study group were have three deliveries and more than fifth for control group were had two deliveries, as well as, three quarter of women in the both study and control group reported that they do not have abortion 64(74.4%), 62 (72.1%) respectively.

Key words: Education, Effectiveness, Postpartum Period, Practices, Women

Introduction

Postpartum period marks the establishment of a new phase of family life for women and their partners and the beginning of the lifelong health record for newborn babies¹, These have highlighted widespread and persistent health problems experienced by women after childbirth, many of which are unreported by women and not identified by healthcare professionals, common health problems include physical morbidity such as backache, breastfeeding problems, perineal pain, stress incontinence, and mental health problems², such as postnatal depression³. Mothers and their newborn babies are at highest risk of dying during the early neonatal period, especially in the first 24 hours following birth and over the first seven days after delivery it estimate about 45% maternal mortality, (50%) newborns who die do so in the first 24 hours after birth, and 65% Maternal mortality, and (75%) neonatal deaths occur within one week of birth (²) Postpartum period, or puerperium, starts about an hour after the delivery of the placenta and includes the following six
weeks. Postpartum care should include the prevention and early detection and treatment of complications and disease, and the provision of advice and services on breastfeeding, birth spacing, immunization and maternal nutrition (3).

Traditional practices are usually derived from the relations with the environment and the attitude of early humans toward nature. These practices usually develop over time and by trial and error in most cases (4).

Mothers in purperium period may be suffering from illness, heaviness, inability to speak, crying, loss of appetite, high fever, bruises, delusions and somniloquy. The example for the practices of mothers use to guard against puerperal fever including not leaving the household for 40 days, not being alongside another mother, not being left alone with the infant for 40 days and 40 nights, keeping a talisman and the Quran at hand, putting scissors or a knife under their pillow and hanging onions or garlic near their bed (5).

Every society and country has its own traditional belief and practice related to postpartum care, most of the practices like rituals and belief, some of the practices are beneficial to the mother and children (6).

Methodology

Quasi-experimental design is accomplish on non-probability (Purposive sample) used to collect the data from 172 multigravida women, (86) study group and (86) control group who were selected from the eight primary health care centers (AL-Uroba Primary Health Care Center, AL Zahraa Primary Health Care Center, AL Hasen AL-Askerry Primary Health Care Center, AL-Qudis primary health care center, AL-Ameer primary health care center, AL-Jawideen primary health care center, AL- Amam AL-Husaan. Primary health care center and AL-AL-Ridha Primary Health Care Center.) These centers were chosen randomly from 16 primary health care centers in the first sector. The study was conducted from (1st December, 2018 to 1st Decebet, 2019.). The questionnaire was consisted of three main parts, including: part 1 socio-demographic characteristics, part 2/ Reproductive Characteristics and part three women’s practices toward postpartum period this part consisted of (23) items these part consists of (three) domain, first domain: women’s practice toward nutritional behaviors in postpartum period, this domain consists of (nine) items. Second domain: women’s practice about breast feeding: this domain was consisted of (seven) items. Third domain: women’s practice related to personal hygiene, this domain was consisted of (seven) items. The content validity of questionnaires are determined through 12 panels of experts from different fields.

Table (1) Distribution of Study Sample (Study and Control Group) According to Reproductive Characteristics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Study Group (n = 86)</th>
<th>Control (n = 86)</th>
<th>D.F</th>
<th>P value</th>
<th>Sign</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>%</td>
<td>F</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Gravidity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>18</td>
<td>20.9</td>
<td>21</td>
<td>24.4</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>19</td>
<td>22.1</td>
<td>23</td>
<td>26.8</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>13</td>
<td>15.1</td>
<td>9</td>
<td>10.5</td>
<td></td>
</tr>
<tr>
<td>5-6</td>
<td>19</td>
<td>22.1</td>
<td>21</td>
<td>24.4</td>
<td></td>
</tr>
<tr>
<td>7-8</td>
<td>11</td>
<td>12.8</td>
<td>7</td>
<td>8.1</td>
<td></td>
</tr>
<tr>
<td>&gt; 9</td>
<td>6</td>
<td>7.0</td>
<td>5</td>
<td>5.8</td>
<td></td>
</tr>
<tr>
<td>Mean (SD)</td>
<td>4.54±2.3</td>
<td></td>
<td>4.16±2.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>13</td>
<td>15.1</td>
<td>18</td>
<td>20.9</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>18</td>
<td>20.9</td>
<td>26</td>
<td>30.2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>22</td>
<td>25.6</td>
<td>9</td>
<td>10.5</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>9</td>
<td>10.5</td>
<td>17</td>
<td>19.8</td>
<td></td>
</tr>
<tr>
<td>5-6</td>
<td>18</td>
<td>20.9</td>
<td>10</td>
<td>11.6</td>
<td></td>
</tr>
<tr>
<td>&gt; 7</td>
<td>6</td>
<td>7.0</td>
<td>6</td>
<td>7.0</td>
<td></td>
</tr>
</tbody>
</table>
**Table (1) Distribution of Study Sample (Study and Control Group) According to Reproductive Characteristics**

<table>
<thead>
<tr>
<th>Mean (SD)</th>
<th>3.43± 2.1</th>
<th>3.04±1.9</th>
<th>3</th>
<th>0.665</th>
<th>NS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abortion</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>64</td>
<td>74.4</td>
<td>62</td>
<td>72.1</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>12</td>
<td>14.0</td>
<td>13</td>
<td>15.1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>9.3</td>
<td>9</td>
<td>10.5</td>
<td></td>
</tr>
<tr>
<td>≥3</td>
<td>2</td>
<td>2.3</td>
<td>2</td>
<td>2.3</td>
<td></td>
</tr>
</tbody>
</table>

Mean (SD) 0.4±0.75 0.5±0.9

| Stillbirth | | | | |
| None | 70 | 81.4 | 72 | 83.7 | | |
| 1 | 6 | 7.0 | 10 | 11.6 | | |
| 2 | 6 | 7.0 | 3 | 3.5 | | |
| ≥3 | 4 | 4.6 | 1 | 1.2 | | |

n=Number of Sample, F.=Frequencies, % Percentage, SD=Standard Deviation, χ²=Chi Square, df=degree of freedom, C.S=Comparison Significant, NS=Non Significant at p-value p < 0.05.

Table (1) Concerning gravidity, the gravidity mean for women in the study group is 4.54 ± 2.3; showed that the same highest percentage of study group 19(22.1%) had three and five-six pregnancy, followed by those who have two pregnancies 18(20.9%), those who have four pregnancies 13( 15.1%), those who 7-8 pregnancies 11(12.8%), and those who have nine or more pregnancies 6(7.0%). For the control group, the gravidity mean is 4.16 ± 2.2; showed that more than a quarter have three pregnancies 23( 26.8%), followed by those who have two pregnancies 21(24.4%), those who have four pregnancies 8( 9.3%), those who have 7-8 pregnancies 7( 8.1%), and those who have nine or more pregnancies 5(5.8%).

**Table (2) Differences in women’s practices related to breastfeeding during puerperium between pretest and posttest for the study group**

<table>
<thead>
<tr>
<th>Li st</th>
<th>Item</th>
<th>Response</th>
<th>Pretest - Study C. (n= 80)</th>
<th>Posttest - Study C. (n= 80)</th>
<th>t</th>
<th>P-value</th>
<th>C.S</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Initiation of breastfeeding immediately after delivery</td>
<td>Never</td>
<td>7</td>
<td>90 .7</td>
<td>0</td>
<td>0</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>1</td>
<td>1. 2</td>
<td>1</td>
<td>20</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Always</td>
<td>7</td>
<td>8</td>
<td>1</td>
<td>39. 0</td>
<td>L</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Initiation of Breast feeding from each breast alternately</td>
<td>Never</td>
<td>7</td>
<td>90 .7</td>
<td>0</td>
<td>0</td>
<td>L</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>3</td>
<td>3. 5</td>
<td>2</td>
<td>24</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Always</td>
<td>5</td>
<td>5</td>
<td>8</td>
<td>38. 3</td>
<td>L</td>
<td></td>
</tr>
</tbody>
</table>
**Table (3) Differences in women’s practices related to personal hygiene during puerperium between pretest and posttest for the study group**

<table>
<thead>
<tr>
<th>Item</th>
<th>Response</th>
<th>Pretest - Study G. (n=86)</th>
<th>Posttest - Study G. (n=86)</th>
<th>t</th>
<th>P-value</th>
<th>C.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>MS</td>
<td>R.S. %</td>
<td>As. s.</td>
<td>f</td>
</tr>
<tr>
<td>1.</td>
<td>Wash hands with soap and water before and after changing perianal pad</td>
<td>Never</td>
<td>5</td>
<td>4.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>3</td>
<td>25</td>
<td>63</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Always</td>
<td>1</td>
<td>69</td>
<td>53</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Ass.= Assessment, C.S. = Comparative Significance, Corr. = Correct, f = Frequency, R.S less than 66.6% (Low), 77.77% - 88.88% (Moderate), 88.89% - 100% (High)**

**MS = Mean Score, n= Number of sample, R.S = Relative Sufficiency, % = Percentage, t = t-test, S = Significant at P-value ≤ 0.05.**
<table>
<thead>
<tr>
<th>2. Wash the perineum area, including a warm containing sterile material (such as iodine or Heptane)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Always</strong></td>
</tr>
<tr>
<td><strong>Sometimes</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Cleaning the area from the pubic bone to the anal area</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Never</strong></td>
</tr>
<tr>
<td><strong>Sometimes</strong></td>
</tr>
<tr>
<td><strong>Always</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. Changing perineal pad every 2-3 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Never</strong></td>
</tr>
<tr>
<td><strong>Sometimes</strong></td>
</tr>
<tr>
<td><strong>Always</strong></td>
</tr>
</tbody>
</table>

**Table (4) Difference in Women’s Overall Practices between the Pretest and Posttest for Study and Control Group**

| Paired Samples Test |
|---------------------|-----------------|-----------------|-----------------|
| Overall Practices   | Paired Differences | 95% Confidence Interval of the Difference |
| Mean               | Std. Deviation  | Mean       | Std. Error Mean | t       | df  | Sig. (2-tailed) |
| Study Pretest – Study posttest | -20.790 | 5.980 | 0.644 | -22.072 | -19.508 | -32.238 | 85 | .000 |
| Control Pretest – Control Posttest | -0.23 | 0.151 | 0.016 | -0.055 | 0.009 | -1.423 | 85 | 0.159 |

Ass. = Assessment, C.S. = Comparative Significance, Corr. = Correct, f = Frequency, H = High R.S less than 66.6% (Low), 77.77% - 88.88% (Moderate), 88.89%-100% (High), MS = Mean Score, n = Number of sample, R.S = Relative Sufficiency, % = Percentage, t = t-test, S = Significant at P-value ≤ 0.05.
Table (1) shows that more than a fifth had 5-6 pregnancies (19; 22.1%) for study group while more than a quarter have the same pregnancies (23; 26.8%) for control group, and Regarding parity around a quarter have three deliveries (n = 22; 25.6%). for study group and for control group less than a third have two deliveries (n = 26; 30.2%), These finding indicated that most of the study sample were “grandmulti gravida & para”. The study concluded that the study sample may had no awareness for using family planning ,or the desire and attitude of the couples to have big family related to the social norms and culture perspectives of the area in Governorate of Mysan. Begum (2003) who reported that the lack of health education ,religious taboos ,against the use of family planning methods and vogue of having large families (especially in a rural areas ) accounts for the increased complications associated with high gravidity(15). Shahid and Moshtaq (2009) who reported in their study that maternal complications increased with the increased of parity ,so the grandmultipara still as high risk pregnancy .In addition the risk of having suboptimal pregnancy outcomes increase in women who are experiencing their sixth or higher birth(16).

Alameda (2006). In a cross-sectional analysis of over 500,000 women delivered between 1992 to 1997 in New South Wales ,Australia ,the incidence of obstetric complications found to be increased significantly from parity 4 onwards.

Number of Live Children

Regarding the number of live children, more than a quarter reported that they have three live children (24; 27.9%), for study group , and for control group, less than a third reported that they have three live children (28; 32.6%). This result agree with Masoud and Saber(2016) who was conducted on (100) primiparous and multiparous, at the BeniSuef general hospital in Egyptian. They showed that shows that; nearly more than quarter of the sample of pregnant women had three live children (26%) (17).

Gestational Age

Regarding the gestational the result indicated that more than a half of study and control group weeks(46; 53.5%),(46; 53.5%) respectively were their gestational age between 35-38 weeks. This result agree with Salhi e et al., (2019) they conducted at Maternity & Children’s Hospital at the city of Najran,Saudi Arabia, between May and August 2018, on 502 women , who showed that( 49.6%) were 37–40 weeks of pregnancy. The results of present study indicated that major study sample were in third trimester, and Commitment visits within this trimester (22).

Conclusions

The study was concluded there was a statistically significant difference in women’s overall practices related to puerperium between the pretest and posttest for study group while for the control group, there is no statistically significant difference in women’s overall practices during puerperium between the pretest and posttest times.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Ministry of Health and all experiments were carried out in accordance with approved guidelines.

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The changes in Blood Pressure in Patients Undergoing Spinal Anesthesia According to the Size of Spinal Needle (G22 versus G24): Case Reference Study

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1Anesthesia and Intensive Care Specialist / Al-Diwaniyah Teaching Hospital / Department of Anesthesia / Al-Diwania / Iraq

Abstract

Background: Previous studies of patients with spinal anesthesia prior to sympathectomy revealed that vasodilatation and hypotension, with subsequent reduction in arterial pressure, were the most common side effects (observed in more than 30% of patients). Hypotension in epidural anesthesia was stated to be more gradual and less extreme than in spinal anesthesia when a comparable amount of anesthesia was given.

Aim of the study: In the current study, we are aiming to evaluate the effect of different size of spinal needle on development of possible blood pressure changes throughout the spinal anesthesia procedure.

Patients and Methods: The current observational case reference study was carried out at Al-Diwaniyah Teaching Hospital in Al-Diwaniyah Province, Iraq. The beginning of the study is dated back to the 3rd of April 2018 and the study continued till September the 15th 2019. It included 60 patients undergoing spinal anesthesia for various surgical operations. In 30 patients a spinal needle of 22 gauge was used whereas in the second group (n = 30), a spinal needle of gauge 24 was used. All patients were instructed to be nil by mouth overnight.

Results: In group 1 (22G), mean systolic blood pressure showed gradual reduction, 139.00 ±8.35 mmHg, 120.67 ±11.43 mmHg, 106.00 ±11.02 mmHG and 97.33 ±10.15 mmHg; similarly, in group 2 (24G) mean systolic blood pressure showed gradual reduction, 144.00 ±10.37 mmHg, 138.00 ± 7.61 mmHg, 131.33 ±9.00 mmHG and 131.67 ±11.40 mmHg; however, the rate of reduction in group 2 (G24) was less than that seen in case of group 1 (G22). In group 1 (22G), mean diastolic blood pressure showed gradual reduction, 84.00 ±7.24 mmHG, 72.00 ±6.64 mmHg, 61.33 ±9.73 mmHG and 54.00 ±8.94 mmHg; similarly, in group 2 (24G) mean diastolic blood pressure showed gradual reduction, 87.33 ±7.85 mmHg, 81.33 ±7.30 mmHg, 77.33 ±10.15 mmHG and 78.00 ±5.51 mmHg; however, the rate of reduction in group 2 (G24) was less than that seen in case of group 1 (G22).

Conclusion: It appears that the use of narrower spinal needle is recommended as it is associated with significantly less drop in both systolic and diastolic blood pressure, thus less hemodynamic disturbances in patients undergoing spinal anesthesia for various indications

Key words: blood pressure, spinal anesthesia according, spinal needle (G22 versus G24)

Introduction

The introduction of regional anesthesia accompanied the isolation of local anesthetic agents, cocaine being the first one, and the first regional technique can be traced back in time to 1898 when the German doctor August Bier did the an operation using spinal anesthesia 1. The spinal anesthesia is included within the umbrella of neuraxial type of anesthesia in which the local anesthetic agent is introduced directly into the subarachnoid space (intrathecal space) 2,3. The form of anesthesia procedure used depends on different factors, such as the desires of the anesthesiologist and patient, in addition to the age of the patient, the type of operation, underlying disorders,
the location of the body intraoperatively, the length of the surgery and the methods of pain management. Regional anesthesia (spinal and epidural) is often used for surgery involving the lower abdomen or limbs to produce the sensory levels required while having minimal effects on the sympathetic nervous system. Spinal and epidural anesthesia contraindications include patient resistance, sepsis, site infection, increased intracranial pressure, local anesthetic allergies and inability to maintain the required body position. A range of advantages have been identified in conjunction with spinal anesthesia, such as negligible failure rate, anesthesia onset is very rapid, pain relief is satisfactory due to dense neuronal blockage and patient morbidity avoidance after major surgery; however, solid opinion about these benefits is lacking. This form of anesthesia is actually preferred for the procedure of the cesarean section due to the rapid start of action. The results of some meta-analyses and randomized controlled clinical trials are uncertain about the outcome and benefits of spinal anesthesia.

A number of drawbacks have been identified in connection with spinal anesthesia, such as short-term pain relief, increased incidence of hypotension and post-spinal puncture headache. Previous studies of patients with spinal anesthesia prior to sympathectomy revealed that vasodilatation and hypotension, with subsequent reduction in arterial pressure, were the most common side effects (observed in more than 30% of patients). Hypotension in epidural anesthesia was stated to be more gradual and less extreme than in spinal anesthesia when a comparable amount of anesthesia was given.

In the current study, we are aiming to evaluate the effect of different size of spinal needle on development of possible blood pressure changes throughout the spinal anesthesia procedure.

Patients and Methods

The current observational case reference study was carried out at Al-Diwaniyah Teaching Hospital in Al-Diwaniyah Province, Iraq. The beginning of the study is dated back to the 3rd of April 2018 and the study continued till September the 15th 2019. It included 60 patients undergoing spinal anesthesia for various surgical operations. In 30 patients a spinal needle of 22 gauge was used whereas in the second group (n = 30), a spinal needle of gauge 24 was used. All patients were instructed to be nil by mouth overnight.

They were given the following premedications: ranitidine 50 mg and metoclopramide 10 mg. An intravenous line was established using the antecubital vein by an 18 gauge cannula on arrival to operative room. Monitoring included: pulse oximeter, blood pressure, pulse rate and ECG. An intravenous fluid in the form of ringer lactate was given in a dose of 10mg/kg for 10 minutes before starting subarachnoid block. A midline approach was used with the patient in sitting position at L3-L4 or L4-L5 level with a Quincke spinal needle (22G or 24G). Keeping the needle bevel parallel to dural fiber was assured. Injection of heavy bupivacaine 9-12.5 mg (1.8-2.5ml) was performed once clear CSF fluid was obtained.

The approval of this study was made by the institutional ethical approval committee and a verbal consent was made by every participant. Variables included in the current study were gender, age, type of operation and successive measurements of blood pressure. The obtained data were transformed into an SPSS (IBM, Chicago, USA, version 23) spread sheet for purpose of statistical description and analysis. Chi-square test was used to study association between categorical variables whereas, independent samples t-test was used to study mean difference of quantitative variables between the two study groups. The level of significance was set at P ≤ 0.05.

Results

The present study included 60 patients undergoing spinal anesthesia for various types of operations who were randomly allocated into two groups according to spinal needle caliber size (gauge 22 versus gauge 24). The age range and mean age in addition to frequency distribution of patients according to gender are shown in table 1. There was no significant difference in mean age and frequency distribution according to gender between both study groups (P > 0.05), table 1. Table 2 shows the frequency distribution of patients according to type of surgical operation.
Table 3 showed the mean systolic blood pressure readings at baseline, 10 minutes, 20 minutes and 30 minutes. In group 1 (22G), mean systolic blood pressure showed gradual reduction, 139.00 ±8.35 mmHG, 120.67 ±11.43 mmHg, 106.00 ±11.02 mmHG and 97.33 ±10.15 mmHg; similarly, in group 2 (24G) mean systolic blood pressure showed gradual reduction, 144.00 ±10.37 mmHG, 138.00 ± 7.61 mmHg, 131.33 ±9.00 mmHG and 131.67 ±11.40 mmHg; however, the rate of reduction in group 2 (G24) was less than that seen in case of group 1 (G22), table 3 and figure 1.

Table 4 showed the mean diastolic blood pressure readings at baseline, 10 minutes, 20 minutes and 30 minutes. In group 1 (22G), mean diastolic blood pressure showed gradual reduction, 84.00 ±7.24 mmHG, 72.00 ±6.64 mmHG, 61.33 ±9.73 mmHG and 54.00 ±8.94 mmHg; similarly, in group 2 (24G) mean diastolic blood pressure showed gradual reduction, 87.33 ±7.85 mmHG, 81.33 ±7.30 mmHG, 77.33 ±10.15 mmHG and 78.00 ±5.51 mmHg; however, the rate of reduction in group 2 (G24) was less than that seen in case of group 1 (G22), table 3 and figure 1.

The difference in mean blood pressure, whether systolic or diastolic, at similar occasions (10, 20 and 30 minutes) was highly significant between group 1 and group 2 (P < 0.001), tables 3 and 4.

Table 1: General characteristics of patients enrolled in the current study

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Group 1 (Gauge 22) n = 30</th>
<th>Group 2 (Gauge 24) n = 30</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>30 - 80</td>
<td>38 - 75</td>
<td>0.119 † NS</td>
</tr>
<tr>
<td>Mean ±SD</td>
<td>51.60 ±14.02</td>
<td>56.87 ±11.63</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male, n (%)</td>
<td>22 (73.3 %)</td>
<td>24 (80.0 %)</td>
<td>0.542 ¥ NS</td>
</tr>
<tr>
<td>Female, n (%)</td>
<td>8 (26.7 %)</td>
<td>6 (20.0 %)</td>
<td></td>
</tr>
</tbody>
</table>

n: number of cases; SD: standard deviation; †: independent samples t-test; ¥: Chi-square test; NS: not significant at P > 0.05

Table 2: Types of operations according to group

<table>
<thead>
<tr>
<th>Operation type</th>
<th>Group 1 (Gauge 22) n = 30</th>
<th>Group 2 (Gauge 24) n = 30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anal fissure</td>
<td>0 (0.0 %)</td>
<td>2 (6.7 %)</td>
</tr>
<tr>
<td>Bilateral inguinal hernia</td>
<td>0 (0.0 %)</td>
<td>2 (6.7 %)</td>
</tr>
<tr>
<td>Cesarean section</td>
<td>4 (13.3 %)</td>
<td>2 (6.7 %)</td>
</tr>
<tr>
<td>Fistula in ano</td>
<td>0 (0.0 %)</td>
<td>4 (13.3 %)</td>
</tr>
<tr>
<td>Gluteal mass</td>
<td>2 (6.7 %)</td>
<td>0 (0.0 %)</td>
</tr>
</tbody>
</table>
Table 2: Types of operations according to group

<table>
<thead>
<tr>
<th>Operation</th>
<th>Group 1 (Gauge 22)</th>
<th>Group 2 (Gauge 24)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemorrhoidectomy</td>
<td>4 (13.3 %)</td>
<td>2 (6.7 %)</td>
</tr>
<tr>
<td>Hydrocelectomy</td>
<td>4 (13.3 %)</td>
<td>0 (0.0 %)</td>
</tr>
<tr>
<td>Percutaneous nephrolithotomy</td>
<td>4 (13.3 %)</td>
<td>2 (6.7 %)</td>
</tr>
<tr>
<td>Pilonidal sinus</td>
<td>2 (6.7 %)</td>
<td>0 (0.0 %)</td>
</tr>
<tr>
<td>Prostatectomy</td>
<td>2 (6.7 %)</td>
<td>0 (0.0 %)</td>
</tr>
<tr>
<td>Right inguinal hernia</td>
<td>2 (6.7 %)</td>
<td>6 (20.0 %)</td>
</tr>
<tr>
<td>Total abdominal hysterectomy</td>
<td>0 (0.0 %)</td>
<td>2 (6.7 %)</td>
</tr>
<tr>
<td>Transurethral resection of the prostate (TURP)</td>
<td>2 (6.7 %)</td>
<td>0 (0.0 %)</td>
</tr>
<tr>
<td>Ureteroscopy</td>
<td>4 (13.3 %)</td>
<td>4 (13.3 %)</td>
</tr>
<tr>
<td>Vesical stone</td>
<td>0 (0.0 %)</td>
<td>4 (13.3 %)</td>
</tr>
</tbody>
</table>

Table 3: Changes in mean systolic blood pressure during operation time according to spinal needle size

<table>
<thead>
<tr>
<th>Systolic blood pressure (mm Hg)</th>
<th>Group 1 (Gauge 22) n = 30</th>
<th>Group 2 (Gauge 24) n = 30</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ±SD</td>
<td>139.00 ±8.35</td>
<td>144.00 ±10.37</td>
<td>0.054 †</td>
</tr>
<tr>
<td>Range</td>
<td>130.00 -150.00</td>
<td>130.00 -160</td>
<td>NS</td>
</tr>
<tr>
<td>10 minutes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ±SD</td>
<td>120.67 ±11.43</td>
<td>138.00 ±7.61</td>
<td>&lt; 0.001 †</td>
</tr>
<tr>
<td>Range</td>
<td>100.00 -140.00</td>
<td>130.00 -150</td>
<td>HS</td>
</tr>
<tr>
<td>20 minutes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ±SD</td>
<td>106.00 ±11.02</td>
<td>131.33 ±9.00</td>
<td>&lt; 0.001 †</td>
</tr>
<tr>
<td>Range</td>
<td>90.00 -130.00</td>
<td>120.00 -150</td>
<td>HS</td>
</tr>
<tr>
<td>30 minutes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ±SD</td>
<td>97.33 ±10.15</td>
<td>131.67 ±11.40</td>
<td>&lt; 0.001 †</td>
</tr>
<tr>
<td>Range</td>
<td>80.00 -110.00</td>
<td>110.00 -150</td>
<td>HS</td>
</tr>
</tbody>
</table>

n: number of cases; SD: standard deviation; †: independent samples t-test; NS: not significant at P > 0.05; HS: Highly significant difference at P ≤ 0.01
Figure 1: Changes in mean systolic blood pressure during operation time according to spinal needle size

Table 4: Changes in mean diastolic blood pressure during operation time according to spinal needle size

<table>
<thead>
<tr>
<th>Diastolic blood pressure (mm Hg)</th>
<th>Group 1 (Gauge 22) n = 30</th>
<th>Group 2 (Gauge 24) n = 30</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ±SD</td>
<td>84.00 ±7.24</td>
<td>87.33 ±7.85</td>
<td>0.093 †</td>
</tr>
<tr>
<td>Range</td>
<td>70 -100</td>
<td>80 -100</td>
<td>NS</td>
</tr>
<tr>
<td>10 minutes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ±SD</td>
<td>72.00 ±6.64</td>
<td>81.33 ±7.30</td>
<td>&lt; 0.001 †</td>
</tr>
<tr>
<td>Range</td>
<td>60 -80</td>
<td>60 -90</td>
<td>HS</td>
</tr>
<tr>
<td>20 minutes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ±SD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>61.33 ±9.73</td>
<td>77.33 ±10.15</td>
<td>&lt; 0.001 †</td>
</tr>
<tr>
<td>30 minutes</td>
<td>40 -70</td>
<td>50 -90</td>
<td>HS</td>
</tr>
<tr>
<td>Mean ±SD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>54.00 ±8.94</td>
<td>78.00 ±5.51</td>
<td>&lt; 0.001 †</td>
</tr>
<tr>
<td></td>
<td>40 -70</td>
<td>70 -90</td>
<td>HS</td>
</tr>
</tbody>
</table>

n: number of cases; SD: standard deviation; †: independent samples t-test; NS: not significant at P > 0.05; HS: Highly significant difference at P ≤ 0.01
Discussion

Despite being widely accepted by both patients and doctors, spinal anesthesia has some disadvantages that limit its use as a universal technique of anesthesia replacing the need for general anesthesia in daily surgical practice. Based on our clinical experience in Al-Diwaniyah teaching hospital, probably the most feared complication seen in association with spinal anesthesia is the development of hypotension. In the current study we demonstrated that blood pressure gets reduced with advancing time during spinal anesthesia; however, the magnitude of pressure reduction was clearly and significantly affected by needle size, being less with smaller caliber spinal needle of G24 in comparison with wider caliber spinal needle of G22.

Hypotension is a typical spinal anesthesia side effect and occurs in 16–33% of cases (Carpenter et al., 1992). This response is amplified in the elderly where a negative effect on a relatively higher sympathetic resting tone and reduced baroreceptor activity can explain the increased incidence of hypotension in response to spinal anesthesia (Salinas et al., 2003; Hartmann et al., 2002). Either a drop in systemic vascular resistance (SVR) or cardiac output (CO) or both are thought to cause hypotension after the onset of spinal anesthesia (Hofhuiizen et al., 2019). A decrease in SVR has been identified by several previous studies as the main determinant of hypotension. In these previous studies patients were given fluid loading just after or before the onset of spinal anesthesia (Lairez et al., 2015; Nakasuji et al., 2012). The loading of the fluid will greatly increase the intravascular volume and therefore the venous return (Hofhuiizen et al., 2019).

Probably this study is the first study that raised the issue that smaller size spinal needle is associated with significantly less drop in blood pressure during spinal anesthesia technique. Indeed, more research work is needed, experimental and clinical, in order to know exactly the mechanism explaining the lower reduction in blood pressure in association with smaller size spinal needle; however, for the present time it appears that the use of narrower spinal needle is recommended as it is associated with significantly less drop in both systolic and diastolic blood pressure, thus less hemodynamic disturbances in patients undergoing spinal anesthesia for various indications.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Al-Diwaniyah Teaching Hospital and all experiments were carried out in accordance with approved guidelines.

References


Nurses’ Knowledge based on Evidence Based Practice toward Eye Care for Intensive Care Units Patients

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Abstract

Background: Eye care in intensive care units is crucial to avoid eye problems associated with infections, use of medications, effect of mechanical ventilators, and patient position. Indeed, there is no specific guideline or protocols use in eye care in Iraqi intensive care units, so the study focused on nurses to assess their knowledge regarding evidence-based practice toward eye care.

Objectives: The objective of this study was to assess nurses’ knowledge regarding evidence-based practice toward eye care in intensive care units, and to find out relationships between their demographics and total knowledge.

Method: A descriptive study using a purposive sample (non-probability) was used to survey 30 nurses who met the sampling criteria in two teaching hospitals in the south of Iraq to assess their knowledge regarding eye care. A valid and reliable tool was used after getting the permission from the copyright holder.

Results: More than one-third of study sample were (22-26) years old they account (40%). Majority of them were male (56.7%), and (53.3%) of the study sample had bachelor’s degree in nursing. Regarding years of experience half of the study sample had more than five years of experience in intensive care units. Majority of the study sample (63.3%) has no participation in training courses about eye care and (83.3%) was day shift of work. The total mean of score of nurses’ knowledge was poor (0.33).

Conclusion: There is a need to conduct training courses for nurses who work in intensive care units about eye care based on standard as the results in this study indicated that there is a significance association between, nurses’ knowledge and participation in training course, about eye care.

Keywords: Eye Care, Nurse, Evidence Base, ICU Patients.

Introduction

The application of nurses’ knowledge in the critical care units promotes the professional identity of nursing practice. In intensive care units (ICU), the kingdom of nursing, nurse can play role, not only delivery of eye care and treatment, but rather assessment and diagnosis of eye disorders related to infection and can prevent complications if well trained and utilize right knowledge [1,2]. Unfortunately, nurses’ backgrounds regarding knowledge, even practice, toward eye care remains to be performed based on individual beliefs and tradition and documentation oftentimes unsatisfactory and poor [3,4]. The Royal college of Ophthalmologist (2017), designed guidance for non-ophthalmic staff in ICU includes, most common eye problems, identify disease and treatment when deliver to the eye when it is prescribed also, addressed factors such as, long length stay of mechanical ventilation, use of sedative drugs, and positive pressure ventilation as factors that can increase
risks of eye problems for patients with unconscious state [5]. Also, eye closure control, loss ability of blinking and tearing among ICU patients who are mostly comatose, sedated, paralyzed and under mechanical ventilation, because the altered level of consciousness (LOC), can cause ocular surface disease [6]. Eye closure is important to protect ocular surface (OS) via prevent not only the dryness but also bacterial growth. On the other hand, long-term eye closure decreases tear secretion and distribution, causes hypoxia and hypercapnia [3]. Blinking is important for distributing tears and sustaining eye health. Guler Eser & Fashafsheh in their international comparison study reported, that the impact of mechanical ventilation, intubation and tight securing taping for the artificial airways increase the intra-ocular pressure and aggravate cause chemosis (ventilator eye) [1]. Many literatures confirmed, not only pressure and infection related mechanical ventilation has effects on the eye, also patient positioning [3,7]. The prospective study investigates the effect of body position on intraocular pressure (IOP), confirmed the prone position record highest pressure among both, investigated and healthy groups [7]. Although, there are many studies in the world focused on eye care in intensive care units, in Iraq the information on this subject is inadequate [1,2,8,9,12,14]. In Iraq also, literatures published about eye screening and care in many types of eye disease in public, there is no study yet, assess nurses’ knowledge based on evidence-based practice toward eye care in ICUs [10]. The main goal of this study was to fill the gap and assess nurses’ knowledge based on evidence-based practice toward eye care for ICU patients in Iraq. The author hypothesized that most of nurses’ who works in ICUs in Iraqi hospitals have no enough knowledge toward eye care based on evidence-based practice.

Material and Method

Design: This is a descriptive study that was conducted to describe Iraqi nurses’ knowledge toward eye care using a questionnaire that contains questions based on evidence.

Ethical Approval: This study approved and permitted by Center of Staff Development and Scientific Research in the health directorate. The IRB was obtained from University of Al Muthanna. The purpose of the study was explained to the nurses who work in the ICUs in the selected hospitals. The informed consent was reviewed and permitted by the Center of Staff Development and Scientific Research. Every participant had the right to withdraw from the study at any time without any penalties.

Study sample: A non-probability (purposive) sample technique was used to collect the data. The populations are nurses who work in ICUs in Iraqi hospitals. The target population that provided the sample data was a group of nurses who met the sampling criteria. All male and female nurses with different educational levels who work in ICUs were included in this study. Also, nurses who work in day and night shifts were included in this study.

The total sample size was 42 who agreed to participate in this study. 12 participants did not wish to continue in the study or their responses were not complete, so they were excluded from the study sample. The total of 30 completed surveys was included in the statistical analysis.

Instrument: A valid and reliable tool that was developed by Fasafsheh et al. 2013, was used to collect the data in this study. The reliability of this tool shows, Cronbach’s alpha was 0.854, he permission to use this tool was obtained via email [11]. This tool consists 30 questions regarding eye care for ICU patients that are based on evidence. The total score for the tool measured based on the mean of the answers (<0.53= poor knowledge, 0.53- 0.79 =fair knowledge and > 0.79= good knowledge).

Also, the questionnaire included nurses’ demographics: age, gender, level of education, years of experience in the ICU, years of experience as a nurse, shift of work, and participation in training courses about eye care.

Data Analysis: The statistics done by the Statistical Package for the Social Sciences (SPSS) version 24 software was used to perform the statistical analysis that included descriptive statistics (frequency, percentage, cumulative percent and mean of score) and inferential statistics(standard deviation and Chi- square).

Findings

From the total 42 participants, 30 nurses completed
the survey and included in the statistical analysis. 40% of the nurses were between (22-26) years old with the mean of age (29.63) and standard deviation is (6.77). 60% of the study sample were married. Regarding to the gender distribution, male nurses were more than half of study subject (57.7%). Most of the nurses (83.3%) worked in day shift. Regarding their educational level, more than half of the nurses have bachelor’s degree in nursing (53.3%). The years of experience in ICU were half (50%) less than five years of the study sample, and 56.7% of them had more than five years of experience as a nurse in hospitals. Regarding the participation in training courses in eye care, 63.3% of study subject did not participate in any training courses about eye care for ICU patients. Table (1) Significance association between total mean of scores of nurses’ knowledge and their demographic characteristics (Age groups, gender, marital status, educational level, years of experience in ICUs, years of experience in nursing, and shift of work). The results showed that there are no significance differences between nurses’ knowledge toward eye care and their demographics. The total nurses Knowledge poor the mean of score (0.33). However, the results highlighted that participation in training courses regarding eye care has a significance association with nurses’ knowledge ($X^2$=10.622, p value=0.004)

**Table (1) Significance association between total mean of scores of nurses’ knowledge and their demographic characteristics (n=30)**

<table>
<thead>
<tr>
<th>Variables</th>
<th>X²</th>
<th>P value</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>73.466</td>
<td>.221</td>
<td>NS.</td>
</tr>
<tr>
<td>Gender</td>
<td>19.819</td>
<td>.100</td>
<td>NS.</td>
</tr>
<tr>
<td>Marital status</td>
<td>19.508</td>
<td>.814</td>
<td>NS.</td>
</tr>
<tr>
<td>Educational status</td>
<td>25.969</td>
<td>.465</td>
<td>NS.</td>
</tr>
<tr>
<td>Length of time in ICU</td>
<td>32.616</td>
<td>.174</td>
<td>NS.</td>
</tr>
<tr>
<td>Total length of time in Nursing</td>
<td>27.750</td>
<td>.371</td>
<td>NS.</td>
</tr>
<tr>
<td>Participation in training course related to eye care</td>
<td>10.622</td>
<td>.004*</td>
<td>Sig.*</td>
</tr>
<tr>
<td>Shift of work</td>
<td>15.600</td>
<td>.271</td>
<td>NS.</td>
</tr>
</tbody>
</table>

Sig.=significance <0.005, NS= Non significance >0.005

**Discussion**

This study assessed nurses’ knowledge who work in ICUs in Iraqi hospitals. Even eye care are not top priority in nursing care, but it is basic for every nurse work in ICUs even, non ophthalmic nurses. The results in this study revealed that nurses’ knowledge toward eye care is not significantly differ regarding demographics such as age, gender, marital status, educational level, years of experience in ICUs, years of experience as a nurse, and the work shift. It was not expected for researchers to see these results because logically high level of education and long years of experience in ICU or hospitals could increase nurse’s knowledge toward evidence-based practice. However, this can be explained as nurses in Iraqi hospitals, especially in ICUs, do not practice based on evidence, and the results of this study clearly found that most of the nurses had poor knowledge regarding eye care based on standard care. Therefore, further
studies can be conducted to assess Iraqi nurses’ practice regarding eye care based on evidence-based practice.

The results in this study showed that most of the study sample was highly educated and had bachelor's degree in nursing; this result agrees with Khalil et al. 2019 [12]. However, there was no significant difference between nurses’ educational level and their level of knowledge regarding eye care for ICU patients. This indicates that evidence-based practice is not a focused topic in nursing education. The researchers in this study recommend that evidence-based practice must be more engrossed in nursing curriculum in undergraduate programs. Although most of the study sample in this study reported that they have not participated in any training courses regarding eye care, the results highlighted that there was a significant difference between nurses’ knowledge and participating in training courses regarding eye care. Alghamdi et al. 2018, assessed ICU nurses’ knowledge and perception about eye care were the most of their study sample not participated in training course about eye care and no significance with their knowledge [13]. These results were expected by the researchers, and the current study recommends conducting training courses regarding eye care based on standard care for nurses in Iraqi hospitals within continuous education to increase their knowledge, which can lead to patient safety and enhance quality of care.

**Conclusion**

The results in this study showed that little of nurses’ who work in ICUs have enough have knowledge regarding eye care for ICU patients that should be done based on evidence-based practice. The study is suggesting conducting training courses for nurses within continuous education in hospital is crucial to increase nurses’ knowledge toward standard practices. Also, teaching based on evidence-based practice in undergraduate nursing programs can play an important role to increase students’ knowledge who will be those nurses that would work in ICUs. All these steps can enhance the quality of care, provide patient safety, reduce costs, and decrease work burnout.

**Conflict of Interest:** Not declare

**Source of Funding:** The researchers have no funding support.

**Ethical Clearance:** This study was approved by the Institutional Ethics Committee, and The IRB was obtained from University of Al Muthanna.

**References**

11. Fashafsheh I, Morsy W. Impact of A designed eye care protocol on nurses’ knowledge, practices and on eye health status of unconscious mechanically ventilated patients at North Palestine


Prevalence of Musculoskeletal Pain among Iraqi Dentists

Alia Tabour Thijeel
Assist. Lecturer, Prevention department, Technical Medical Institute, Middle Technical University/Iraq

Abstract

Introduction: Prevalence of musculoskeletal disorders (MSD) very high among dentists world wide. Among these MSDs, neck pain & Low back pain are most common. Objective: After extensive search on prevalence of MSDs pain among dentists in different countries, we planned a study to examine prevalence among Iraqi dentists. Methodology: this study was cross sectional survey study conducted at Medical institute of Baghdad, Al-Falah dental center and Prosthetic and orthodontic dental center. Dentists were selected using simple randomized methods and using certain exclusion and inclusion criteria. Results: All participants filled the questionnaire forum. 44.4% were male, 66.6% female. Prevalence of back pain was 18.9%, Neck pain was 13.3%, 2.2% had hand pain, 30% had no pain. Conclusion: High prevalence of MSDs in general reach to about 70% and the most affected area were as fellow: Neck & shoulder, back and hand. Male and young age were more prone to different MSDs.

Keywords: Musculoskeletal pain, Prevalence, Iraqi, Dentists

Introduction

Job-related musculoskeletal disorders (MSDs) are common disorders among dentists especially neck and low back pain. There are many contributing factors for these disorders among dentists like long working hours, Awkward working postures, use of heavy instrument and limited work area with a limited scope of movement leads to overexertion of cervical spine and lumbar spine. Low back pain (LBP) is the most frequent complaint, and nearly all dentists worldwide have experienced this pain at some point during their careers. Prevalence for both low back pain and neck pain were high for both gender with some differences. Female dentists showed a higher frequency of cervical, lumbar, dorsal, and wrist pain. On the other hand, another study reported a higher frequency of back pain among male dentists while female dentists were at higher risk of tendonitis. It is also possible that dental students can experience musculoskeletal problems even during their clinical training period. As the prevention of MSDs could be better than cure, Various preventive measures could be taken such as stretching before work, taking a break in the middle of working hours, avoid awkward postures, and reduce repetitive motion. However, still there are many other factors that causes MSDs. After extensive search on prevalence of MSDs pain among dentists in different countries, we planned a study to examine the prevalence of MSDs among Iraqi dentists and differences in gender and different age groups.

Material and Method

This study is a cross sectional design using printed questionnaire forum. We take a sample of 180 dentists, who were selected using simple random sampling method with the provisions of a maximum 60 years old and have been active for at least one year of private practice. Participants were excluded if they had any past history of spinal deformities, spinal malignancies, musculoskeletal & neurological disease that may be vulnerable factor for neck & back pain, trauma to spine. A signed written inform consent was taken from dentist consisting of information about the details of the study. 100 of them were females and 80 were males. The study was conducted on 21 December 2018 and 21 February 2019. The questionnaire used for the study printed in Arabic and consisted of 15 questions about the general information(age, sex, weight, height, smoking) and woks history (subspecialty, presence of assistant, working hours per day, working years) and history about MSDs pain(onset, site) and some questions about preventive measure (knowledge, take into account or not
while working and if they were referred to a doctor and if they were taking medication for their symptoms. The dentists were selected from the following places:

1. Medical institute of Baghdad.
2. Al-Falah dental center.
3. Prosthetic and orthodontic dental center.

### Results

44.4% of dentists were male whereas 66.6% were females, 70% had pain in hand, neck & shoulder or back. Highest single pain experienced was back pain making 18.9% whereas neck pain experienced by 13.3%, 2.2% had hand pain, 30% had no pain, as shown in Table-2.

#### Table 1: percentage & frequency of participants according to gender.

<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>4</td>
<td>24</td>
<td>28</td>
<td>6</td>
<td>2</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>%</td>
<td>5.1%</td>
<td>30.7%</td>
<td>35.8%</td>
<td>7.7%</td>
<td>1.6%</td>
<td>7.8%</td>
<td>15.6%</td>
</tr>
<tr>
<td>Count</td>
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<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>%</td>
<td>0%</td>
<td>53.8%</td>
<td>0%</td>
<td>7.7%</td>
<td>7.7%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Count</td>
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<td>6</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>%</td>
<td>0%</td>
<td>7.1%</td>
<td>21.4%</td>
<td>0%</td>
<td>0%</td>
<td>21.4%</td>
<td>0%</td>
</tr>
<tr>
<td>%</td>
<td>2.2%</td>
<td>22.2%</td>
<td>18.8%</td>
<td>4.4%</td>
<td>2.2%</td>
<td>8.9%</td>
<td>11.1%</td>
</tr>
</tbody>
</table>

#### Table-2: Frequency and percentage of clinical features according to age groups

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>2</td>
<td>18</td>
<td>10</td>
<td>8</td>
<td>4</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>%</td>
<td>2.5%</td>
<td>22.5%</td>
<td>12.5%</td>
<td>10%</td>
<td>5%</td>
<td>15%</td>
<td>10%</td>
</tr>
<tr>
<td>Count</td>
<td>2</td>
<td>22</td>
<td>24</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>%</td>
<td>2%</td>
<td>22%</td>
<td>24%</td>
<td>0%</td>
<td>0%</td>
<td>4%</td>
<td>12%</td>
</tr>
<tr>
<td>Count</td>
<td>4</td>
<td>40</td>
<td>34</td>
<td>8</td>
<td>4</td>
<td>16</td>
<td>20</td>
</tr>
<tr>
<td>%</td>
<td>2.2%</td>
<td>22.2%</td>
<td>18.8%</td>
<td>4.4%</td>
<td>2.2%</td>
<td>8.9%</td>
<td>11.1%</td>
</tr>
</tbody>
</table>

% while male 2.5% , Neck & shoulder pain in female was 22% for male 22.5%
Table-3: Frequency & percentage of Patients with pain in different Regions according to gender.

<table>
<thead>
<tr>
<th>Region</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back</td>
<td>20.00%</td>
</tr>
<tr>
<td>Neck or shoulder</td>
<td>25.00%</td>
</tr>
<tr>
<td>Hand</td>
<td>15.00%</td>
</tr>
<tr>
<td>Hand &amp; neck</td>
<td>10.00%</td>
</tr>
<tr>
<td>Neck &amp; back</td>
<td>5.00%</td>
</tr>
<tr>
<td>Neck &amp; hand &amp; Back</td>
<td>0.00%</td>
</tr>
<tr>
<td>No disorder</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

Discussion

The Purpose of our study was to see the prevalence of back, hand, neck & shoulder pain among Iraqi dentists as single entity and combined. The overall prevalence of MSDs in dentistry differs from 63% to 93% worldwide.

Wide, in our study, it was 70%. Prevalence of hand pain was 2.2% and back pain was 18.8% and neck & shoulder pain was (we consider them in our research as a single entity) 22.2% alone not combined while other studies showed prevalence of neck pain 30% and back pain was also 30% that may or may not associated with other pain area. Male dentists were more likely to have MSDs this is supported by recent research done by Kaur J et al., (2018) but different to older syudy done by Unruh AM. In contrast to other studies, our study showed higher prevalence of different musculoskeletal pain among the youngest age group (24-34) this may be due to not caring about proper posture, longer working hours and not taking breaks in between.

Proper exercise management can reduce the effects of overused repetitive micro trauma and relaxation of shortened muscles. This holistic technique might be a challenge to dental professionals, but the result benefits in reducing MSD symptoms.

Conclusion

High prevalence of MSDs in general reach to about 70% and the most affected area were as fellow: Neck & shoulder, back and hand. Male and young age were more prone to different MSDs.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Technical Medical Institute and all experiments were carried out in accordance with approved guidelines.

References


The Evaluation of Ochratoxin A in Patients Suffer from Renal Failure

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¹Student, University of Kufa College of Science, ²Assistant Professor, University of Kufa College of Science

Abstract

The study is conducted on 94 patients (54 male and 40 female) and 15 healthy people (10 male and 5 female) as the control group. All these cases were suffers from renal failure, when attended to AL-Sader hospital in AL-Najaf province from February till May 2019. we make qualitative diagnosis by using TLC (thin layer chromatography) 29 cases have an ochratoxin A in serum and 65 cases without ochratoxin A and quantitative diagnosis by using HPLC (high-performance liquid chromatography) for 25 cases from positive results (15 male and 10 female) and detects of WBCs count for 29 cases with ochratoxin A and 15 with out ochratoxin A.

Keywords: ochratoxin, renal failure, TLC, HPLC, Iraq.

Introduction

Cutaneous failure is a medical condition in which the renals no longer work. Cutaneous failure can also be classified into two types of acute renal failure and chronic renal failure. Ochratoxin A (OTA) is a secondary metabolism mycotoxin produced by a number of filamentous species of the Aspergillus and Penicillium genera. It is a nephrotoxic mycotoxin that has been regarded as a part of the etiology of Balkan nephropathy (BEN). The blood OTA is higher than that of healthy people in patients with chronic renal insufficiency diagnosed with dialysis; and OTA is not less with this treatment. The risk of OTA for human renal disease because it is widely distributed around the world and the rarity of reported cases that show its role in chronic renal disease is paradoxical.

Aim: In this study, Ochratoxin A patients are recognized as having a relationship with renal failure.

Material and methods

Study design and patients

Serum collection

In healthy and infected patients, five ml of blood were collected. In sterile, plain tubes blood samples were drawn and left for 30 minutes at room temperature. Five minutes of centrifugation (Memmert, Germany) at 3000 rpm were performed. Serum was collected and kept under deep freeze at -20 in sterile tubes until use.

Thin-layer chromatography (TLC):

TLC is a simple and reliable method that is reasonably expensive to implement in a research laboratory. Most laboratories have considerable experience and expertise in developing countries.

Detection of ochratoxin A in serum blood by TLC

In patients suffering from kidney failure (94) person. The ochratoxin A was recognized after the examinations of the serum samples by using the TLC plate, twenty nine out of 29 (31%) , while renal failure patients without ochratoxin A was 65 (69%) .

This result is agree with study in Karbala government of Iraq (16) revealed that the main cause of infection agent acute kidney disease that caused renal failure in patients was ochratoxin A. high ratio of renal failure with OTA was (14.4%).

This result illustrated the present ochratoxin A in the blood serum in renal failure patients may be due to higher toxicity of OTA and its ability to kidney damage (direct effect) and the occurrence chronic kidney disease.
Table 1: Detecting of OTA in renal failure patients.

<table>
<thead>
<tr>
<th>Patient population</th>
<th>NO.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>renal failure with OTA</td>
<td>29</td>
<td>31</td>
</tr>
<tr>
<td>renal failure without OTA</td>
<td>65</td>
<td>69</td>
</tr>
<tr>
<td>Total</td>
<td>94</td>
<td>100</td>
</tr>
</tbody>
</table>

Detection of OTA with renal failure patients according to gender:

In patients suffering from kidney failure with OTA (29). OTA was recognized by TLC method to 17 male (59%) and female were 12 (41%) the incidence of males’ injury increases because the males are more susceptible to contact with the cause through continuous exit from their homes for the purpose of working and eating from shops and streets that lack cleanliness or play sports. This results disagreement with study of (16) in Karbala government revealed that renal failure with OTA in both female and male were (54.5%) and (45.5%) respectively.

In the study group, men had a higher proportion (59%) than women (41%) of renal failure due to weak immunity and chronic chronic kidney disease. More than women in OTA renal failure are caused by the regular action of males compared with female due to the causes of male injury. 17.

Table 2: Detecting of OTA according to gender.

<table>
<thead>
<tr>
<th>Gender</th>
<th>NO.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>17</td>
<td>59</td>
</tr>
<tr>
<td>Female</td>
<td>12</td>
<td>41</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>100</td>
</tr>
</tbody>
</table>

Detection of OTA with renal failure according to age:

This study showed that the highest prevalence of patients aged 17% (62%) and 21% (15-34) and (35-54) were diagnosed with RDA at age 55-74, as opposed to other patient age groups.

In age > 55, the high incidence of OTA renal failure can be due to low immunity and extremely toxicity of significant kidney damage than other classes. OTA 18.

This results agree with study of 16 that showed higher ratio with renal failure patients with OTA was 60% in (51-70) years old in Karbala government.

Table 3: Detecting of OTA according to age

<table>
<thead>
<tr>
<th>Age</th>
<th>NO.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>15-34 years</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>35-54 years</td>
<td>6</td>
<td>21</td>
</tr>
<tr>
<td>55-74 years</td>
<td>18</td>
<td>62</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>100</td>
</tr>
</tbody>
</table>

B. HPLC

High-pression fluids (HPLCs) is used to identify, quantitize, separate and purify compounds that are present in a mixture and are now known as high-performance fluid chromatography (HPLCs) 14. For determining ochratoxin A, we identify a high-performance chromatographic liquid (HPLC) system with fluorescent detector.)1).

Table( 4-4): Detection of OTA in the blood serum by HPLC.

<table>
<thead>
<tr>
<th>Sex</th>
<th>Age</th>
<th>Concentration of OTA ng/ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>20</td>
<td>0.99</td>
</tr>
<tr>
<td>M</td>
<td>29</td>
<td>2.00</td>
</tr>
<tr>
<td>M</td>
<td>30</td>
<td>0.85</td>
</tr>
<tr>
<td>M</td>
<td>35</td>
<td>0.59</td>
</tr>
<tr>
<td>M</td>
<td>45</td>
<td>0.76</td>
</tr>
<tr>
<td>M</td>
<td>50</td>
<td>1.37</td>
</tr>
<tr>
<td>M</td>
<td>55</td>
<td>1.06</td>
</tr>
<tr>
<td>M</td>
<td>60</td>
<td>2.56</td>
</tr>
<tr>
<td>M</td>
<td>60</td>
<td>1.15</td>
</tr>
<tr>
<td>M</td>
<td>61</td>
<td>0.91</td>
</tr>
<tr>
<td>M</td>
<td>62</td>
<td>1.39</td>
</tr>
<tr>
<td>M</td>
<td>64</td>
<td>1.59</td>
</tr>
<tr>
<td>M</td>
<td>65</td>
<td>1.10</td>
</tr>
<tr>
<td>M</td>
<td>65</td>
<td>1.92</td>
</tr>
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<td>M</td>
<td>70</td>
<td>1.08</td>
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<td>1.35</td>
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<td>M</td>
<td>45</td>
<td>1.33</td>
</tr>
<tr>
<td>M</td>
<td>45</td>
<td>1.12</td>
</tr>
<tr>
<td>M</td>
<td>63</td>
<td>0.83</td>
</tr>
<tr>
<td>M</td>
<td>64</td>
<td>0.92</td>
</tr>
<tr>
<td>M</td>
<td>65</td>
<td>0.75</td>
</tr>
<tr>
<td>M</td>
<td>65</td>
<td>1.01</td>
</tr>
</tbody>
</table>

*M=Male, **F=Female
Statistical Analysis

In this analysis T-test was used to compare samples using the 10 program graph pad prism. 11.

Results and Discussion

The results of the study revealed a significant increase (P<0.05) to (1.298 ng/ml) and (0.543 ng/ml) respectively in the concentrations of (OTA) in the total number patients suffering from renal failure with OTA and the control group. Also they revealed that the concentration of (OTA) in male and female patients suffering from kidney failure were significantly increased to (1.136 ng/ml) and (1.231 ng/ml) respectively compared with the control group (0.573 ng/ml) and (0.48 ng/ml), respectively. It also revealed variation depending on ages (15-34), (35-54) and (55-74) years old was the concentration of OTA (1.613 ng/ml), (1.097 ng/ml) and (1.309 ng/ml) respectively compared with the control group (0.444 ng/ml), (0.618 ng/ml) and (0.7 ng/ml), as seen in Fig (1), (2) and (3).

In the current study used the thin layer chromatography (TLC) to detect the presence of OTA in serum of patients suffer from kidney failaur and used HPLC to measure the concentration of it in the province Al-Najaf. Ochratoxin is a group of mycotoxins produced by some Aspergillus species and some Penicillium species 3. Kidney damage is the most vulnerable and prominent effect but toxin can affect the development of the fetus and the immune system. This association in humans is unclear, contrary to the clear proof of kidney and kidney toxicity due to exposure of ochratoxin A in the animals 16. To order to prevent infectious diseases to commercially valuable animals, maintenance of a competent immune system is necessary. Mycotoxin OTA induces immunosufficiency, and prolonged low dose exposure to OTA is more significant than acute high-dosage exposure 4. The findings of this trials showed no significant improvements in the frequency of male and female infection. In the kidney OTA results in high nephrotoxicity, with a higher incidence of upper urinary tract malignancy 15. The study shows that this rise in OTA is significantly increased due to low dose exposure to OTA; OTA induces specific changes in the function and physiology of renal cells at nanomolar concentration. 5. Therefore, Very low OTA levels administered for a prolonged duration (up to 14 days), in the human tubular proximal, affect the cell destiny, and in addition they do not only function in the target organ, e.g., the kidney, but also in previously unsuspecting cells, e.g. fibroblasts. 6,7. In all ages of kidney-insufficient patients, OTA concentrations increased compared with control groups particularly at age 15-35 because of a size decrease in vital immune species, including thymus, spleen and lymphatic kernels, antibody response depression, number and functional alters. The study revealed an increase in OTA concentration in every age group 4. 9 It was shown that immunosuppressive mycotoxin, such as OTA inhibits humoral and cell immunity and lymphoid organ works at various levels of the immune system.

Figure 1: Comparison between Concentration of OTA (ng/ml) in total patients suffering from renal failure and total control. This different letter refers to significant differences at p>0.05 according to T test.
**Conclusion**

OTA has a role in changing the human immune response. OTA has an effect on some immunological biomarkers.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the University of Kufa College of Science and all experiments were carried out in accordance with approved guidelines.

**References**


Estimation of Radiation Exposure to Some Iraqi Patients with Hyperthyroidism treated with Radioactive Iodine-131 as an Outpatient Basis

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Abstract

A broadly established therapy is radioactive iodine-131 for patients with hyperthyroidism (1). The radioactive iodine-131 dose is given to the patient as a single dose, which leads to a high radiation exposure surrounding the patient’s location for several days, depending on the amount of the received radiation dose, patient’s isolation in a special room is necessary for a period of time until the amount of radiation exposure decreases to an acceptable limits according to the National regulations. This study aimed to obtain a measurable estimation to the amount of radiation exposure resulting from patients treated with iodine-131 and assessment of compliance of patients and their family members to radiation safety instructions (RSI).

In this study, (35) Iraqi patients with hyperthyroidism (15 male and 20 female) divided in to three groups according to $^{131}$I doses received that ranging from 3.7 to 7.4 GBq (100-200 mCi), the radiation dose rate was measured at different levels of the patient’s body as well as at different periods after receiving the I-131 treatment dose.

Results shows that the external dose rates decrease rapidly and as a result, the greater amount of radioactive iodine is disposed of in the urine in the first two days after therapy. Also there is no observed differences appears in the average radiation dose rate (µSv/hr) resulting from patients after giving the dose of iodine-131 between males and females within the same group, while a significant difference was observed in the average dose rate between the divided groups, especially after an hour of giving the dose.

Conclusion this study provide an estimation to the amount of radiation exposure resulting from patients for three days post $^{131}$I therapy on outpatient basis, also these results enables us to obtain a database that can be used in determining the amount of radiation reflected from patient to family members and contacts. Oral and written radiation safety instructions (RSI) are given in an appropriate way to patients and family members before patient’s discharge.

Keywords: Radiation Exposure, Iraqi Patients, Hyperthyroidism

Introduction

Hyperthyroidism is the increasing in the amount of thyroid hormones secretion in the blood while the amount of TSH is minimized, and the thyroglobulin creation is amplified ¹. The thyroid is used up of iodine because of the hormones that are quickly secreted from the thyroid gland. The general reason for hyperthyroidism are diffuse toxic goiter, also called Graves’ disease, toxic multi nodular goiter and toxic adenoma ². Radioactive Iodine-131 has been used widely for hyperthyroidism since the 1940s ³. A move towards radioactive $^{131}$I therapy hyperthyroidism treatment in western countries was listed as a result of well-known safety profile of I-131 therapy ⁴. Benefits to patients treated with radioiodine–131 must be balanced against radiation

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exposure to contacts, family members and occupational workers. Each Medical center present these detailed self-protective recommendations that should be useful to minimize the exposure to radiation levels to the whole community. The ICRP and IAEA set a detailed strategy for all radiation employees to follow in dealing with radiation. The annual limit of occupational dose to an individual adult is 20 mSv and 15 mSv for adults older than 60 years according to national regulations. Whereas the U.S.NRC recommended dose base of 5 mSv per episode in all age. Many studies in western countries confirmed that radioactive I-131 treatment on outpatient basis is an efficient and secure therapeutic method with low exposure to radiation levels to family and contacts of patients treated with I-131, and also for relatives of patients who obtained high doses of I-131. While, there is a few in formations regarding exposure to radiation to family members and contacts of outpatients treated with I-131 in the Arab communities. A previous Saudi study noted that I-131 is very efficient in treatment of hyperthyroidism with little side effects, this mutually with its safety and minimum cost have made it a best treatment of many patients with hyperthyroidism. To our Knowledge, this study is the first to conduct on Iraqi patients for the purpose of obtaining a quantitative estimation to the amount of radiation exposure resulting from patients treated with radioactive iodine-131 on outpatient basis and evaluation of compliance of patients and their family members to radiation safety instructions (RSI).

Material and Method

Dose Rate Measuring System Graetz X5C plus was used directly and combined with Telescopic Probe DE for measurements from a (1 m) distance to obtain a quantitative estimation of the radiation exposure rate resulting from patients treated with radiiodine-131. Therapeutic doses using radioactive iodine-131 were all taken from the Jordan Nuclear Medicine Center (Jordan).

Thirty-five self-dependent hyperthyroidism Iraqi patients all were used I-131 for treatment on an outpatient basis. They were divided into three groups according to the amount of radiation dose received for each group.

Patients were administered into isolated rooms and doses were given orally in liquid form; iodine is fast and totally absorbed in the upper intestine, it is spread first in the body’s extra vascular fluid within the first one hour and the radiation dose rate was measured and recorded after 1, 24 and 48 hours at a distance of (1m) from the patient’s body at the level of the abdomen (bladder), thyroid and knees.

Oral and written radiation safety instructions were given to patients and family members before leaving the Nuclear Medicine Center.

Results and Discussion

The current study included (35) Iraqi patients with hyperthyroidism (15 male and 20 female) aged between (27 and 63) years old, all were treated for their hyperthyroidism with I-131 doses ranging from 3.7 to 7.4 GBq (100-200 mCi) as shown in Table (1). The female patients were more influenced with thyroid diseases than male patients for all groups around (57.14% female and 42.85% male). This is in accord with a previous study by Morganti et al. 2005 which reported that thyroid diseases are more common in females.

Table (1): Patients distribution according to radioactive I-131 doses received and gender

<table>
<thead>
<tr>
<th>Groups I-131 Doses</th>
<th>Patients Number</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 3.700 GBq (100 mCi)</td>
<td>8 10 18</td>
<td>8</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>B 5.550 GBq (150 mCi)</td>
<td>4 6 10</td>
<td>4</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>C 7.400 GBq (200 mCi)</td>
<td>3 4 7</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Total no. of patients</td>
<td>15 20 35</td>
<td>15</td>
<td>20</td>
<td>35</td>
</tr>
</tbody>
</table>

The average of age, weight, and length for the patients included in the study, distributed by groups and gender were listed in Table (2).

Table (2): Average of age, length and weight for patients according to their groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>Average of age (years)</th>
<th>Average of Length (cm)</th>
<th>Average of Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male Female Male Female Male Female</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A 46.23 42.67 170.9 163.12 81.55 83.86</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B 60.78 52.54 173.0 166.98 79.0 78.9</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C 47.94 43.63 168.9 159.0 69.44 75.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The average dose rate (µSv/hr) at (1 m) distance resulting from patients after giving the dose of radioactive iodine-131 and at three different levels of the body (bladder, thyroid and knee) where the radiation exposure rate was measured for each patient individually at three different periods as shown as in Table (3).

**Table (3): Average dose rate (µSv/hr) of patients after receiving radioactive iodine-131 doses.**

<table>
<thead>
<tr>
<th>Group</th>
<th>Sex</th>
<th>Time</th>
<th>Average Dose Rate (µSv/hr)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Thyroid</td>
</tr>
<tr>
<td>A</td>
<td>Female</td>
<td>1 hr</td>
<td>130.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24 hrs</td>
<td>40.56</td>
</tr>
<tr>
<td></td>
<td></td>
<td>48 hrs</td>
<td>20.90</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>1 hr</td>
<td>124.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24 hrs</td>
<td>30.07</td>
</tr>
<tr>
<td></td>
<td></td>
<td>48 hrs</td>
<td>14.54</td>
</tr>
<tr>
<td>B</td>
<td>Female</td>
<td>1 hr</td>
<td>184.11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24 hrs</td>
<td>50.38</td>
</tr>
<tr>
<td></td>
<td></td>
<td>48 hrs</td>
<td>23.40</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>1 hr</td>
<td>179.10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24 hrs</td>
<td>49.80</td>
</tr>
<tr>
<td></td>
<td></td>
<td>48 hrs</td>
<td>21.70</td>
</tr>
<tr>
<td>C</td>
<td>Female</td>
<td>1 hr</td>
<td>290.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24 hrs</td>
<td>80.11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>48 hrs</td>
<td>36.67</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>1 hr</td>
<td>270.40</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24 hrs</td>
<td>84.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>48 hrs</td>
<td>38.40</td>
</tr>
</tbody>
</table>

**Figure (1): The average dose rate (µSv/hr) of male patients after receiving radioactive iodine-131 doses.**
Figure (2): The average dose rate (µSv/hr) of female patients after receiving radioactive iodine-131 doses.

Figures (1) and (2) together with Table (3) shows that the external dose rates decrease rapidly and as a result, the greater amount of radioactive iodine is disposed of in the urine in the first two days after treatment, and the results do not indicate that there are a significant differences in the average radiation dose rate (µSv/hr) resulting from patients after giving the dose of iodine-131 between males and females within the same group, while a significant difference was observed in the average dose rate between the three groups, especially after an hour of giving the dose and the reason behind may relay on a personal basis that all I-131 incur patients do not importantly have the same iodine kinetics. A previous study by Mountford and O’Doherty, reported that keeping a patient in hospital needs an extra financial income, and the rules when discharging the hospital may reason a real disturbance of their family and daily life. Therefore, the time spend in hospital and the regulations to pursue after discharge could be depend on a proper radio protective evaluation and may not be so preventive. The residence factors should be relay on the patient’s daily life and the patient’s livelihood, also on their capability to accept a set of social restrictions for many days. Taking in to account the previous constraints and according to our results from Table (3) partners are advised to sleep apart for 3 days (1850 MBq in follow-up of patient) to 23 days in the case of 7400 MBq dose.

Conclusion

The results of this study indicate that the external dose rates decreases and to be within the ICPR limit of 1 mSv/year only after two days from receiving I-131treatment dose thus hyperthyroid patients can continue to be treated with radioiodine on an outpatient basis, if given appropriate radiation protection advice such as a preventive isolation of the patient with sleeping separately up to 23 days in order to strictly abide by ICPR limit of 1 mSv/year. For patients with hyperthyroidism, I³¹I is considered as a widely accepted therapy but the decisions of treatment is optional due to
the patient preference with taking in to consideration the balance of risks with advantages of each available treatment for hyperthyroidism as well as patient’s lifestyle and health status. We believe the results of this study provide a quantitative estimation to the amount of radiation exposure resulting from patients treated with radioactive iodine-131 on outpatient basis and it could be considered as a base for further future studies.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Health and Medical Technologies and all experiments were carried out in accordance with approved guidelines.

References
3. Ingbar SH, Braerman LE. Werner’s The Thyroid – A Fundamental and clinical Text, J.B. Lippincot Company, Philadelphia, 1986
Evaluation of Some Minerals Content of Drinking and River Water in Iraq by AAS Method

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1(M.Sc. Food Sc. & tech.); Lecturer in Dept. of Food Sc. & Tech. College of Food Science/ Al-Qasim Green University

Abstract

The experiment was conducted during 2018 to evaluate the presence of certain elements (Lead, Copper, Chromium, Zinc, Nickel, Cadmium, Arsine and mercury) in Tab and Bottled water in addition to riverbed and cliff water. The obtained data were compared with the corresponding international and national guideline values. The concentration of Tap and Bottled water samples for Cr and As were higher than the permitted concentration established by FAO/WHO scoring (0.0623, 0.3120) and (0.0680, 0.448) respectively. Whilst Zn, Ni, Pb, Hg, Cd, and Cu were lower than the permitted concentration established by FAO/WHO for both samples Tab and Bottled water which scored (0.0608, 0.0550, 0.0075, 0.00589, 0.0013 and nil) and (0.0420, 0.0152, 0.0105, 0.00581, 0.0003 and nil) respectively. Thus, the concentrations of As in both River bed and cliff water samples were higher than the permitted concentration established by the Iraqi (C.O.S.Q.C) Central Organization for Standardization and Quality Control which scored (0.754 and 0.245) respectively. Regarding the rest of the element which seem to be lower than the permitted concentration established by Central Organization for Standardization and Quality Control in Iraq for Riverbed and cliff.

Keywords: AAS, heavy metals, trace minerals

Introduction

Water can be defined as a substance composed of hydrogen and oxygen. Water can be exist in three states gaseous, liquid and solid. depends upon temperature, tasteless and odourless. It has the important ability to dissolve many other substances such as salts and gases. Water covers greater than two-thirds of the earth’s surface. however most of it salty and undrinkable. Only 2.7% fresh water from the sum of the whole water on planet earth is fresh, but 1% of the fresh water can be used and accessible presented in lakes, rivers and groundwater. The inaccessible freshwater portion presented in deep aquifers and frozen in the polar ice. In our life Water considered to be an essential component. Water is an important source of elements more over pollutants which affect humans health. Therefore, water quality and quantity is of major importance for the human health. There is no clear and uniform definition for SDW “safe drinking water.” Safe drinking water can be defined as the water that does not represent any significant risk to health (chemical and microbial) during consumption over a long period of time.Trace elements are carried in water as either dissolved. Majority of the harmful effects potentially comes from dissolved materials in the rivers or streams. Therefore, they may settles at the bottom of the riverbed sludge or penetrate into the underground water thereby it considered to be a source of ground water contaminations. Trace elements at a low concentration considered to be essential nutrients, but may became toxic at a high concentration, also because of its formula. Yet, in the aquatic ecosystem elements (macro and micro) are considered to be one of the most substantial and main pollutants. Toxic intakes and optimal intakes levels may vary from elements to other. Elements can be classified based on their biological activity in to essential trace elements which the human body needs it in very small amounts, and play a major role in good wellbeing. The second group are not considered as essential elements because of their toxicity and human nutrition. WHO (2004). Lead is a chemical element with the symbol Pb, it is a heavy metal that is considered to be widespread and environmental toxicant.
Lead is exist in the environments in three forms: Metallic lead, lead salts, and organic lead containing carbon. Lead is a normally and naturally exist in the forms of toxic metal found in the Earth’s crust, also Lead used widespread in may industry around the global has led to extensive environmental contamination. (WHO 2019). Lead is considered to be major harmful elements, can be accumulate in the environment thus causing pollutation that affect all biological systems through exposure to air, water, and food sources. Lead inside the human body is distributed in different organs such as brain, liver, kidney and bones. Also its stored in the teeth and bones. The main sources of environmental contamination include mining, smelting, manufacturing, recycling activities, leaded paint, leaded gasoline, and leaded aviation fuel. (WHO 2019). Copper is a chemical element with the symbol Cu. It is a reddish elements that occurs normally and naturally in rocks, soils, water, earth sediment, and air at relatively low level. Copper can also occurs in the crusts of the earth, plants and animals. It is considered to be an essential element for many living organisms including humans and other animals at relatively low levels. At much higher levels of Copper toxic effects can occur. Cu can enter to our body when we drink water or eating food, soil, or other substances that contain Copper. Chromium is a chemical element with the symbol Cr. It is a steelygrey, specular, hard and brittle transition metal. Cr is a part in lipid and protein metabolism inside human body. at low concentrations. For the normal human function very small amounts of Cr are needed. Chromium also exist at a relatively higher concentrations in industrial processes that can release potential pollutants to air and drinking water. Zinc is a chemical element with the symbol Zn. Inside the human body Zinc considered to be the most important trace elements. It’s important to life due to fundamental role in gene expression, cell development and replication. Zinc major role is in the stabilization of the protein structure. Nickel is a chemical element with the symbol Ni. Nickel is a silver-white elements found in several oxidation forms. Ni II is the most widespread in biological systems. Nickel easily forms nickel containing alloys, which have found an ever increasing use in modern technologies for over a hundred years now. Arsenic is a chemical element with the symbol As. Arsenic normally and naturally existed at relatively high levels in the groundwater of some countries. Arsenic is highly toxic in its inorganic formula. Polluted water which used used for drinking and some time in food preparation also in irrigation of food crops poses the greatest threat to public health. Arsenic is a natural component of the earth’s crust and is widely distributed throughout the environment in the air, water and land. (WHO 2018). Arsenic is highly toxic in its inorganic formula. Polluted water which used used for drinking and some time in food preparation also in irrigation of food crops poses the greatest threat to public health. Arsenic is a natural component of the earth’s crust and is widely distributed throughout the environment in the air, water and land. (WHO 2018). Mercury is a chemical element with the symbol Hg. Mercury is nonessential and toxic to the human body. Mercury is widely used in industry, agriculture, and medicine, and circulates in ecosystems, but is never destroyed. Mercury may have toxic effects on the nervous, digestive and immune systems, and on lungs, kidneys, skin and eyes. The main objective of the present study was to evaluate the presence of certain elements in tab water, bottled water, riverbed water and Rivercliff water to compare the obtained levels of the studied with the corresponding international and national guideline values. Selected trace elements was measured (Pb, Cu, Cr, ZN, Ni, Cd, As and Hg).

Materials and Method

The experiment was conducted during 2018, to evaluate the concentration of selected metals in tab water, bottled water, riverbed water and Rivercliff water to compare the obtained levels of the studied with the corresponding international and national guideline values. The selected metals of the study were (Pb, Cu, Cr, ZN, Ni, Cd, As and Hg).

Materials and equipment used

2. Glass tube and volumetric flask.
3. H2SO4, HNO3 and distilled deionized water.

Sample Collection
A total of 36 water samples were obtained from Djilas river and the tab and bottled water present in Baghdad city. The water samples were obtained from local markets located in Baghdad. The samples were stored until the chemical analysis.

Chemical Analyses
The analysis was done in a chemical laboratory belongs to the ministry of Industry and minerals – republic of Iraq. Atomic Absorption Spectroscopy (AAS) used to analyze the samples.

Results and Discussion
Mean concentration of Lead (Pb), Copper (Cu), Chromium (Cr), Zinc (Zn), Nickel (Ni), Cadmium (Cd), Arsenic (As) and Mercury (Hg) obtained from the water samples were measured using Atomic Absorption Spectroscopy (AAS) method.

Our results indicated the following findings:

Tab water
The data in table 1, shows that the highest concentration for tab water samples were in As (0.3120) followed by Cr, Zn, Ni, Cd, Hg, Pb, and Cu which were (0.0623, 0.0608, 0.0550, 0.0075, 0.00589, 0.0013 and nil) respectively. The concentrations of Cr(0.0623) and As(0.3120) in tab water samples were higher than the permitted concentration established by FAO/WHO which were (0.05 and 0.01) respectively. On the other hands the concentrations of Zn, Ni, Pb, Hg, Cd, and Cu which were (0.0608, 0.0550, 0.0075, 0.00589, 0.0013 and nil) respectively seemingly lower than the permitted concentration established by FAO/WHO.

<table>
<thead>
<tr>
<th>No.</th>
<th>Elements</th>
<th>Tab water (p.p.m.)</th>
<th>FAO/WHO standards (p.p.m.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cr</td>
<td>0.0623</td>
<td>0.05</td>
</tr>
<tr>
<td>2</td>
<td>Cu</td>
<td>Nil</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Ni</td>
<td>0.0550</td>
<td>0.07</td>
</tr>
<tr>
<td>4</td>
<td>Zn</td>
<td>0.0608</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>Pb</td>
<td>0.0075</td>
<td>0.01</td>
</tr>
<tr>
<td>6</td>
<td>As</td>
<td>0.3120</td>
<td>0.01</td>
</tr>
<tr>
<td>7</td>
<td>Hg</td>
<td>0.00589</td>
<td>0.006</td>
</tr>
<tr>
<td>8</td>
<td>Cd</td>
<td>0.0013</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Nil= no concentration detected

Bottled water
The data in table 2, shows that the highest concentration for bottled water samples were in As (0.4480) followed by Cr, Ni, Pb, Zn, Hg, Cd and Cu which were (0.0680, 0.0420, 0.0152, 0.0105, 0.00581, 0.0003 and nil) respectively. The concentrations of Cr(0.0680) and As(0.448) in Bottled water samples were
higher than the permitted concentration established by FAO/WHO which were (0.05 and 0.01) respectively. On the other hands the concentrations of Ni, Pb, Zn, Hg, Cd, and Cu which were (0.0420, 0.0152, 0.0105, 0.00581, 0.0003 and nil) respectively Seem to be lower than the permitted concentration established by FAO/WHO.

**Table 2: The mean concentration of the tested elements for Bottled water with standards levels of FAO/WHO.**

<table>
<thead>
<tr>
<th>No.</th>
<th>Elements</th>
<th>Bottled water (p.p.m.)</th>
<th>FAO/WHO standards (p.p.m.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cr</td>
<td>0.0680</td>
<td>0.05</td>
</tr>
<tr>
<td>2</td>
<td>Cu</td>
<td>Nil</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Ni</td>
<td>0.0420</td>
<td>0.07</td>
</tr>
<tr>
<td>4</td>
<td>Zn</td>
<td>0.0105</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>Pb</td>
<td>0.0152</td>
<td>0.01</td>
</tr>
<tr>
<td>6</td>
<td>As</td>
<td>0.448</td>
<td>0.01</td>
</tr>
<tr>
<td>7</td>
<td>Hg</td>
<td>0.00581</td>
<td>0.006</td>
</tr>
<tr>
<td>8</td>
<td>Cd</td>
<td>0.0003</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Nil= no concentration detected

**River bed water**

The data in table 3, shows that the highest concentration for River bed water samples were in As (0.754) followed by Pb, Ni, Cr, Zn, Cd, Hg and Cu which were (0.0874, 0.0774, 0.0446, 0.0162, 0.0041, 0.00299 and nil) respectively. The concentrations of As(0.754) in River bed water samples were higher than the permitted concentration established by Central Organization for Standardization and Quality Control which were (0.05). On the other hands the concentrations of Pb, Ni, Cr, Zn, Cd, Hg and Cu which were (0.0874, 0.0774, 0.0446, 0.0162, 0.0041, 0.00299 and nil) respectively Seem to be lower than the permitted concentration established by Central Organization for Standardization and Quality Control in Iraq.

**Table 3: The mean concentration of the tested elements for River bed water with standards levels of Central Organization for Standardization and Quality Control.**

<table>
<thead>
<tr>
<th>No.</th>
<th>Elements</th>
<th>River bed (p.p.m.)</th>
<th>Standards of C.O.S.Q.C (p.p.m.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cr</td>
<td>0.0446</td>
<td>0.1</td>
</tr>
<tr>
<td>2</td>
<td>Cu</td>
<td>Nil</td>
<td>0.1</td>
</tr>
<tr>
<td>3</td>
<td>Ni</td>
<td>0.0779</td>
<td>0.1</td>
</tr>
<tr>
<td>4</td>
<td>Zn</td>
<td>0.0162</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Pb</td>
<td>0.0874</td>
<td>0.1</td>
</tr>
<tr>
<td>6</td>
<td>As</td>
<td>0.754</td>
<td>0.05</td>
</tr>
<tr>
<td>7</td>
<td>Hg</td>
<td>0.00299</td>
<td>0.005</td>
</tr>
<tr>
<td>8</td>
<td>Cd</td>
<td>0.0041</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Nil= no concentration detected
River cliff water

The data in table 4, shows that the highest concentration for River cliff water samples were in As (0.245) followed by Ni, Cr, Pb, Cd, Zn, Hg and Cu which were (0.0690, 0.0435, 0.0223, 0.0067, 0.0065, 0.00516 and nil) respectively. The concentrations of As(0.245) in River cliff water samples were higher than the permitted concentration established by Central Organization for Standardization and Quality Control which were (0.05). On the other hands the concentrations of Ni, Cr, Pb, Cd, Zn, Hg and Cu which were (0.0690, 0.0435, 0.0223, 0.0067, 0.0065, 0.00516 and nil) respectively Seem to be lower than the permitted concentration established by Central Organization for Standardization and Quality Control in Iraq.

<table>
<thead>
<tr>
<th>No.</th>
<th>Elements</th>
<th>River bed (p.p.m.)</th>
<th>Standards of C.O.S.Q.C (p.p.m.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cr</td>
<td>0.0435</td>
<td>0.1</td>
</tr>
<tr>
<td>2</td>
<td>Cu</td>
<td>Nil</td>
<td>0.1</td>
</tr>
<tr>
<td>3</td>
<td>Ni</td>
<td>0.0690</td>
<td>0.1</td>
</tr>
<tr>
<td>4</td>
<td>Zn</td>
<td>0.0065</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Pb</td>
<td>0.0223</td>
<td>0.1</td>
</tr>
<tr>
<td>6</td>
<td>As</td>
<td>0.245</td>
<td>0.05</td>
</tr>
<tr>
<td>7</td>
<td>Hg</td>
<td>0.00516</td>
<td>0.005</td>
</tr>
<tr>
<td>8</td>
<td>Cd</td>
<td>0.0067</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Nil= no concentration detected

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Food Science and all experiments were carried out in accordance with approved guidelines.

References


Impact of Social Media upon Juvenile Delinquency in Basra Central Prison and AL-Maqal Police Station

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Abstract

Objective: This study aimed to determine the impact of social media domains. And find out the know which among social media sites were mostly used by the juveniles.

Methodology: Quantitative design (a descriptive study) of one hundred juveniles were selected. All the juveniles for both sexes as delinquent who were temporarily detained in police station convicted of felony, crime or misdemeanor who is awaiting trial; and delinquent convicted of crime or felonies for rehabilitation or punishment convicted of misdemeanors and major offenses in central prison; juveniles who were at 14-17 years, for the period from 3rd February 2019 until 4th April 2019 in AL-Maqal Police Station and 14th April 2019 until 14th May 2019 in Basra Central Prison. The collection of data is performed out of the utilization of developed questionnaire and by means of structured interview technique with the subjects who were individually interviewed by the using of Arabic version of the questionnaire in Basra Central Prison and AL-Maqal Police Station.

Results: The results of the study indicate more than half 59% of age 16-17 year; more than three-quarters 82% were male; also more than three-quarters 77% living in urban and in slum area 51%. The results revealed that the samples of social media were (100%) watch movies; (96.5%) used chat; (86%) play game; while (100%) use the you tube; (97.7%) use face book; while (98.8%) browse the violence program. The more types of offenses and misdemeanor committed by the Juveniles were (18%) theft; and (16%) drug abuse.

Keyword: Impact; Social Media; Juvenile Delinquency; Prison; Police Station.

Introduction

Mass media is a channel, device, utility, or instrument used as a means of mass communication process and as variety channel of information for knowledge and entertainment. Mass media are an inseparable part of lives. In the recent times, with reach technology to every segment of population across the world in a very short amount of time, this advancement in the accessibility more information that associated with various social alterations which have profound influences the individuals and community through influences on the social links intimate or personal interaction and system of communication between individuals and families. The media, whether visual or audio, it has become a family member. Juvenile can learn, imitate behavior and behave in the same way as media content is seen in daily life. So, the quantitative content received by juveniles with the increase in the number of hours spent in watching media materials that contain on news of killings, bombings, wars, and assassinations, as well as the detective, pornographic, crime, fictional, and violence films and exposing to scenes of violence, hatred aggression, and extremism and takes the feelings of compassion and mercy from their hearts lead to increased probability of a juvenile falling in delinquency. Social media is a group of web based applications and foundations of technological which includes Twitter, Facebook and Instagram has positive or negative effect
that acts to create new opportunities of connect with transfer and amplify the messages or information among people, it has a massive impact on the behavior and minds the juveniles through encourage and instigate to participate into criminal activities. Social media plays a role in shaping individual perceptions and spread, instill, influence and stimulate on the thoughts, value, actions, attitudes and behaviors of individuals and community that embrace all aspects of human life, media become the more profound to attraction the juveniles through tempting content. Media content create temptations of juveniles that are outcome of the interaction a juvenile’s desires of needs and wants with juvenile’s commitments and opportunities in pursuing an ambition or a goal with devote and convert much of time, resources, energy and motivated in engaging in delinquent behavior. Therefore, the power effect of media content on juvenile lead to acquiring, altering, triggering, and reinforcing the juvenile’s behavior according approaches the media and exposure to media overdoses due to media influence on an individual’s mental processes or the product of those processes that involves the acquisition of information, absorb this information then process of memorization and storage of information in human mind, transform information into knowledge to create new meanings with generalize to generate principles about real life. The ability of media to attract individual’s attention and influence them, it uses information manipulation through omits some facts and provides deliberately incomplete information and persuasion of the distorted information, with displays things that are not in line with local culture and values, this effect either occurs in the short term and occurs immediately and fade more quickly or in the long term and occurs slowly based on the content that contains. The effect whether positive or negative involved many aspects of affective, cognitive and psychomotor through read, listen, conversation and see of social media. Exposure to media content might lead juveniles to copy what they see, hear and read according the situations in which they might be able to copy it as knowledge, attitudes, skills and behaviors with make this copy is basic in deal with others. Media plays huge rolls an important role in juvenile’s cognition and comprehension as a motivating factor in effect on aspects of behavior through advocating freedom of expression and thought, and rejecting many of the conservative standards and values of society, promoting promiscuity, violence, alcohol and drug use, rape, vandalism, prostitution, with give the impression that aggression and violence is permissible in many deviant activities and disrespect of values and norms.

Juveniles are committing crime when disagree with rule of conduct stated in law or breaks a rule from rules of conduct through lack of ability to exercise self-control. A delinquency as a harmful act against the public and community, upon conviction, is punishable with a fine, imprisonment, and death. Juvenile delinquency takes various forms according frequency, degree, duration and seriousness like obscenity, pilfering, murder, burglary, fraud, loitering, gambling, drug abuse, begging, and disrespect of values and norms in society.

Wrongdoing, misdemeanor, felony, crime is a product of learning the values, norms and behaviors due to response to personal propensities or a specific motivation or environmental inducements that law is prohibited, associated with unwanted activity. Any violation in Iraq is punishable under the Criminal Code or known as the Code of Criminal Procedure, which regulates all Iraqis under the umbrella of the law.

Results

The results revealed that the majority of the samples (59%) at age 16-17 year; were male (82%); were living in urban area (77%) have interrupted at school (64%); and education level (37.98%) at 5-6 class, while lowest percentage (1.26%) at 11-12.
Table (1) Distribution of the Study Sample by Ways Used the Internet

<table>
<thead>
<tr>
<th>No.</th>
<th>Variables</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Do you use internet</td>
<td>86</td>
<td>86%</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>14</td>
<td>14%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>Ways used</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Computer</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Laptop</td>
<td>3</td>
<td>3.5%</td>
</tr>
<tr>
<td></td>
<td>Mobile</td>
<td>83</td>
<td>96.5%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
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<td>100%</td>
</tr>
<tr>
<td>3</td>
<td>Purpose use the internet</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Find a Friendship</td>
<td>81</td>
<td>94.2%</td>
</tr>
<tr>
<td></td>
<td>Find a Relationship</td>
<td>31</td>
<td>36%</td>
</tr>
<tr>
<td></td>
<td>Learning Science</td>
<td>6</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>Find Solutions to Problems</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Identify Culture</td>
<td>2</td>
<td>2.3%</td>
</tr>
<tr>
<td></td>
<td>Entertainment</td>
<td>86</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>31</td>
<td>36%</td>
</tr>
</tbody>
</table>

F= Frequency, %= Percentage

Table (1) The results revealed that the majority of the samples (86%) to used internet; (96.5%) by used mobile; (100%), (94.2%) used internet to entertainment and to find a friendship, while absent percentage (0%) of find solution to problems.

Table (2) Distribution of the Study Sample by Places Used the Internet

<table>
<thead>
<tr>
<th>No.</th>
<th>Variables</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Home connected with Internet</td>
<td>84</td>
<td>97.7%</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>2</td>
<td>2.3%</td>
</tr>
<tr>
<td>2</td>
<td>Place use the internet</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Home</td>
<td>24</td>
<td>27.9%</td>
</tr>
<tr>
<td></td>
<td>Coffee Shop</td>
<td>1</td>
<td>1.2%</td>
</tr>
<tr>
<td></td>
<td>Anywhere</td>
<td>61</td>
<td>70.9%</td>
</tr>
<tr>
<td>3</td>
<td>Internet use</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alone</td>
<td>86</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>With Friends</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>With Family</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>4</td>
<td>How many hours used internet</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1-2</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>2-3</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>3-4</td>
<td>6</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>More</td>
<td>80</td>
<td>93%</td>
</tr>
</tbody>
</table>

F= Frequency, %= Percentage
Table (2) The results revealed that the majority of the samples (97.7%) connect juvenile’s home with website; (70.9%) the internet used in anywhere as alone (100%) for more than four hours a day (93%).

Table (3) Distribution of the Study Sample by Social Media Sites

<table>
<thead>
<tr>
<th>No.</th>
<th>Variables</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Field use of the Internet</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Scientific Research</td>
<td>1</td>
<td>1.2%</td>
</tr>
<tr>
<td></td>
<td>Chat</td>
<td>83</td>
<td>96.5%</td>
</tr>
<tr>
<td></td>
<td>Messages</td>
<td>45</td>
<td>52.3%</td>
</tr>
<tr>
<td></td>
<td>Game</td>
<td>74</td>
<td>86%</td>
</tr>
<tr>
<td></td>
<td>Music</td>
<td>37</td>
<td>43%</td>
</tr>
<tr>
<td></td>
<td>Movies</td>
<td>86</td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>Commonly used sites</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Google</td>
<td>5</td>
<td>5.8%</td>
</tr>
<tr>
<td></td>
<td>You Tube</td>
<td>86</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Face Book</td>
<td>84</td>
<td>97.7%</td>
</tr>
<tr>
<td></td>
<td>Netflix</td>
<td>27</td>
<td>31.4%</td>
</tr>
<tr>
<td></td>
<td>Instagram</td>
<td>28</td>
<td>32.5%</td>
</tr>
<tr>
<td></td>
<td>Twitch</td>
<td>49</td>
<td>57%</td>
</tr>
<tr>
<td></td>
<td>Pornhub</td>
<td>26</td>
<td>30.2%</td>
</tr>
<tr>
<td></td>
<td>X videos</td>
<td>27</td>
<td>31.4%</td>
</tr>
<tr>
<td></td>
<td>Wikipedia</td>
<td>4</td>
<td>4.6%</td>
</tr>
<tr>
<td>3</td>
<td>Browse the violence program</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>85</td>
<td>98.8%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>1</td>
<td>1.2%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

F= Frequency, % = Percentage

Table (3) The results revealed that the samples of social media were (100%) watch movies; (96.5%) used chat; (86%) play game; while (100%) use the you tube; (97.7%) use face book; (4.6%) use the Wikipedia; while (98.8%) browse the violence program.
Table (4) Distribution of the Study Sample the Offenses and Misdemeanor Committed by the Juveniles

<table>
<thead>
<tr>
<th>No.</th>
<th>Variables</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Types of Offenses and Misdemeanor Committed by the Juveniles</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Theft</td>
<td>18</td>
<td>18%</td>
</tr>
<tr>
<td></td>
<td>Drug Abuse</td>
<td>61</td>
<td>16%</td>
</tr>
<tr>
<td></td>
<td>Murder</td>
<td>15</td>
<td>15%</td>
</tr>
<tr>
<td></td>
<td>Threat</td>
<td>10</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>Rape</td>
<td>10</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>Sabotage</td>
<td>7</td>
<td>7%</td>
</tr>
<tr>
<td></td>
<td>Motorcycle/Car Accidents</td>
<td>5</td>
<td>5%</td>
</tr>
<tr>
<td></td>
<td>Cheating</td>
<td>4</td>
<td>4%</td>
</tr>
<tr>
<td></td>
<td>Beatings</td>
<td>3</td>
<td>3%</td>
</tr>
<tr>
<td></td>
<td>Vagrancy</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>Betrayal</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>Forgery</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>9</td>
<td>9%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

2.

Table (4) The results revealed that the samples of types of offenses and misdemeanor committed by the Juveniles that indicate to (18%) theft; (16%) drug abuse; (15%) murder; (10%) rape and threat; while were (9%) others offenses and misdemeanor committed. While (45%), (19%) friend and brother as high percentage which helped juvenile to commit the misdemeanor.

**Discussion**

The results revealed that the more than half of the samples were (59%) at age 16-17 year, while 14-15 year were less than half (41%); juvenile’s male more than four fifths (82%) and the rest of the sample were females; living in urban area were more than three-
quarters (77%), while were little more than ten (15%) continuous at school and third (21%) the juveniles were did not enter at school; while were more than three fifths (64%) samples have interrupted at school; with more than one-third (37.98%) of juveniles have fifth and sixth class; while eleventh and twelfth grade were less percentage (1.26%) of sample.

Concerning the results of the ways used the internet of social media table (2) that indicates to use internet more than four fifths (86%) of sample by mobile more than nine tenths (96.5%) for entertainment (100%); find a friendship (94.2%), this finding agrees and supported with results obtained from study done by 13 a study (Impacts of Media on Society, India) reports indicate that more than nine tenths (93%); and used internet by mobile were (75%); also this finding agrees and supported with results obtained from study done by 10; a study (The Uses of Middle Teenage Students for Networks Social Communication in the Schools of Nablus in Palestine) mentions that the more sites that juvenile’s used are face book (43.85%); while you tube is (9.65%), while this finding disagrees with results obtained from study done by 12; a study (The Features of the Internet Culture Among Adolescents in Algeria) reports indicate that juveniles use internet for browse the violence program were (40.6%).

Table (5) Show distribution of samples according to offenses committed by the juveniles; it indicates that high five percentages more than third were theft (18%), drug abuse (16%) and murder (15%), threat and rape were (10%); the friends (45%), Brotherhood (19%) and parents (16%) were more persons who help the juvenile commit the misdemeanor or crime, this finding agrees and support with results obtained from study done by (Hameed, 2011); a study (Personality of the Juvenile delinquency, Algeria) reports indicate that offenses committed by the juveniles are theft (38.13%), drug abuse (17.79%), also this finding agree with results obtained from study (Chowdhury et al, 2012); a study (Causes and Consequences of Juvenile Delinquency in Bangladesh) that indicates to theft (47.37%) and murder (36.84%), with help friends (54%).

Concerning the results of the social media sites the findings shown in table (4), that indicates to used internet were full percentage (100%) for watching movies and more than nine tenths (96.5%) for used chat with others; (86%) play game and the commonly sites that juvenile’s used were you tube (100%); face book (97.7%) and (98.8%) browse the violence program, these findings agree and support with results obtained from study done by 13; a study (Impacts of Media on Society, India) reports indicate that juveniles use internet in watching movies (84%), for used chat (89%) and for play game (81%), and also this finding agrees and supported with results obtained from study done by 10; a study (The Uses of Middle Teenage Students for Networks Social Communication in the Schools of Nablus in Palestine) mentions that the more sites that juvenile’s used are face book (43.85%); while you tube is (9.65%), while this finding disagrees with results obtained from study done by 12; a study (The Features of the Internet Culture Among Adolescents in Algeria) reports indicate that juveniles use internet for browse the violence program were (40.6%).

Conclusions

The findings of the present study conclude that the mostly social media used by the juveniles are you tube and face book by mobile of entertainment for more than four hours that lead the juveniles to broken the law and then delinquency.

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Conflict of Interest: None to declare.
Ethical Clearance: All experimental protocols were approved under the Ministry of Health and all experiments were carried out in accordance with approved guidelines.

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Assessment of Referral System Quality from Clients’ Perspectives at Outpatient Consultancy Clinics in Al-Hilla City Hospitals

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2 Ph.D. Assistant Prof., Department of Community Health Nursing, bab-Al-Moudham

Abstract

Aim: The aim of the study is to assess the referral system quality from clients’ perspectives at outpatient consultancy clinics in al-Hilla city hospitals.

Subjects and Methods: A descriptive analytic study design was carried out at outpatient consultancy clinics of Al- Hilla city hospital (Al-Hilla and Al-Imam Al-Sadiq general teaching hospital) from March 14th to December 12th 2019. Non – probability (purposive) sample of 200 clients who were coming to the Outpatient Consultancy Clinics were selected. Data is collected through used of an assessment tools and interview technique with (19) items of questionnaire. Reliability of instrument was determined through the use of Alpha Cronbach approach and the instrument validity was determined through a panel of experts. The analysis of the data was used descriptive statistics frequencies, percentages, mean, mean of score, cut off point, Chi square. In order to assess the referral system quality from clients’ perspectives.

Results: The findings of the present study reveal that overall assessment of the referral system quality is poor, grand mean of referral system services from clients’ perspectives are fair, majority reason for referring is lack of specialty(51%), and finally; medical diseases unit is most referred clients to it(24%).

Conclusion: The study concluded that poor referral system quality for clients at outpatient consultancy clinics in Al-Hilla city hospitals.

Keyword: Assessment; referral system; quality; clients; Outpatient Consultancy Clinics.

Introduction

The referral system is one of the cornerstones of basic healthcare systems. It is a complete and sustainable system with two directions to connect the primary healthcare units/centers and hospitals. It is one of the basic healthcare systems. It leads to continuous improvement of comprehensive health care for all patients by assigning priorities to those who need it (1). A referral can be defined as a process in which a health worker at a one level of the health system, having insufficient resources (drugs, equipment, skills) to manage a clinical condition, seeks the assistance of a better or differently resourced facility at the same or higher level to assist in, or take over the management of, the client’s case (2).

Most countries in the Eastern Mediterranean Region (EMR) are committed to strengthening family practice, however, implementation is uneven and inconsistent. An assessment of the status of family practice revealed significant gaps in terms of political commitment, client registration, packages of essential health care, essential medicines lists, referral systems and staff. Another big challenge is the insufficiency of trained care provider and the inability of current training programs to meet the enormous needs (3). The referral system given to primary care providers is based on clear guidelines detailing the referral process. This includes the use of a pre-designed standardized referral form with important relevant clinical and social information (4). The health care in Iraq are provided through a network of public Primary...
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Health Care (PHC) centers and hospitals where care are provided at very low charges. However, the Iraqi health system faces enormous problems that have mainly resulted from wars and economic sanctions during the last few decades(5). The Ministry of Health (MOH) in Iraq adopted a referral system in late 2008 to ensure a close relationship among all levels of the health system, to ensure people receive the best possible care closest to home, and to make cost effective use of hospitals and primary health care. Most PHC clinics (85%) had a referral system record, however (69%) did not have an electronic archive or family inventory and (64%) said they do not have any follow up mechanisms for the clients who are in need of continuous care(6). Although the Iraq referral system is between primary and secondary care, in practice, there is minimal coordination between the primary health care (PHC) level and the district hospitals apart from communicable disease surveillance(7). An effective referral system ensures a close relationship between all levels of the health system and helps to ensure people receive the best possible care. It also benefits in making cost-effective use of hospitals and primary health care. Support to health centers and outreach care by experienced staff from the hospital or district health office helps build capacity and enhance access to better quality of health care within a community(8). The important of the referral system can be brief as the following points: for the clients (prompt diagnosis and management, save time, low cost and effort, and better quality of health care), for primary care providers (learning and training, gaining self confidence, increase communication between the health care staff), and finally for consultant (improve the quality of client’s management, and increase communication between the primary health care staff by feedback reports)(9). Recently, The studies increase the interest in quality of referral system, with increasing focus for assessing and measuring the referral quality, evaluation of referral services which based on clients’ perspective are becoming very important. clients have a special perspective for evaluating the non technical aspects of health care. There are different definitions of referral system quality(10).

Materials and Method

A descriptive analytic study design was carried out at outpatient consultancy clinics of Al- Hilla city hospital (Al-Hilla and Al-Imam Al-Sadiq general teaching hospital) from March 14th to December 12th 2019. Non – probability (purposive) sample of 200 clients who were coming to the Outpatient Consultancy Clinics. These clients were selected according to the following criteria: clients who had referral from PHCCs to outpatient consultancy clinics of general hospitals in Al-Hilla city; both gender of clients (male and female); clients who had three referral times and above to outpatient consultancy clinics.. For the purpose of the present study a questionnaire was designed and developed by the researchers which consists of three parts: The first part of the questionnaire concerned with determination of the socio-demographic characteristics of the sample, and the second part was consist referral information and third part was assessment of referral system quality from clients’ perspectives. Reliability of instrument was determined through the use of Alpha Cronbach approach (r = 0.881), and the instrument validity was determined through a panel of (20) experts. In order to achieve the early stated objectives, the data of the study were analyzed through the use of Statistical Package of social sciences (SPSS) version 20 through statistical procedures that includes: frequency, percentage, mean, mean of score, cut off point, and Chi square.

Results

Table 1: Distribution of Referral Information at Primary Health Care Centers

<table>
<thead>
<tr>
<th>List</th>
<th>Items</th>
<th>F.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Indications for referring</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lack of specialty</td>
<td>102</td>
<td>51</td>
</tr>
<tr>
<td></td>
<td>Unavailability X ray and ultrasound</td>
<td>36</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Lack of lab. Tests</td>
<td>35</td>
<td>17.5</td>
</tr>
<tr>
<td></td>
<td>Need for further management</td>
<td>15</td>
<td>7.5</td>
</tr>
<tr>
<td></td>
<td>Diagnosis difficulty</td>
<td>12</td>
<td>6</td>
</tr>
</tbody>
</table>
The results indicated that the referral information was (51%) of indications for referring are lack of specialty, and (24%) of clients had referred to medical diseases unit.

Table 2: Assessment of Referral System from Clients’ perspectives in Outpatient Consultancy Clinics: n= 200

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>F</th>
<th>%</th>
<th>F</th>
<th>%</th>
<th>F</th>
<th>%</th>
<th>F</th>
<th>%</th>
<th>M.S</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Referral system link between PHC and hospital</td>
<td>3</td>
<td>1.5</td>
<td>52</td>
<td>26</td>
<td>34</td>
<td>17</td>
<td>85</td>
<td>42.5</td>
<td>26</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>PHC distance</td>
<td>9</td>
<td>4.5</td>
<td>87</td>
<td>43.5</td>
<td>39</td>
<td>19.5</td>
<td>63</td>
<td>31.5</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>Good diagnosis</td>
<td>4</td>
<td>2</td>
<td>73</td>
<td>36.5</td>
<td>20</td>
<td>10</td>
<td>87</td>
<td>43.5</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>Decrease admission</td>
<td>11</td>
<td>5.5</td>
<td>92</td>
<td>46</td>
<td>43</td>
<td>21.5</td>
<td>47</td>
<td>23.5</td>
<td>7</td>
<td>3.5</td>
</tr>
<tr>
<td>5</td>
<td>Less waiting time</td>
<td>6</td>
<td>3</td>
<td>56</td>
<td>28</td>
<td>43</td>
<td>21.5</td>
<td>90</td>
<td>45</td>
<td>5</td>
<td>2.5</td>
</tr>
<tr>
<td>6</td>
<td>Low cost</td>
<td>17</td>
<td>8.5</td>
<td>136</td>
<td>68</td>
<td>23</td>
<td>11.5</td>
<td>24</td>
<td>12</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>7</td>
<td>Good health care</td>
<td>14</td>
<td>7</td>
<td>117</td>
<td>58.5</td>
<td>39</td>
<td>19.5</td>
<td>28</td>
<td>14</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

F: Frequency %: Percentage
Cont.. Table 2: Assessment of Referral System from Clients’ perspectives in Outpatient Consultancy Clinics: n= 200

<table>
<thead>
<tr>
<th></th>
<th>Decrease load</th>
<th>8</th>
<th>4</th>
<th>22</th>
<th>11</th>
<th>40</th>
<th>20</th>
<th>124</th>
<th>62</th>
<th>6</th>
<th>3</th>
<th>3.5</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Provide health education by medical staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.93</td>
</tr>
<tr>
<td>9</td>
<td>Provide health education by nursing staff</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.91</td>
</tr>
</tbody>
</table>

Grand mean (Total) 2.73 Fair

HS: Highly significant had mean of scores greater than 3.68, Sig.: significance had mean of scores equal to 2.34-3.67, NS. : Non-significant had mean of scores less than 2.34, F: Frequency, %:Percentage

The finding out of this table show that significant items are 1,2,3,4,5,7, and 8, while non significant items are 6, 9, and 10. That mean the referral system for clients in outpatient consultancy clinics is fair level (2.73) according to their perspectives.

Table (3): Overall Assessment of Referral System quality from clients’ perspectives

<table>
<thead>
<tr>
<th>Poor</th>
<th>Fair</th>
<th>Good</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>F.</td>
<td>%</td>
<td>F.</td>
<td>%</td>
</tr>
<tr>
<td>196.7</td>
<td>60.15%</td>
<td>41.6</td>
<td>12.72%</td>
</tr>
</tbody>
</table>

F: Frequency %: Percentage

Results out of this table present that most of the Primary Health has poor for referral system quality from clients’ perspectives (60.15%).

Discussion

The present study indicates that the majority (90.5%) of clients who were coming to the outpatient consultancy clinics of general teaching hospitals in AL-Hilla city were living in urban areas, and the remaining (9.5%) were living in rural areas(Table 1). This result is similar to the study in Jordan(11), who found that the majority of the study sample (89%) were living in capital (Amman), and 11% were living in city parties. Regarding to the clients’ age, the finding of the study indicates that the highest percentage of the study sample (33.5%) of clients who were coming to the outpatient consultancy clinics were at age group less than 30 years, while the lowest
percentage (4%) of them were at age group 50 years and above. These results agree with the study in Iraq\textsuperscript{(12)}, who found that the majority of the study subjects at age (20-30) years. The findings of the present study show that the majority of the study samples were male (71%) and the remaining (29%) are females. This result similar to study done in Iraq\textsuperscript{(15)}, show that most of referred client were male (80%) and (20%) were female. Concerning the educational levels, the findings of the present study indicate that (27.5%) who were coming to the outpatient consultancy clinics have bachelor and above, (20.5%) have primary school, (20%) have read and write, (18%) have illiterate(can't read and write), whereas only (14%)of them were secondary school degree. This result was supported by the study in Uganda\textsuperscript{(13)}, who found that the most of the study subject (50%) have bachelor degree, (34%) have primary school, whereas (8%) of them can’t read and write. With respect to the occupation, the findings of the present study show that (34%)of the clients have government employee; (23%) have retired , (18.5) unemployed, (14%) housewife , (10.5%)private employee. This result agree with The study which is conducted in Nigeria\textsuperscript{(14)}, which reported that the majority occupation of referred clients were 38% government employee and lowest percentage of clients’ occupation was private employee(7.4%).

According to indications for referral reasons were maximum percentage ( 51%) lack of specialty, followed (18%) unavailability to x-ray and ultrasound, (17.5%) lack of lab. tests, (7.5%)need for further management, and (6%) diagnosis difficulty(Table 2). This results similar to study done in Iraq\textsuperscript{(12)}, which illustrated that reasons for indicated referrals were (43.4%) lack of specialty, (42%) unavailability to x-ray and ultrasound, (7.7%) lack of lab. tests, (3.9%) need for further management, and finally; (3%) diagnosis difficulty. The departments and units selected for clients referral were highest percentage unit to medical diseases (24%), and lowest percentage unit to pediatric diseases. This results disagree with study done in Iraq\textsuperscript{(15)}, which presented that most the referred clients to pediatric unit (31.5%), and least referred clients were send to oncology department (1.2%). The disagreement between both studies is attributed to there are two specific hospitals (AL-Noor hospital, and Babil hospital for obstetrical and child) in AL-Hilla city which treatment the children and the most health care providers in PHCCs referred the children to this hospitals, therefore; the percentage of pediatric unit at general hospital in AL-Hilla city was lowest level.

Regarding the assessment of referral system from clients’ perspective in outpatient consultancy clinics(Table 3), the present results was fair in grand mean (2.73). Mean of score show that significant items were 1,2,3,4,5,6,and 7 while the non significant items were 6,9,10. Non significant items included referral system contribute to low of cost, provide health education by medical and nursing staff, the reason of this result can be attributed to insufficiency of indicated referral from PHCCs to hospitals, there are unnecessary requests for referral, self- requested referral, and most letters of referral that send from private clinics that leads to increase number of clients in hospital or outpatient consultancy clinics without clear dissemination guidelines for referral that is may be leads to increase of health care services and increase of cost and waiting time. Regarding lack of provide health education by medical and nursing staff may because of shortage of health care providers in PHCCs, lack of health care providers’ knowledge concerning administrative tasks and activities for referral system unit and the greater number of them does not participate in training sessions for referral system and unawareness of them toward benefits of health education for clients regard to referral system.

The overall assessment for the referral system quality from clients’ perspectives in present study is poor (60.15%) (Table 4). This result provides evidence that these centers are unable to provide acceptable and effective referral services. So, the quality of referral system was poor and lacking important and relevant items in majority of referral needs to be improved. This result agrees with study obtained in Iraq\textsuperscript{(16)}, which indicates that the overall evaluation of referral system quality for letters and feedback was poor and inadequate 69.5% and 78.5% respectively. Also this study similar to other study in Nigeria\textsuperscript{(17)}, the overall of referral system and quality of health care were insufficiency and at the low levels(56.3%).

**Conclusions**

The findings of the present study conclude that the overall assessment of the referral system quality from clients’ perspectives at poor services level in the present...
study, and the clients’ perspectives for referral system services are fair.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Ministry of Health and all experiments were carried out in accordance with approved guidelines.

**References**


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The Effect of Adding Different Concentration of Vitamin E to Frying Oil on the Peroxide Value

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Abstract
The aim of this research is to reduce the number of peroxide in two frying oil samples (Aldura and altusan) by using one of the natural antioxidants which is vitamin E. one of the chemical specifications that assess the oil is the peroxide number, which is the amount of free radicals formed in the oil and the number of peroxides increases during exposure to heat, moisture, oxygen, bad storage conditions, light or other conditions. These peroxides have a harmful effect on the consumer health (initiation cancer). The vitamin E had a clear impact on the peroxide value, as when conducting the experiment and using oil to fry potato slices, the number of peroxide was high before adding vitamin E which score (Peroxide number is 5.6 for 15 minutes, 9.8 for 30 minutes, and 11.6 for 45 minutes). After using vitamin E in amount of 10 microgram per 100 ml of oil, the effect was clear of vitamin E on the number of peroxide as it decreased significantly. Which scored (5 for 15 minutes, 8.1 for 30 minutes, 8.9 for 45 minutes). When vitamin E added by 20 microgram the result was (4.8 for 15 minutes, 5.5 for 30 minutes, 6.5 for 45 minutes). 50 microgram per 100 oil shown to have no significant effect on the peroxide value. it was found that the best concentration is 20 microgram for a sample of 100 ml of oil.

Keywords: frying oil, peroxide value, vitamin E

Introduction
Frying is one of the daily habits of most consumers around the world 1. When frying at the commercial or institutional level, it is usually done continuously and at high temperatures, and often an amount of old oil is added repeatedly and the frying process continues. also it is constantly exposed to oxygen, in addition to the presence of water in food, this may leads to a series of chemical changes due to the deteriorating characteristics of frying oil and for. Thus, it form non-volatile compounds and free radicals that negatively affect the properties of oil, and on the other hand, they negatively affect food and constitute a danger to the consumer health 1-6. Due to these changes that occur in foods during frying, the demand for more stable oils when frying increased, and it was found that Vitamin E has a positive effect to reduce these changes. Vitamin E have a unique colour which is pale yellow oil, acid and heat resistant, in-soluble with water 2. Extremely slow in oxidation. which gives it an important role as an antioxidant agents. Vitamin E is a soluble in fat but not water that consists of eight formulas alpha, beta, gamma, delta tocopherol and alpha, beta, gamma, delta tocotrienol, obtaining it means preventing oxidation of fatty acids and preventing oxidation of low-density Lipoproteins, which also reduces the possibility of human infection with atherosclerosis. This vitamin is concentrated in red and retinal blood cells and respiratory membranes 7,8. When a person increases the intake of unsaturated fatty acids, he should increase his intake of vitamin E, however, many of them ignore the importance of this vitamin and the reason for this because they follow a routine diet that lacks vitamin E as in the case of obtaining an appropriate amount of this vitamin by eating foods rich in it is considered an important factor in maintaining immunity and preventing a group of diseases and obtaining healthy and beautiful skin. 9 Vitamin E also has been found to be important in preventing colon cancer, prostate and breast cancers. Also some cardiovascular diseases some time poor eye lens, arthritis and some neurological disorders. Vitamin E, which is found in some vegetable oils such
as corn oil and soybean oil, is able to fight cancer and inhibit cell growth. Cancer vitamins in our diets are found in various forms, and Vitamin E is one of these vitamins. Researcher Zhong Yang stated in 1995 that vitamin E in the form of Tocopherols Gama is found in many natural diets and Tocopherols Delta is found in vegetable oils are useful in the treatment of types of cancer and chronic diseases and various infections and reduce the risk of infection by either Tocopherols Alfa is the most commonly used formula in vitamin E, which some take as a dietary supplement from pharmacies. Vitamin E is also considered to be one of the most important antioxidants agents that fight free radicals, the main cause of toxins accumulation and the spread of incurable diseases in the body. And as we mentioned, the thermal treatment of the oil leads to the rancidity of oils, forming peroxides, as oxidation occurs in light, oxygen, or traces of heavy metals and storage. The peroxide value is used to determine the degree of oxidation in fats and oils as oxygen interacts with the lipid molecule and creates free radicals in the form of peroxides. The objective of the current study is to evaluate the effect of adding different concentration of vitamin e to frying oil on the peroxide value.

**Materials and Method**

Oils and food

Two samples were used, the first is Iraqi origin oil type Aldar and the second is Tunisa which is Turkish made. The oil was obtained from local markets and vitamin E with a concentration of 98% from a specialized office for the supply of chemicals shop.

**Peroxide value**

All tests for the value of peroxide are based on a measurement of the amount of liberated iodine when potassium iodide interacts with rancid fat. In the Lea method, one gram of fat and one gram of potassium iodide are used with a solvent consisting of acetic acid and chloroform in a ratio of 2:1. After this heating is made to estimate the iodine produced by correction with a standard solution of sodium thiosulfate (0.03%). According to the following equation.

\[
\text{Peroxide number} = \frac{\text{volume (ml) } 10 \times 0.1 \times \text{Na}_2\text{SO}_3}{\text{sample weight (g)}}
\]

As the amount of peroxide was estimated before the thermal treatment, the amount of peroxide after the thermal treatment was estimated at the mentioned concentrations and times.

**RESULTS AND DISCUSSION**

At the beginning of the work, the peroxide value was estimated for both sample Al-Dar and Altonsa (Iraqi and Turkish origin) respectively. The control samples were low due to the lack of frying process. The peroxide number was measured for both Al-Dar and Altonsa oil during frying in 15, 30 and 45 min of the processing at a fixed temperature. 4.1 and 6.4 respectively, and kept on was rising In the value of peroxide this indicates the formation of free radicals and after continuing frying for 30 minutes the value of peroxide increased more than the first value and after continuing frying for more than 45 minutes the value of peroxide increased more.

The value of peroxide increases to a large degree, from which we conclude that by repeating the frying process of the oil and increasing the time, the value of peroxide is constantly increasing frying and this indicates the formation of free radicals (Hopia, Huang, & Frankel, 1996).

100 ml of oil was used to fry potato slices without adding vitamins, and three samples were taken during different time periods, so the peroxide number was as follows:
100 ml of oil was used to fry potato slices without adding vitamin and we took three samples during different time periods so the peroxide number was as follows.

After that, liquid vitamin E was used with a concentration of 98%. The first use is 10 micro ml of micropipette and was added to 100 ml of Aldar and Tunisa oil.

And the process of frying the oil with the material potato slices for 15 minutes, and there was a decrease in the value of peroxide by a little degree compared to the lack of adding vitamins, as well as the continuation of frying process.

The second use is 20 micro ml of vitamins to 100 ml of Aldar and tuna oil. The oil was used for frying by adding vitamins to it for 15 minutes. It was found that...
there was a noticeable decrease in the value of peroxide and the continuation of the frying process for 30 minutes. The value of peroxide increased, but to a lesser extent than its rise without using the vitamin. Likewise, for the continuation of the frying process for 45 minutes, as the peroxide number has increased, not like the high peroxide value without the vitamin.

The third use is 50 micro ml of vitamins to 100 ml of Aldar and Tunisa oil. The oil was used for frying for the same mentioned periods of time. The results were different to a lesser degree than the results using 20 micro ml of vitamins, as well as for other results, regardless of the numbers, constantly frying. This indicates that No significant change occurred when the vitamin concentration increased and these results were consistent with 10,14 The higher the percentage of the vitamin, there will be no significant change. After that, the vitamin was added in different concentrations. Use the oil by frying the potato slices. The results are as follows:

![Graph](al_dura_oil.png)

**Figure 3. The vitamin was added in different concentrations.**

After that, the vitamin was added with the same aforementioned concentrations. The oil was used by frying the potato slices. The results were as follows:

![Graph](altonsa_oil.png)

**Figure 4. The vitamin was added in different concentrations.**
We conclude from this that the heat leads to an increase in the peroxide number with repeated use and an increase in time and that the use of vitamin E in the amount of 20 microgram per 100 ml of oil has resulted in a significant decrease in the value of peroxide and that the increase in the vitamin is of little effect depending on the amount of oil used and its increase when using A greater amount of oil, this means that there are limits to reducing the number of peroxide in the oil, so that the increase in the vitamin did not show a significant decrease in the number of peroxide. The addition of vitamin to frying oils reduces the number of peroxide and this corresponds to 15

Recommendations

1- Use of originating oils with a low peroxide number, as the Iraqi oil had a lower peroxide number than the Turkish one.

2- Storing oils in places away from sunlight and not storing them in hot places.

3- Not to use oil for frying more than once and for the shortest period of time possible.

4- Use vitamin E and add it to oils before using them to reduce the number of peroxide, according to the mentioned percentage.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Al-Qasim Green University and all experiments were carried out in accordance with approved guidelines.

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15. Schlenker E, Long S. / Williams (Hopia, Huang, Schwarz, German, & Frankel. 1996.
Correlation between Hormonal and Biochemical Changes with Kidney Function in Newly and Previously Diagnosed Women Diseased with Polycystic Ovary Syndrome

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Abstract

The objectives of our work was to identify the effects of insulin resistance and other hormonal changes on kidney function in newly and previously diagnosed women diseased with PCOS.

Method: This prospective study was done by collect serum samples and urine from three group (Control 60), (previously 50), (newly 50) patients. The withdrawal led samples were subsequently assay for hormonal and biochemical changes.

Results: The data of tests were available for both groups. We found significant differences in level of insulin, Homeostatic model assessment Insulin resistance (HOMA-IR), Homeostatic model assessment Beta function (HOMA-B), Progesterone among newly and previous women, also the data indicated a significant correlation between urea and testosterone in newly while direct significant correlation between urea and progesterone. There was significant correlation between Thyroid stimulating hormone (TSH) and creatinine in previously diagnosed PCOS, also direct correlation between uric acid and Body mass index (BMI), Fasting blood glucose (FBS), HOMA IR and inverse correlation with Triiodothyronine (T3) in new PCOS while in previously diagnosed PCOS there is inverse correlation between uric acid and T3. Finally, significant correlation between FBS, insulin, HOMA B and HOMA IR in previously diagnosed patients while correlation is seen between FBS, insulin and HOMA IR in newly patients.

Keywords: Biochemical changes, kidney, women, polycystic ovary syndrome.

Introduction

Polycystic Ovarian Syndrome: Polycystic ovarian syndrome (PCOS) is metabolic, endocrine and genetic disorders, chronic absence of ovulation of, with clinical and biochemical changes and presentation of hyperandrogenism (1)

PCOS affects as many as 10% of reproductive-age women when using the National institutes of health (NIH) standards in diagnosis. It is convenient that menstrual disturbances, insulin resistance and hyperandrogenism are currently existent, that includes anovulation, hirsutism, irregular and painful menstrual cycles, amenorrhea oligomenorrhea with small cysts in the ovaries, central obesity, and one more presentations related to the insulin resistance (2,3,4).

Epidemiology: The predisposing factors for PCOS include the following:

High maternal androgen: Prenatal exposure and Onset of type 1 diabetes mellitus before menarche, insulin resistance and obesity. Drugs: such as anti-epileptic drugs (e.g., Valproate) (5). Polycystic ovaries develop when the ovaries are stimulated to produce excessive amounts of (androgens), particularly testosterone, by either the release of excessive luteinizing hormone and
high levels of insulin in the blood or change due to levels of sex-hormone binding globulin (SHBG) resulting in increased free androgens\(^6\).

Women affect with PCOS reign elevated level of gonadotropin releasing hormone (GnRH), hence gives rise to a rise in ratio of Luteinizing hormone (LH)/Follicle stimulating hormone (FSH). The preponderance of women affected with PCOS have obesity and/or insulin resistance. The hypothalamic, pituitary and ovarian axis changes in PCOS are caused by insulin levels rises\(^7\).

The state of hyperinsulinemia augments GnRH shoots frequency, LH upon FSH predominance, ovarian androgen output excess, follicles’ maturation reduction and lowering binding of SHBG.\(^8\).

Autosomal dominant method sounds to be the genetic part of PCOS inheritance\(^9, 10\).

**Diagnosis of PCOS:** NIH works proposed that diagnosis of PCOS is performed when patient has pictures of androgen rise in vivo and in vitro, whether patent endures oligoovulation, and when other conditions causing PCOS are excluded\(^11\).

**Standard Diagnostic Assessment:** The diagnosis assessment includes the followings:

**A-History-taking:** women are inquired for menstrual manner, fatness, lack of breast evolution, acne and/or hirsutism, Lifestyle modality such as exercise, diet, and smoking require estimation and whether to consume any drugs and their influence should be scrutinized. Gynecological enquiry has to recognize age of menarche, menstrual disturbance, infertility and presence of relatives’ hirsutism.\(^12\)

**Patients and Methods**

**Selection of patients:**

This work was performed at the Obstetric and Gynecological Teaching Hospital in Karbala. It was carried out from July to November 2018. The age of patients and controls groups was (18-38) years. This study was carried on 100 patients with PCOS and 60 healthy individuals as controls, the patients were allocated into (2) groups:

Groups (A): include 50 patients with PCOS since above 1 year (as previously patients group).

Group (B): include 50 patients recently diagnosed with PCOS (as newly diagnosed group).

All patients were tested for fasting serum glucose and fasting insulin level, FSH, LH, progesterone, estradiol (E2), prolactin, testosterone, thyroid stimulating hormone (TSH), free T3, free T4, urea, creatinine and uric acid were measured by using a ready-made kits and Microalbuminuria was measured by urinalysis reagent strips.

**Statistical Analysis**

Modeling and featuring of data was accomplished by using SPSS 22.0.0 (Chicago, IL), GraphPad Prism version 8.0.0 for Windows, GraphPad Software, San Diego, California USA, software package applied to predict analytic techniques, p value is counted significant if lower than 0.05.

**Results**

**Hormonal and biochemical change in PCOS groups and control**

The data presented in the table (3.1) and in the figures (3.1) indicated serum insulin was significantly elevated in previous PCOS compared to control. The data presented in the figure (3.2), (3.3), indicated a significant different in the HOMA-IR, HOMA-B, among the previous and new PCOS to control patients and in the figure (3.4) the data indicated a significant different in the progesterone among the previous and new PCOS compared to control.
### Table 1: Hormonal and biochemical changes

<table>
<thead>
<tr>
<th></th>
<th>Control</th>
<th>Old PCOS</th>
<th>New PCOS</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number</strong></td>
<td>60</td>
<td>50</td>
<td>50</td>
<td>-</td>
</tr>
<tr>
<td><strong>Age (years)</strong></td>
<td>28.4 ± 7.5</td>
<td>27.7 ± 5.2</td>
<td>26.9 ± 7.3</td>
<td>0.797</td>
</tr>
<tr>
<td><strong>BMI (kg/m²)</strong></td>
<td>29.8 ± 5.4</td>
<td>32.6 ± 4.4</td>
<td>33.6 ± 5.3</td>
<td>0.087</td>
</tr>
<tr>
<td><strong>FBS (mg/dl)</strong></td>
<td>119.9 ± 12.6</td>
<td>127.5 ± 17.8</td>
<td>125.7 ± 35.0</td>
<td>0.626</td>
</tr>
<tr>
<td><strong>Insulin</strong></td>
<td>11.0 ± 5.2</td>
<td>32.3 ± 38.5</td>
<td>21.1 ± 15.8</td>
<td>0.008 [S]</td>
</tr>
<tr>
<td><strong>HOMA-IR</strong></td>
<td>3.3 ± 1.6</td>
<td>11.1 ± 14.5</td>
<td>7.3 ± 8.6</td>
<td>0.014 [S]</td>
</tr>
<tr>
<td><strong>HOMA-B</strong></td>
<td>72.1 ± 37.7</td>
<td>161.7 ± 150.2</td>
<td>142.3 ± 126.9</td>
<td>0.006 [S]</td>
</tr>
<tr>
<td><strong>Prolactin (ng/ml)</strong></td>
<td>17.1 ± 8.0</td>
<td>17.8 ± 10.3</td>
<td>17.6 ± 8.1</td>
<td>0.971</td>
</tr>
<tr>
<td><em><em>Progesterone</em>(ng/ml)</em>*</td>
<td>0.7 ± 1.6</td>
<td>4.0 ± 8.4</td>
<td>0.2 ± 0.2</td>
<td>&lt;0.001 [S]</td>
</tr>
<tr>
<td><em><em>Estrogen</em>(pg/ml)</em>*</td>
<td>37.8 ± 23.7</td>
<td>48.2 ± 44.2</td>
<td>38.6 ± 16.7</td>
<td>0.660</td>
</tr>
<tr>
<td><strong>FSH (m.Iu/ml)</strong></td>
<td>6.5 ± 2.0</td>
<td>5.9 ± 2.0</td>
<td>6.2 ± 2.2</td>
<td>0.685</td>
</tr>
<tr>
<td><em><em>LH</em> (m.Iu/ml)</em>*</td>
<td>5.5 ± 1.8</td>
<td>7.5 ± 5.4</td>
<td>7.7 ± 5.1</td>
<td>0.570</td>
</tr>
<tr>
<td><em><em>TSH</em> (uIU/ml)</em>*</td>
<td>2.4 ± 1.9</td>
<td>4.5 ± 8.9</td>
<td>2.9 ± 1.8</td>
<td>0.320</td>
</tr>
<tr>
<td><strong>T3 (pmol/L)</strong></td>
<td>5.0 ± 0.6</td>
<td>5.1 ± 0.6</td>
<td>5.1 ± 0.5</td>
<td>0.862</td>
</tr>
<tr>
<td><strong>T4 (pmol/L)</strong></td>
<td>16.2 ± 2.3</td>
<td>15.5 ± 3.2</td>
<td>16.3 ± 1.9</td>
<td>0.595</td>
</tr>
<tr>
<td><strong>Urea (mg/dl)</strong></td>
<td>24.0 ± 7.0</td>
<td>21.2 ± 6.2</td>
<td>22.8 ± 4.5</td>
<td>0.334</td>
</tr>
<tr>
<td>*<em>Creatinine</em> (mg/dl)**</td>
<td>4.5 ± 13.6</td>
<td>0.6 ± 0.1</td>
<td>0.7 ± 0.5</td>
<td>0.954</td>
</tr>
<tr>
<td><strong>Uric acid (mg/dl)</strong></td>
<td>4.3 ± 0.7</td>
<td>4.4 ± 1.2</td>
<td>4.8 ± 1.3</td>
<td>0.409</td>
</tr>
</tbody>
</table>

Results were presented as mean ± SD

**Relationship between urea and various variables**

The data presented in the table (2) are indicated in the newly diagnosed PCOS; urea is negatively and significantly coorelated with testesterone. While in previous PCOS urea is directly and signifincatly correlated with progesterone.
Figure 3.1 Insulin level in control, previously and newly diagnosed PCOSIs considered significantly different (P>0.05)

Figure 3.2: HOMA-IR level in control, previously and newly diagnosed PCOSIs considered significantly different (P>0.05)

Figure 3.3: HOMA-B level in control, previously and newly diagnosed PCOSIs considered significantly different (P>0.05)

Figure 3.4 progesterone level in control, previous and newly diagnosed in PCOSIs considered significantly different (P>0.05)

Table 2: Relationship between urea and various variables

<table>
<thead>
<tr>
<th>Urea</th>
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<th></th>
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<tbody>
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<td></td>
<td>Newly diagnosed PCOS</td>
<td>Old PCOS</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Regression coefficient</td>
<td>p-value</td>
<td>Regression coefficient</td>
<td>p-value</td>
</tr>
<tr>
<td>Age</td>
<td>0.090</td>
<td>0.706</td>
<td>0.056</td>
<td>0.790</td>
</tr>
<tr>
<td>BMI</td>
<td>-0.023</td>
<td>0.923</td>
<td>-0.200</td>
<td>0.339</td>
</tr>
<tr>
<td>FBS</td>
<td>0.011</td>
<td>0.962</td>
<td>-0.135</td>
<td>0.519</td>
</tr>
<tr>
<td>Insulin</td>
<td>0.173</td>
<td>0.467</td>
<td>-0.170</td>
<td>0.417</td>
</tr>
<tr>
<td>HOMA-IR</td>
<td>0.138</td>
<td>0.562</td>
<td>-0.164</td>
<td>0.434</td>
</tr>
<tr>
<td>HOMA-B</td>
<td>0.095</td>
<td>0.690</td>
<td>-0.190</td>
<td>0.362</td>
</tr>
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</table>
### Table 3. Relationship between creatinine and various variables

<table>
<thead>
<tr>
<th></th>
<th>Newly diagnosed PCOS</th>
<th></th>
<th>Old PCOS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regression coefficient</td>
<td>p-value</td>
<td>Regression coefficient</td>
<td>p-value</td>
</tr>
<tr>
<td>Age</td>
<td>-0.156</td>
<td>0.511</td>
<td>0.174</td>
<td>0.406</td>
</tr>
<tr>
<td>BMI</td>
<td>0.218</td>
<td>0.357</td>
<td>-0.170</td>
<td>0.418</td>
</tr>
<tr>
<td>FBS</td>
<td>0.061</td>
<td>0.798</td>
<td>0.065</td>
<td>0.758</td>
</tr>
<tr>
<td>Insulin</td>
<td>0.090</td>
<td>0.707</td>
<td>-0.068</td>
<td>0.747</td>
</tr>
<tr>
<td>HOMA-IR</td>
<td>0.068</td>
<td>0.777</td>
<td>-0.061</td>
<td>0.771</td>
</tr>
<tr>
<td>HOMA-B</td>
<td>-0.012</td>
<td>0.961</td>
<td>-0.108</td>
<td>0.607</td>
</tr>
<tr>
<td>Prolactin</td>
<td>-0.315</td>
<td>0.176</td>
<td>-0.019</td>
<td>0.928</td>
</tr>
<tr>
<td>Progesterone</td>
<td>-0.328</td>
<td>0.158</td>
<td>0.303</td>
<td>0.141</td>
</tr>
<tr>
<td>Estrogen</td>
<td>-0.001</td>
<td>0.998</td>
<td>0.058</td>
<td>0.784</td>
</tr>
<tr>
<td>Testosterone</td>
<td>0.175</td>
<td>0.461</td>
<td>-0.043</td>
<td>0.838</td>
</tr>
<tr>
<td>FSH</td>
<td>-0.027</td>
<td>0.911</td>
<td>0.093</td>
<td>0.657</td>
</tr>
<tr>
<td>LH</td>
<td>0.227</td>
<td>0.336</td>
<td>0.007</td>
<td>0.972</td>
</tr>
<tr>
<td>TSH</td>
<td>0.068</td>
<td>0.776</td>
<td>0.537</td>
<td>0.006 [S]</td>
</tr>
<tr>
<td>T3</td>
<td>-0.187</td>
<td>0.430</td>
<td>-0.386</td>
<td>0.057</td>
</tr>
<tr>
<td>T4</td>
<td>0.188</td>
<td>0.427</td>
<td>-0.328</td>
<td>0.109</td>
</tr>
<tr>
<td>Microalbuminuria</td>
<td>-0.307</td>
<td>0.187</td>
<td>0.032</td>
<td>0.878</td>
</tr>
</tbody>
</table>

**Relationships between creatinine and various variables**

The data presented in the table (3.3) indicated direct and significant correlation between creatinine and TSH in previous PCOS.

Cont... Table 2: Relationship between urea and various variables


**Relationship between uric acid and various variables**

The data presented in the table (3.4) indicated direct correlation between uric acid and BMI, FBS, HOMA-IR and inverse correlation with T3 in newly diagnosed PCOS, while in previous PCOS there was inverse correlation between uric acid and T3.

**Table 4: Relationship between uric acid and various variables**

<table>
<thead>
<tr>
<th></th>
<th>Uric acid</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Newly diagnosed PCOS</td>
<td>Previous PCOS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Regression coefficient</td>
<td>p-value</td>
<td>Regression coefficient</td>
</tr>
<tr>
<td>Age</td>
<td>0.068</td>
<td>0.776</td>
<td>0.338</td>
</tr>
<tr>
<td>BMI</td>
<td>0.535</td>
<td>0.015 [S]</td>
<td>0.072</td>
</tr>
<tr>
<td>FBS</td>
<td>0.508</td>
<td>0.022 [S]</td>
<td>-0.209</td>
</tr>
<tr>
<td>Insulin</td>
<td>0.389</td>
<td>0.090</td>
<td>0.156</td>
</tr>
<tr>
<td>HOMA-IR</td>
<td>0.512</td>
<td>0.021 [S]</td>
<td>0.145</td>
</tr>
<tr>
<td>HOMA-B</td>
<td>-0.063</td>
<td>0.793</td>
<td>0.203</td>
</tr>
<tr>
<td>Prolactin</td>
<td>0.116</td>
<td>0.625</td>
<td>-0.013</td>
</tr>
<tr>
<td>Progesterone</td>
<td>-0.441</td>
<td>0.051</td>
<td>-0.016</td>
</tr>
<tr>
<td>Estrogen</td>
<td>-0.149</td>
<td>0.530</td>
<td>-0.081</td>
</tr>
<tr>
<td>Testosterone</td>
<td>-0.443</td>
<td>0.051</td>
<td>-0.073</td>
</tr>
<tr>
<td>FSH</td>
<td>0.183</td>
<td>0.439</td>
<td>0.031</td>
</tr>
<tr>
<td>LH</td>
<td>-0.151</td>
<td>0.525</td>
<td>0.215</td>
</tr>
<tr>
<td>TSH</td>
<td>-0.043</td>
<td>0.857</td>
<td>-0.008</td>
</tr>
<tr>
<td>T3</td>
<td>-0.652</td>
<td>0.002 [S]</td>
<td>-0.452</td>
</tr>
<tr>
<td>T4</td>
<td>-0.211</td>
<td>0.372</td>
<td>0.197</td>
</tr>
<tr>
<td>Microalbuminuria</td>
<td>-0.010</td>
<td>0.968</td>
<td>0.258</td>
</tr>
</tbody>
</table>

Relationship between HOMA-IR and various variables

The data presented in the table (3.5) indicated significant correlation between FBS, insulin, HOMA-B and HOMA-IR in previous PCOS while there is correlation between FBS, insulin and HOMA-IR in newly PCOS patients.

**Table 5: Relationship between HOMA-IR and various variables**

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HOMA-IR</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Newly diagnosed PCOS</td>
<td>Previously diagnosed PCOS</td>
</tr>
<tr>
<td></td>
<td>Regression coefficient</td>
<td>p-value</td>
</tr>
<tr>
<td>Age</td>
<td>0.401</td>
<td>0.080</td>
</tr>
<tr>
<td>BMI</td>
<td>0.357</td>
<td>0.123</td>
</tr>
<tr>
<td>FBS</td>
<td>0.804</td>
<td>&lt;0.001 [S]</td>
</tr>
<tr>
<td>Insulin</td>
<td>0.911</td>
<td>&lt;0.001 [S]</td>
</tr>
</tbody>
</table>


Discussion

The elevated insulin level in the PCOS women regarding to the table (1) figure (1), (2) indicate that insulin level in the two groups of PCOS women are higher matched to controls. The present study revealed that serum insulin levels in both new and old PCOS were higher than that reported in controls; this attributed to the presence of insulin secretion impairment besides state of insulin resistance. An agent outer to receptor of insulin, supposedly a serine/threonine kinase, impetuses mentioned aberrations and it is a model of paramount neoteric mechanism of resistance of insulin correlated to agents dominating insulin receptor coding. PCOS patients were noted to be insulin resistant, and had beta-cell dysfunction. The data presented in the table (1) figure (3) indicate a significant different in HOMA B function ,HOMA B was significantly higher in old PCOS compared to control.

The homeostasis model assessment (HOMA) is a technique applied to endue an evaluation of beta cell assignment and sensitivity of insulin from glucose levels and serum fasting insulin. In this study also, there is relationship between HOMA-IR with various variables as presented in the table (5):

The results in previously PCOS women showed a significant correlation between HOMA-IR and FBS, insulin and HOMA-B While in newly PCOS women illustrate a significant correlation between HOMA-IR and FBS and insulin. There is a strong association of PCOS with insulin resistance. This can be due to increase process of phosphorylation in insulin receptor proteins, which reduces its protein tyrosine kinase performance leading to abnormal insulin secretion. PCOS patients had significantly higher values of fasting glucose, fasting insulin and HOMA-IR compared with controls. This study clarify a significant elevation in insulin resistance (HOMA -IR) in both newly and previously diabetic patients compared to control and a significant elevation in beta cell assignment (HOMA-B) in previously patients group compared to newly patients group and control group, this increase develops initially to compensate for Hyperinsulinemia, as glucose level increase, beta cell function decreases further but insulin hypersecretion within time lead to beta cell exhaustion.

Conclusion

In newly diagnosed PCOS women the hormones (testosterone, progesterone) may have an effect on the kidney function, while in previous diagnosed PCOS women the hormones (progesterone, TSH) effect on the kidney function.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols
were approved under the Department of Pharmacology and Toxicology and all experiments were carried out in accordance with approved guidelines.

**References**


The Effect of the use of E-Learning Teaching Physiology in the Academic Achievement of Students of the Technical Medical Institute

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Abstract

Physiology is an important science that is taught at the Technical Medical Institute, where it is taught in most sections and branches, and to know the extent of the student’s understanding and mental abilities by the use of modern technology, and learning may be an immediate or simultaneous learning in the classroom or outside. E-learning is characterized by ease and modification of information provided and increases the possibility of communication to exchange views, experiences and perspectives between students and teachers and overcome the problem of the number of students with narrow classrooms. It is also successful for the “traditional education” that exists at the institute, where it constitutes the collective presence of students and promotes joint work among them. The present research aims to identify the effect of using an e-learning by teaching physiology in the academic achievement of the students of the Technical Medical Institute. They were divided into two groups, the first experimental and the second by twenty students for each group, one of the experimental group that studied e-learning method and the second control, which studied by lecture method.

Keywords: E-Learning, Achievement, Technical Medical Institute

Introduction

Modern education advocates the use of various methods of learning processes, especially the philosophy of distance learning\(^1\), which is consistent with the principles of e-learning, and that the strategy of e-learning is the application of technology in education as a method of self-learning\(^2\). The e-learning strategy is one of the modern strategies in education that integrates technology and technology in distance education\(^3\). The researcher noted that the method of teaching in the medical institute is based on traditional methods of conservation and indoctrination without technology or technology having a role in teaching\(^4\). Hence the researcher felt the problem of her research, and can be summarized in the following question: What is the effect of using e-learning by teaching physiology on the academic achievement of the students of the Technical Medical Institute?

Second: the importance of research

Many educators pointed to the need to train teaching staff on modern scientific techniques and methods and their various applications, which are expected to stimulate the thinking of learners for interaction and self-participation in the classroom, in addition to strengthening the social link between students. It should be noted that the use of an effective teaching method not only has an effect on raising the level of academic achievement of students but beyond that until this method becomes part of the preparation for the teaching staff. To this end, many educational institutions in the world have spent a lot of money and conducted many studies, pursuant to the principle of targeted education, which aims to regulate the thinking of students on the one hand and the introduction of technology in education on the other hand\(^5\).

The importance of research can be summarized in the following:

Theoretical importance

A. The importance of keeping abreast of modern technological developments in the field of education,
especially university education, which prepares graduates to deal with the different work requirements in the field of technology and others.”

B. Educational technology is one of the variables introduced in the field of education, which constituted important steps in the transfer of education from the traditional form to another more sophisticated form.

C. Still, most educational institutions are absent from the use of technology and deal with it, due to the lack of material allocations on the one hand and the lack of knowledge of ways of dealing and employment of this technology on the other.

Practical importance

A. It is expected that there will be an increase in achievement as a result of the use of a new and unconventional method of teaching based on the technology used and fluent students outside the classroom.

B. Highlighting a vital and important subject that did not receive attention and attention - according to the knowledge of the researcher.

C. “The research will come up with a set of conclusions, recommendations, and proposals that are expected to enrich the local library and open the door for other researchers in the same field.”

Third: Research objectives

Current research seeks to identify:

The effect of the use of e-learning teaching physiology in the academic achievement of students of the Technical Medical Institute.

Fourth: Research hypothesis

The current research is based on the following hypothesis:

There are no statistically significant differences between the mean of the experimental group studied by the method of e-learning and the average of the control group studied by the lecture method in physiology in the post-test.

Fifth: Limits of research

The current search is defined by a set of limits:


2. Temporal field: the academic year 2018-2019


Types of E-Learning

A number of sources, including (Al-Allaq, 2004: 7), (Astetah and Sarhan, 2007: 270), (Kittaneh, 2009: 278), and (Al-Wadi, 2011: 338) agree that e-learning is divided into two main parts:

1. Asynchronous e-learning: “This is the kind of education that does not require learners and teachers to be online at the same time, but requires the use of correspondence and communication techniques between learners and teachers such as e-mail or other networks, where information is exchanged at different times and not in At the same time, where the teacher prepares the course material, and then published on the Internet, and students according to the time that suits them to follow this article, and therefore can be counted asynchronous e-learning is the most common and used as a result of flexible use and employment “Among the most important tools are:

1. E-mail: is a program for the exchange of messages and documents using the computer through the Internet.

2. Textile Web: It is an information system that displays different information on the pages.

3. Discussion Groups: is one of the tools of communication via the Internet.

4. CDs: These are discs in which curricula or educational materials are prepared (Zaytoun, 2005, 60).

2. Simultaneous e-learning: is the opposite of the first type, that requires the presence of teachers and learners at the same time in front of computers in order to hold discussions and direct dialogues about the educational material, and this is done through the custom conversation or through the virtual classroom,
meaning that this type of education requires live and direct interaction between learners with each other, and the delivery of cognitive material immediately, and where this is done through the Web and other modern programs, the most important tools are the following:

1. Conversation: The possibility of talking via the Internet with users at another time.

2. Audio Conferences: is an electronic technology based on the Internet.

3. Video Conferences: Conferences through which communication between individuals separated by a distance through a high-capacity television network.

4. Whiteboard: It is a blackboard similar to the traditional blackboard. (Mohsen, 2004)

**Benefits of E-Learning**

E-learning is a set of benefits for educational institutions with its members:

1. Individual’s learners gain the ability to deal with modern technology, which is reflected positively on academic achievement and the lives of learners.

2. E-learning is characterized by the ease of modification of information and data releases through which it is also characterized by the easy transfer of parameters to individuals regardless of the space between them.

3. E-learning is facing some educational problems such as lack of experience and competence of some teachers in addition to the shortage of teachers (Astina and Sarhan, 2007: 288).

4. E-learning reduces the cost of travel to and from educational institutions.

5. Works to exceed the limits of space and time in education (Paulsen, 2009, 1)

6. The possibility of diversifying educational services because of the diversity of the means used.

7. The possibility of teaching and training a large number of students in different places and wide (Tulaiti, 2012: 178).

**Research Methodology and Experimental Design:**

The researcher relied on the use of the experimental method in the research, to suit the objectives of the research, where this approach seeks to use two methods in education and comparison between them, so the research may be from the first two experimental groups and the second control. Design of a randomized pre and post-selection randomized control group.

**Research Community**

The research community was chosen intentionally (intentional) and they are the first-grade students in the Technical Medical Institute for the academic year 2018-2019 and the number (30), students

**The research sample**

The research sample consisted of two divisions (A and B). The experimental and control group were randomly selected by lottery. The experimental group (Division B) was studied by the e-learning method, while the control group (Division A) was studied in the traditional way (lecture). The following illustrates the properties of the two groups:

<table>
<thead>
<tr>
<th>Table 1. Shows the individual sample according to the two research groups</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group</strong></td>
</tr>
<tr>
<td>Experimental</td>
</tr>
<tr>
<td>Control</td>
</tr>
</tbody>
</table>

**The equivalence of the two research groups:**

In order to achieve parity between the two research groups, the researcher conducted parity between the two groups in a number of variables that they believe could affect the results of the research. Physiology consists of (40) questions.

1. Equal age

To ensure that the experimental and control groups were equal in the estimated life span in months, the
researcher used the T test for two independent samples. The results are as shown in the following table:

**Table (2) Parity between the two groups in the chronological age**

<table>
<thead>
<tr>
<th>Total</th>
<th>Number</th>
<th>Arithmetic mean</th>
<th>standard deviation</th>
<th>Value T</th>
<th>Significance level</th>
<th>Judgment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Calculated</td>
<td>Tabular</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>15</td>
<td>218.70</td>
<td>1.80</td>
<td>0.308</td>
<td>2.02</td>
<td>0.05</td>
</tr>
<tr>
<td>Control</td>
<td>15</td>
<td>218.90</td>
<td>2.26</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It is noted from the previous table that the experimental and control groups were equal in chronological age by the calculated value which was lower than the tabular.

2. **Parity in the IQ test**

To ensure that the experimental and control groups were equal in the IQ test, the researcher used the T-test for two independent samples. The results are as shown in the following table:

**Table (3) parity between the two groups in the intelligence test**

<table>
<thead>
<tr>
<th>Total</th>
<th>Number</th>
<th>Arithmetic mean</th>
<th>standard deviation</th>
<th>Value T</th>
<th>Significance level</th>
<th>Judgment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Calculated</td>
<td>Tabular</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>15</td>
<td>46.35</td>
<td>2.90</td>
<td>0.807</td>
<td>2.02</td>
<td>0.05</td>
</tr>
<tr>
<td>Control</td>
<td>15</td>
<td>47.10</td>
<td>2.91</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It is noted from the previous table that the experimental and control groups were equal in the IQ test by the calculated value that was lower than the tabular.

3. **Parity in the preliminary achievement test**

To ensure that the experimental and control groups were equal in the achievement test, the researcher used the T test for two independent samples. The results are as shown in the following table:

**Table (4) parity between the two groups in the achievement test**

<table>
<thead>
<tr>
<th>Total</th>
<th>Number</th>
<th>Arithmetic mean</th>
<th>standard deviation</th>
<th>Value T</th>
<th>Significance level</th>
<th>Judgment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Calculated</td>
<td>Tabular</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>15</td>
<td>23.30</td>
<td>1.03</td>
<td>0.388</td>
<td>2.02</td>
<td>0.05</td>
</tr>
<tr>
<td>Control</td>
<td>15</td>
<td>23.15</td>
<td>1.38</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It is noted from the previous table that the experimental and control groups were equal in the pretest achievement test by the calculated value which was lower than the tabular.
Search tool

Achievement test:

A test was constructed in physiology consisting of (40) questions with four alternatives, three false and one correct, including three levels (understanding, application, analysis).

Psychometric properties of the test

1. Sincerity test

The validity of the test was verified by the subject of a group of experts and arbitrators in the field of competence, the researcher relied on the criterion (80%) of the views of experts to accept the paragraph and according to this criterion did not drop any paragraph.

2. Stability test:

To verify the stability of the test, the researcher used the equation (Alfa Kronbach) for each of the test paragraphs, the researcher found that the value of the stability coefficient is (0.90), and (Odeh, 1998: 367) pointed out that the stability of the tests Standardized attainment (0.85) and above. Based on this criterion, the test was considered static.

Apply the final experiment

The experiment was applied to the two research groups, after the equivalence between them in a number of variables mentioned above, the researcher gave the same educational material to the two groups, and was applied (e-learning) on the experimental group, and the lecture method on the control group as follows:

A- Experimental group:

The experimental group studied the way of e-learning.

1. The researcher identified the subject of the lesson and divided the time of the lesson into an introduction, presentation and conclusion

2. Equipped equipment (such as data shop, calculators on the number of students, intelligent patient).

3. Presented the material on the screen and explained, and then asked the students to use the computer to search for answers to questions submitted to them by using the Internet speed requirement in obtaining the answer and accuracy in its formulation.

4. The researcher asked the students to be two groups in the form of two rings, ring A and ring B, to answer a question and the group that succeeds in answering the question is the winner

Control Group:

The teaching material was applied to the students by the method of lecture within the scheduled lesson and at the same times and places set for the experimental group.

Posttest tests

After completing the experiment, the researcher applied the post-achievement test to the experimental and control groups, with the help of two colleagues in the department.

Statistical means:

The researcher used the following statistical methods in data processing:

1. Arithmetic mean
2. Standard deviation
3. Test (T) for two independent samples

Fourth Chapter/ Research results

The research hypothesis states:

There were no statistically significant differences between the mean of the experimental group studied by the e-learning method and the average of the control group studied by the lecture method in post-test physiology. To validate this hypothesis, the researcher applied the subsequent test to the experimental and control groups and used the T test for two independent samples. The results are as shown in the following table:
Table (5) Comparison between the experimental and control group in the post test

<table>
<thead>
<tr>
<th>Total</th>
<th>Number</th>
<th>Arithmetic mean</th>
<th>standard deviation</th>
<th>Value T</th>
<th>Significance level</th>
<th>Judgment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Calculated</td>
<td>Tabular</td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>15</td>
<td>29.75</td>
<td>1.552</td>
<td>8.432</td>
<td>2.02</td>
<td>0.05 Is a function</td>
</tr>
<tr>
<td>Control</td>
<td>15</td>
<td>24.80</td>
<td>2.118</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It is clear from the previous table that the calculated $T$ value was greater than the tabular $T$ value.

The researcher attributes this result to the effect of the e-learning method in increasing students’ academic achievement, because this method has saved a lot of time and effort on the student in addition to the compatibility of this method with students’ inclinations in information technology, and thus has helped them to overcome some of the achievement problems that they were suffering.

**Conclusions**

1. The impact of the method of e-learning on the achievement of the physiology of students of the Medical Institute

2. The members of the experimental group studied the method of e-learning on the members of the control group, which was studied by a lecture in the test of achievement of physiology.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Institute of medical Technology and all experiments were carried out in accordance with approved guidelines.

**References**

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Impact of Quality of Primary Health Care Centers Upon Adolescents’ Health Status With Chronic Diseases in Kirkuk City

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1Academic Nurse, Kirkuk Health Directorate, Kirkuk, Iraq, 2Professor, Community Health Nursing Department, College of Nursing, University of Baghdad

Abstract

Background: The primary health care centers initiatives are designed to improve patient care and health outcomes. A process failed to address the impact on health outcomes, patient satisfaction, and costly of chronic diseases expected to adolescents. This study aimed to determine the role of quality of primary health care centers (PHCCs) on adolescents’ health status with chronic diseases in kirkuk city.

Methodology: A descriptive (quantitative design) was conducted through (18) PHCCs in Kirkuk city. Two questionnaires were designed for the purpose of the study. A simple random sample of (180) health professional (manager) were selected through the use of probability sampling approach. The sample of study was divided into two groups which include organization structure (PHC )centers (18) and (162) adolesents with chronic diseases. Data analysis is performed through the use of descriptive statistical data analysis approach.

Results: the overall evaluation for the quality of PHCCs is adequate on (59% ; N=11), and fair on (41% ; N=7) respectively. The quality of PHCCs is adequate relative to all of its dimensions of general health status, tangibles, accreditation, responsiveness, assurance and empathy. The experienced good level for the general, physical, mental, relationships and emotional dimensions of health status with chronic diseases Inadequate on Adequate on (44.%: n=71 ), Fair on (34.% :n= 55 ), and Inadequate (23. % :n= 36 ), level of evaluation. except that of the quality of life dimension of health status Adequate on Fair on (37.%: n = 60 ), Inadequate (30 %: =49 ) ,and Adequate (33.% n=53 ) does not impose any effect on adolescents’ general health status.

Conclusion: The study findings depict that the quality of PHCCs is adequate relative to all of its dimensions of general health status, tangibles, accreditation, responsiveness, assurance, and empathy. Adolescents’ health status is good regardless of their age groups as being early, middle and late age adolescents except that of the quality of life dimension of health status which has a fair level of evaluation. The study confirms that the Impact of quality of PHCCs does not execute an impact on adolescents’ health status.

Keywords: Adolescents’, health status, chronic diseases, primary health care.

Introduction

Primary healthcare centers refer to the first contact-access, continuous, comprehensiveness services available, and coordinated care provided to individuals regardless of gender, race, or diseases. Most PHC services have focused on treating illnesses as and when they arise(1). Primary healthcare centers include a wide variety of services delivered; the diagnosis, treatment, promoting good health, preventing health problems, and managing the ongoing care of people with health problems long-term conditions (2). The PHC system is being placed under immense pressure to perform as well as meet clinical targets, patient needs, and effective care (3). This strategy importance of implementing quality procedures and the continuous improvement of quality services. The fact that these strategies do not always lead to the desired outcome (4). The PHC services initiatives are
designed to improve patient care and health outcomes. A process failed to address the impact on health outcomes, patient satisfaction, and costly of chronic diseases expected to adolescents (5). Adolescents with multiple chronic diseases had substantially more bed days, school absence days, and behavioral problems than adolescents understand the importance of health care, conscious of the main health issues affecting them and therefore, should be engaged in addressing their health care needs and influences are strongly associated with their health outcomes. (6) Today management of chronic diseases for adults populations thus becomes a major focus for quality of PHCCs. Health system is needed strengthening if they are to meet the growing challenge of chronic diseases in low-income and middle-income countries(7). The goals of the current services to increasing availability and improving the quality care of chronic disease, and reducing disparities in the PHC services(8). The health-care team will aim to reduce the impact of the disease and agree to maintain a life as similar as possible to their developmental change to the adolescent period of life, but also by participated young people themselves in developing self-care management(9). In this study aims to help countries develop competency-based and self-management programs for adolescent health status and development in both pre-service and in-service management. In addition, it provides guidance on how to assess and improve the structure, content, and quality health-care services for adolescents with chronic diseases.

Methodology

A descriptive evaluation study is using a quantitative design conducted on a total of (18) PHCCs are selected for the purpose of the study in Kirkuk city. A simple random sample of (180) subject, it is selected throughout the use of probability sampling approach (a questionnaire). It was comprised of two parts and overall items included in the questionnaire were (102) item.

A: Organization Structure: This is comprised of information about socio-demographic characteristics of manager, and (22) item it is comprised such as about:- Tangibles, Accreditation, Responsiveness, Assurance, and Empathy of PHC centers.

B. (Adolescents') with chronic diseases: This part is comprised of information about socio-demographic characteristics of clients, and (12) items related to evaluate the health status in general, and (55) items consists of:- Physical condition, emotional state, the effect stress, evaluate the overall quality of your life, and Life enjoyment adolescents ‘with chronic diseases. The questionnaire provided a three-point scale: (1) Adequate, (2) Fair, (3), Inadequate.

Results

Table (1): Overall Evaluation of the Quality of Primary Health Care Centers

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Adequate</th>
<th>Fair</th>
<th>Inadequate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Tangibles</td>
<td>(20-14.68) (6)</td>
<td>(14.67-- 9.34) (12)</td>
<td>(9.33 - 4) (0)</td>
</tr>
<tr>
<td>2. Accreditation</td>
<td>(25 - 19) (11)</td>
<td>(18- 12) (7)</td>
<td>(11 - 5) (0)</td>
</tr>
<tr>
<td>3. Responsiveness</td>
<td>(20 - 14.68) (9)</td>
<td>(14.67- 9.34) (9)</td>
<td>(9.33 - 4) (0)</td>
</tr>
<tr>
<td>5. Empathy</td>
<td>(25 - 19) (13)</td>
<td>(18 - 12) (5)</td>
<td>(11 - 5) (0)</td>
</tr>
<tr>
<td>Overall Evaluation</td>
<td>(110 - 80.33) (11)</td>
<td>(80.32-50.67) (7)</td>
<td>(50.66-22) (0)</td>
</tr>
</tbody>
</table>
This table demonstrates that the overall evaluation for the quality of primary health care centers is adequate on (n=11 with 59% ), and fair on (n=7 with 41% ) respectively.

**Table (2): Evaluation of Overall Dimensions of Adolescents’ with Chronic Diseases**

<table>
<thead>
<tr>
<th>Overall Evaluation of Adolescents’ Health Status</th>
<th>Adequate</th>
<th>Fair</th>
<th>Inadequate</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>a. General Health Status</strong></td>
<td>162 – 109 (70)</td>
<td>108 – 55 (50)</td>
<td>54 – 1 (42)</td>
</tr>
<tr>
<td><strong>b1. Physical Dimension</strong></td>
<td>162 – 109 (84)</td>
<td>108 – 55 (56)</td>
<td>54 – 1 (22)</td>
</tr>
<tr>
<td><strong>b2. Mental Health Dimension</strong></td>
<td>162 – 109 (77)</td>
<td>108 – 55 (51)</td>
<td>54 – 1 (34)</td>
</tr>
<tr>
<td><strong>b4. Emotional Dimension</strong></td>
<td>162 – 109 (75)</td>
<td>108 – 55 (54)</td>
<td>54 – 1 (33)</td>
</tr>
<tr>
<td><strong>b5. Quality of Life Dimension</strong></td>
<td>162 – 109 (53)</td>
<td>108 – 55 (60)</td>
<td>54 – 1 (49)</td>
</tr>
</tbody>
</table>

This table presents that the experienced good level for the general, physical, mental, relationships and emotional dimensions of health status with chronic diseases Inadequate on Adequate on (n=71 with 44.% ), Fair on (n= 55 with 34.% ), and Inadequate (n=36 with 23. % ), level of evaluation. except that of the quality of life dimension of health status Adequate on Fair on (n = 60 with 37.% ), Inadequate (n =49 with 30 % ), and Adequate (n=53 with 33.% does not impose any effect on adolescents’ general health status.

**Table (3): Multiple Linear Regression for the Impact of the Quality of Primary Health Care Centers upon Adolescents’ Health Status**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Standard Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.167 a</td>
<td>0.28</td>
<td>0.33</td>
<td>8.85195</td>
</tr>
<tr>
<td></td>
<td>Sum of Squares</td>
<td>df</td>
<td>Mean Square</td>
<td>F</td>
</tr>
<tr>
<td>Regression</td>
<td>35.899</td>
<td>1</td>
<td>35.899</td>
<td>4.58</td>
</tr>
<tr>
<td>Residual</td>
<td>125.713</td>
<td>16</td>
<td>78.357</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1289.611</td>
<td>17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model</td>
<td>Un-standardized Coefficients</td>
<td>Standardized Coefficients</td>
<td>T</td>
<td>Significance P ≤ 0.05</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1 (Constant)</td>
<td>61.955</td>
<td>25.545</td>
<td>2.425</td>
<td>0.27</td>
</tr>
<tr>
<td>Independent</td>
<td>-0.766</td>
<td>0.261</td>
<td>-0.167</td>
<td>-0.677</td>
</tr>
</tbody>
</table>
R: Multiple Correlation, df: Degree of Freedom, F: F- Statistics, B: Regression Coefficient, T: t-test

a. Dependent Variable: Adolescents’ Health Status

b. Independent Variable: Quality of Primary Health Care Centers

This table indicates that the quality of primary health care Centers does not impose any effect on adolescents’ health status.

Discussion

Part I: Overall Evaluation of the Quality of Primary Health Care Centers

Analysis indicates that the quality of PHCCs is adequate with respect to its domains of tangibles, accreditation responsiveness, assurance and empathy (Table 1). Such findings can be interpreted in a way that the PHCCs are concerned about adolescents with chronic diseases. So, they are well equipped to present such health care services to this target segment of the population in the community.

These findings are very well-noted in the high mean of scores on items of the domains of such quality (Table 1). Except on 2 items of Tangibles, the nature of the departments, places of waiting, offices, doctors, and other existing staff matches what you expect in your mind and items of Responsiveness 2 on Patients are not expected to receive immediate service from the quality of PHC staff are low. These items have presented the actual state through which the PHCCs are managed and provided.

A sequential exploratory mixed method design is carried out to identify quality determinants for healthcare services for adolescents and young adults with chronic conditions based on the perceptions and the experiences of adolescents and young adults themselves. The study uses the initial qualitative phase employed semi-structured in-depth interviews to elicit the elements and determinants of quality of care as identified by adolescents and young adults living with chronic conditions. The second phase employs a questionnaire developed from the data gathered during the qualitative phase to survey the target population.

This is distributed to a larger sample of adolescents and young adults with chronic conditions to determine and confirm the relevance of the identified care elements and quality determinants.

The global standards are developed through a four-stage process:- (1) conducting needs assessment (2) developing the global standards and their criteria. (3) expert consultations. (4) assessing their usability. The global standards are developed based on the needs assessment in conjunction with the analysis of (26) national standards from (25) countries. The final document is reviewed by experts from the (WHO) regional and country offices, governments, nongovernmental organizations, academia, and development partners. The study has resulted in the development of eight global standards and (79) criteria for measuring them of adolescents’ health. (1).

It has been reported that the care given to all children, including young adolescents, in health facilities is evidence-based, safe, effective, timely, efficient, equitable and appropriate for their age and stage of development (10).

Part II: Evaluation of Overall Dimensions of Adolescents’ with Chronic Diseases

Analysis of such health status presents that most of the early age adolescents have experienced good level for the general, physical, mental, relationships and emotional dimensions of health status for chronic diseases except that of the quality of life dimension of health status which has a fair level of evaluation (Table 2). These findings present empirical evidence that early age adolescents in Kirkuk city are more blessed to gain better health status throughout their lifespan. Furthermore, the quality of their life may be straggling due to the burden of chronic diseases that are imposed upon their life.

All their age groups distinguished health status of the adolescents with chronic diseases is very noticeable in the high mean of scores on items the dimensions of general, physical, mental, relationships, emotional and quality of life of the adolescents with chronic illness health status (Table 2).
It has been reported that at least (12%) of adolescents living with a chronic condition. Some conditions are characterized by increasing incidence (e.g., diabetes and asthmatic) or improving survival rates (e.g., cystic fibrosis), while others are concerning because of differentially poorer outcomes in adolescents in comparison to both children and adults (e.g., cancer). Growing evidence suggests that adolescents’ health status with chronic disease is particularly disadvantaged engaging in risky behaviors to at least similar if not higher rates as healthy peers while having the potential for greater adverse health outcomes from these behaviors (11).

Research studies confirm that chronic disease affects one in ten adolescents worldwide. Outcomes included challenges to adolescent self-management, nature of the parent-adolescent relationship, illness representation, and perceptions of adolescent self-efficacy in compliance, medical decision making, laboratory measures, and adolescent self-management competence (12).

Part III: The Impact of the Quality of Primary Health Care Centers Upon the Adolescents’ Health Status

Throughout the course of data analysis, the study depicts that the quality of PHCCs does not enforce any effect on adolescents’ health status (Table 3). The logically driven interpretation for such findings can be presented in a way that as long as the quality of PHCCs is adequate for adolescents with chronic diseases they definitely maintain a good level of health status.

Due to the originality of the current study, no supportive empirical evidence of these findings is available in the literature. It has been recognized that health care comprises services provided by health professionals, including screening and prevention, treatment and disease management that result in the maintenance of physical and emotional well-being. Improvements in the health of adolescents can be accomplished through the utilization of empowered, efficient and effective public health measures that represent adequate quality health care(13). The report highlights the need to strengthen improving PHC, particularly to better manage the large numbers of patients with multiple chronic conditions (14).

Conclusion:

The study findings depict that the quality of PHCCs is adequate relative to all of its dimensions of general health status, tangibles, accreditation, responsiveness, assurance, and empathy. Adolescents’ health status is good regardless of their age groups as being early, middle and late age adolescents except that of the quality of life dimension of health status which has a fair level of evaluation. The study confirms that the impact of quality of PHCCs does not execute an impact on adolescents’ health status. It is confirmed that male adolescents experience more incidence of chronic diseases than females.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Community Health Nursing Department and all experiments were carried out in accordance with approved guidelines.

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Study of Some Immunological Aspects in Scabietic Patients

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Abstract

Scabies is an important parasitic skin disease that continues to persist all over the world. The current study was designed to assess some immunological parameters that may be related with scabies disease. Blood samples were collected from 60 patients (30 first infestation, 30 re-infestation) with ordinary scabies and 30 healthy individuals as a control group to determine the total and differential WBCs count, in addition sera levels of some immunological parameters including, C3, IgE and Indoleamine 2,3 dioxygenase (IDO). The results revealed that a significant increase (P≤0.05) in total and differential WBCs count of patients groups compared with healthy group, also the levels of immunoglobulin IgE and IDO showed a significant increase (P≤0.05) in patients groups in comparison with healthy group. Concerning with complement components (C3) its levels observed a significant differences (P≤0.05) between patients groups (first infestation and re-infestation), also between patients and healthy group.

Keywords: Sarcoptes scabiei. IDO. IgE. C3. WBCs. Patients.

Introduction

Scabies is a pruritic skin disease caused by Sarcoptes scabiei var. hominis which is characterized by severe itching particularly at night, red papules and often secondary infection. Commonly infested areas are the skin between the fingers, elbows, axillae, groin, penis, and nipples (1). Since, both the cell-mediated immune reaction in the skin and the circulating antibody response act parallels in clearing of the mites, eggs and debris (2). Hypersensitivity reactions in patients infested with scabies caused by secretion of different materials by S. scabiei in the host skin (3-4) and during 4 weeks from infestation of scabies the immunity developed and appears of first symptom (5) The human body is exposed to different pathogens every day, but only few of them causing diseases because of the natural defense that called innate immune system, which represent the first line of host defense (6).

The data concluded that serum levels of C3 and IDO may be play an important role in controlling or persistent of skin parasitic infestation with Sarcoptes scabiei and increased levels of IgE.

Materials and Methods

1. Patients and control:

A total of 60 patients infected with Sarcoptes scabiei var. hominis (25 males and 35 females) and 30 healthy individuals (15 males and 15 females) were included in current study.

2. Blood samples:

The blood samples were drown from each patients and healthy subjects (5ml). The sample was divided into two parts, the first placed in EDTA tube for calculate the total and differential WBCs count, while the other part was kept to clot at room temperature, then centrifuged at 3000 rpm for 10 minutes, after that sera samples were transferred into eppendorf tubes and stored at deep freeze until used.

3. Laboratory investigations:

A. The total and differential WBCs count assay:

The total and differential WBCs count were done according to the

B. Immunological assays:

Serum IgE was measured by Enzyme Linked immuno- Fluorescent Assay technique (ELFA) performed by mini VIDAS, according to the manual procedure in kit provided by bio Mérieux company /
France, while the levels of C3 and IDO were estimated by ELISA according to the manual procedure of kits provided by MyBiosource company/USA and Abcam company/UK respectively.

**Statistical Analysis**

The results were analyzed by using statistical system spss version -24. The data were expressed by means ± standard deviation (±SD). Differences among patients and control groups were assessed using least significant differences (L.S.D.)

**Results**

There was a significant increase (P<0.05) in means of the total WBCs count for patients groups compared with control group which reached to $12.783±1.488 \times 10^9$ and $12.790±1.482 \times 10^9$ (cell /L) for first infestation and re-infestation groups respectively, while it was $8.147±2.403 \times 10^9$ (cell /L) for controls (table 1).

The differential WBCs counts for the first infestation and re-infestation groups of patients were shown a significant increase (P<0.05) in neutrophils, eosinophils, and basophils compared with healthy group, but there was a significant decrease (P<0.05) in monocytes and lymphocytes in patients groups compared with healthy group as shown in table(1).

**Table 1: The total and differential WBCs counts (%) in patients and control groups.**

<table>
<thead>
<tr>
<th>Variables</th>
<th>First Infestation n=30</th>
<th>Re infestation n=30</th>
<th>Control n=30</th>
<th>LSD</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBCs</td>
<td>12.783±1.488</td>
<td>12.790±1.482</td>
<td>8.147±2.403</td>
<td>0.946</td>
<td>0.000</td>
</tr>
<tr>
<td>Neutrophils</td>
<td>70.967±6.803</td>
<td>72.350±6.597</td>
<td>54.217±5.139</td>
<td>3.194</td>
<td>0.000</td>
</tr>
<tr>
<td>Lymphocytes</td>
<td>13.500±5.308</td>
<td>13.953±5.532</td>
<td>32.010±6.428</td>
<td>2.964</td>
<td>0.000</td>
</tr>
<tr>
<td>Monocytes</td>
<td>4.470±3.073</td>
<td>4.140±2.955</td>
<td>10.048±2.398</td>
<td>1.449</td>
<td>0.000</td>
</tr>
<tr>
<td>Eosinophils</td>
<td>10.783±2.426</td>
<td>9.290±2.263</td>
<td>3.473±1.539</td>
<td>1.084</td>
<td>0.000</td>
</tr>
<tr>
<td>Basophils</td>
<td>0.443±0.264</td>
<td>0.393±0.200</td>
<td>0.105±0.100</td>
<td>0.103</td>
<td>0.000</td>
</tr>
</tbody>
</table>

As notified in table (2) the results revealed that a significant increase(P<0.05) in the levels of IgE in patients groups compared with control group which reached to $524.15±246.59$ and $513.13±251.64$ (IU/ml) for first infestation and re-infestation, whereas it was $73.64±19.21$ (IU/ml) in control group. The data of current study showed statistically significant differences at the level of significance P-value < 0.05 between mean averages in studied groups, as notified in table( 2). In which, there was a significant differences in the levels of C3 between the three groups, which is reached to $2.61±1.49 \mu g/ml$, $64.74±26.8 \mu g/ml$ and $11.68±3.28 \mu g/ml$ in first Infestation, re-infestation and control groups respectively.
The results (table 2) showed that a significant increase (P < 0.05) in the level of Indoleamine 2,3 dioxygenase in patients compared to control groups, which reached to 7.61±2.39, 7.83±2.26 and 0.52±0.28 (ng/ml) in first infestation, re-infestation and control groups respectively.

**Table (2): The levels of IgE, C3 and IDO in first infestation, re-infestation and control groups.**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Groups</th>
<th>First Infestation n=30 Mean ± S.D.</th>
<th>Re-infestation n=30 Mean ± S.D.</th>
<th>Control n=30 Mean ± S.D.</th>
<th>LSD</th>
<th>Sig. or P. Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IgE IU/ml</td>
<td></td>
<td>524.15±246.59</td>
<td>513.13±251.64</td>
<td>73.64±19.21</td>
<td>104.55</td>
<td>0.000</td>
</tr>
<tr>
<td>C3 µg/ml</td>
<td></td>
<td>2.61±1.49</td>
<td>64.74±26.8</td>
<td>11.68±3.28</td>
<td>8.01</td>
<td>0.000</td>
</tr>
<tr>
<td>ID0 ng/ml</td>
<td></td>
<td>7.61±2.39</td>
<td>7.83±2.26</td>
<td>0.52±0.28</td>
<td>0.979</td>
<td>0.000</td>
</tr>
</tbody>
</table>

**Discussion**

There were a significant differences (P<0.05) in the total and differential WBCs counts between patients and healthy subjects groups. (8) and (9) mentioned that the elevated numbers of lymphocytes, monocytes, eosinophils and basophils in scabetic patients compared with healthy group, also (5) reported that occurs of blood eosinophilia and enhanced production of IgE in scabetic patients.

IL-10 and TGF-β cytokines produced by eosinophils may alter the local character of the Th2/Th1 responses by preventing the differentiation of naïve T lymphocytes to either the Th1 or Th2 phenotype, on the other hand producing indoleamine 2,3,−dioxygenase by eosinophils may also drive Th1/Th2 imbalance (10-11).

The mechanisms for the infiltration of mast cells and basophils into the blood and skin remains to be addressed to elucidate their role and importance in scabies inflammatory and allergic responses. (12) and (13) referred that the activated mast cells and basophils rapidly produce TNF-α, IL-6 and Th2 cytokines (IL-4, IL-5 and IL-13) which are the main molecules responsible for the allergic Th2-type inflammation.

There were a significant differences in IgE levels among the patients groups and healthy subjects, in which (14) noted that elevate levels of IgE in patients compared with healthy groups which ranged between 17–1219 (IU/mL) when they studied 50 patients (suspected with scabies) and 20 healthy group. Also, (15) showed a high significant differences in total IgE levels (1.92±0.52 pg/ml) in patients with scabies compared with control group, while (16-17) have been documented a wide variation in serum IgE levels among healthy non-allergic adult populations. (18) explains the hypersensitivity reaction type 1 in patients infested with scabies who is responsible for expelling parasites and products from the borrowing of severe itching and scratching, which in turn leads to a sudden reduction in the density of parasites at the time it began to itch (19). On the other hand, the studies of humoral immune responses in forty scabietic patients and twenty healthy control individuals, showed no significant difference in the levels of IgE between patients and control groups, while other researches have demonstrated a significant increase in IgE levels among patients with scabies (20-21-22-23-24-25).

The cysteine and serine proteases of the dust mite and the serine protease of Aspergillus fumigatus have
all been documented to induce Th2-driven inflammatory responses dominated by elevated IgE, eosinophilia, and Th2 cells, therefore, the author suggests the mites and its products contains on inactivated serine proteases may be leads to elevate level of IgE. 

There are a significant differences in C3 levels between the three groups of the study, found that a significant difference in C3 levels between scabietic patients and control groups, in which there was a high levels of C3 in patients, while pointed out no significant differences in C3 levels between patients(177.71±81.34pg/ml) and controls (160.37±61.22pg/ml). On the other hand, showed no significant differences in the level of C3 in scabietic patients before or after treatment compared with control group, that’s mean a normal levels in the C3 concentration.

The results of current study revealed that a significant increase in IDO level in patients(first infestation, re-infestation) compared to healthy subjects group. illustrated that cutaneous Leishmania major infection stimulated expression of the immune regulatory enzyme indoleamine 2,3 dioxygenase (IDO) in local lymph nodes, therefore, induced IDO attenuated the T cells stimulatory functions of dendritic cells and suppressed local T cells responses to exogenous and nominal parasite antigens.

Recently, IDO-1 enzyme activity were lower in patients with asthma and allergic rhinitis than in control group (P<0.05), while in the same study they found that the patients with atopic dermatitis shows higher IDO-1 activity compared with control group (P<0.05). Meantime, mentioned that the IDO activity in serum of patients with atopic dermatitis and controls considered statistically significant differences.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Biology and all experiments were carried out in accordance with approved guidelines.

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Evaluation of Aspects of Continuing Nursing Education Programs in Kirkuk Health Directorate Hospitals

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Abstract

Objective(s): To evaluate the aspects of the Continuing Nursing Education Programs in Kirkuk Health Directorate Hospitals

Methodology: A descriptive design, using self-evaluation approach, is employed throughout the present study. A non-probability sample of (251) staff nurse are recruited from Kirkuk Health Directorate Hospitals; Kirkuk General Hospital and Azady Hospital. A questionnaire is constructed for the purpose of the study which comprised of (1) part, (6) aspects and (52) item. Content validity and internal consistency reliability are determined for the questionnaire through a pilot study. Data are collected through the use of the questionnaire and structured interview a means of data collection. Data are analyzed through the application of descriptive statistical data analysis approach of frequency, percentage, mean of scores, total scores and range.

Results: The study indicates that the majority of nurses have evaluated the aspects of the continuing nursing education program as poor at Kirkuk Health Directorate.

Conclusion: The study concludes that the evaluation of aspects of the continuing nursing education programs is appraised as poor for the majority of nurses’ self-evaluation.

Recommendations: The study recommends that mandatory, periodic, systematic and effective evaluation of continuing nursing education program can be carried out for the benefit of both staff nurses, these programs and the quality of nursing care. Further research can be carried out on a large sample size, varied range scale of variables, large sample size and nation-wide continuing nursing education programs.

Key wards: Determination, Continuing Nursing Education Program, Kirkuk Health, Directorate

Introduction

Nursing is a thriving profession whose importance continues to grow in a complex healthcare system. Opportunities for continuing education abound and with online resources. While the availability of so many resources may feel overwhelming, it can be good to remember that nurses can tailor their continuing education to fit their particular professional needs (¹). Nursing is a lifetime learning process. Nurses not ever learn everything they want to know in nursing school. However, the greatest important thing that nurses learn is that if they don’t know something, or have not ever accomplished a procedure, they must ask for assistance and, when necessary, supervision. As far as we are concerned, the major reason for continuing education in nursing is the development and improvement in professional practice. Nursing continuing education provides nurses the prospect to learn and improvement of their own practices in secured patient care (²). Nurses in the 21st century will want to be highly skilled in technology and have widespread knowledge of healthcare policy, leadership and research. Nurses of the future will comprehend the value of evidence-based practice and be the leaders who aid implement new research for enhanced patient outcomes. These highly educated nurses will understand the value of collaboration and coordination crosswise multiple interdisciplinary teams. The future is very cheerful for highly educated nurses, especially those entering RN to
MSN programs. The healthcare system requests nurse leaders and visionaries more than ever. Those nurses will manage complex problems and see the impact of decisions on patient care and the healthcare environment in general. All of these topics can be met throughout continuing nursing education (3). Continuing nursing education and the submission of innovative knowledge to practice are progressively important means to advance patient care in today’s health environment. The inclination and aptitude to transmission knowledge, skills, and attitudes are serious to improving patient outcomes. It has been also suggested that continuing education program endorse knowledge, attitude, performance and competency of nurses (4,5). Nursing continuing education affords nurses the opportunity to learn and advance their own techniques in safe patient care. Continuing education, more than a professional requirement, is aimed at improving overall knowledge and career prospects of the nurses. Continuing education is necessary for nurses for such reasons: (1) Professional Requirement: Nurses are required to complete a certain number of hours, in specific or open courses, to get their license renewed; (2) Professional Validation: As a way to validate clinical competence and education, many employers require nurses to complete specific courses; (3) Quality Care: Continuing education helps in staying current in evidence-based practices to assist nurses in providing safe and quality patient care; (4) Promotion: As every course adds to your knowledge and skills, it helps in landing a promotion or a coveted position and (5) Minimize legal risks: Staying up-to-date is a mandatory requirement for the nurses. Failing to do so can have serious consequences. Continuing nursing education helps them keep their practice current and minimize potential legal ramifications (6).

In addition to that nursing continuing education presents nurses the prospect to learn and advance their own techniques in secured patient care, continuing education presents benefits for nurses that include: Remaining up-to-date in evidence based practices in order to provide safe and quality patient care. Many organizations contain continuing education in their employee performance evaluation, professional and personal satisfaction (2).

Based on the early stated evidence, the present study ought to evaluate the Continuing Nursing Education Programs at hospitals in Kirkuk Health Directorate.

**Methodology**

A descriptive design is employed throughout the present study to evaluate the aspects of the continuing nursing education programs in Kirkuk Health Directorate from November 3rd 2018 to April 30th 2020.

After receiving the approval of the Council of Nursing College for the study and prior to data collection, proposal and questionnaire of the study have been submitted to the Ministry of Planning Central Statistical Organization and the Ministry of Health and Environment Kirkuk Health Directorate in order to obtain an official permission to carry out the study. The permission, after being granted, is presented to the hospitals to ensure the agreement and cooperation.

The study is conducted at Kirkuk General Hospital and Azady Teaching Hospital in Kirkuk Health Directorate. These settings are the designated site for data collection, because all of them are representing the classification of hospitals as general and specialized ones.

A purposive “nonprobability” sample of (251) staff nurse is selected for the present study. All staff nurses, who have participated in the study, have presented with consent form and they are asked to sign the form for their agreements for the participation in the study. All participants are introduced with the study objectives and they are presented with the opportunity of being aware of the study affairs. Such action has been implemented to protect the participants’ human rights and facilitate access to them in order to gather the necessary data for the study.

The study instrument consists of the following:

**Part I: Aspects of the Continuing Nursing Education Program**

This part is comprised of six aspects as follows:

1. Program goals:

This part is comprised of (7) items which are concerned with the program goals. It is evaluated as poor (7-12), fair (13-17) and good (18-21).
2. Program Planning:

This part is comprised of (6) items which are concerned with the program planning. It is evaluated as poor (7-12), fair (13-17) and good (18-21).

3. Performance:

This part is comprised of (7) items which are concerned with the program performance. It is evaluated as poor (10-17), fair (18-24) and good (25-30).

4. Operation and Management:

This part is comprised of (8) which are concerned with program’s operation and management. It is evaluated as poor (10-17), fair (18-24) and good (25-30).

5. Program Outcomes:

This part is comprised of (10) item which are concerned with the program outcomes. It is evaluated as poor (10-17), fair (18-24) and good (25-30).

6. Program Effectiveness:

This part is comprised of (8) item which are concerned with the program effectiveness. It is evaluated as poor (8-13), fair (14-18) and good (19-24).

Each one of these aspects is evaluated based on the calculation of the total scores and ranges.

A pilot study is conducted for the determination of the study instrument validity and reliability for the period from February 12th to March 7th 2019.

The content validity of questionnaire is determined by panel of (10) experts who are provided with copy of study instrument and are asked to review and evaluate the instrument for its content clarity and adequacy. Some items are excluded and others are added after taking all the comments and recommendations into consideration. So, the questionnaire is considered adequately valid measure after performing the modifications that are based on the experts’ responses.

Internal consistency reliability of the questionnaire is determined through the use of split-half technique and the computation of Cronbach alpha correlation coefficient on responses of (20) staff nurse. The correlation coefficient is (r=0.85) which indicates that the questionnaire is adequately reliable measure.

Data are collected through the use of the study instrument and the structured interview technique as means of data collection for the period from March 10th 2019 to May 8th 2019.

The data are analyzed through the use of descriptive statistical data analysis approach of frequency, percent, mean and standard deviation, mean of scores, total scores and ranges.

Results

Table (1): Evaluation of the Program Goals as an aspect of the Continuing Nursing Education Program

<table>
<thead>
<tr>
<th></th>
<th>Poor (7-12)</th>
<th>Fair (13-17)</th>
<th>Good (18-21)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>%</td>
<td>F</td>
<td>%</td>
</tr>
<tr>
<td>214</td>
<td>85.2%</td>
<td>29</td>
<td>11.5%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8</td>
<td>3.1%</td>
</tr>
</tbody>
</table>

F: Frequencies, %: Percentages

This table presents that the program goals is poor for the majority of the subjects (85.2%).
Table (2): Evaluation Program Planning as an aspect of the Continuing Nursing Education Program

<table>
<thead>
<tr>
<th>Poor (7-12)</th>
<th>Fair (13-17)</th>
<th>Good (18-21)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>%</td>
<td>F</td>
</tr>
<tr>
<td>192</td>
<td>76.4%</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

F: Frequencies, %: Percentages

This table reveals that the program planning is poor for most of the subjects (76.4%).

Table (3): Evaluation of program performance as an aspect of the Continuing Nursing Education Program

<table>
<thead>
<tr>
<th>Poor (10-17)</th>
<th>Fair (18-24)</th>
<th>Good (25-30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>%</td>
<td>F</td>
</tr>
<tr>
<td>203</td>
<td>80.8%</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3</td>
</tr>
</tbody>
</table>

F: Frequencies, %: Percentages

This table shows that the program performance is poor for the majority of the subjects (80.8%).

Table (4): Evaluation of Program Operations and Management as an aspect of the Continuing Nursing Education Program

<table>
<thead>
<tr>
<th>Poor (10-17)</th>
<th>Fair (18-24)</th>
<th>Good (25-30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>%</td>
<td>F</td>
</tr>
<tr>
<td>201</td>
<td>80.1%</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5</td>
</tr>
</tbody>
</table>

F: Frequencies, %: Percentages

This table depicts that the program operation and management is poor for the majority of the subjects (80.1%).
Table (5): Evaluation of Program Outcomes as an aspect of the Continuing Nursing Education Program

<table>
<thead>
<tr>
<th>Poor (10-17)</th>
<th>Fair (18-24)</th>
<th>Good (25-30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>%</td>
<td>F</td>
</tr>
<tr>
<td>209</td>
<td>83.2%</td>
<td>38</td>
</tr>
</tbody>
</table>

F: Frequencies, %: Percentages

This table presents that the program outcomes is poor for the majority of the subjects (83.2%).

Table (6): Evaluation of Program Effectiveness as an aspect of the Continuing Nursing Education Program

<table>
<thead>
<tr>
<th>Poor (8-13)</th>
<th>Fair (14-18)</th>
<th>Good (19-24)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>%</td>
<td>F</td>
</tr>
<tr>
<td>203</td>
<td>80.8%</td>
<td>40</td>
</tr>
</tbody>
</table>

F: Frequencies, %: Percentages

This table reveals that the program effectiveness is poor for the majority of the subjects (80.8%).

Discussion

Analysis of evaluation of the aspects of the Continuing Nursing Education Program in Kirkuk Health Directorate has revealed that staff nurses have appraised these aspects as poor for the majority of them. Such finding provides empirical evidence that the continuing nursing education program has practiced series of insufficiencies with respect to all aspects of the program.

A study was done, In Korea, to develop a measurement tool for evaluation of continuing nursing education programs and to verify its validity for effective management and quality of education programs. The draft of the evaluation measurement is developed from consultation with professionals, focus group interviews targeting groups of nurses, and individual interviews with education program planners. After (6) professionals examined content validity, 46 items were retained. A pilot-survey is conducted to confirm the time required to complete the questionnaire and the level of understanding of general content and each item in the questionnaire. Construct validity is verified through exploratory factor analysis of data from a survey with (44) items completed by (452) nurses and (59) education program planners. The final evaluation measurement for continuing nursing education programs consisted of (6) evaluation factors and (36) evaluation items. The (6) evaluation factors include identifying program goals and target groups, program planning, performance, operation and management, program outcomes, and program effectiveness. The study concludes that the evaluation measurement for continuing nursing education programs developed in this study is considered suitable to utilize as
an evaluation measurement of the quality of continuing education programs for nurses (7).

**Conclusion**

The study concludes that the evaluation of aspects of the continuing nursing education programs is appraised as poor for the majority of nurses’ self-evaluation.

**Recommendations:**

The study recommends that mandatory, periodic, systematic and effective evaluation of continuing nursing education program can be carried out for the benefit of both staff nurses, these programs and the quality of nursing care. Further research can be carried out on a large sample size, varied range scale of variables, large sample size and nation-wide continuing nursing education programs.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Kirkuk Health Directorate and all experiments were carried out in accordance with approved guidelines.

**References**

2. Quan K. The Importance of Nursing Continuing Education. 2017.
Epidemiology and Seasonal Variation of Ixodid Ticks and Piroplasmida Detection in Cattle of Basrah Province, Iraq

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1Prof., Dr, 2Assist. Lecturer, Department of Biology, College of Education for Pure Sciences, Basrah University

Abstract

Four hundred and twenty cattle belonging to different breed and age groups were investigated for infestation by ticks during the period from October 2018 to September 2019 in Basrah governorate, Iraq. Investigated cattle were found to be infested by four species of hard ticks namely (Hyalomma anatolicum anatolicum, Hyalomma marginatum turanicum Rhipicephalus (Boophilus) annulatus, Rhipicephalus sturanicus). No significant difference in infestation rate was observed according to the method of cattle raising (X²=0.455, p=0.500), however, seasonal variation in infestation with significant difference was found, higher infestation rate reported in June (63.3%) and the lowest was in January (20%) (X² =76.740 ,p = 0.05). In the meantime blood smears samples from the same cattle were also examined by microscopy for hemoprotozoan pathogens. The examination revealed that those cattle are infected by Babesia spp. (27.14%) and Theileria spp. (19.52%). No, significant difference in infection rate was found between male and females, but a significant variation was seen among age groups, however, age group 1-3 years revealed a high rate of infection. Seasonal variation in the infection rates were observed in infected cattle. Higher infection rates of Babesiosis and Theileriosis reported in June (50%) and (36.7%) respectively.

Keywords: Epidemiology, Babesia bovis, Theileria annulata, Hyalomma, Rhipicephalus, Basrah, Iraq.

Introduction

Cattle are most important source of national income for countries. The directorate of animal wealth estimated the number of cattle in Iraq about 2.5 million in 2007. We have no specific information on the races and strains of cattle that are raised in Iraq but are believed to be most of the indigenous cattle breeds and fall within the following races: AL-Janobi cows; AL-Restaki cows, AL-Sharabi cows and AL-Karadi cows; the last two races are confined to the northern region of Iraq, in addition, there are few numbers of the strain Holstein – Friesian introduced to improve local of dairy production. There are a number of obstacles facing the progress and development of livestock industry in Iraq, mainly diseases including ticks and tick-born disease (TBDs) which are most prevalent and exert their huge impact in tropical and sub-tropical regions. TBDs cause enormous losses through mortality, morbidity, productive losses and the cost control and their effect on the immune status of infected animal. The passive impact of ticks does not only acts as vectors for pathogens, but also causes significant effects on animals, such as lack of milk production, weight loss, skin grafting, and predispose animal to other bacterial and fungal diseases. The climatic condition of Iraq is favorable for growth of tick species which is contribute to potential occurrence of Babesiosis and Theileriosis which are caused by Babesia spp. and Theileria spp., respectively. Routine diagnosis of babesiosis and theileriosis is performed by microscopic examination of Giemsa stained blood smears and parasite viewing as well as clinical signs in severe cases, but in subclinical infections parasite microscopically undetectable and lead to relatively high rate of false negative diagnosis. Moreover, Bilgic et al. (2013) pointed out that it is difficult to differentiate between species of Babesia based on morphological characteristics, especially in mixed infection. If animals

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Email: s.almayah60@gmail.com
recovery from infection, along with lasting carrier status, occurs in which low numbers of erythrocytes remain infected with parasites, and acts as carrier or reservoir for parasites. These carriers have an important role in the transmission of the infection by ticks.  

Materials and Methods

A - Study Area and Field Sampling

The study was accomplished in Basrah province, which is located in the southern part of Iraq, at a latitude of 30°30' and longitude 47°48'. A total number of 420 cattle were randomly sampled during the period from October 2018 to September 2019.

Samples were collected on farms with two different methods. Methods were applied, those that are grazed in unimproved natural pasture and those that are kept in the pens and are hand fed and watering. All cattle without regular acaricide treatment. The sample-level variables included sample size and location (northern, central, east, west, and southern areas). Cattle were categorized into age classes (<1 year old to ≥ 10 years) and divided into two categories: cattle with tick burden and no tick burden.

B - Collection of tick and Blood samples

Ticks were collected using rubbing alcohol pads surrounding the skin of cattle and removed by forceps and kept in labeling screw plastic tubes containing ethanol. All collected ticks were examined under the stereomicroscope. Species, sex, and state of feeding were recorded.

Ticks identification was done according to Hoogostaal et al. (1981) and Shubber (2014). Some of female ticks were frozen at -20˚C for DNA extraction.

Blood samples were collected from the vena jugularis from a total of 420 cattle with a 10ml disposable syringe under aseptic precautions. About 5ml of blood was collected in tubes containing Ethylene Diamine Tetraacetic Acid (EDTA) for DNA extraction and then stored in iceboxes at 4˚C. The samples were transported to the parasitology laboratory at Basrah University, Education College for Pure Sciences, where blood smears were prepared, and fixed by using methanol and stained by Giemsa, then examined under an oil immersion 1000x objective.

C - DNA Extraction

The DNA was extracted from blood and tick samples using DNA extraction kit (GeneiadBiotech, Taiwan) according to the manufacturer instructions. The extracted DNA were tested by Nano drop spectrophotometer (Type Implen) at a wave length 260/280 nm.

D - Polymerase Chain Reaction (PCR)

For the molecular diagnosis of T. annulata, B. microti, B. bovis, B. ovis, and B. motasi in ticks and cattle, PCR reactions were performed using the specific primers for detection T. annulata Cytob1 (F: ACTTTGGCCGTAATGTTAACAC, R: CTCTGGACCAACTGTCTTGG), 312bp (Bilgic et al., 2010); B. microti ISSrRNA (F: CTTAGTATAAGCTTTTATACAGC, R: ATAGGTCAGAAACTTGAATGATACA), 238bp (Inoue et al., 2015); B. bovis SSrRNA (F: CTGTCGTACCGTGGTTGAC, R: CGCACGGACCGGAGACCGA), 541bp (Chaudhry et al., 2010); B. ovis SSrRNA (F: TGGGCAGGACCTGGTTGAC, R: CCACGGGTTGCRAGACCGA), 565bp (Aktas, 2005); and B. motasi Rap1b (F: TGGGCAGGACCTGGTTGAC, R: CCACGGGTTGCRAGACCGA), 565bp (Ni, 2016).

The amplification protocol was as follows: initial denaturation at 95˚C for 1 minute followed by 35 cycles of 95˚C for 50 sec for T. annulata, 40 cycles of 94˚C for 1 min. for B. microti, 35 cycles of 94˚C for 30 sec. for B. bovis, and B. motasi, and 35 cycles of 94˚C for 1 min. for B. ovis, annealing 35 cycles at 55˚C for 50 sec. for T. annulata, 40 cycles of 54˚C for 1 min. for B. microti, 35 cycles of 50˚C for 30 sec. for B. bovis, and 35 cycles of 62˚C for 1 min. for B. ovis, and 35 cycles of 58˚C for 30 sec. for B. motasi. Extension at 72˚C for 1 min. for T. annulata and 72˚C for 90 sec. for B. microti, 72˚C for 45 sec. for B. bovis, and 72˚C for 1 min. for B. ovis and B. motasi with final extension at 72˚C for 10 min. for all pathogens (except for B. bovis at 72˚C for 7 min.) in the MiniAmp plus thermocycler. The amplification products were separated on 1.5 agarose gel stained with ethidium bromide.
E- Statistical analysis:

Chi-square test was used according to the SPSS statistical program (software, Version 23).

Results

Out of 420 cattle examined in Basrah governorate, an overall 42.5% cattle were infested by *Hyalomma anatolicum anatolicum*, 32.5% with *H.turanicum*, 23.1% with *Rhipicephalus turanicua*, 21.8% with *R.(Boophilus) annulatus*, and 6.2% with mixed infestation. 485 specimens of ticks were collected from 160 animals that mean the intensity of infestation for each animal was 3.0 ticks. Cattle raised in pens recorded the highest prevalence of ticks reaching 39.5%, while cattle grazing in pastures recorded a lower prevalence (34.9%), but the differences were insignificant ($X^2 = 0.455, P=0.500$). No marked differences were observed between sex or between age groups regarding the prevalence of ticks infestation. However, the monthly prevalence of infestation in cattle, *H. a. anatolicum*, *H. turanicum*, *R. turanicus* and *R.B. annulatus* was highest in June (63.3%) and the lowest in January (20%). There were significant differences ($X^2 = 76.7, P=0.05$) in monthly prevalence (Table 1).

Table (1) Monthly prevalence of ticks

<table>
<thead>
<tr>
<th>Months</th>
<th>No. of examined cattle</th>
<th>No. of cattle infested with ticks</th>
<th>Pervalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>October</td>
<td>25</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>November</td>
<td>25</td>
<td>10</td>
<td>36</td>
</tr>
<tr>
<td>December</td>
<td>30</td>
<td>7</td>
<td>23.3</td>
</tr>
<tr>
<td>January</td>
<td>25</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>February</td>
<td>30</td>
<td>8</td>
<td>26.7</td>
</tr>
<tr>
<td>March</td>
<td>25</td>
<td>12</td>
<td>48</td>
</tr>
<tr>
<td>April</td>
<td>40</td>
<td>18</td>
<td>45</td>
</tr>
<tr>
<td>May</td>
<td>50</td>
<td>22</td>
<td>44</td>
</tr>
<tr>
<td>June</td>
<td>30</td>
<td>19</td>
<td>63.3</td>
</tr>
<tr>
<td>July</td>
<td>50</td>
<td>27</td>
<td>54</td>
</tr>
<tr>
<td>August</td>
<td>50</td>
<td>22</td>
<td>44</td>
</tr>
<tr>
<td>September</td>
<td>40</td>
<td>20</td>
<td>50</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>420</strong></td>
<td><strong>160</strong></td>
<td><strong>38.1</strong></td>
</tr>
</tbody>
</table>

$X^2 = 76.740, P=0.05$

Microscopic examination of 420 blood smears showed that 114 (27.1%) and 82 (19.5%) of cattle were positive for *Babesia spp.* and *Theileria spp.* respectively, according to the sex of cattle, however, there were no significant differences in the prevalence of infection.

Higher prevalence of infection with bovine babesiosis and theileriosis were recorded in cattle of 1-3 years age group 32.3% (50/155) and 22% (34/155) respectively, while lower prevalence recorded in ≥10 years for babesiosis 0.1% (1/11) and 0% (0/11) for theileriosis. There were significant differences between age groups ($X^2=19.88, P=0.001$) and ($X^2=24.81, P=0.00$) respectively.

The seasonal variation of infection showed that the highest rate of infection were found in June, represented by 50% for Babesiosis and 36.7% for Theileriosis, while lower rates recorded in October 8% and 4% respectively (Table 2). There were significant differences ($X^2=$
88.6, \( P = 0.00; X^2 = 116.69, P = 0.00 \) and \( X^2 = 71.5, P = 0.00 \) respectively.

<table>
<thead>
<tr>
<th>Months</th>
<th>No. of cattle examined</th>
<th>No. of cattle infected with Babesia</th>
<th>Prevalence (%)</th>
<th>No. of cattle infected with Theileria</th>
<th>Prevalence (%)</th>
<th>Mixed infection</th>
<th>Prevalence (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>October</td>
<td>25</td>
<td>4</td>
<td>16</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>November</td>
<td>25</td>
<td>2</td>
<td>8</td>
<td>1</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>December</td>
<td>30</td>
<td>3</td>
<td>10</td>
<td>2</td>
<td>6.7</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>January</td>
<td>25</td>
<td>3</td>
<td>12</td>
<td>5</td>
<td>20</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>February</td>
<td>30</td>
<td>4</td>
<td>13.3</td>
<td>4</td>
<td>13.3</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>March</td>
<td>25</td>
<td>7</td>
<td>28</td>
<td>5</td>
<td>20</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>April</td>
<td>40</td>
<td>15</td>
<td>37.5</td>
<td>10</td>
<td>25</td>
<td>7</td>
<td>17.5</td>
</tr>
<tr>
<td>May</td>
<td>50</td>
<td>15</td>
<td>30</td>
<td>12</td>
<td>24</td>
<td>8</td>
<td>16</td>
</tr>
<tr>
<td>June</td>
<td>30</td>
<td>15</td>
<td>50</td>
<td>11</td>
<td>36.7</td>
<td>5</td>
<td>16.7</td>
</tr>
<tr>
<td>July</td>
<td>50</td>
<td>21</td>
<td>42</td>
<td>12</td>
<td>24</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>August</td>
<td>50</td>
<td>18</td>
<td>36</td>
<td>9</td>
<td>18</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>September</td>
<td>40</td>
<td>7</td>
<td>17.5</td>
<td>10</td>
<td>25</td>
<td>11</td>
<td>27.5</td>
</tr>
<tr>
<td>Total</td>
<td>420</td>
<td>114</td>
<td>27.14</td>
<td>82</td>
<td>19.52</td>
<td>49</td>
<td>11.70</td>
</tr>
</tbody>
</table>

\( X^2 = 116.669, P = 0.000 \), \( X^2 = 71.542, P = 0.000 \), \( X^2 = 88.659, P = 0.000 \)

Frequency of babesiosis and theileriosis infections were significantly higher in cattle with tick burden than no tick burden.

In the present study using specific primers, it was found that \( H.a.anatolicum \) ticks were infected by \( T. annulata, B. bovis \) and \( B. ovis \) Fig.(1) and \( R.h.(Boophilus)annulatus \) were infected by \( T. annulata, B. microti \) and \( B. bovis \) Fig. (2) and the cattle had been infected by \( B. microti, B. ovis, T. annulata, B. bovis \) and \( B. motasi \) Fig. (3),(4).

![Fig.1: Agar gel electrophoresis PCR products of H.a.anatolicum :T.annulata(4) and B.bovis (2) and B.o비스(4) positive . L. (100-2000bp) represents ladder](image)
Fig. 2: Agar gel electrophoresis PCR products of *Rh. (Boophilus) annulatus*, *T. annulata* (1,2,3,4,5) and *B. microti* (3) and *B. bovis* (3,4) positive. L. (100-2000bp) represents ladder.

Fig. 3: Agar gel electrophoresis PCR products of cattle: *B. microti* (3) and *B. ovis* (1,4) positive. L. (100-2000bp) represents ladder.
Discussion

Iraq is located in the southern part of the northern temperate zone, and this location has significant impact on its climate, which is similar to the climate of the tropical region in terms of temperatures, as it is subtropical.

The current study provides preliminary epizootiological data on ticks and ticks borne diseases (TBDs) in south region of Iraq. However, this study provides useful information about the species of parasitoid ticks in cattle of this area. Cattle were infested with H. a. anatolicum, H. m. turanicum, R. turanicus and Rh. B. annulatus. Thus, it does not differ in terms of diversity with the study of Abdul Hussein(2006) and Muhammad(2013) in middle and southern Iraq. Infestation rate in the present study (38.1%) differs from 48.2% recorded by Tuama et al. (2007), 54.3% of AL-Ramahi (2011) and 62% of Mohammad(2015) from other parts of Iraq. These differences in infestation prevalence may be due to the animal raising practices and using or not using of acaricides, difference in vegetation, rainfall rate from year to year and availability of other appropriate host.

There was no significant difference in the rate of infestation of cattle raised in pens and that grazing in the pastures, although the cattle raised in the pens recorded a higher rate of infestation (39.5%).

Although variation was observed in H.a.anatolicum population in different seasons, the result indicates that is the predominant tick in all season in Basrah cattle. This population dynamic pattern may be attribute to the fact that hot and dry weather is conducive for the development of H.a.anatolicum ticks.

Aktas et al.(2004) have referred the abundance and diversity of ticks as well as the intensity of infestation in animals when studying the epidemiology of the diseases it transmits and this is what the current study has.
The life cycles of *Babesia* and *Theileria* parasites are very similar and closely related to them in that they are transmitted by the same vector which are ticks, but the latter differs by having a development stage in its life cycle, which is the infection of lymphocytes before the erythrocytes are infected, so it is possible to explain the epidemiological picture of both diseases as it is correct on the first can be correct in the second.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the College of Education for Pure Sciences and all experiments were carried out in accordance with approved guidelines.

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Epidemiologic and Clinical Characteristics of Children with Measles during the Year 2019

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Abstract

Background: Measles remains a major public health problem in many developing countries including Iraq.

Objective: To describe the epidemiological and clinical profiles of measles among children admitted to Babylon Teaching Hospital for Maternity and Children.

Methodology: A descriptive observational cross-sectional epidemiologic study was conducted on children diagnosed and admitted to Babylon teaching hospital for Maternity and Children. using the (person, place, time epidemiological model) during the period from 1st of January 2019 to the 1st of September 2019. The total number patients was 157. The independent variables studied include; age, gender, residence, time of admission, nutritional status, vaccination status, any co morbidities, clinical presentations and complications.

Results: One hundred fifty seven clinically and serologically diagnosed measles cases who were admitted to Babylon Teaching Hospital for Maternity and Children. The male to female ratio was 1.4:1 the mean age of the patients 35.15±38.5 months (ranging between one month to 11 years). In this study Children under years were most affected. Seventy four percent patients were from rural districts and sub districts. The disease took the profile of epidemic and was seen most often during the hot season, with a peak in July. Majority of cases stayed in the hospital for three days and more. Only one death was reported with a a case fatality rate (0.63%).The most common complications in this study was pneumonia.

Conclusion: Measles remains a common, endemic illness mostly due to inadequate vaccination coverage, further analytic studies are strongly requested in Iraq to identify the real potential risk factors of the occurrence of this serious endemic diseases.

Keywords: Clinical Characteristics, Children, Measles

Introduction

Measles remains a common disease in many countries, especially in parts of Africa and Asia. People from both developed and developing countries are seen to be targeted from this medical problem. Although the incidence rate of this disease was significantly decreased during the period from 2000 until 20171. recent studies conducted in the USA and other countries indicated the level has started to grow up2. Measles is usually associated with fever and rashes3 that could be more dangerous among children came from developing countries and potentially leading to increase the mortality rate up to 15 percent4. Despite undertaken efforts on the issue of measles elimination in Europe by 2015, the goal was not achieved yet5. In some cases, the patients are urgently admitted to the hospital due to the severe complications6. In 2017, There were about 110,000 individuals who passed way from measles worldwide and most of the cases were seen to be among children7. The spread of this disease could be reflected by a significant demand of vaccination being used over the countries8-11. Epidemiological information is necessary to assess progress and document, measles elimination12-13.
Epidemiological studies about this contagious disease in Iraq are limited. This manuscript aims to describe the epidemiological features of measles cases admitted to Babylon maternity and children hospital during the year 2019.

**Methodology**

A descriptive observational cross sectional hospital based epidemiologic study was conducted on children with measles admitted and diagnosed clinically in Babylon teaching hospital for Maternity and children. This study covered the period from January until September 2019.

Data were collected retrospectively from Medical case sheets of children aged from 1 month till 11 years.

The independent variables studied include; age, gender, residence, time of admission, nutritional status, vaccination status, any co morbidities, clinical presentations and complications. We approached registered data in the hospital records on measles cases.

The collection of data were made by collaborative group of students of 6th stage of Babylon medical College After obtaining ethical clearance from the health authority. Data were presented in tables and figures, Spss version 21 was used to analyze data, Chi square was performed to assess the significance differences among the categorized variables, P values less than 0.05 were considered significant.

**Ethical Considerations:** This study was approved by the Research Ethical Committee in Babylon University –Hammurabi College of Medicine.

**Results**

Table (1) shows that about half of patients are below one year (45.2%).

Only (19.1%) of children above nine months were vaccinated as shown in table(2).

**Table (2): Distribution of measles cases by status of vaccination**

<table>
<thead>
<tr>
<th>Vaccination</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>30</td>
<td>(19.1)</td>
</tr>
<tr>
<td>No</td>
<td>48</td>
<td>(30.6)</td>
</tr>
<tr>
<td>Below 9 months</td>
<td>51</td>
<td>(32.5)</td>
</tr>
<tr>
<td>Missed</td>
<td>28</td>
<td>(17.8)</td>
</tr>
<tr>
<td>Total</td>
<td>157</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table (3) reveals that more than half of patients are moderately and severely malnourished.

**Table (3): Distribution of measles cases by nutritional status**

<table>
<thead>
<tr>
<th>Nutritional status</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>47</td>
<td>(29.9)</td>
</tr>
<tr>
<td>Mild</td>
<td>13</td>
<td>(8.3)</td>
</tr>
<tr>
<td>Moderate</td>
<td>44</td>
<td>(28.0)</td>
</tr>
<tr>
<td>Sever</td>
<td>53</td>
<td>(33.8)</td>
</tr>
<tr>
<td>Total</td>
<td>157</td>
<td>100%</td>
</tr>
</tbody>
</table>

While table (4) depicts that 70.1% of participants have no complications but the most common complication (23.6%) is pneumonia.

**Table (4): Frequency distribution of measles cases by complications**

<table>
<thead>
<tr>
<th>Complication</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumonia</td>
<td>37</td>
<td>(23.6)</td>
</tr>
<tr>
<td>Bronchiolitis</td>
<td>6</td>
<td>(3.8)</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>3</td>
<td>(1.9)</td>
</tr>
<tr>
<td>Fit + Encephalitis</td>
<td>1</td>
<td>(0.6)</td>
</tr>
<tr>
<td>No complication</td>
<td>110</td>
<td>(70.1)</td>
</tr>
<tr>
<td>Total</td>
<td>157</td>
<td>100%</td>
</tr>
</tbody>
</table>
Table (5) explains that more than 70% of patients stayed in the hospital more than three days.

**Table (5): Frequency distribution of measles cases by duration of hospitalization**

<table>
<thead>
<tr>
<th>Duration of hospitalization</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>One day</td>
<td>15</td>
<td>(9.6)</td>
</tr>
<tr>
<td>Two days</td>
<td>30</td>
<td>(19.1)</td>
</tr>
<tr>
<td>Three days</td>
<td>41</td>
<td>(26.1)</td>
</tr>
<tr>
<td>Four days</td>
<td>38</td>
<td>(24.2)</td>
</tr>
<tr>
<td>More than four days</td>
<td>33</td>
<td>(21.1)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>157</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

In table (6) reveals a statistically significant association between the younger age of patients and the long duration of hospital stay. Chi Square = 24.685, df= 12, P-value = 0.016.

**Table (6): association between duration of hospitalization and age of patient**

<table>
<thead>
<tr>
<th>Hospitalization</th>
<th>1 day</th>
<th>2 days</th>
<th>3 days</th>
<th>4 days</th>
<th>&gt;4 days</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 1 year</td>
<td>3</td>
<td>12</td>
<td>13</td>
<td>18</td>
<td>24</td>
<td>70</td>
</tr>
<tr>
<td>1-4 years</td>
<td>5</td>
<td>12</td>
<td>13</td>
<td>12</td>
<td>2</td>
<td>44</td>
</tr>
<tr>
<td>5-10 years</td>
<td>6</td>
<td>5</td>
<td>11</td>
<td>7</td>
<td>6</td>
<td>35</td>
</tr>
<tr>
<td>Above 10 years</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>14</strong></td>
<td><strong>30</strong></td>
<td><strong>41</strong></td>
<td><strong>38</strong></td>
<td><strong>33</strong></td>
<td><strong>156</strong></td>
</tr>
</tbody>
</table>

Chi Square = 24.685, df= 12, P-value = 0.016

**Discussion**

The current study shows that measles is still recurrent endemic viral disease in our country with evidence of epidemic on the endemic situation. The transmission of the endemic measles could be referred to the presence of continuous indigenous of measles virus for about 12 months and onwards targeting a specific area. Despite the fact that measles infection has been significantly reduced over the last decades, measles is still a big contributor for mortality among children living in low income countries. This study shows that males are infected slightly more than females this finding goes in line with the finding of another local study conducted in Baghdad province by Aziz HA et al but disagrees with the results of other studies. About one third of infection occurred before the age of one year this finding is similar to the finding of a local study and to the reported result by Choe YJ et al. in Republic of Korea. Large proportion of measles cases occurred among unvaccinated children in urban area. Measles is still attacking vaccinated children in our
society this may be to many factors including vaccine failure, this finding is similar to the finding of another studies \(^\text{19}\). These findings could be explained due to the vaccine failure. This failure could be caused by several factors like vaccine’s dosage being used, cold-chain system being applied. In addition to that, host-specific factors like persistence of maternally acquired immunity could also be accounted for such failure \(^\text{20}\).

The occurrence of this small epidemic of measles in our province was found to be higher in the beginning of summer months with a peak in July this result is in agreement with Hirfanoglu et al. in Turkey \(^\text{21}\) but disagrees with the results of other study \(^\text{13}\). This difference in timing may be explained by the time of occurrence of epidemics. The present study reveals that more than half of patients are moderately or severely malnourished, this result is higher than the proportion of malnourishments children with measles reported by other similar studies. In the present study about half of the study group were malnourished while 32.12% of children were malnourished in a local research \(^\text{13}\), while Ur-Rehman et al. reported 40% as malnourished \(^\text{22}\). The major complication in the present study is pneumonia and bronchiolitis (about 27%) followed by diarrhea, this finding is similar to the finding reported by Khan I et al.2013 in Peshawar –Pakistan \(^\text{23}\). In this study the majority of measles cases (nine in tenth) have typical presentations, studies indicated that both fever, maculopapular (hyper pigmented) rash are among other symptoms that can be effectively used as a monitoring tool for this disease in an epidemic area. More confirmation could also be established from the titter of anti-measles Ig M. \(^\text{24,25}\). Moreover, few patients showed some less typical features. More than two thirds of measles patients in this study stayed in the hospital more than three days duration of admission there is a significant association between younger age (<one year) and increasing the duration of hospitalization, this finding is in accordance with other study \(^\text{26}\), in Italy commonest age for admission was below one year \(^\text{27}\). Measles still threaten the health status of our community, a strategy for control and elimination of measles should be planned to get rid of this serious viral disease similar to countries in the Middle East. In 2019, the regional verification commission for measles and rubella announced that some of Eastern Mediterranean countries like Oman, Bahrain, and Iran are absolutely clear from both measles and rubella and this big achievement could therefore participate in the global efforts for reducing such diseases worldwide. \(^\text{28}\)

**Conclusions**

The study shows that measles still endemic in our country with evidence of recurrent epidemics, males are affected slightly more than females and about, affecting young children below five years mainly infants. Large proportion of measles cases occurred among unvaccinated children in urban area. Measles is still attacking vaccinated children in our society, the disease is associated with malnutrition and the vast majority of cases have typical presentation, the majority of patients were hospitalized for three years and more.

**Limitations:**

1- There may be inaccuracies in the data of the file system.

2- The study did not look at the measles laboratory performance indicators or the quality of serological specimens.

3- The weaknesses in surveillance performance and the gaps in the investigation of cases and outbreaks may conceal the true incidence and epidemiological pattern of measles in the province since it is hospital based, in this cross sectional study design cause and effects associations cannot be determined.

**Competing Interest:** The authors declare that they have no competing interests

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the University of Babylon and all experiments were carried out in accordance with approved guidelines.

**References**


Bacterial Infection and Seminal Fluid Parameters in Iraqi Sub Fertile Men

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Abstract
Semen samples of 60 sub fertile men that aged from 25 and 45 years that attending an Al-Sammrai infertility hospital from 10-10-2017 to 5-12-2018 and were examined for bacteriological culture. The patients divide to negative group (A) the second as positive group (B). Semen were chaked from the groups and analyzed for viscosity, sperm morphology, semen volume, sperm concentration, and motility percent. The results for cultures was negative in 15% and positive in 85% of patients. The isolated organisms were as the following percentage ( Escherichia coli 11%, Staph. aureus (16%), B-hemolytic streptococcus 30%, Staphylococcus epidermidis 43 %). The semen characteristics in infected samples showed that the motility and viability of spermatozoa were lower when compared to noninfected semen sample. That are means, the infections have a direct effect on seminal fluid quality and subsequently negative effects on human fertility. The results showed that there are a highly significant difference (p˂0.001) between fertility power in noninfected men and infected cases.

Keywords: spermatozoon, seminal fluid, microorganisms, infection, human infertility.

Introduction
Infections of semen may affect male fertility power in different and methods. The mechanism of infertility is not understood completely and for some researchers the possible effect of infection in human sub fertility is debatable 24, 25. Chronic bacterial infection of semen is uncommon, but may be a cause of male infertility 5,23. The bacterial pathologies of the genital tract are the same to those infected the urinary tract 22,28. More studies found the correlation between seminal fluid infection and sperm quality. Fertile men have less microorganism in their seminal fluid when compared to sub fertile patients 14,22. These bacterial infections may effects directly on the sperm, or indirectly on the seminal fluid which may include antisperm antibodies forming 7,26. In the developing countries, the infections of semen is the most important factors that may cause human sub fertility 27. Gdoura R. et al, (2007) 6 and Hannachi H. et al, (2015) demonstrated that genital mycoplasmas and ureaplasmas seem to be widespread among the male partners of infertile couples in Tunisia which could influence semen quality negatively. The results also found that assay of PCR-microtiter plate hybridization method takes a rapid and good effective technique to determine human genital mycoplasmas and ureaplasmas which is very useful for epidemiological and etiological studies of these pathogens.

Materials and Method
Seminal fluid samples were evaluated from 60 men (25 to 45 years of age (average of 35 f 5.9) that they were no symptoms of genitourinary system. All selected men expatriate any medication in the past 3 months. The elect sub fertile men were refused if they had a varicocele and groin injury in genital tract. At the time of insertion, the sub fertile men were tested for urethral discharge and if it was present it will be excluded. Before they visited the hospital, the men will abstain for 3-4 days. Penis and hands were washed with bactericidal effect substance (exa. Soap), then by masturbation semen samples were obtained, then it will put into a sterile specimen container. During collection of the specimen, the sub fertile patients were not to use any lubricants.
One milliliter of the seminal fluid will be used for culture and sensitivity examination for microorganisms growth within short time. After liquefaction of seminal fluid, we examined it for other semen parameters (concentration of sperms, percentage of motile sperms, morphology and others). Morphology was performed as Eliasson procedure in 1971. Depending on [WHO 2010] criteria, seminal fluid analysis were performed. Bacterial culture of seminal fluid was performed as described by [12]. The data was statistically evaluated by using (Student t test) with the Minitab computer program.

**Results**

**Seminal fluid Characteristic**

The sub fertile patients were 25 years to 45 years old with (average of 35 ± 5.9). The sub fertility infertility duration was 2-6 years. This study inclusive 60 patients, 20 men were normal sperm concentration (35.6 %), azoospermia were 8 (12.12 %), and oligozoospermic were 12 (20 %), in 15 (25 %) were primary infertility and 5 (8.3 %) was secondary infertility. Depending on the result of bacteriological analysis, the samples were divided in two groups. The samples that did were Group A which were not show positive culture (n = 15 (25 %) and group B (n = 45) (75%) that with bacteriological positive cases. Table (1) is a summary of seminal fluid characteristics. Regarding motility percent, volume and viability, there were statistically significant differences between the two groups A and B. In group A, the motility of sperm and viability were higher in comparison to group B.

**Semen Bacteriology:**

Table 2 identified bacterial infection (anaerobic and aerobic) that present in the seminal fluid of sub fertile patients. The 60 samples were divided as following categories: 35 were aerobic positive bacteria and 10 were for anaerobic positive bacteria. 43% Staph. epidermidis, 11 %, E. coli, 16 %, Staph. Aureus and P-hemolytic streptococcus in 30 %.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Culture was Negative</th>
<th>Culture was positive</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>patients numbers</td>
<td>15</td>
<td>45</td>
<td></td>
</tr>
<tr>
<td>Seminal fluid volume (millimeters)</td>
<td>2.6± 1.5</td>
<td>2.7±1.0</td>
<td>.063</td>
</tr>
<tr>
<td>Sperm count</td>
<td>88±12.8</td>
<td>95±15.7</td>
<td>NS</td>
</tr>
<tr>
<td>Motility(%)</td>
<td>45±12</td>
<td>39±13</td>
<td>.0001</td>
</tr>
<tr>
<td>Viability(%)</td>
<td>72±13</td>
<td>64±14</td>
<td>.0001</td>
</tr>
<tr>
<td>Normal morphology(%)</td>
<td>42±13</td>
<td>32±11</td>
<td>0.001</td>
</tr>
</tbody>
</table>

**Table 2: Anaerobic and aerobic microorganisms isolated from 60 sub fertile patients.**

<table>
<thead>
<tr>
<th>Microorganisms</th>
<th>patients No.</th>
<th>percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staph. epidermidis</td>
<td>24</td>
<td>43 %</td>
</tr>
<tr>
<td>E. coli</td>
<td>7</td>
<td>11 %</td>
</tr>
<tr>
<td>Staph. aureus</td>
<td>10</td>
<td>16 %</td>
</tr>
<tr>
<td>P-hemolytic Streptococcus</td>
<td>18</td>
<td>30 %</td>
</tr>
</tbody>
</table>
Fig 1: E coli growth

Fig 2: Gram negative cocci growth
Discussion

Our study is fastened on the subclinical non-symptomatic infection and its relationship to sub-fertility. Male accessory genital inflammation diagnosis is not easy and its causes on sub-fertility is questionable. The variability in more researches is very great that the effects of microorganisms infection and seminal fluid parameters of sub-fertile and fertile patients. The variation is 10 and 60% of positive cultures of fertile men and varied between 20 and 100% in sub-fertile men (2, 3, 8, 11, 13, 15, 19, 20, 22, 27). We try to determine the effects of infection by microorganism on the semen parameters. Staphylococcus has been reported to have a prevalence in semen of 24-100% [7] found that Staph epidermidis. have prevalence of 24 – 100%, but in our study is 63%. Besides in 28% of cases was recovered Strept. viridans of semen specimens in comparisons to 15 – 74% in another researches [19]. From 7% of the samples, non-aerobic gram-positive cocci were recovered in comparisons to 15 – 20% in those of another studies [19]. Depending on our study, we find that the infection by microorganisms, make changes of seminal fluid parameters such as sperm motility percent, semen volume, and status of viability. The fail of in spermatozoon motility percent may due to fixation of mobility ability of human sperm [6], or make spermatozoon to be dead by making harmful poisons produced by the infected microorganisms [10]. Degeneration of the morphology of human spermatozoon may happen due to infection by infectious microorganisms [1], also our present study find the same effect of infection on human spermatozoon by making deep structural effect in the morphology. Other study describe that there is no difference in parameters of seminal fluid for presence of infection or not in cases of study [27]. Kenny (2018) [13] established that there were no effects of any types of microbe that present in human
semen fluid on characteristics of sperm. In 1980, Jacques et al., established that the motility percent was decreased. The reason of variability of results may be due to seminal fluid collection ways and deference of investigation.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Ministry of higher Education & Scientific Research and all experiments were carried out in accordance with approved guidelines.

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Daily Living Activities of School Age Children with Acute Lymphocytic Leukemia at Welfare Pediatric Teaching Hospital

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Abstract

Objective(s): The study aims to assess daily living activities domain of school age children with acute lymphocytic.

Methods: A descriptive study, conducted in Baghdad City from 13 of February to 20 of May 2016. A purposive sample of 50 children with acute lymphocytic leukemia at welfare pediatric teaching hospital and child central pediatric hospital. The study instrument was consists of three parts, the first was demographic data demographic characteristics of the child, the second part is related to the symptoms and clinical signs and complications phenomenon on the child, and the third part related to the daily activities for school age children.. Data was analyzed using (SPSS) version 25. The data analysis for this study included descriptive and inferential statistical analysis.

Results: The results of our study showed that (50%) within age groups (6-7)years , (60%) were males, (66%) of them were continuing school attendance, (56%) within class level (1-2) , the highest percentage (58%) of the study sample are not miss school. there is significant association between participants DLA and their demographic characteristics such as age, gender, school situation and education level, at p-value of (0.007, 0.004, 0.013,and 0.001) respectively, (96%) of them complain from yellowing and pale skin , (70%) complain from anemia, vast majority of them have moderate daily activities. that there is significant association between participants’ DAL and their Symptoms and Clinical Signs and Complications of the Child with Acute Lymphocytic Leukemia of, breathing difficulties , Yellowing and pale skin, bleeding and bruising and Anemia, at p-value of (0.003, 0.002, 0.001,and 0.005) respectively

Keywords: Children, Acute Lymphocytic Leukemia, Welfare Pediatric Teaching Hospital

Introduction

Leukemia is one of the most prevalent kinds of cancer in children, includes more than one third of all cases of cancer in the childhood 12. According to the International Society of Pediatric Oncology (2015), approximately 25000 cancer cases are diagnosed each year with estimates that suggest 90000 annual deaths due to cancer. Cancer is the third-leading cause of death after congenital heart disease 5. Acute lymphoblastic leukemia (ALL) is an aggressive neoplastic characterized by the uncontrolled proliferation of lymphocytes, and represents the most common childhood cancer. , several efforts have been made for the best treatment approach, such as combination of chemotherapy and radiotherapy

13 Diagnosis, hospitalization, and cancer treatment can cause distress for the child and family that lead to physical, psychological, and social problems. means living with disruptions to daily roles and routines due to the long protocols of chemotherapy usually last 2.5-3.5 years. Life, These problem involve motor skills and balance; social functioning especially in relating to their friends, and in their ability to learn 7. The main role of the nurse is to provide the children with adequate information about the planned procedure. The physical care of children with leukemia is usually complicated and risk of functional limitations and participation restrictions. General areas of nursing care include the assessment, management and prevention of infections, pain, side effects of chemotherapy and nutritional
problems 9. ALL refers to life threatening diseases among school age children can cause many physical health problems, which may affect their life process. is extremely stressful, and variety of school functioning. In addition to physical health problems, may also affect the psychosocial aspects.

Materials and Method

Design of the Study

Descriptive study was carried out in order to achieve the stated objectives.

Objectives of the study:

The study aims at: 1. Assess daily living activities domain of school age children with acute lymphocytic leukemia 2- find out relationships between daily living activities domain of school age children with ALL and their demographic characteristics such as (age, gender, school performance).

Setting of the Study

The study was conducted in Baghdad city; oncology ward at Welfare Pediatric Teaching Hospital

Sample of Study

Non-probability (purposive) sample of (50) school age children with ages of (6-12) year old are selected and their diagnosis with acute lymphocytic leukemia, as well as hospitalized for management

Study Instrument

An assessment tool has been adopted and developed by researcher design for purpose at the study: Part One Demographic Characteristics of the Child. The demographic characteristics of the child such as (age, gender, grade, Residency, Scholastic Case, child in the family order).Part Two Symptoms and Clinical Signs and Complications Phenomenon on the Patient the symptoms and clinical signs and complications phenomenon on the child such as (Skin problems, hair loss, anemia, breathing difficulties, Yellowing and pale skin, bleeding and bruising, abdominal pain, joints and bones pain, anorexia, inflammatory frequent, severe insomnia lethargy)

Rating and Scoring

The items have been rated and scored according to the following two points of likert scales are used for rating the items of activities as yes = 2, no = 1, for all items.

Data Collection.

The collection of data has been performed out of the utilization of questionnaire, and by means of direct interview with child. Data were collected from 13 of February 2016 to 20 of April 2016.

Statistical Analysis

The statistical data analysis using (SPSS-ver.20) in order to analyze and evaluate the data of the study. A descriptive statistical data analysis used in the study: which include frequencies, percentages; and Inferential statistical data analysis: used the Chi-square test.

Results of the Study

Table (1): Daily Activities for School Age Children who Suffer from Acute Lymphatic Leukemia

<table>
<thead>
<tr>
<th>Items</th>
<th>Yes</th>
<th>No</th>
<th>MS</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>%</td>
<td>F</td>
<td>%</td>
</tr>
<tr>
<td>1. dressing activities</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1 Find it difficult to wear your clothes on and off</td>
<td>11</td>
<td>22</td>
<td>39</td>
<td>78</td>
</tr>
<tr>
<td>1.2 You need to help others in the wear and take off your clothes</td>
<td>14</td>
<td>28</td>
<td>36</td>
<td>72</td>
</tr>
</tbody>
</table>

### Table (1): Daily Activities for School Age Children who Suffer from Acute Lymphatic Leukemia

<table>
<thead>
<tr>
<th>Activity</th>
<th>No.</th>
<th>F.</th>
<th>%</th>
<th>MS</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Find it difficult to arrange and suspend your clothes</td>
<td>17</td>
<td>34</td>
<td>33</td>
<td>66</td>
<td>1.34</td>
</tr>
<tr>
<td>Find it difficult to walk on foot</td>
<td>10</td>
<td>20</td>
<td>40</td>
<td>80</td>
<td>1.2</td>
</tr>
<tr>
<td>Find it difficult to run</td>
<td>23</td>
<td>46</td>
<td>27</td>
<td>44</td>
<td>1.46</td>
</tr>
<tr>
<td>Find it difficult to lift heavy things</td>
<td>39</td>
<td>78</td>
<td>11</td>
<td>22</td>
<td>1.78</td>
</tr>
<tr>
<td>Find it difficult to perform the duties of school</td>
<td>23</td>
<td>46</td>
<td>27</td>
<td>44</td>
<td>1.46</td>
</tr>
<tr>
<td>Find it difficult to understand the subjects</td>
<td>25</td>
<td>50</td>
<td>25</td>
<td>50</td>
<td>1.5</td>
</tr>
<tr>
<td>Few scientific your level that you get low marks</td>
<td>28</td>
<td>56</td>
<td>22</td>
<td>44</td>
<td>1.56</td>
</tr>
<tr>
<td>Find it difficult to play with toys that require a great effort</td>
<td>38</td>
<td>76</td>
<td>12</td>
<td>24</td>
<td>1.76</td>
</tr>
<tr>
<td>Find it difficult to play with other children</td>
<td>15</td>
<td>30</td>
<td>35</td>
<td>70</td>
<td>1.3</td>
</tr>
<tr>
<td>Find it difficult to practice hobbies</td>
<td>11</td>
<td>22</td>
<td>39</td>
<td>78</td>
<td>1.22</td>
</tr>
<tr>
<td>Find it difficult to shower and clean your body</td>
<td>21</td>
<td>42</td>
<td>29</td>
<td>58</td>
<td>1.42</td>
</tr>
<tr>
<td>Find it difficult to wear the clothes</td>
<td>15</td>
<td>30</td>
<td>35</td>
<td>70</td>
<td>1.4</td>
</tr>
<tr>
<td>Find it difficult to use the toilet</td>
<td>12</td>
<td>24</td>
<td>38</td>
<td>76</td>
<td>1.24</td>
</tr>
<tr>
<td>Difficulty in eating and drinking alone</td>
<td>7</td>
<td>14</td>
<td>43</td>
<td>86</td>
<td>1.14</td>
</tr>
<tr>
<td>You need to help others in eating and drinking</td>
<td>7</td>
<td>14</td>
<td>43</td>
<td>86</td>
<td>1.14</td>
</tr>
<tr>
<td>Find it difficult to wash your hands after every meal</td>
<td>6</td>
<td>12</td>
<td>44</td>
<td>88</td>
<td>1.12</td>
</tr>
<tr>
<td>Like isolation and staying on your own</td>
<td>14</td>
<td>28</td>
<td>36</td>
<td>72</td>
<td>1.28</td>
</tr>
<tr>
<td>You see people pity you because you are sick</td>
<td>18</td>
<td>36</td>
<td>32</td>
<td>64</td>
<td>1.36</td>
</tr>
<tr>
<td>Complaining about the lack of friends</td>
<td>11</td>
<td>22</td>
<td>39</td>
<td>78</td>
<td>1.22</td>
</tr>
<tr>
<td>Find it difficult to sleep</td>
<td>13</td>
<td>26</td>
<td>37</td>
<td>74</td>
<td>1.26</td>
</tr>
<tr>
<td>Used drugs for the purpose of sleeping</td>
<td>1</td>
<td>2</td>
<td>49</td>
<td>98</td>
<td>1.52</td>
</tr>
<tr>
<td>Wake up several times during sleep</td>
<td>13</td>
<td>26</td>
<td>37</td>
<td>74</td>
<td>1.26</td>
</tr>
</tbody>
</table>

No. : Number , F. : Frequencies , % Percentage , MS : mean of score , M.A ) mild affected : (0.5-1) , ( Mo.A) moderate affected : (1-1.5) , ( S.A ) sever affected : (1.5-2).
Table (1) summarizes the children responding to the items level that are done by using mean of score (MS) in regard to the items of dressing activities subdomain there is a moderate affected in all items except item number (1.2 “You need to help others in the wear and take off your clothes”) mild affected mean of score for this item is (0.88), also in regard to the items of activity and movement subdomain there is a moderate affected in all items except item number (2.3 “Find it difficult to lift heavy things”) severe affected mean of score for this item is (1.78), also in regard to the items of school activity subdomain the study children’ responses shows moderate affected in all items except item number (3.3”) Few scientific your level that you get low marks) severe affected mean of score for this item is (1.56), at the toys and hobbies domain and their subdomain affected at moderate level except item number (4.1.” Find it difficult to play with toys that require a great effort) severe affected mean of score for this item is (1.76), in responses to the Personal hygiene, Appearance subdomain there is moderate affected in all items, in regard to the items of nutrition subdomain there is a moderate affected in all items, also in regard to the items of social activity subdomain there is a moderate affected in all items, in responses to the sleep subdomain there is moderate affected in all items except item number (8.2 “Used drugs for the purpose of sleeping”) severe affected mean of score for this item is (1.52).

Table (2): Symptoms and Clinical Signs and Complications of the Child with Acute Lymphocytic Leukemia and association with ADL(n=50)

<table>
<thead>
<tr>
<th>No.</th>
<th>Variables</th>
<th>n(%)</th>
<th>(X^2)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Skin problems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>15(30)</td>
<td></td>
<td>P=0.066</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>35(70)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.2</td>
<td>breathing difficulties</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>38(76)</td>
<td></td>
<td>P=0.003</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>12(24)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.3</td>
<td>Yellowing and pale skin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>48(96)</td>
<td></td>
<td>P=0.002</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>2(4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.4</td>
<td>hair loss</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>30(60)</td>
<td></td>
<td>P=0.065</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>20(40)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td>bleeding and bruising</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>42(84)</td>
<td></td>
<td>P=0.001</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>8(16)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.6</td>
<td>Anemia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>31(62)</td>
<td></td>
<td>P=0.005</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>19(38)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.7</td>
<td>abdominal pain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>22(44)</td>
<td></td>
<td>P=0.080</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>28(56)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.8</td>
<td>joints and bones pain</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Continued Table (2): Symptoms and Clinical Signs and Complications of the Child with Acute Lymphocytic Leukemia and association with ADL (n=50)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Yes</th>
<th>X²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anorexia</td>
<td>33(66)</td>
<td>26.764</td>
<td>0.075</td>
</tr>
<tr>
<td>inflammatory frequent</td>
<td>27(54)</td>
<td>33.764</td>
<td>0.055</td>
</tr>
<tr>
<td>severe insomnia lethargy</td>
<td>26(52)</td>
<td>25.764</td>
<td>0.0515</td>
</tr>
</tbody>
</table>

No. Number, % : percentage

Table (2) symptoms and clinical signs and complications phenomenon on the child, (70%) of the study sample are not complain about skin problems, (76%) of the study sample are complain from breathing difficulties, (96%) of the study sample are complain from yellowing and pale skin, (60%) of the study sample are complain from hair loss, (84%) of the study sample are complain from bleeding and bruising, (62%) of the study sample are complain about anemia, (56%) of the study sample are not complain about abdominal pain, (66%) of the study sample are complain from joints and bones pain, (54%) of the study sample are complain from anorexia, (58%) of the study sample are not complain from inflammatory frequent, (52%) of the study sample are complain from severe insomnia lethargy.

Discussion of the Results

Symptoms and Clinical Signs and Complications Phenomenon on the Patient

Table (3) symptoms and clinical signs and complications phenomenon on the child, (70%) of the study sample are not complain about skin problems, (76%) of the study sample are complain from breathing difficulties, (96%) of the study sample are complain from yellowing and pale skin, (60%) of the study sample are complain from hair loss, (84%) of the study sample are complain from bleeding and bruising, (62%) of the study sample are complain about anemia, (56%) of the study sample are not complain about abdominal pain, (66%) of the study sample are complain from joints and bones pain, (54%) of the study sample are complain from anorexia, (58%) of the study sample are not complain from inflammatory frequent, (52%) of the study sample are complain from severe insomnia lethargy.

Daily Activities for School Age Children who Suffer from Leukemia

Table (1) summarizes the children responding to the items level that are done by using mean of score (MS). In regard to the items of dressing activities subdomain there is a moderate affected in all items except item number (1.2 “You need to help others in the wear and take off your clothes) mild affected mean of score for this item is (0.88), also in regard to the items of activity and movement subdomain there is a moderate affected in all items except item number (2.3 “Find it difficult to lift heavy things) severe affected mean of score for this item is(1.78), also in regard to the items of school activity subdomain the study children’ responses shows moderate affected in all items except item number (3.3)” Few scientific your level that you get low marks) severe affected mean of score for this item is (1.56), at the toys and hobbies domain and their subdomain affected
Conclusions

According to the findings of the present study, the researcher concluded the following: Acute lymphocytic leukemia mostly occurs in males more than in females. Most of the study sample are at age group (6-7). The study confirms that ALL mostly common occurs among patients in urban residential area more than in rural. The vast majority of the ALL the children are continuing their school condition within educational level (Grade) (1-2). The vast majority of children complain about symptoms and clinical signs and complications of ALL. The vast majority of the ALL the children have moderate affected on daily activities.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Baghdad and all experiments were carried out in accordance with approved guidelines.

References

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Assessment of Primary School Teachers’ Knowledge about Stuttering of School-Age Children at First Al-Karkh Education Directorate in Baghdad City

Rafea Qadri Meteab Al-Qaisi1, Eqbal Ghanim Ali2, Ali Kareem Khudhair3

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Abstract

Objective(s): To assess knowledge of primary school teachers’ about the stuttering of school-age children at first al-karkh education directorate in Baghdad city, and find out the relationships between primary school teachers’ knowledge and their demographic characteristics.

Methodology: The study started from the period of 20th September 2018 to the 1st of March 2020. Probability samples of 370 primary school teachers were chosen randomly. The questionnaire was designed and composed of two parts: the first part deals with the teachers’ demographic data; the second part includes a stuttering knowledge scale. Determined reliability of the questionnaire through a pilot study and determined validity through a panel of (31) experts. The data was collected through the self-administration method was used by asking the participants to complete the format of the questionnaire and fulfill the questions, and it described statistically and analyzed through the use of descriptive and inferential statistical analysis procedures.

Results: The findings of the present study indicate that (53.5%) of the study sample have poor knowledge about stuttering of school-age children, and the no-significant relationship between teachers’ demographical characteristics and their knowledge about stuttering.

Conclusions: The study concludes that most of the teachers’ had poor knowledge about the stuttering of school-age children, and there are no effects of socio-demographic characteristics of teachers’ on their knowledge about stuttering.

Recommendations: The study recommended an education program for primary school teachers about stuttering to improving their knowledge about stuttering in the school environment.

Keywords: Primary School Teachers, Knowledge, Stuttering, School Age Children.

Introduction

Stuttering is the most prevalent fluency disorder; it is a disruption in the flow of talking characterized by the repetitions of sounds or words, sound prolongations, and blocks, that may affect the rate and rhythm of speech, these core behaviors may be accompanied by avoidance of words, or speaking situations, physical tension, and negative reactions 17, 29, 31. It is a complex problem, also known as stammering.6,10,15,18,19,20. Stuttering is a common disorder that exists worldwide and in all cultures and races 1,4,12,21, is indiscriminate of intelligence, income, and occupation, it affects people of all ages and both gender, despite the difference in prevalence rates. Nearly 5% of all children stuttering for a period of their life, although there is no known cure for stuttering, 75% of children who stutter (CWS) will outgrow or recover spontaneously without any treatment by late childhood, and remaining about 1% with lifetime disorder 25. This can be attributed to factors such as the age of onset, gender, duration of stuttering moments, and family history 25.
Although there are many theories and abundant research about the stuttering, the specific etiology of stuttering remains unknown\(^5\), most scholars agree that stuttering has a multifactorial etiology. This means that stuttering is most likely the result of the interaction of genetics, environmental factors (such as stressful life events, parent attitudes), and developmental factors (such as physical, cognitive, speech-language skills)\(^21\). These factors are typically combined and can be the deciding factor in a child spontaneously recovering or becoming a person who stutters their entire life\(^29\).

Teachers carry a large share of the responsibility for children’s educational development, this responsibility may be greater when it comes to children with disabilities\(^24\). Moreover, teachers’ empathy and behavior as their interactions with CWS can have an effect on the way these children are viewed and treated by their peers\(^14\).

School-age children spend a significant amount of time at school, and there is no doubt that teachers are authority figures who can have a significant influence on their lives during early years of life\(^1,2,3,22\) also, teachers play an important role in the educational development of CWS, their attitudes can significantly affect the performance of school-age children in the classroom, as well as their progression, Many CWS testify that stuttering negatively impacted their self-confidence in school, academic capacity, and relationships with teachers and peers.

**Materials and Method**

**Study Design:** Descriptive cross-sectional study design was conducted on teachers working in governmental primary schools at first Al-Karkh education directorate in Baghdad city, the study started from the period of 20\(^{th}\) September 2018 to 1\(^{st}\) March 2020 and aims to assess knowledge of primary school teachers’ about the stuttering of school-age children, and find out the relationships between primary school teachers’ knowledge about stuttering and their demographic characteristics.

**Study Sample:** Probability samples of 370 primary school teachers and currently works in government primary schools were selected from 30 primary schools at first Al-Karkh education directorate in Baghdad City, they were chosen randomly from each school.

**The Study Instruments:** The instrument was constructed by the investigators to measure the primary school teachers’ knowledge about stuttering, the questionnaire format consists of two parts:

**Part I: Teacher’s Demographic Characteristics:** This section includes (6) items concerning the respondents’ general characteristics: age of teacher, gender, residency, marital status, education level, and their teaching experience years.

**Part II: Stuttering Knowledge Scale:** This part of questionnaire format comprised of a multi choices questions (26 items) concerning the teacher knowledge about stuttering, true and false choices have been scored and rated on two levels dichotomous scale true answer and false answer, (2) points for the true answer and (1) point for the false answer. The total score ranged from a maximum score of 52 to a minimum 26 with the higher score indicated of more complete knowledge of stuttering while the lowest score indicated poor knowledge.

**Data collection:** The data collected by the investigators, Participants were asked to complete a self-administered questionnaire, after taking the initial consent of each teacher to participate in the study, the process started from the 20\(^{th}\) of February until the 30\(^{th}\) of May 2019.

**Data Analyses:** This analysis was performed through the computation frequencies, percentages, standard deviation (SD), mean of the score (MS) and relative sufficiency (RS %). Also, the Contingency Coefficients (C.C.) test was used to the assessment of the relationship between the overall knowledge of participants and other variables.

**Results**

This result indicates that most of the study sample were represented (34.1%) within age groups of (40-49) years, and (83.8%) were females. Also, the highest percentage (93.2%) of the study sample are living in an urban residential area, (71.9%) of the study sample were married, (40.3%) were graduates from (Institute/2 year Diploma degree), and (35.9%) have (10-19) years’ experience in teaching.
The results in figure (1) illustrate that more than half (53.5%) of the study sample represents poor knowledge.

**Discussion**

Totally, the result of the current study revealed that overall knowledge about stuttering of school-age children of the majority of teachers was poor knowledge, which represented more than half of study sample, and over a third of the sample had fair knowledge, and only (3.5%) had good knowledge about stuttering (figure 1). The findings and evaluation of the teachers’ knowledge in the present study, lead to consider teachers’ responses as unsatisfactory, especially if take into account that the majority of questions were not practical but theoretical. The findings of this study were in agreement with previous study conducted by St. Louis, (2005) they reported that study sample had poor knowledge about stuttering and agree with (de Britto Pereira et al., 2008) they mention that study sample had poor knowledge about stuttering. Also agree with 13 who mention that teachers demonstrate an overall poor knowledge about stuttering.

**Conclusions**

Most of the primary school teachers were poor knowledge about the stuttering of school-age children, and there is no significant association between teachers’ attitudes toward stuttering and their demographic characteristics.

**Recommendations:**

Education program about stuttering is fundamental to increase the teachers’ knowledge about stuttering, and using mass media for educating the community as a whole and not teachers only.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance**

All experimental protocols were approved under the College of Nursing and all experiments were carried out in accordance with approved guidelines.
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Effect of Preheating on Micro-hardness of different Composite Resins

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Abstract

Aim: The aim of this study was to assess the effect of preheating on the surface microhardness of different commercially available composite resins (G-aenial, Filtek Z350 and Tetric-N-Ceram).

Materials and Methods: Tubes of the composite resins were either kept at room temperature (24±1°C) or preheated for 40 min in a commercially preheating device to 40°C, 50°C and 60°C, respectively. From composite resin tubes, a total of 120 disk-shaped specimens (40 specimens of each composite resin, 10 disks from each temperature setting) were prepared by inserting uncured preheated composite resin into cylindrical nylon moulds (5 mm diameter × 2 mm height); before light polymerized for 40s with a light-emitting diode curing unit. The Vicker’s microhardness number (VHN) of each specimen was measured. Two-way ANOVA and Tukey test were used to analyze the collected data at a significance level of 0.05.

Results: In comparison to the room temperature, there was a significant increase in the mean VHNs of each composite resin by preheating to 40°C, 50°C and 60°C, respectively (p<0.05). For G-aenial posterior, Filtek Z350XT and Tetric-N-Ceram, at room temperature, the mean VHNs were 51±4.3, 60.6±3.7 and 76.6±1.4, respectively with significant difference between G-aenial posterior and Tetric-N-Ceram (p<0.05), while at 40°C, the mean VHNs were 65.7±2.5, 86.8±2.3 and 88.4±1.8, respectively with significant differences (p<0.05) between G-aenial posterior and the other two composites. At 50°C, the mean VHNs were 109.4±0.9, 104.4±3.4 and 114±0.71, respectively with no significant difference between composite resins. At 60°C, the mean VHNs were 122±3.2, 129±3.4 and 136±2, respectively with significant difference between G-aenial posterior and Tetric-N-Ceram (p<0.05).

Conclusions: Preheating significantly increased the surface microhardness of all tested composite resins with the highest value observed for Tetric N-Ceram at 60°C preheating temperature.

Keywords: Composite resins, Preheating, Vicker’s microhardness.

Introduction

Composite resin restorations placement in anterior and in particular, posterior teeth has increased dramatically over the past 5 years.1 The driving factors for such an increase might be the patient’s aesthetic demand, an increased desire for more conservative restorations and more predictable dental adhesive systems.2 In posterior teeth, load-bearing composite resin restorations may have a longevity comparable to that of amalgam.3 However, the use of conventional compositions, such as high-filler content densified or hybrid composite resin materials, may result in poor adaptation to the prepared cavity walls because of high viscosity.4 In such a framework, the marginal integrity of the final composite resin restoration might be affected because of the subsequent voids entrapment and the microleakage between the composite and the underlying tooth surface.5 However, composite preheating to a
temperature of approximately 68⁰C has been introduced as a method to increase the initial flow of the high viscous conventional composite resin materials prior to their placement and curing. An improvement in polymerization parameters such as curing depth, reaction rate and degree of conversion was found to be the coincidental aspect of such pre-heating procedure. Thus, a positive effect on mechanical properties of composite resin materials might be expected as a consequence to pre-heating, before polymerization, and such an effect has also been reported. Moreover, a mutual relationship has been reported between the degree of polymerization and surface microhardness. Vickers microhardness number (VHN) may be appropriated as a simple monitor of the conversion rate of composite, wear resistance and surface stability of composite, thus it may be identified as being one the best parameters to evaluate mechanical strength. Pre-heating resin composite reduces its pre-cured viscosity and enhances its subsequent surface hardness. These effects may translate as easier placement together with an increased degree of polymerization and depth-of-cure.

Chairside warming of composite resin is achieved by placing capsules, or syringes, of the material in a composite warming tray or a water bath. A number of manufacturers present commercial heating devices for this purpose. Calset composite warmer (AdDent, Inc., Dandury, CT, USA) is the most popular and effective preheating device; it can heat the resin to 37⁰C, 54⁰C and 68⁰C, and maintains a constant temperature as needed by the clinician. Another device called ThermaFlo™ composite warmer has introduced by Vista dental (USA) with a specially designed applicator to keep the material warm for optimal flow and added the advantage of extended length for access in deeper areas.

Warming composite resin has also shown to improved manipulation and resulted in less microleakage, which reduced the film thickness of some conventional materials. Testing the kinetic parameters of resin monomers polymerization revealed an Arrhenius-type behaviour such that a relatively simple increase in temperature may promote a large increase in reaction rate.

The aim of this study was to measure the surface microhardness of three commercially available conventional composite resin materials (G-aenial, Filtek Z350, and Tetric-N-Ceram) at room temperature and after preheating procedure to 40⁰C, 50⁰C and 60⁰C. These materials are usually used for direct composites posterior restorations. The null hypothesis stated that there is no difference in surface microhardness of the three composite resins at room temperature from that gained after preheating procedure.

**Materials and Method**

Three commercially available composite resin materials were used in this study. Tubes of each composite type were preheated as follow, the control tube of each type of composite resin material was kept at room temperature (24⁰C ± 1⁰C) without preheating and the other three tubes were preheated to 40⁰C, 50⁰C and 60⁰C in a commercially available preheating device (Figure 1) (Foshan, Stardent, Equipment Co., Limited, China), respectively. Preheated composite resins were used to prepare a total of 120 disk-shaped specimens (40 specimens of each composite resin). The specimens were prepared by inserting the uncured preheated composite resin into the cylindrical nylon moulds (5 mm diameter × 2 mm height). The moulds covered with a Mylar strip and held firmly between two microscopic glass slides (Micro Slides, Gold Seal) on both upper and lower surfaces to remove excess material and standardize surface finishing and to prevent leakage of thermally softened materials, as shown in (Figure 2).

Light was applied to the top surface of each specimen for 40 seconds with a light-emitting diode curing unit (Valo, Ultradent, Cologne, Germany). The light intensity was nominally 1200 mW/cm² checked with a radiometer (Patterson curing light meter, Patterson Dental Supply, St. Paul, MN, USA). For the three preheated groups, the composite resin tubes placed in the heating device for 40 minutes before light curing. This time was required for initially warming the device and maintaining the composite resin inside the tube at a constant temperature.

The temperature of each preheated composite material was monitored by inserting a thermocouple probe (1.3 mm diameter) inside the tube of composite resin immediately after removing it from the heating device; the probe fitted to a high-sensitivity temperature recorder (Geratherm medical AG, Gschwend, Germany). Each composite resin material inserted into the mould
within 45 seconds after removal from the heating device. The nylon moulds, clear glass slides, and the plastic filling instrument were warmed to 37°C before insertion of the materials. The composite resin discs stored in a dry opaque box for 24 hours. The surface microhardness analysis was performed with an HVS 1000 digital vickers microhardness tester (Leader precision instruments Co., Shenzhen, China), as shown in Figure 3, using a 100g load for 15 seconds. The microhardness machine provided with Vickers indenter produced a diagonal indentation on the on the top smooth surface of the specimens calculating the VHN at higher magnification. Three randomly selected points for each specimen was measured and averaged.

Statistics performed using SPSS software (SPSS Statistics 17.0, SPSS Inc., Chicago, IL, USA). Two-way analysis of variance (ANOVA) and Tukey test were used for multiple comparisons.

Results

The preheated composite resin showed higher Vicker’s hardness numbers than that of composite resins at room-temperature. Differences in VHNs were significant between the three composite resin materials at each temperature setting (p<0.05), except at 50°C, there was no significant difference in VHNs between the three composite resins. Also, there was continuous increase in VHNs of each composite resin material at different temperatures settings (p<0.05).

At room temperature, the mean VHNs were 51±4.3, 60.6±3.7 and 76.6±1.4 for G-aenial posterior, Filtek Z350XT and Tetric-N-Ceram, respectively with significant difference in VHNs between G-aenial posterior and Tetric-N-Ceram (p<0.05). At 40°C, the mean VHNs were 65.7±2.5, 86.8±2.3 and 88.4±1.8 for G-aenial posterior, Filtek Z350XT and Tetric-N-Ceram, respectively with significant differences (p<0.05) between G-aenial posterior and both Filtek Z350XT and Tetric-N-Ceram, respectively. At 50°C, the mean VHNs were 109.4±0.9, 104.4±3.4 and 114±0.71 for G-aenial posterior, Filtek Z350XT and Tetric-N-Ceram, respectively with no significant difference between composite resins. At 50°C, the mean VHNs were 122±3.2, 129±3.4 and 136±2 for G-aenial posterior, Filtek Z350XT and Tetric-N-Ceram, respectively with significant difference between G-aenial posterior and Tetric-N-Ceram (p<0.05).

Discussion

Based on the results reported here, the null hypothesis, stating that there is no significant correlation between pre-curing warming of composite resin and post-curing microhardness should be rejected. The three types of composite resin tested in the current study showed increased values of microhardness as a direct response to pre-curing warming. For all the three resin composites used in the current study, surface microhardness increased with preheating, these findings are in accordance with the results of previous studies.11, 15-18

In order to explain these results, it is important to understand that during polymerization, as soon as exposure to light, the process of monomer conversion will be initiated. With the progression of the reaction, composite will become more viscous with the formation and growing of the polymer chains. The increased in viscosity will limit the movement of molecules at this vitrified state, and prevents the completion of the polymerization.14, 19 Contrariwise, as a result of higher thermal energy, preheated composites exhibit an increase in monomer mobility, reducing the viscosity and augmented the molecular motion.15, 19, 20

Studies showed that, light curing of warmed composite resin even for a shorter period of time demonstrated a higher degree of conversion than light-curing at room temperature.8 On the other hand, refrigerated composite resin illustrated lower conversion rate.14 The increased viscosity of the refrigerated material resulted in slower propagation and subsequently decreased in monomer conversion. A correlation between monomer conversion and surface microhardness values has been reported in several studies.9, 17, 21, 22 In the current study, this might explain the significant rise in surface microhardness among all tested composite resin materials. It is important to note that all composites tested were light activated type, the polymerization reaction is initiated by light only, pre-curing warming of composite resin showed no evidence of polymerization until the material exposed to light.

Dental composites can be defined three-dimensionally by filler, organic matrix and coupling
agent. The hardness of composite resins reflects their molecular chain flexibility and degree of polymerisation\(^9,17\) and is affected by other factors such as resin matrix type, filler type and filler volume fraction. According to the results of this study, the chemical composition of each composite may have a significant effect on the microhardness of each tested material. Tetric-N-Ceram resin composite exhibited the highest mean microhardness under the various experimental conditions investigated, followed by Filtek Z350XT and G-aenial posterior. The high microhardness values achieved by both Tetric-N-Ceram and Filtek Z350XT resin composites may be related to the amount and type of fillers. These materials have high filler contents (63.5\%, and 78.5\% by weight, respectively) and employ the nano-filler technology, no significant difference was found between these two materials in surface microhardness. Filler content has been also correlated with depth of polymerization, hardness, compressive strength, and stiffness\(^23\). The presence of fillers enhances the resistance of the composite to abrasion, improves its mechanical strength and resistance to indentation.

The presence of different filler particle size could be another factor that affects the microhardness. As the light beam is scattered and reflected within the composite material during light-curing this can affect the degree of composite conversion, leading to lower microhardness values. Larger filler size variation in G-aenial posterior (16-200nm) might explain the lesser microhardness value when compared with Filtek Z350XT (4-20nm) and Tetric-N-Ceram (40-160nm).

**Conclusion**

within the limits of this study, warming of the resin composite materials significantly increased their surface microhardness; the greatest increase occurred at 60\(^\circ\)C, which may be recommended as suitable preheating temperature for all materials tested. This recent trend in composite application is promising, improving the mechanical properties, and thus enhance the durability of the restorations.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved and all experiments were carried out in accordance with approved guidelines.

**References**


Antibiotic Effect on Pseudomonas Aeruginosa Isolated From Patient In Hila City

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Abstract

In this study, a total of 400 clinical samples were collected from patients different hospitals in hilla city((13.51%) Margin teaching hospital, (27.03%)Al-Hilla teaching hospital,( 43.24%) Babylon hospital for maternity and pediatric and (16.22%)Chest Disease Center) , ( 37 ) isolates were identified as to P. aeroginosa, from 9 (18%) isolates from burn specimen, 7 (14%) isolates from otitis , 5 (10%)isolates from UTI , 4 (8%) isolates from wound , 3(7.5%) was isolated from blood specimen where as 6 (6%)was isolated sputum and only 3 (5%)isolates were detected from skin. The period of collection was extended from January 2019 to June 2019. Also antibiotic susceptibility were preformed using disk employed diffusion and agar utilizing dilution processes. Furthermore , the resistance of isolate to a variety of antibiotics has been investigated and found that these isolate have been resistance to more than one antibiotic : 37(100%) resistance to Cloxacilin , 37(100%) to Amoxicillin /Clavulanic acid, 37(100%) to cefotaxime, 36(97%) to ceftizoxone, 34(92%) to Ceftazidime, 14(37%) to Levofloxacin, 18(49%) to Gentamicin, , 3(8%) to Norfloxacin and 1(3%) to Azetronam.

Keywords: Pseudomonas aeruginosa, Different sources, Antibiotic susceptibility, Resistant, Gram-negative bacteria.

Introduction

Pseudomonas aeruginosa is a Gram-negative bacterium, an aerobe rod belongs to the Pseudomonadaceae bacterial family and so taxonomic classification relies on preserved substances, including 16srRNA which is a range of members of the Pseudomonas genus, divided into eight classes 17. Pseudomonas aeruginosa infection allowed the incorporation of the constituents of the outer membrane, namely secretary toxins like Lipopolysaccharides (LPs), general endotoxin, which is a protein, toxoids, mutant reacting toxins or nontoxic substances, Pilli, and Flagella 23,35. P. aeruginosa allows β-Lactamases; enzymes to deactivate the antibiotics by hydrolyzing the peptide attachment of the Ring β-Lactam. P.aeruginosa is capable of producing numerous β-lactamases, such as extended-spectrum β-lactamases (ESBL), chromosomal cephalosporinase (AmpC), and metallo-β-lactamases (MBL). Different kinds of MBLs were previously identified and brought on integrated products. Earlier researches have shown that high levels of morbidity and mortality are connected with MBL-generating P.aeruginosa in bloodstream diseases. the ampC gene mutation generates such resistance which unlike other β-lactamases 1,9,10,13.

Material and Methods

1- Patients:

A total of 37 Pseudomonas aeruginosa isolates were collected from different clinical specimens in Babylon province during the period from January to June 2019. These specimens were collected from 400 specimens obtained from inpatients suffering from different infections by taking swabs from Burn, wound, ear, UTI, blood, urine ,sputum and skin. MacConkey and Nutrient agars were utilized in aerobic conditions with a temperature at 42°C for 24 to 48hrs. Later, the bacteria were characterized using traditional biochemical tests depending on protocols from MacFaddin, (2000).
2- Antibiotic susceptibility tests:

The susceptibility of P. aeruginosa isolates were determined by disk diffusion method (Kirby–Bauer standardized disk method).

The Mueller–Hinton medium was employed for this test. The medium was cooled to 45–50°C and with a sterile wire loop, the 4–5 pure colonies were transferred to a tube containing broth at 5ml of BHI 37°C-incubated until its turbidity standard. This usually required at least 4–6 hours incubation. The cells density was compared with McFarland standard tube No. 0.5. Sterile swab made of wood and cotton was standardized-suspension-dipped streaking it onto the Mueller–Hinton medium dry surface with three different directions to obtain an even distribution of the inoculums. Using a flat and even surface, the plates were let to stay without distribution for 3 to mins for better dryness. The disks were inserted on the surface using gentle pressing with a sterile forceps within 15mins and incubated for 18hrs at 37°C with inverted position. The inhibition zones later were ruler-measured (millimeter) using CLSI (2012) as guidelines for deciding the sensitivity or resistance of the bacteria to the antibiotics used.

Result and Discussion

1) Isolation of Pseudomonas aeruginosa

During the period of study, 400 hospital-patient-based specimens were collected in hilla city, only 37 (9.25%) isolates from P. aeroginosa bacterium, 9 (18%) isolates burn specimen, 7 (14%) from otitis , 5 (10%) isolates, 4 (8%) isolates from wound ; 3 (7.5%) was isolated from blood specimen whereas 6 (6%) was belong to sputum and only 3 (5%) isolates were detected from skin . The outcomes were identified, table (1).

<table>
<thead>
<tr>
<th>Specimen source</th>
<th>No. of Specimen</th>
<th>No. (%) of P. aeruginosa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burn</td>
<td>50</td>
<td>9 (18%)</td>
</tr>
<tr>
<td>Wound</td>
<td>50</td>
<td>4(8%)</td>
</tr>
<tr>
<td>Sputum</td>
<td>100</td>
<td>6(6%)</td>
</tr>
<tr>
<td>UTI</td>
<td>50</td>
<td>5(10%)</td>
</tr>
<tr>
<td>Otitis</td>
<td>50</td>
<td>7(14%)</td>
</tr>
<tr>
<td>Blood</td>
<td>40</td>
<td>3(7.5%)</td>
</tr>
<tr>
<td>Skin</td>
<td>60</td>
<td>3(5%)</td>
</tr>
<tr>
<td>Total</td>
<td>400</td>
<td>37(9.25%)</td>
</tr>
</tbody>
</table>

The second Gram negative HAP bacterium isolated from health care centers is P. aeruginosa with leveled up incidence and fatality rates 22,27 with highly risky illnesses, such as septic burns, in patients with low defense of the immune system 11,34 .

The P. aeruginosa incidence findings, here, assured 9.25 % (37/400) of the hospital samples with lower rates than that, 39.1%, uncovered by Okon et al.,2009 from Nigerian patients with infected wounds and, 25.5%, revealed by Ndip et al., (2005) in Cameroon, in Al-Sulaimania City Hospital, Iraq, at 17.85%, and in Egypt at 18.6%. Sample size and geographical distribution may have induced variations in the collected findings 30,14,15.
P. aeruginosa is well-revealed as HAP antimicrobial and chemical resistant gene carrying as unveiled of those genetically transferred materials such as via plasmids Nordmann (1993).

2. Properties of P. aeruginosa

Smooth and irregular looking colonies on nutrient agar with aromatic sweetish odor. Pseudomonas aeruginosa appear on Pseudomonas base agar Shiny, opaque, shiny, convex smooth, greenish-yellow colony Medium turned light blue. as shown in figure (1), a wide collection of the bacterium isolates unveiled colonies with green-blue fluorescent color with pyocyanin of medium diffusion in nature.

Figure (1) Pseudomonas aeruginosa on Pseudomonas base agar.

β-hemolysin was recorded to be released by certain isolates on blood agar. The growing on MacConkey agar was the dominant feature of all isolates; however, a limited number claimed positive lactose fermentation properties. Positive oxidase with Gram negative non-fermenting bacterial rods was uncovered for the survey isolates.

3. Antibiotic susceptibility test of P. aeruginosa:

Disk diffusion method:

The results of presents study showed resistant and sensitive isolates, so the effects of different antibiotics on P. aeruginosa isolates were investigated, and the results were similar to locally and worldly studies and the drug susceptibility patterns of P. aeruginosa isolates were varied as shown in table (2).

Table (2): P. aeruginosa based susceptibility-to-antibiotics profile

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Sensitive No.(%)</th>
<th>Resistance No.(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloxacilin</td>
<td>0(0%)</td>
<td>37(100%)</td>
</tr>
<tr>
<td>Amoxicilin / Clavulan acid</td>
<td>0(0%)</td>
<td>37(100%)</td>
</tr>
<tr>
<td>Cefotaxime</td>
<td>0(0%)</td>
<td>37(100%)</td>
</tr>
<tr>
<td>Ceftazidime</td>
<td>3(8%)</td>
<td>34(92%)</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>1(2%)</td>
<td>36(97%)</td>
</tr>
<tr>
<td>Azetronam</td>
<td>36(97%)</td>
<td>1(3%)</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>19(51%)</td>
<td>18(49%)</td>
</tr>
<tr>
<td>Levofloxacin</td>
<td>23(62%)</td>
<td>14(37%)</td>
</tr>
<tr>
<td>Norfloxacin</td>
<td>34(91%)</td>
<td>3(8%)</td>
</tr>
</tbody>
</table>

As shown above antibiotic susceptibility to P. aeruginosa results showed 97% resistance to ceftizoxone (30 μg), 63% to Norfloxacin, 100% to Cloxacilin, 100% to Amoxicilin /Clavulan acid, 37% to Levofloxacin, 49% to Gentamicin (10 μg), 92% to Ceftazidime (30 μg), 100% to cefotaxime (30 μg) and 71% to Azetronam, the results of presents study in line with results of were locally studies conducted by Al-Maamori (2011), Al-saffar (2005), Al-Gibouri (2006) and Zeki (2006). In presents study P. aeruginosa isolates showed resistant to aminoglycoside antibiotics, gentamicin (49%) to be disagreed with Lee et al in (2007) who was detected aminoglycoside-resistant in (47%) of aeruginosal reported variants and Alammary, (2013) declared resistant to aminoglycoside antibiotics, gentamicin (45%) in Hilla teaching hospital because the appearance of aminoglycoside resistant as acquired.

Resistance of P. aeruginosa to antibiotics of aminoglycosidic nature shows geographical variation as highest in Southern Europe with Greece, 49.8%, and the United Kingdom, 96.6%, of non-susceptibility to gentamicin.
The greatest antibiotic resistance rates were observed in ceftizoxime (100%), Cloxacilin (100%), Amoxicillin/Clavulan acid (100%) followed by Ceftriaxone (97%) which was agreement with other studies in ceftizoxime (99.2%), Cloxacilin (91%) and Amoxicillin/Clavulan acid (94%) (Amini and Mobasseri, 2017) and Kerman (95%) ceftizoxime, Cloxacilin (88%) and Amoxicillin/Clavulan acid (95%) (Moosavian and Rahimzadeh, 2015) This can make ceftizoxime, Cloxacilin and Amoxicillin/Clavulan acid a bad choice for further prescription against P. aeruginosa. (ICA, 2016). Show in Figure (2).

![Figure (2) Antibiotics on Pseudomonas aeruginosa](image)

Strains of P. aeruginosa have evolved increased resistance rates against in ceftizoxime (100%), Cloxacilin (100%), Amoxicillin/Clavulan acid (100%) and Ceftriaxone (97%) (Sofianou et al., 1997 and Snydman, 2010), The super bacterial resistance may be due the incidence of genetic modifications via mutations and gene moving between strains of P. auroginosa. 7, 32

The result of present study was disagreement with Babaeekhou et al., (2018) who showed 78.9% resistance to ceftizoxime, 68.1% to Amoxicillin/Clavulan acid, 67.3% to Ceftriaxone, 67.3% to carbenicillin, 65.2% to Cloxacilin, 63.7% to ceftazidime, 63.04% to gentamicin, 53.6%.

Azetronam and Norfloxacin had been recorded the lowest rate of resistance in the present study (3%) and (8%) respectively. It shows relatively low frequencies in other studies, the current findings from this work in line with Saderi and Owlia (2015) findings in Tehran (10.4%) resistance to Azetronam and (13.6%) resistance to Norfloxacin.

Levofloxacin had been recorded resistance rate in present study (37%) was agreement with study concluded by Peymani et al., (2015) in iran showed resistance of p. aeruginosa to levofloxacin (33.7%).

Geographical and time criteria may apply critical alterations in the status of resistance to those drugs. However, MDR of the bacterium is a featured property narrowing the antibiotic options available for managing related diseases. De novo occurrence of elevated rates of MDR was ensured via drug exposure with circulating of MDR strains between individuals. 2, 18, 21

**Conclusion**

Pseudomonas aeruginosa recovering from patients’ infected burns constitute a serious therapeutic problem. Pseudomonas aeruginosa isolates were resistant to Cloxacilin, Amoxicillin/Clavulanic acid and Cefotaxime, where as Pseudomonas aeruginosa isolates were susceptible to Azetronam.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the College of Science for women and all experiments were carried out in accordance with
approved guidelines.

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Genetic Survey of Enteroaggregative E.coli in Diarrheic Children under 5 years in Thi-qar governorate

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Abstract

The study aimed to investigate the prevalence of Enteroaggregative E.coli obtained from children of Thi-qar suffered from diarrhea through PCR detection of virulence factors (aggR, astA, pic) antibiotic resistance and extended spectrum β-lactamase (ESBL) production. The investigation included collection 430 stool samples from diarrheic children under five years involved both gender and 40 samples as a control from healthy children , were consulted in (Bint al- Huda Hospital for Gynecology obstetrics and pediatrics , Al-Mousawi hospital and private clinics laboratory ) at a period extended from 10th December 2018 -21th July 2019. A total of the isolates were diagnosed by different laboratory and molecular method. PCR diagnosis confirmed the distribution of genes (aggR and astA) within EAEC were (66% and 53%), respectively. The highest resistance to antibiotics was (100%) to ceftazidime and cefpodoxime , (97% ) to ceftriaxone, followed by (96%) for Ampicillin, Sulfa-Trimethoprim and cefuroxime, respectively, and cefixime, amoxiclav, Cefotaxim and Tetracycline (94.8%), (92.3%), (85%) and (78.2%), respectively. While the medium resistance was (55.13%) for each of ciprofloxacin , pipercillin-tazobactam, respectively, and Amikacin (51%). While the lowest resistance was to Gentamicin (30.7%) and Imipenem (26.9%). EAEC isolates were multidrug resistance in average 64/66 (96.97%).

Key words: Enteroaggregative E.coli, virulence genes, antibiotic resistance, ESBL.

Introduction

Diarrheal diseases are still a global problem around the world especially in children under five years and are among the commonest causes of death among infants and children in developing countries, where poor hygiene and the absence of access to fundamental sanitation enable their dissemination. Worldwide diarrhea takes Order advanced on average death and UNICEF still considers diarrhea as one of the causes of death in young children under 5 years of age, it comes second after death rates of pneumonia (¹). Diarrhoeagenic Escherichia coli (DEC) is a common bacterial cause of acute and persistent infectious diarrhea, play a major role in children under 5 years of age. DECs are classified into six groups based on clinical associations, phenotypic assays and factors of virulence: Enteroaggregative E. coli, Enteropathogenic E. coli, Enterotoxigenic E. coli, Enteroinvasive E. coli , Shiga toxin-producing E. coli, and Diffusily adherence E. coli (²-³). Enteroaggregative E.coli is important one that has been implicated as an emerging cause of traveler’s diarrhea and persistent diarrhea among children and immunocompromised patients in both developing and developed countries. Enteroaggregative E.coli characterize by the primary infection mechanism start with attachment to intestinal mucosa by aggregate fimbriae and is controlled by the agg gene , as well as other secreted proteins that play a major part in pathogenicity. Culture and biochemical test can’t distinguished between commensal or pathogenic strains of E.coli in stool so PCR used to detect the virulence genes in pathogenic strains (⁴). PCR provide detection to many Diarrhoeagenic E.coli strains virulence genes with high sensitivity and specificity (⁵).

Materials and Method

Collection of samples

During the period from 10th December / 2018-21th July/ 2019, a total of 430 stool samples were collected from both gender of diarrheic children under five years had been admitted at hospitals and attended at
private clinics in Thi-Qar province, Iraq. Otherwise, 40 samples of stools from healthy children were obtained as control. The stool samples transported on Carry Blair swabs and cultured on MacConkey agar, Blood agar, XLD and EMB, incubated aerobically at 37 °C for 24 hours, the isolated bacteria were identified according to morphological, biochemical tests, API 20E and VITIK-2 system.

**Antibiotic susceptibility test:** performed by Kirby-Bauer procedure on Muller Hinton agar and results interpreted according to Clinical and Laboratory Standards Institute. All isolates were tested for ESBL production using the combined-disk test using ceftazidime (30 μg) and cefotaxime (30 μg) disks and combination with clavulanic acid (10 μg) disk and interpreted findings according to the Institute for Clinical and Laboratory Standards (6).

**Genetic diagnosis:** It preformed by PCR technique that was used for amplifying the virulence genes. The mixture reaction was performed in a total volume 20 μl of PCR Mastermix Gold Monoplex 5x (Mastermix 5 μl, DNA Template 2 μl, Forward primer 1 μl for each primer, Reverse primer 1 μl for each primer, free water ddH2O 11μl). PCR cycling program parameters used in this reaction for detection of (aggR , astA, pic) genes, the thermal cycling program(Initial denaturation 95°C for 3 min. 1cycle), ( Denaturation 94°C for 45 sec 30 cycle ), (Annealing 58°C for (aggR ,astA) and 59°C for (pic) 45 sec. 30 cycle ), ( Extension 72°C for 50 sec.. 30cycle), (Final extension 72° C for 10min. 1 cycle) (Holding 4° C 1 cycle). The amplification products were electrophoresed through a 2 % agarose gel and visualized with UV transilluminator after RedSafe™ staining. A 5 μl of 100 bp DNA ladder was used as a molecular size marker in a gel. Statistical analysis of all variables and comparisons was performed with Excel application (version 2010), Windows 7 and Statistical Package for the Social Sciences (SPSS) (version 22). Chi-square test was used for independent under P-value ≤ 0.05 was considered statistically significant (7).

<table>
<thead>
<tr>
<th>Primers Sequence (5’ – 3’) Products size References</th>
</tr>
</thead>
<tbody>
<tr>
<td>16SrRNA F: AGAGTTTGATCMTGGGCTCAG 1500 8</td>
</tr>
<tr>
<td>R: CGGTTACCTTGTTACGACTT</td>
</tr>
<tr>
<td>aggR aggR-F: ACGCAGAGTTGGGCTGATAAAG 400 9</td>
</tr>
<tr>
<td>aggR-R: AATACAGAAATTGGCAGCATCAGC</td>
</tr>
<tr>
<td>astA astA-F: TGCCATCAACACAGTATATCCG 102 9</td>
</tr>
<tr>
<td>astA-R: ACGGCTTTTGTAGTCCTTCAT</td>
</tr>
<tr>
<td>pic pic-F: AGCCGTCTTCGCAGAAGCC 1,111 9</td>
</tr>
<tr>
<td>pic-R: AAATGTCACTGAACCGACGATTG</td>
</tr>
</tbody>
</table>

**Results**

The percentage of positive bacterial infections were 180 (41.86%) while the rate of 250 (58.14%) represented other causes of diarrhea E.coli were isolated in 100(23.26%) of 430 collection samples followed by 80(18.60%) represented of other gram-negative bacteria (Salmonella, Klebsiella, Proteus, Pseudomonas, Enterobacter, Serratia, Cronobacter). Enteroaggregative E.coli occurred as the most present strain when reached 66/100 (66.0%), especially in children under two years while it not appeared in healthy children (control patients).

The appearance of aggR, astA and pic virulence genes EAEC isolates were rate 66 (66%), 53 (53%), and 6 (6%), respectively. The fact of aggR gene appearance in all EAEC isolates may be means all of them were
The distribution of patients infected with E.coli according to gender which were 53(53.00%) in males and 47(47.00%) in females, while the patients infected with strain Enteroaggregative E.coli were 37(37.00%) in males and 29(29.00%) in females. This results show no statistical significant differences between both gender.

The highest rate of infection exhibited artificial fed with rate 31/100(31.00%) while breast fed and mixed fed reduced to 15/100(15.00%) and 20/100(20.00%), respectively. Show table (1).

**Tabal(1): prevalence of the infected children with Enteroaggregative E.coli according to type of feeding.**

<table>
<thead>
<tr>
<th>Infection Feeding</th>
<th>Enteroaggregative E.coli</th>
<th>Other Strains of E.coli</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Breast FE</td>
<td>15</td>
<td>15.0</td>
<td>18</td>
</tr>
<tr>
<td>Artificial FE</td>
<td>31</td>
<td>31.0</td>
<td>8</td>
</tr>
<tr>
<td>Mixed FE</td>
<td>20</td>
<td>20.0</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
<td>66.0</td>
<td>34</td>
</tr>
</tbody>
</table>

|                   | Calx² = 9.737 | Tabx² = 5.99 | DF = 2 | P. Value = 0.008 |

The high incidence of EAEC infection was recorded in first and second age group flowed by third and fourth age group, but there were no cases recorded in fifth age group as shown in figure (1).

**Antibiotic resistance patterns**

The results of antimicrobial susceptibility testing of the 66 EAEC isolates against 15 antibiotics are summarized in Table (5). All isolates (100%) were resistant to Ceftazidime and Cefpodoxime, followed by Sulfamethoxazole, Ampicillin and Ceftriaxone 63 (95.5%) then 61 (92.4%) for Amoxiclav and Cefixime, 56 (84.9%) Cefotaxime, 36 (54.6%) Ciprofloxacin, Piperacillin –tazobactam and Amikacin 34 (51.5%). While the lowest resistance was to Gentamycin and Imipenem that was 20(30.3%) and 18 (27.3%) respectively.

**ESBLs Phenotype**

The overall occurrence of ESBL-producing EAEC isolates was 56.06% (37/66). All isolates that were tested positive for ESBLs were also MDR.

**Discussion**

In present study, the most common type of diarrheagenic E.coli was EAEC, which may be largely responsible for diarrhea in children.

The most common type of diarrheagenic E.coli was EAEC, which was prospect largely responsible for diarrhea in children with prevalence 66%, this result near with globally studies such as by Abimiku et al (8) in Nigeria (68.67%), Mandal et al(10) in India (69%). The out result more than local and globally studies such as Abdul-Hussein et al (5) in Kut who showed incidence of EAEC was (40.5%) and Zhou et al(11) in China reported (20%), that reported a high a frequency of EPEC pathotypes associated with pediatric diarrhea.

Three predominant genes detected in EAEC from diarrheic children in Thi-qar were aggR (66%), astA
(53%), and pic (6.0%). This results corresponding with Ali et al (12), they were reported relatively similar findings for aggR (90%), astA (52.6%) and pic (5.3%).

The present study with PCR showed no-statistical significant according to gender. The current study agreed with Ammary and Pediatrics (13) in Baghdad, Aslani et al (14) in Iran, when was detect differences between males and females infection rate, males was higher than females. The virtual but not statistical high rate of infection in males may be due to males are more active, and more mixing in society Thi-qar than females.

Molecular analysis proved statistical significant according to type of feeding where the infection rate in artificial fed more than mixed fed and breast fed. These results corresponded with some previous studies as the study by Ali et al (12) in Egypt and Ammary and Pediatrics (13) in Baghdad. The high incidence of infection in artificial fed and mixed fed may be due to several factors including; poor hygiene, sanitation, Contamination, the widespread spread of bacteria, particularly in low-birth communities social and economic (14).

Habitation did not excite statistical significant in infection rate that was (56.06%) in rural while decreased in urban (43.94%). These results consistent with some previous studies Gutiérrez-Jiménez et al (15) in Mexico whose noticed infection rate of EAEC in rural (52%) compared with urban (48%), also the current results were comparable to the results of Ammary and Pediatrics (13) in Baghdad, were said (64%) positive samples from rural and (36%) positive samples in urban.

Enteroaggregative E. coli pathotype were detected in each one of 4 age group, but the most cases infection were occurred among children in first and second years, this result consistent with local study reported by Khalil (3) in Baghdad showed high prevalence of EAEC in children less than 2 years. Some researches close agreement with this results involved Nguyen et al (16) in Vietnam who showed that EAEC was more frequently isolated in children less than 2 years.

**Antimicrobial Susceptibility Pattern**

Our study for Cefpodoxime and Cefuroxime was agreement with global studies by, Amin et al (3) 81.3%, Karami et al (17) 97 % and Rodriguez-Baño et al (18) 97.3. Resistance to Ceftriaxone and Cefotaxime (100,85%), respectively agreement with another study had been reported high resistance in studies done by Sakhi (19) 85.7% and AL-Hilali (20) 68%.

Resistance to Amoxiclave (92.32%), was agreement with another studies as done by Al-Hilali (20) in Al-Najaf who motioned resistance 83.4 % and also with the study of Khoshvaght et al (21) in Iran with rate 86.11% . Resistance to ampicillin and sulfa-Trimethoprim (96.1%), were agrees with Aslani et al (14) and Amin et al (3), hose reported 100% resistance for each one.

Similar study by Sakhi (19) in Thi-qar indicated highest resistance in E.coli isolates to Tetracycline 78%. Another studies involved Konate et al (22) in Burkina Faso whose revealed that 85 % of E. coli isolates were resistance to tetracycline. Therefore tetracycline should not be used without first performing culture and sensitivity (23).

Piperacillin-tazobactam showed resistance similar with global study by Konaté et al (22) whose reported resistance (64.5%). locally Shamki (24) where pointed resistance in rate (60%).

Ciprofloxacin showed medium resistance corresponding with globally study by Cassier et al (25) and Khoshvaght et al (21) whose marked out resistance about (61%) and (47%), respectively.

Amikacin, this result corresponds a study performed by Shamkhi (24). Globally in lined with Zhou et al (11) found that vast majority of E. coli were susceptible to Amikacin, in 7.4%

Gentamycin showed low resistance agreemented with 34% reported Cassier et al (25) and Khoshvaght et al (21) 41%.

Imipenem belong to carbapenem antibiotic binds to different penicillin binding protein. It is from the most active drug against gram negative bacteria, the sensitivity of Enteroaggregative E.coli to imipenem was (44.87%).

The current study found all Enteroaggregative E.coli isolates were multidrug resistance in rate 96.97%. This results agreed with Dembélé (23) in Burkina Faso and each study of Khoshvaght et al (21) and Aslani et al
Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Science and all experiments were carried out in accordance with approved guidelines.

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Prothrombotic Changes in Patients with End-Stage Renal Disease and its Relation to Thrombotic Cardiovascular Complication

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Abstract

Background: There is a great risk of cardiovascular disease (CVD) and vascular thrombosis in patients with End-Stage Renal Disease (ESRD). These patients exhibit numerous abnormalities in coagulation, fibrinolytic, inhibitory protein abnormalities in multiple levels.

Aim: To assess hypercoagulable changes by measuring the levels of Antithrombin, plasma fibrinogen and FXII activity in patients with ESRD, and to found correlation between and hematological parameters including: Hb level, WBC count, reticulocyte percentage and platelet count.

Method: A case control study conducted at Al-Hayat center, Al Karama teaching hospital during the period from the 1 of February to the 30 of October 2014 and 50 patients aged < 60 years of both genders with (ESRD) in addition to 20 apparently healthy controls were included in this study.

Results: Patients and controls were matched for age and gender. The mean hemoglobin level, total WBC count, absolute neutrophil count, reticulocyte percentage and platelets count were significantly lower in ESRD patients than controls, P<0.05. The mean values of the coagulation parameters, Prothrombin time (PT), Activated Partial Thromboplastin Time (APTT), Plasma Fibrinogen and Factor XII activity were significantly higher in patients than controls. Anti-thrombin activity was significantly lower in patients group than controls, (P<0.001). Cardiovascular complications and vascular thrombosis included Deep Venous Thrombosis (DVT), Cerebro-Vascular-Accident (CVA), Myocardial Infarction (MI), angina or heart failure reported in 62% of the patients. Patients with cardiovascular complication and vascular thrombosis had significantly higher PT, APTT, and factor XII activity, lower anti-thrombin activity as compared to those without cardiovascular complication and vascular thrombosis.

Conclusion: (ESRD) patients had coagulation abnormalities render them more liable to have cardiovascular complications and vascular thrombosis.

Keywords: End stage renal disease, Antithrombin, Factor XII activity, plasma Fibrinogen, coagulation parameters.

Introduction

The chance of occurrence of cardiovascular disease and vascular thrombosis is far greater in patients with ESRD than in general population.(1) CVD was significantly more prevalent in uremic patients treated by hemodialysis (HD) or peritoneal dialysis (PD) compared with other populations of a similar age as proved by many studies.(1,2) ESRD poses a great cardiovascular fatality rate as it has been established. Cardiovascular consequences provide a mortality
rate of about 10- to 100- fold higher among patients on dialysis than persons matched for age and sex in the general population.\(^{(3)}\) Vascular sequelae caused by atherosclerosis are the main cause of death in patients undergoing HD.\(^{(4)}\) A modification in the coagulation pathway and in fibrinolysis are the major cause of hyprocoagulability and these modifications may result from endothelial cell activation and damage.\(^{(5)}\) Most of the traditional risk factors detected in the general population increase the risk of CVD in chronic kidney diseases (CKD) patients. In fact, numerous Framingham risk factors are more prevalent among CKD patients as compared to those with normal kidney function. Additionally, non-traditional risk factors which are related to CKD patients also contribute to the CVD burden.\(^{(6)}\) CVDs are the leading cause of death among patients on HaemoDialysis HD.\(^{(7)}\) Elevated levels of fibrinogen and D-dimer were associated with the presence of atherosclerotic disease independent of renal function and other risk factors. Changes in hemostatic parameters occur early in the course of renal failure in patients with arteriolar nephrosclerosis, suggesting a prothrombotic state that may contribute to the risk for atherosclerotic disease at all levels of renal function.\(^{(8)}\) Persons with elevated plasma fibrinogen concentration in those with risk factors may further increase the risk of the development of atherothrombosis and subsequent CVD through the blood coagulation system.\(^{(9, 10)}\)

**Patients and Method**

**Study design setting and time:**

This case-control study was conducted at Al-Hayat center in Al-Karama teaching hospital during the period from 1 February to 30 October 2014

**Patients:** After approval of study protocol from the scientific council of the Iraqi Board of Pathology and patients consents, a total of 50 adult patients aged < 60 years of both genders (35 males and 15 females) with ESRD on repeated sessions of HD, 2-3 times per week, were included in this case-control study.

**Exclusion criteria:**

- Patients aged above 60 years to avoid the risk of thrombosis.
- Patients with congenital or acquired thrombotic disorders, e.g. malignancy, DIC, liver disease or deranged liver enzymes, systemic lupus erythematosus or other immunologic diseases and pregnancy.
- Recent major surgery within the last 3 months.
- Active inflammation.
- Patients taking any type of anticoagulant therapy during the preceding one week.
- Women using oral contraceptives pills.
- Inability to give informed consent.
- Those who did not want to participate.

**Control group:** A 20 apparently-healthy participants aged (22-50) years, 14 males and 6 females were enrolled as controls and pre-constructed data collection sheet was filled for each participant (patients and controls) and included: personal information, and clinical and laboratory data.

**Methods:** This study test the hematological parameters including: Hb,WBC count, absolute neutrophil count and platelet count by using an automated electronic counter (Hematology auto-analyzer - BECKMAN COULTER, ACT. 5 diff. USA) and reticulocyte percentage by standard method using new methylene blue solution. While Coagulation Tests which were done in current study include:

- **Prothrombin time (PT)**
- **Activated partial thromboplastin time (APTT).**
- **Fibrinogen assay (clauss technique) by using commercially available kit FIBRI- PREST® 2 (DIAGNOSTICA STAGO, France).\(^{(11)}\)**
- **Coagulation factor XII activity:** was done using coagulation factor XII (STA Deficient XII) kit where the assay consists of measurements of the clotting time in the presence of cephalin and activator of a system in which all the factors are present and in excess except factor XII which is derived from the sample being tested.\(^{(12)}\)
- **Antithrombin activity (AT):** LIATEST® AT Kit was used using antigenic assay of AT
concentration by the immunoturbidimetric method which based on the change in turbidity of a micro-particle suspension that is measured by photometry and the suspension is mixed with the test plasma whose AT antigen level is to be assayed. An antigen-antibody reaction takes place, leading to an agglutination of the latex micro-particles which induces an increase in turbidity of the reaction medium. This increase in turbidity is reflected by an increase in absorbance, the latter being measured photometrically.\(^{(13)}\)

**Statistical Analysis**

Data of patients and participant were transformed and entered to the computer by using data base software with statistical utilities; The IBM statistical package for social sciences (SPSS), Chicago, USA, software version 20 was used for entering and analyzing the data. Level of significance (\(P\) value) was set at < 0.05 as cutoff point to be considered as significant difference. Results and findings presented in tables and figures with explanatory paragraphs.

**Results**

The hematological parameters of patients were significantly lower than that of the controls with a statistically significant differences with \(P\) value <0.001 for Hb, total WBC count and reticulocyte percentage, and \(P= 0.005\) regarding platelet count while there was no statistically significant difference found in absolute neutrophil count between both groups (Table 1).

The mean PT, APTT, fibrinogen and factor XII were significantly higher in patients than in control group with \(P\)-values of 0.008, 0.026, <0.001 and 0.001, respectively. While antithrombin was significantly lower in partent’s group with \(P\)-value of <0.001 (Table 2).

Cardiovascular disease (CVD) and vascular thrombosis was present in 62% of patients (31/50): deep venous thrombosis, cerebrovascular accident, angina, myocardial infarction, and heart failure were noticed in 20%, 16%, 16%, 8% and 8% respectively. Interestingly, 3 patients had 2 CVD at the same time.

The correlation between coagulation parameters and hemoglobin revealed a significant inverse relation between PT, APTT, fibrinogen and factor XII activity with Hb (\(P\)-values= 0.02, 0.001, 0.001 and 0.001 respectively), a significant direct relation between AT activity and Hb with \(P=0.001\) (Table 3).

The comparison of the mean values of the coagulation parameters with CVD and vascular thrombosis had significantly prolonged mean PT, APTT, higher factor XII activity and lower anti-thrombin activity than the 19/50 patients with no CVD and vascular thrombosis as follows: the mean PT was 17.49 ± 6.06 versus 14.32±2.31 with \(P=0.013\) (Figure 1); APTT 45.38 ± 23.90 versus 33.56 ± 9.51 with \(P=0.017\) (Figure 2) and factor XII activity (%) 205.94 ± 110.99 versus 136.59 ± 65.82 with \(P=0.008\) (Figure 3).

**Table 1. The mean values of hematological parameters of studied groups (N=50)**

<table>
<thead>
<tr>
<th></th>
<th>Patients (n=50)</th>
<th>Control (n=20)</th>
<th>(P)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Hb (g/dl)</td>
<td>9.67</td>
<td>1.46</td>
<td>14.05</td>
</tr>
<tr>
<td>Total WBC count (×10⁹/L)</td>
<td>6.45</td>
<td>2.00</td>
<td>8.32</td>
</tr>
<tr>
<td>Absolute neutrophil count (×10⁹/L)</td>
<td>4.17</td>
<td>1.69</td>
<td>4.70</td>
</tr>
<tr>
<td>Reticulocyte count (%)</td>
<td>1.35</td>
<td>0.37</td>
<td>1.88</td>
</tr>
<tr>
<td>Platelet count (×10⁹/L)</td>
<td>181.9</td>
<td>67.8</td>
<td>229.9</td>
</tr>
</tbody>
</table>

*p; pvalue is of significance if < 0.05, **SD: standard deviation.
*Statistical analysis was performed using t-test.

Table 2. The Mean values of coagulation parameters of studied groups (N=50).

<table>
<thead>
<tr>
<th>Coagulation parameters</th>
<th>Patients (n=50)</th>
<th>Control (n=20)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>PT (seconds)</td>
<td>16.37</td>
<td>5.25</td>
<td>13.00</td>
</tr>
<tr>
<td>APTT (seconds)</td>
<td>41.36</td>
<td>20.84</td>
<td>30.58</td>
</tr>
<tr>
<td>Anti-thrombin activity (%)</td>
<td>48.03</td>
<td>23.12</td>
<td>78.55</td>
</tr>
<tr>
<td>Plasma Fibrinogen g/l</td>
<td>4.28</td>
<td>1.70</td>
<td>2.75</td>
</tr>
<tr>
<td>Factor XII activity</td>
<td>182.36</td>
<td>102.76</td>
<td>104.05</td>
</tr>
</tbody>
</table>

*Statistical analysis was performed using t-test.

Table 3. The Pearson’s correlation test between coagulation parameters and hemoglobin of the studied group (N=50)

<table>
<thead>
<tr>
<th>Coagulation parameters</th>
<th>Hb (g/dl)</th>
<th>r</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>PT</td>
<td></td>
<td>-0.28</td>
<td>0.02</td>
</tr>
<tr>
<td>APTT</td>
<td></td>
<td>-0.35</td>
<td>0.001</td>
</tr>
<tr>
<td>Antithrombin activity</td>
<td></td>
<td>0.47</td>
<td>0.001</td>
</tr>
<tr>
<td>Fibrinogen</td>
<td></td>
<td>-0.47</td>
<td>0.001</td>
</tr>
<tr>
<td>Factor XII activity</td>
<td></td>
<td>-0.37</td>
<td>0.001</td>
</tr>
</tbody>
</table>

*Correlation is significant at $P<0.05$; minus sign indicated inverse correlation

*Statistical analysis was performed using Pearson’s correlation test.
Figure 1. Box plot of the comparison of the mean values of PT of the patients with and without cardiovascular disorders and vascular thrombosis.
*Statistical analysis was performed using t-test.

Figure 2. Box plot of the comparison of the mean values of APTT of the patients with and without cardiovascular disorders and vascular thrombosis.
*Statistical analysis was performed using t-test.

Figure 3. Box plot of the comparison of the mean values of anti-thrombin activity of patients with and without cardiovascular disorders and vascular thrombosis.
*Statistical analysis was performed using t-test.
Discussion

In general ESRD patients not only experience an excess morbidity and mortality due to arteriosclerotic cardiovascular disease, but also thrombosis of the vascular access.(14) The ESRD patients exhibited numerous abnormalities of coagulation, fibrinolytic, and inhibitory proteins at multiple levels which involved in the pathogenesis of cardiovascular complications and vascular thrombosis in those patients. (15)

The current study found that the mean values of Hb level, total WBC count, reticulocyte percentage and platelets count of the 50 ESRD patients were significantly lower than their corresponding values of the controls (P<0.05). The mean value of the absolute neutrophil count was also lower in ESRD patients than controls in this study but the difference didn’t reach the statistical significance. Anemia is a common complication of CKD which is associated with increased morbidity and mortality and this finding is supported by that of Al-Nozha et al.(16) The frequency of occurrence of anemia correlates with the severity of Renal Failure, and is forming about 1% in stage 2 of CKD to almost 100% in ESRD or chronic HD patients. (17, 18)

Patients with ESRD in this study had a lower total leukocytes and differential counts when compared to that of control group and this finding was explained by Agarwal and Light who mentioned in their study that leukocyte counts change over time in people with CKD, and there was a decrease in lymphocytes and eosinophils. (19)

The current study found that PT and APTT were significantly elevated in patients as compared to controls (P<0.05). These findings were consistent with that reported by Alghythan and Al Saeed (20) who found that PT and APTT were significantly increased after-HD when compared to the before-HD levels and controls. The present study documented that mean plasma fibrinogen of ESRD patients was significantly higher than that of controls, (P<0.001), in line with the findings of a recent Egyptian study in 2013 which found a significant increase in plasma fibrinogen which might contribute to the hypercoagulability in ESRD patients.(21) The present study found that AT activity was significantly lower in ESRD patients than controls, (P<0.001). This finding agreed the findings of previous studies, Vaziri and his colleagues (23) which found that AT activity and concentration were significantly reduced in ESRD patients. Regarding factor XII activity, the current study reported that the mean factor XII activity of the ESRD patients was higher than that of controls (P=0.001). These findings were consistent with another study was conducted by Svensson et al involving ESRD patients on hemodialysis, it was reported that FXII activity in those patients was higher compared to normal subjects. (24)

Conclusions

End stage renal disease patients had significantly lower Hb levels (anemic), lower total WBC count, lower Reticulocyte count and lower platelets count as compared to healthy controls. Also we conclude that PT, APTT, plasma fibrinogen and factor XII activity levels were elevated in ESRD patients compared to healthy controls, while Anti-thrombin activity was reduced. Another conclusion we found in this study is that Higher levels of PT, APTT, Plasma Fibrinogen and Factor XII activity and the lower Anti-thrombin activity associated with higher prevalence of cardiovascular disorders and vascular thrombosis.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Pathology and all experiments were carried out in accordance with approved guidelines.

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2. FIBRIPREST® (REF000608) DIAGNOSTICA STAGO S.A.S., 9 rue des Freres Chaussan 92600 Asnieres sur Seine (France). webmaster@stago.com.

3. STA-deficient XII immune-depleted plasma for factor XII assay (ref 00725) diagnostica stago s.a.s., 9 rue des Freres Chaussan 92600 Asnieres sur Seine (France). stago@stago.fr.


Relationship of Sex Hormon Binding Globulin, Thyroid Stimulating Hormone, Testosterone and Prolactine with Body Mass Index (BMI) Value among Iraqi Females in Reproductive Age

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Abstract

Background: The purpose of this study was to determine the relation between increasing in the body mass index (BMI) value and sex hormones level represented by sex hormon binding globulin (SHBG), Thyroid stimulating hormone (TSH), testosterone and prolactine in 51 women in reproductive age aiming following the life quality of these females.

Method: Participants were 51 women from center of Baghdad city. Every female full a questionnaire and sex hormone concentration from each female were measured. Level of FBS and HbA1c test was estimated and designed as exclusion criteria for diabetic mellitus and other metabolic disorders. Body mass index value was compared by demographic properties, Pearson’s correlation coefficient and A stepwise method in linear regression statistic test was applied to detect the association of BMI (kg/m²) with serum sex hormon binding globulin (SHBG), Thyroid stimulating hormone (TSH), testosterone and prolactine and predict the most affected factor.

Results: The mean and standard deviation level of most studied parameter were not differences between case study and control females group (obese vs non-obese) in compared with normal value of each test. BMI value were negatively correlated with age and SHBG (nmol/l) level (r = 0.156; P= 0.274) and (r = 0.578; P = 0.00) respectively. While BMI were moderately positive correlated with testosterone (nmol/l), TSH (μIU/mL) and prolactin (ng/ml) (r = 0.388; P = 0.005), (0.354; P = 0.011) and (0.37; P = 0.006) respectively. Depending on the stepwise method in linear regression analyses, the SHBG (nmol/l) and testosterone (nmol/l) were the most independent predictor factors for BMI in the studied groups (β = 0,484; P = 0.001) and (β = 0.348; P = 0.001) respectively.

Conclusions: The most factors affecting obesity identified in the study were SHBG, Testosterone. However, other variables such as age, did not impact the BMI value of participants.

Keywords: Iraq; Sex hormone binding globulin, Testosterone; obesity.

Introduction

Obesity can be defined a complicated and multifactorial disease that occurs due to the interaction of social, behavioural, metabolic, genetic and impact of cultural behavioral. Obesity offers a cause for many health problems, reduces life’s duration, effect the quality of life and increased mortality. As a result, it has become an important public health affair on a global scale (1). Gender specific issues in female with obesity start with initial puberty, menstrual disturbances and dysovulation, and then they go forward with polycystic ovary syndrome (PCOS), obstetric problems, infertility, endometrial and breast cancer incidence which rise after

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menopause (2). Hormonal changes are associated with gradually increasing BMI are slow, therefore a certain “adaptation mechanism” could improve and might clarify why the BMI-associated sex hormone alterations were not proven to be a significant role in anxiety pathogenesis in overweight individuals. Hormonal changes which were associated with obesity could be “protective” against anxiety.

The term “sex steroid-binding globulin (SSBG)” are also called “Sex hormone-binding globulin (SHBG)” structurally are homodimer glycoprotein which are able to binds both estrogens and androgens hormones (1). SHBG structurally are synthesis from the liver with different binding affinity values for different hormones such as five high affinity with dihydrotestosterone (DHT), testosterone (T) while less bindings values with 17β -estradiol (E2) hormones (2). Therefore, (SHBG) regarded as the major vehicles for transporting these sex steroids hormones, also to non-specific carriers such as albumin, primarily the concentration of SHBG control the availability of the aforementioned steroids hormone (3). The literature indicated that the influence of genetic, different hormonal, and lifestyle-related factors on circulating SHBG levels. The estrogen/ androgen balance was typically the key feature in the regulation of SHBG synthesis. SHBG regulation is considered currently as multifactorial and other non-steroidal factors have a significant character in the circulating levels of this binding protein. (4). The rise in body fat ratio in premenopausal women, can lead to an imbalance in sex steroids. Estrogen aromatization of androgens rises the estrogen amount in stromal vascular cells in fatty tissue. On the other hand, the estrogen/androgen ratio rises in obese individuals, there is a fall in sex hormone- binding globulin (SHBG).

**Materials and Method**

**Participant**

The present study was a cross-sectional types of cases and control. The studied population included female patients with gynecological health problems in Baghdad teaching hospital department of gynecology in Iraq between September 2018 and February 2019. The age of participants was 19 years or greater. The participants in the present study were chosen by simple random sampling method from among female patients with gynecological health problems. Thirty-one female patients were chosen as cases (BMI 30 and above) and twenty female patients (BMI ≤ 29.9) were chosen as controls. Inclusion criteria were being females free from some health problems such as polycystic ovary disease, thyroid disorder, chronic renal diseases, chronic hepatopathy, and tumors and any metabolic syndrome (MetS.). As well as, females who were undergoing to hormone treatment. The sample size was calculated by this formula:

\[ n = \frac{2(z_1 + z_2)^2 \cdot s^2}{d^2} \]

=51 participants The research council and ethics committee of Baghdad health directorate in Iraq approved this study. Written informed consent was completed by all the patients before starting this study. The data collection tools in this study included: demographic characteristics, anthropometric measurements and Biochemical tests. Each participant woman in this study was undergoes to biochemical tests. **Hormonal and another parameter assay**

A blood sample for biochemical test was drawn from each participant at day of experiment and after 12 hours overnight fasting. Blood samples were divide into two tubes one for serum collection the other was transferred in test tubes containing EDTA substances. Questionaries’ was obtained from the participants before starting this study. All samples were sent to the medical city complex for teaching laboratories institute for assessments. The SHBG, testosterone, prolactin and TSH were detected by using IMMULITE® 2000 immune assay system (IMMULITE, SIMENS, USA). While the FBS and HbA1c were assessed by using (Dimension® RxL Max®, USA) integrated system, and analyzer by using (Arkay, ADAMS, JAPAN) respectively.

**Statistical Analyses**

Statistical analyses were calculated using the Statistical Package for Social Sciences (SPSS) software (SPSS version 22. Inc., Chicago, IL, USA, 2013) and the level of significance was established at a p-value 0.05 or less. Descriptive analysis was conducted to determine the means, standard deviations, percentages and frequencies. Shapiro walk test for normality was
carried out on each continuous variable because of the sample size less than 100.

**Result**

**Frequency and biochemical test descriptive of studies groups**

The demographic properties of participants’ biochemical measurement were summarized in Table 1 and Table 2. The frequency of obese group was 31 in number which account (60.8 %) in comparison with non-obese groups females which has normal body mass values which account 20 cases (39.2%) of total participants from total study count. When categorized the BMI (kg/m2) values of studied groups the resulted group were (obese vs overweight normal weight) the mean value was (35.7±4.2 vs 19.35±1.26) as arranged in (Table 1). There are no obvious differences in the mean values of the four types of sex hormones level which includes SHBG (nmol/l), Testosterone (nmol/l), TSH (μIU/mL) and Prolactin (ng/ml) for both groups when compared with normal value of each test. The result of this study also revealed the level of both test FBS (mg/dl) and HBA1c level % which designed primarily as exclusion criteria for studied the normal health status of both groups were within normal range (97.6±7.05 vs96.3±7.1) and (5, 14±0, 3 vs 5, 1±0, 5) respectively when compared with normal value of each test as arranged in (Table 2). Subsequently, on bivariate correlation analysis, the BMI of participants was found to be significant associated with the independent variables which include SHBG, Testosterone, TSH, prolactin and which are significant predictors as declared in (Table 3). The results revealed that correlation of BMI (kg/m2) had strong negative significant correlation with SHBG (nmol/l) hormone (r= -0.578, P= 0.00). While the rest hormones such as Testosterone (nmol/l), TSH (μIU/mL) and Prolactin (ng/ml) were showed moderate positive significant correlation (r= 0.388, P=0.005), (0.354, P= 0.011) and (0.37, 7, P= 0.006) respectively as shown in (Table 4). We excluded the HbA1c and FBS tests from predicator test because we regarded it in the design of our study as exclusion tests of diabetic status. Four-predictor multiple linear regression models are proposed to explain the variation of BMI(Y). The four-predictor variables proposed are SHBG (X1), Testosterone (X2), TSH (X3), and Prolactin (X4). A stepwise method in linear regression has been used (Table 5). Therefore, the variables already in the equation are removed if their p-value becomes larger than the default limit due to the inclusion of another variable. The result of regression revealed highly significant model (p < 0.001). For addressing the multicollinearity, the researcher has been used collinearity statistics to remove the offending variables, where they represented clearly multicollinears, which indicated a problem in the statistics. The result of regression revealed significant model \{F =25, df = (3, 47) p < 0.001\}.

Table 1: Frequencies of BMI of Study Groups

<table>
<thead>
<tr>
<th>Group of Categorical BMI</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 24.9 (control)</td>
<td>20</td>
<td>39.2</td>
</tr>
<tr>
<td>25 and above (case)</td>
<td>31</td>
<td>60.8</td>
</tr>
<tr>
<td>Total</td>
<td>51</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2: Descriptive statistic of studies group

<table>
<thead>
<tr>
<th>No</th>
<th>Parameter</th>
<th>(M±SD) of obese</th>
<th>(M±SD) of non-obese</th>
<th>Norma value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age (years)</td>
<td>29.90±6.2</td>
<td>30.9±5.1</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>(BMI) kg/m2</td>
<td>35.7±4.2</td>
<td>19.35±1.26</td>
<td>24.9&lt; non-obese</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>30 obese</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>≥30 overweight</td>
</tr>
<tr>
<td>3</td>
<td>SHBG (nmol/l)</td>
<td>31.7±14.2</td>
<td>52±10.23</td>
<td>27-109</td>
</tr>
</tbody>
</table>
**Table 3: Correlations between BMI and other variables**

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Age (Years)</th>
<th>SHBG (nmol/l)</th>
<th>Testosterone (nmol/l)</th>
<th>TSH (IU/ml)</th>
<th>Prolactin (ng/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI (Kg/m²)</td>
<td>Correlation -r</td>
<td>-0.156</td>
<td>-0.578**</td>
<td>0.388**</td>
<td>0.354*</td>
</tr>
<tr>
<td></td>
<td>P-value</td>
<td>0.274</td>
<td>0.000</td>
<td>0.005</td>
<td>0.011</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>51</td>
<td>51</td>
<td>51</td>
<td>51</td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (2-tailed)**

**Correlation is significant at the 0.05 level (2-tailed)**

**Table 4: Interpretation of correlation result of BMI with other independent variables**

<table>
<thead>
<tr>
<th>No</th>
<th>Variables</th>
<th>Correlation</th>
<th>p-value</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SHBG (nmol/l)</td>
<td>-0.578</td>
<td>0.000</td>
<td>Strong negative significant correlation</td>
</tr>
<tr>
<td>2</td>
<td>Testosterone (nmol/l)</td>
<td>0.388</td>
<td>0.005</td>
<td>Moderate positive significant correlation</td>
</tr>
<tr>
<td>3</td>
<td>TSH (IU/mL)</td>
<td>0.354</td>
<td>0.011</td>
<td>Moderate positive significant correlation</td>
</tr>
<tr>
<td>4</td>
<td>Prolactin (ng/ml)</td>
<td>0.377</td>
<td>0.006</td>
<td>Moderate positive significant correlation</td>
</tr>
</tbody>
</table>
Table 5: Multiple linear regression analysis of BMI and associated with the predictor variable

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients B</th>
<th>Standardized Coefficients B</th>
<th>t-statistic</th>
<th>Sig.</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Tolerance</td>
</tr>
<tr>
<td>SHBG (nmol/l)</td>
<td>-0.264</td>
<td>-0.484</td>
<td>-3.511</td>
<td>0.001</td>
<td>0.869</td>
</tr>
<tr>
<td>Testosterone (nmol/l)</td>
<td>0.578</td>
<td>0.348</td>
<td>-4.992</td>
<td>0.001</td>
<td>0.938</td>
</tr>
</tbody>
</table>

Dependent Variable: BMI (Kg/m²)

Discussion

Hepatocyte SHBG production is under the influence of several factors which can either increase (thyroid hormones, estrogens) or reduce its levels (obesity, progestogen, growth hormone, prolactin) 4,5. The mechanism by which obesity is associated with decreased SHBG has not been fully explained, but may involve inhibition of hepatic source of SHBG due to increased levels of insulin hormone (7, 8). Sex hormone-binding globulin (SHBG), are regarded as a major transporter protein of testosterone hormone, the level of (SHBG) are one indicator of risk for metabolic syndrome in both men and women 9. Another publisher who indicated that a low circulating level of SHBG was not associated with high concentration of insulin level( 10) but was associated with dyslipidemia and obesity conditions that are strongly associated with fatty liver in humans 11-13. Women with MS showed increased testosterone and lower SHBG independently of menopausal status (9). Our result was disagreement with previous study, so the level of the FBS level (mg/dl) and HbA1c % range was within normal range (97.6±7.05, 96.3±7.1,5,14±0,3,5,1±0,5%) respectively. Obesity is documented as one causes which lead to insulin resistance state which in turn lead to development of diabetes mellitus disease 10, increase the risk of Metabolic syndrom state 11 also associated with hypercortisolism condition 12, and elevated level of estrogen hormones 13. The result of regression analysis represented by stepwise method revealed the SHBG (nmol/l) and testosterone (nmol/l) were the most independent predictor factors affected due to increased in the BMI (kg/m²) value in the studied groups (β = -0.484; P = 0.001) and (β = 0.348; P= 0.001) respectively. Obesity is linked with lower serum levels of SHBG in both men and women 14,15. Some studies, that has been applied on typically small samples of peri-menopausal women, indicate either a decrease in or no substantial age-related changes in SHBG concentration 16-18. There is increasing evidence that low SHBG levels are strongly associated with metabolic syndrome and also an independent risk factor for development for diabetes, especially in postmenopausal women 19,20.

Conclusion

The main objective of this study, are to follow the healthy status of obese females under reproductive stage aiming to protect them from and metabolic syndrome which may lead to impair their quality of life also to predict the most biochemical test which may predict the hormonal disturbances for those females who are not married.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Middle Technical University and all experiments were carried out in accordance with approved guidelines.

References

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Impact of Juvenile Diabetes Long-Term Treatment upon Adolescents Physical Activities at Al Nasiriya Diabetic and Endocrinology Center

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²Assistant Prof. Dr., College of Nursing, University of Baghdad

Abstract

Introduction: Exercise has a positive effect on health, strength gain, weight control, social activity and self-development, contribute to the development of healthy habits in adults, but can also cause hypoglycemia. The variety, weight and duration of administration can cause various hormones (insulin, glucagon, catecholamine glucocorticoid), mediated metabolism. when the administration of insulin derived from insulin and / or an increase in anti-regulatory hormones increase glucose production in the liver and damage glucose in skeletal muscles. Although potential hyperglycemia can scare patients and their families, recipient fear of hypoglycemia can be a serious problem for clinical attention.

Objectives: To determine impact of juvenile diabetes long-term treatment upon adolescents’ physical activity and to discovery out the relationship between impact of long-term treatment with adolescents specific demographic data.

Methodology: A descriptive study design was performed to determine the impact of juvenile diabetes long-treatment upon adolescent’s physical activity in Al Nasiriya diabetic and endocrinology center. The study had started from February 6th, 2019 to June 7th, 2019. Non – probability (accidental) sample of (100) adolescents were selected.

Conclusion: The present study concludes that the greatest impact of long-term treatment of diabetes on the adolescents lifestyle was on physical activity; in addition the statistical test shows that the significant association between the adolescents’ physical activity and their age, socio-economic status.

Key words: impact, juvenile diabetes, adolescents, physical activities.

Introduction

Diabetes Mellitus Type 1, present in 5 to 10% of the cases of diabetes, results from the destruction of pancreatic beta cells, consequently leading to insulin deficiency. The main immunological markers of pancreatic compromise are the anti-islet, anti-insulin and anti-glutamic acid decarboxylase (GAD) antibody levels present in 90% of patients at the time of diagnosis. Diabetes type 1 habitually occurs in children and adolescents, however, it may also manifest in adults, generally in a more insidious manner. Patients with this type of diabetes necessarily depend on insulin administration. The main goal of treatment is to prevent the appearance or progression of chronic complications, such as microvascular (diabetic retinopathy, nephropathy and neuropathy) and macrovascular (cerebral vascular accident and peripheral arterial disease) complications, simultaneously minimizing the risks of acute complications such as severe hypoglycemia (1).

Lifestyle is an important determinant of glycemic control in diabetic type 1 and 2 patients. The treatment of DM1 interferes in the lifestyle, is complicated, painful, depends on self-discipline and is essential to the patient’s survival. The therapeutic approach involves various levels of action, such as insulin therapy, dietary guidance, acquisition of knowledge about the disease,
the ability to self-apply insulin, and self-monitoring of glycemia, maintenance of regular physical activity and psychosocial support. Due to the many beneficial effects, regular physical activity is indicated for patients with DM1, because it improves metabolic control and diminishes cardiovascular risk, in addition to adding an important effect on preventing the chronic complications of this pathology (2).

**Methodology**

**Design of the Study:**

A descriptive study design was performed to determine the impact of juvenile diabetes long-treatment upon adolescent’s physical activities in Al Nasiriya diabetic and endocrinology center. The study had started from February 6th, 2019 to June 7th, 2019.

**Setting of the Study:**

The study was conducted in Al Nasiriya Diabetic and Endocrinology Center This study was conducted on the adolescents who treated as a juvenile or type 1 diabetes mellitus.

**Sample of the Study:**

Non-probability (accidental) sample of (100) adolescents were selected. All patients diagnosed as having juvenile diabetes (DM type 1). They selection of patients was built on the following criteria:

**Method Data Collection:**

The data was collected through the use of a developed questionnaire (Arabic version), the researcher assumed full responsibility for interviewing the study sample after explaining and clarifying the objectives of the study for the adolescent, after obtaining the initial approval of each adolescent to participate in the study.

Data collection was carried out from February 6th, 2019 to June 7th, 2019.

Spend approximately (25-35) minutes with each adolescent to the interview and complete the questionnaire.

**The Study Instrument:**

The study tool is a questionnaire that was designed for the purpose of the study after extensive reviews of accessible literature and related studies. The study tool consists of three parts. The first part includes the demographic characteristics of the participants in the study, the second part includes physical activities.

**Part I: Socio-demographic Characteristics of the Sample of the Study**

This part deals with demographic characteristics of the sample consists of student’s age, gender, parents educational level, parents occupation, and family economic status.

**Part II: Physical Activities of Child**

This part constitute the activity domain consisting of (8) elements.

**Data Analysis**

Data from this study were analyzed using SPSS version 20. The following statistical data analysis methods were used to analyze and evaluate the results of the study (Frequencies, percent Mean of score (MS), Relative sufficiency (R.S), Standard Deviation and Chi-square).

**Results**

**Table (1) Distribution of the Study Sample by their Demographic Data**

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>Rating and intervals</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age/ years</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11-13</td>
<td></td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>14-16</td>
<td></td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td>17-19</td>
<td></td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>Child’s Order</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>54</td>
<td>54</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td></td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td>Urban</td>
<td></td>
<td>55</td>
<td>55</td>
</tr>
<tr>
<td>Absence From School/Month</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 day</td>
<td></td>
<td>66</td>
<td>66</td>
</tr>
<tr>
<td>2 days</td>
<td></td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>3 days</td>
<td></td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Failed in School</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td>39</td>
<td>39</td>
</tr>
<tr>
<td>No</td>
<td></td>
<td>61</td>
<td>61</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
This table shows that the majority of the study sample age is (11-13) years old (48%), and the gender distributed equally between female and male. Concerning child’s order, the study results indicate that the majority of the study subjects are in first order (54%). In addition, the majority of the study subjects are urban residents (55%). In addition, (66%) of the study sample absent from the school for one time, and (61%) of them have times of no failed.

Table (2) Summery Statistics for Activity Domain According To Mean of Score, Stander Deviation, and Relative Sufficiency

<table>
<thead>
<tr>
<th>Activity domain</th>
<th>M.S</th>
<th>S.D</th>
<th>R.S%</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel difficult in walking</td>
<td>1.9</td>
<td>0.611</td>
<td>0.63</td>
<td>Moderate</td>
</tr>
<tr>
<td>I feel difficult in running</td>
<td>1.79</td>
<td>0.671</td>
<td>0.59</td>
<td>Moderate</td>
</tr>
<tr>
<td>I feel the difficulty of lifting heavy stuff</td>
<td>1.46</td>
<td>0.642</td>
<td>0.48</td>
<td>Bad</td>
</tr>
<tr>
<td>I have difficulty when up to stairs</td>
<td>1.51</td>
<td>0.674</td>
<td>0.50</td>
<td>Bad</td>
</tr>
<tr>
<td>I feel tired when you make an effort</td>
<td>1.2</td>
<td>0.492</td>
<td>0.40</td>
<td>Bad</td>
</tr>
<tr>
<td>I have difficulty going to school</td>
<td>2.04</td>
<td>0.695</td>
<td>0.68</td>
<td>Moderate</td>
</tr>
<tr>
<td>I need help when doing exercise</td>
<td>2.52</td>
<td>0.577</td>
<td>0.83</td>
<td>Good</td>
</tr>
<tr>
<td>I feel physically weak</td>
<td>1.28</td>
<td>0.57</td>
<td>0.42</td>
<td>Bad</td>
</tr>
</tbody>
</table>

Mean of score= 1-1.66 is bad, 1.67-2.32 is moderate, 2.33 and more is good

This table show that the study results for study sample response to the activity domain items are moderate in (1, 2, and 6) items, and good in seventh item, and bad in the other items.

Table (3) Summery Statistics of Physical Activities of Adolescent with Diabetes Mellitus

<table>
<thead>
<tr>
<th>Overall Domains</th>
<th>Rating And Scoring</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Activities</td>
<td>Good</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Fair</td>
<td>34</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>Bad</td>
<td>58</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

This table show that the study results for responses by study samples that indicate for physical activity are bad.
Table (4) Association between the Study Subjects physical Activities and their Demographic Data

<table>
<thead>
<tr>
<th>Demographic Data</th>
<th>Rating and Scoring</th>
<th>Overall for Lifestyle</th>
<th>Chi.sq</th>
<th>d.f</th>
<th>p. value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Good</td>
<td>Fair</td>
<td>Bad</td>
<td></td>
</tr>
<tr>
<td>Age/years</td>
<td>11-13</td>
<td>2</td>
<td>25</td>
<td>21</td>
<td>9.569</td>
</tr>
<tr>
<td></td>
<td>14-16</td>
<td>0</td>
<td>24</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>17-19</td>
<td>0</td>
<td>16</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>SES</td>
<td>Barely Sufficient</td>
<td>2</td>
<td>57</td>
<td>21</td>
<td>10.051</td>
</tr>
<tr>
<td></td>
<td>Insufficient</td>
<td>0</td>
<td>8</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0</td>
<td>14</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>0</td>
<td>45</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>2</td>
<td>65</td>
<td>33</td>
<td></td>
</tr>
</tbody>
</table>

The study results indicate that there is a significant association between the adolescents’ physical activities and their age and socio-economic status at p-value less than 0.05.

**Discussion**

**Part I: Discussion of the Socio-Demographic Characteristics for the Study Sample**

Finding results in (table 1) shows that the common of the study subject age is (11-13) years old (48%), these finding agree with Hapunda et al,. (3) that found the great age group representative his study was (12-15) years. Anderson et al,. (4) supported present study by the gender is equally distributed by males and females who participant in their study.

With regard to the child order, the results indicate that the majority of subjects ranked first (54%). This conclusion is supported by et al,. Cardwell (5) who concluded that children who were second or highest in the birth order had a lower risk of Diabetes in children by 10% on average, the cause of any decreased risk of diabetes in children with a high birth order, but may reflect increased exposure to siblings at an early age.

As regards the school absence and performance, (66%) of the study sample absent from the school for one time, and (61%) of them have times of no failed this findings match with Cooper et al,. (6) who declared the impact of type 1 diabetes on a child’s ability to achieve it in school is a common concern for people with type 1 diabetes and their families. Low school attendance, cognitive deficits associated with diabetes, hypoglycemia, hyperglycemia and the psychosocial effects of chronic diseases are all possible factors that can lead to poor school performance for a child with diabetes compared to peers.

**Part II: Discussion of the Physical Activities of Adolescents with Juvenile Diabetes**

Regarding physical activity the present study found (58%) of total sample responses was bad that indicate affected, these finding agree with Jabbour et al,. (7) that concluded adolescent with type 1 diabetes, when exercising at high temperatures, dehydration develops more rapidly than non-diabetic couples and, therefore, suffers from poor performance and muscle cramps, which limits their physical activities.

**Part III: Discussion of the Association between the Study Subjects Lifestyle and Their Demographic Data**
Lawrence et al., (8) declared the age was to demonstrate statistically significant association with physical activities this finding support present study results as shown in (table 4) results indicate that there is a significant association between the adolescents’ activities and their age.

Regarding the socio-economic status there is a significant association with adolescents’ physical activities ($P= 0.04$) as shown in (table 4) this finding agree with Cho et al., (9) that stated there was a significant relationship between physical activity and socio-economic status and increase changes on it in higher socio-economic status.

Conclusions

The present study concludes that the greatest impact of long-term treatment of diabetes on the adolescents (physical activity) in addition the statistical test shows that the significant association between the adolescents’ physical activity and their age and socio-economic status.

Recommendation:

- Encourage adolescents with juvenile diabetes to regular exercise to reduce the risks of emerging complications in the long period, and monitor blood glucose regularly before and after exercise.
- Because much of a child’s day is spent at school, communication with school staff is important for optimum diabetes control and school performance.
- Most health promotion programs are needed to be implemented at schools, to increase the awareness of students and their teachers and improve their healthy behaviors.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Nursing and all experiments were carried out in accordance with approved guidelines.

References

Evaluation of Nurses’ Burnout among Nurses at Hospitals in Nasiriyah City Iraq

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²University of Thi_Qar, Faculty of Nursing, Department of Community Health Nursing - Nasiriyah – Iraq

Abstract

Objective: To evaluate burnout among Nurses at Hospitals in Nasiriyah City,

Methodology: The sample of the study was purposeful and included (216) nurses, who were selected from hospitals from October 2, 2016, to June 28, 2017 CE.

Results: The study’s results have showed (63.9%) of the sample were (19 - 28) years, (74.1%) of the sample have experience of year (<10), (41.7%) were preparatory, (95.8%) of the sample were Urban, (47.2%) of the sample were Sometime enough of Economic status, the results have revealed that there is a moderate assessment in for an overall satisfied related to job satisfaction (128, 59.3%).

Recommendations: The study recommends an Establish laws that protect nurses from abuse and stress at work. Commitment by the ethics of the profession and work according to the policy of the institution.

Keywords: Evaluation; Burnout ; Nurses, Hospitals, Nasiriyah City.

Introduction

Reported was shows that 40% of nurses in the hospitals experience burnout and about every five hospital nurses there is one of them think of quit work over the next year, nurses suffered from burnout because they have a wide range of tasks and long working hours, and contacts with doctors, other co-workers, the patients, and patients’ families. (⁴)

Also, nurses are particularly vulnerable to stress. About 25% of all nurses suffer from stress, as shown by the results of two European epidemiological studies (⁵)

High levels of absence among healthcare professionals and poor mental health may lead to a lowered goodness of patient care (¹⁰)

Stress often comes from your work, but anyone who feels overworked or undervalued is at risk of overwork, the characteristics of your lifestyle and personality traits can contribute to overwork, what do you do when you stop working and how you look at the world can play a big role in causing stress like Requirements for work or home, fatigue is a gradual process, signs, and symptoms are hidden at first but get worse over time, think of the early symptoms as red signs that there is an error that must be addressed if you pay attention and work to reduce stress, you can prevent a major breakdown, if Ignore them, it will burn in the end (³¹)

A chronic condition of emotional and physical exhaustion that results from excessive work and/or personal demands and constant stress, and it describes feelings of emotional exhaustion and fatigue caused by work. It manifests itself in both physical fatigue and a sense of emotional and psychological drained (³²)

Studies have been isolated from occupational stress among health workers, especially in Nigeria at best, there has not been a sufficient comparison study between professionals on stress among health workers, police personnel and teachers. (³⁴)

A review of staff pressure in healthcare settings in 17 countries found that nurses in most countries experienced high levels of stress. Many researchers have described the nurses’ work as stressful work. (²)
Nurses are the largest health profession in Canada, with over 300,000 regulated nurses. Nurses have been identified as experiencing high levels of occupational stress, due to work overload, role conflict, aggression and working with traumatized patients. An adverse consequence to occupational stress in nurses is absenteeism (taking days off work), low job satisfaction and leaving the job (turnover). (8)

**Methodology**

A descriptive study was conducted at Thi-Qar Governorate in Al- Hussein Teaching Hospital, Bent AL_Huda Hospital, Al-Musawy Hospital and Al-Haboby Hospital from the period of the October 2nd 2016 to June 28th of 2017.

The sample is purposive “Non-probability” of 216 nurses who work in the units from which the study sample was recruited, in the above mentioned hospitals.

The questionnaire has been adopted after an extensive review of available literature and related studies. The study instrument consists of three parts. The first part includes participants’ demographic characteristics of age, gender, level of education,…etc. The second part is related to burnout.

Data collected by the researcher are from nurses who work in the above mentioned hospitals by interview and through filling a tool.

Truth of the tool is determined through pilot study Cornbach’s alpha which has been (0.80), while the validity obtained by experts in the field.

Statistical analysis was performed using the Microsoft office excel 2007 and SPSS package (version 19).

**Results**

**Table (1): Distribution of demographical data (n=216)**

<table>
<thead>
<tr>
<th>Rating</th>
<th>F.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 - 28</td>
<td>138</td>
<td>63.9</td>
</tr>
<tr>
<td>29 - 38</td>
<td>54</td>
<td>25.0</td>
</tr>
<tr>
<td>39 - 48</td>
<td>16</td>
<td>7.4</td>
</tr>
<tr>
<td>49 - 59</td>
<td>7</td>
<td>3.2</td>
</tr>
<tr>
<td>&gt; 60</td>
<td>1</td>
<td>.5</td>
</tr>
<tr>
<td>Total</td>
<td>216</td>
<td>100.0</td>
</tr>
<tr>
<td>Years of experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;10</td>
<td>160</td>
<td>74.1</td>
</tr>
<tr>
<td>10 -19</td>
<td>43</td>
<td>19.9</td>
</tr>
<tr>
<td>20 - 29</td>
<td>8</td>
<td>3.7</td>
</tr>
<tr>
<td>30 -39</td>
<td>4</td>
<td>1.9</td>
</tr>
<tr>
<td>&gt; 40</td>
<td>1</td>
<td>.5</td>
</tr>
<tr>
<td>Total</td>
<td>216</td>
<td>100.0</td>
</tr>
<tr>
<td>Level of education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>course</td>
<td>1</td>
<td>.5</td>
</tr>
<tr>
<td>school</td>
<td>3</td>
<td>1.4</td>
</tr>
<tr>
<td>intermediate</td>
<td>9</td>
<td>4.2</td>
</tr>
<tr>
<td>preparatory</td>
<td>90</td>
<td>41.7</td>
</tr>
<tr>
<td>institute</td>
<td>82</td>
<td>38.0</td>
</tr>
<tr>
<td>college</td>
<td>31</td>
<td>14.4</td>
</tr>
<tr>
<td>Total</td>
<td>216</td>
<td>100.0</td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>207</td>
<td>95.8</td>
</tr>
<tr>
<td>Rural</td>
<td>9</td>
<td>4.2</td>
</tr>
<tr>
<td>Total</td>
<td>216</td>
<td>100.0</td>
</tr>
</tbody>
</table>
This table reveals that, (63.9%) of the sample were (19 - 28) years, (74.1%) of the sample have experience of year (<10), (41.7%) were preparatory, (95.8%) of the sample were Urban, (47.2%) of the sample were Sometime enough of Economic status

Table 2: Assessment for an Overall Satisfied Related to burnout

<table>
<thead>
<tr>
<th>Rating</th>
<th>F.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Burnout</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mild</td>
<td>87</td>
<td>40.3</td>
</tr>
<tr>
<td>Moderate</td>
<td>114</td>
<td>52.8</td>
</tr>
<tr>
<td>Sever</td>
<td>15</td>
<td>6.9</td>
</tr>
<tr>
<td>Total</td>
<td>216</td>
<td>100.0</td>
</tr>
</tbody>
</table>

F. = Frequency ; % = Percent
Cut-off-point: 1-1.67 = Low; 1.68-2.33 = Moderate; 2.34-3.00 = High ; F= Frequency; % percentage;

This table presents that there is a moderate assessment in for an Overall Satisfied Related to burnout (114, 52.8)

Discussion

The participants’ mean age of more than half of them is within (19-28) years-old. This result is consistent with the study of Tziaferi S, et.al. (2010) who have found that most medical services and nurses were graduated from the technological foundation, having working experience for the general hospital, there an age at a mean of 30 years old. I agree with the study of (Tuama, 2019) who found that more than half of the nurses are within 18-27 years-old. This can be attributed to that most nurses who are participants in this study are newly employed; they are small in age. Besides, the researcher targeted certain units and departments in the hospitals like the emergency department, operation room, intensive care unit, and medical and surgical wards, and most of the newly employed nurses are assigned in this unit to get the required skills and experience.\(^{16}\);\(^{17}\)

Regarding the years of experience, the majority of the sample has (\(\leq 10\) ) years of experience in work, this result is consistent with the study of Velonakis MG and Tsalikoglou F, (2010) who have found that The greatest proportion of respondents have less than 10 years of clinical experience (51%). This can be attributed to that most nurses are newly employed, and have less than 5 years of working experience. It was the criteria of the study.\(^{18}\)

Less than half of them have a Preparatory Nursing School at the level of Education. This result is consistent with the study of M. H. P. Marziale and O. S. Hong, (2005) who have found that in relation to the level of schooling, most nurses have a high school education prevailing (54.3%) which is the minimum requirement to carry out the function. This can be attributed that the number of nursing institutes and colleges has been very limited in the last years, in comparison to the huge number of preparatory nursing schools.\(^{19}\)

The majority of them live in urban areas. This result agree with Amare et. al., (2013), indicated that the majority of the study participants were living in urban areas (61.8%). This can be attributed that most hospitals lie in the city center where they are more close to nurses. Moreover, most of rural men prefer to work in their farms rather than looking for other jobs.\(^{20}\)

Finally, regarding socio-economic status, less than half of them report that their monthly income is somewhat sufficient. This can be referred to, as mentioned earlier, most of those nurses are newly employed and the higher the years of working, the higher the monthly wages.

Concerning to the burnout, the study subjects responses were moderate at the burnout. This can be attributed that, over time work in the work place and shortage in the nursing staff.

Recommendations:

The study recommends an Establish laws that protect nurses from abuse and stress at work. Commitment by the ethics of the profession and work according to the policy of the institution.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Nursing and all experiments were carried out in accordance with approved guidelines.

References


Prevalence of Toxoplasmosis and Relationships With Estradiol Hormone and Vascular Cells Adhesion Molecular-1 (VCAM-1)

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Abstract
Sero-epidemiological study were conducted for pregnant and aborted women to investigate the infection person with toxoplasmosis in Babylon province during the period from December 2018 till March 2019, ELISA technique for 53 serum samples for pregnant and 67 serum sample for aborted women, according to epidemiological criteria (Residence area, age group, existence of cats in houses, times number of abortion status, number of children, collection samples monthly, trimesters period of pregnancy). Concerning biochemical parameters, the present included determination of estradiol hormone and vascular cell adhesion molecule -1 (VCAM-1) in aborted and healthy women that their ages ranged between 20 to 49 years old. it has been found a significant increase (P<0.05) in the levels of estradiol hormone in women affected with toxoplasmosis compared to healthy women . VCAM-1 results indicated a significant increase (P<0.05) in a comparison with those of healthy women it can be concluded that infection with Toxoplasma gondii is associated with estradiol hormone and vascular cell adhesion molecules.

Keyword: Toxoplasmosis, Estradiol, VCAM-1

Introduction
Toxoplasma gondii is protozoan parasite a compulsory intracellular, which results toxoplasmosis. Its distributed worldwide, and capable infecting virtually all warm-blooded animals. Its ability of causing acute and life-threatening qualifications in pregnant females (women) and immunocompromised persons. In many statuses, the laboratory identification of severe and latent toxoplasmosis depends upon the identification of T. gondii especially IgG and IgM antibodies. Most serological tests like ELISA, have been used for the detection of antibodies against the infection that takes place in pregnant women. Ecumenically, the distribution of this disease is extremely variable even inside the countries. In all host species, including humans, Toxoplasmosis is generally acquired either vertically from mother to fetus (congenital infection), or through ingestion of oocysts in contaminated food or water. Rarely, T. gondii can transmit through organ transplantation and the transfusion of infected blood. In many cases, laboratory diagnosis of latent and acute T. gondii is based on detecting T. gondii specific IgM and IgG antibodies, there are several serologic tests for anti-toxoplasma IgM and IgG, among which ELISA has maximum sensitivity and specificity. In Arab and regional countries, the prevalence of toxoplasmosis was ranged between 26-81.4%. In Iraq toxoplasmosis studies have reported different prevalence rates, ranged between 19.1-25.2%. VCAM-1 is expressed and located on luminal and lateral sides of endothelial cells. During inflammations or infections, VCAM-1 act to enhance rolling and adhesion of white blood cells before they migrate from blood circulation into affected tissues.

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**Materials & Method**

**Blood Samples Collection**

1. It had been taking five milliliter of venous blood for both pregnant women and aborted women
2. By using syringe five milliliters as 3 ml. for serological and biochemical tests.
3. Three ml. of the blood samples were put in a gel tube and left standing for 20 minutes at room temperature for a clot, and then the tube was centrifuged at 3000 rpm for five minutes to collect serum.
4. The serum obtained was divided into many portions for different serological tests to avoid the melting of the samples and repeat the freeze because this will affect the quality of the result.
5. All sera were stored in the deep freezing -20°C until being analyzed *Toxoplasma* antibodies.

**Enzyme Linked Immunosorbent assay (ELISA)**

This assay was performed by using two kits, One for detection of IgG antibodies, and the other for detection of IgM specific antibodies against *Toxoplasma* antigen in the patient’s serum.

- **Detection of anti-*T. gondii* antibody (IgG)** by Enzyme linked Immunosorbent Assay (ELISA) technique.

  The bioCheck *Toxoplasma* IgG ELISA (BC-1087) kit was used. The *Toxoplasma* IgG ELISA is intended to evaluate a patient serologic status to *T.gondii* infection.

  **Principle:**

  Serum samples were added to patients to dig the plate covered with the pure *Toxoplasma* antigen. In the case of IgG antibodies to Toxoplasmosis in the serum, they will bind to the antigen. All non-washable substances are removed after the addition of the conjugate enzyme is linked to the anti-antigen complex, and remove conjugate enzyme by washing and the base material is added. The plate is incubated to allow hydrolysis of the base material to produce the absorption coefficient of the infected samples.

- **Detection of anti-*Toxoplasma gondii* antibody (IgM)** by Enzyme linked Immunosorbent Assay (ELISA) technique.

  The bioCheck *Toxoplasma* IgM ELISA (BC-1087) kits were used. The Toxoplasma IgM ELISA is intended for use in detecting IgM status to *T.gondii* in human serum and the procedure of IgM antibodies ELISA it’s the same methods that used above in IgG procedure.

**Biochemical tests**:

**Blood Samples Collection**:

A total number of subjects in this was 65 women of these, 50 women were infected with *Toxoplasma gondii* and suffering from abortion at a least five month ago. The ages of women ranged between 20 to 49 years old. Fifteen healthy fertile women were selected to serve as a control group. The infected women were classified according to their ages into three groups, First group 20-29 years old, Second 30-39 years old, Third group 40-49 years old. All women of this study were free from other chronic diseases and diagnosed by consultant physicians. Five milliliters of blood were withdrawn and then divided into two parts, The first part (2 milliliters) were put in EDTA tubes to complete hematological analyses. The second part of blood sample (3ml) was brought into gel plain tubes and left for 15 minutes to complete blood coagulation. After complete coagulation the samples were transferred into centrifugation at 3000 rpm for 10 minutes and then sera were a spirited by micropipette and transported into Eppendorf tubes for storage at 20°C for future biochemical analysis.

**Estimation of estradiol hormone concentration**

Estradiol hormone was estimated by kit supplied from Monobind company (USA)\(^1\)

**Estimation of vascular cell adhesion molecular-1 (VCAM-1)**

The concentration of VCAM-1 factor was estimation according to instructions Monobind company (USA)\(^1\).

**Results**

A total of 120 blood samples (67 pregnant and 53 aborted) women that attending to Maternity and Children’s Hospital in the Al-Hilla city, Babylon province, during the period from December 2018 till
March 2019, their age groups between (20 years to 49 years) and more than years.

Table (1): Percentage of infection of toxoplasmosis among aborted and pregnant women, diagnosed by ELISA technique

<table>
<thead>
<tr>
<th>Women status</th>
<th>Examined No.</th>
<th>Positive cases for antibody IgG</th>
<th>(%) antibody IgG</th>
<th>positive cases for antibody IgM</th>
<th>(%) antibody IgM</th>
<th>positive cases for antibody (IgG&amp;IgM)</th>
<th>(%) Both antibody (IgG&amp;IgM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abortion</td>
<td>67</td>
<td>16</td>
<td>25.8</td>
<td>6</td>
<td>8.9</td>
<td>3</td>
<td>4.4</td>
</tr>
<tr>
<td>pregnancy</td>
<td>53</td>
<td>8</td>
<td>15.1</td>
<td>3</td>
<td>5.6</td>
<td>1</td>
<td>1.8</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>24</td>
<td>20</td>
<td>9</td>
<td>7.5</td>
<td>4</td>
<td>3.3</td>
</tr>
</tbody>
</table>

No significance differences at level 0.05
P value = 0.232  P value = 0.496  P value = 0.432
X2 calculated = 1.427  X2 tablated = 3.841  X2 calculated = 0.463  X2 tablated = 3.841  X2 calculated = 0.616  X2 tablated = 3.841

Table (2): Percentage infection of toxoplasmosis among aborted and pregnant women according residence area which diagnosed by ELISA technique.

<table>
<thead>
<tr>
<th>Residence Area</th>
<th>Examined No.</th>
<th>Positive cases for antibody IgG</th>
<th>(%) antibody IgG</th>
<th>positive cases for antibody IgM</th>
<th>(%) antibody IgM</th>
<th>positive cases for antibody (IgG&amp;IgM)</th>
<th>(%) Both antibody (IgG&amp;IgM)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural Area</td>
<td>45</td>
<td>10</td>
<td>22.2</td>
<td>5</td>
<td>11.1</td>
<td>3</td>
<td>4.4</td>
</tr>
<tr>
<td>Urban Area</td>
<td>75</td>
<td>14</td>
<td>18.6</td>
<td>4</td>
<td>5.3</td>
<td>1</td>
<td>1.3</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>24</td>
<td>20</td>
<td>9</td>
<td>7.5</td>
<td>4</td>
<td>3.3</td>
</tr>
</tbody>
</table>

No significance differences at level 0.05
P value = 0.637  P value = 0.244  P value = 0.115
X2 calculated = 0.222  X2 tablated = 3.841  X2 calculated = 1.353  X2 tablated = 3.841  X2 calculated = 2.482  X2 tablated = 3.841

Figure (1): Shows the correlation between estradiol hormone and vascular cell adhesion molecule-1 (VCAM-1) in women affected with *Toxoplasma gondii*
Prevalence of toxoplasmosis among pregnant and aborted women.

The results of a positive sample by using ELISA technique for IgG and IgM and mixed (IgG & IgM) among aborted women 25.8 %, 8.9 %, and 4.4 %, respectively, but the pregnant women that lowest than compared with aborted woman for IgG, IgM and mixed (IgG & IgM) 15.1 %, 5.6 %, and 1.8 % respectively, these results shows the percentage of infection in the aborted women has high level but do not reveal significant differences (p>0.05). The present study agreement with the study of the 15 in both (IgG&IgM) was 3.7% in aborted women and study of 16 agree in aborted women for IgG and IgM was 20%, 5% respectively, also the study 17 for IgM was 6.04%.

While present study disagree with the 18 for it is antibodies IgG and IgM which were 40%, 29% respectively, in aborted women and also 17 percentage infection in the aborted women for IgM only it was 6.04%, as well as study 19 in aborted and pregnant women for IgG were 41.8%, 40.0% respectively and 16 do not show the percentage IgM in the pregnant women was 0%.

The reason for this fluctuations for the rates of infection may be explain as the antibodies IgM level have been in the first weeks to three weeks from infection are very high and then begin to reduced its concentration and high increased concentration for antibody IgG significantly and that too those seen in aborted women where they have been subjected to infection, , predecessor and thus stimulate the immune system in advance which increases of high concentrations of these antibodies no these fall into chronic infections or may be confirmed the most patients in this study have chronic infection (IgG) or sub-acute infection (IgG&IgM) and acute infection (IgM).

Prevalence of toxoplasmosis among pregnant and aborted Women according to the residence area

By using ELISA test IgG, IgM and mixed (IgG,IgM) in rural area where 22.2% ,11.1% 4.4% respectively, compared to urban area 18.6 %, 5.3%, 1.3% ,respectively any rural more susceptible of urban area to infection , these results shows the rural area have high level but do not reveal significant differences (P>0.05). The current study agreement with study 15 where had percentage infection IgG and mixed (IgG &IgM) 18.2% , 5.5% in rural area while in urban area 13.8%, 4.5% respectively , and the study 20 showed that IgM in rural area was 10% and the urban area for IgG was 28% and agree with 21 in rural area for IgM was 9.7%, also, study 22 has percentage IgG and IgM were 23%, 1% in rural area respectively, as well as study 23 agree with present study where has IgM in rural area and urban area were (4%) and (1.5%) respectively.

The present study disagreement with 24 in Babylon province showed that urban area more than rural area for IgG were 73.1%,26.9% , respectively, but significant differences did not appear in urban areas compared to rural areas. And 18 who found for (IgG & IgM) 44.8% urban area and 39.6% rural area and as well as study 25 disagree with current where has percentage infection of IgG was (68%) in rural area and (32%) in urban area.

Biochemical Parameters :

Data obtained from the present study indicated significant elevation (p< 0.05) of estradiol hormone level in first and second groups of women affected with toxoplasmosis the association between sex-hormone and toxoplasmosis infection is a particular problem in public health 29. The present results were not consistent which indicated that acut infection with Toxoplasmosis is related with significant increase in the levels of estrogen of pregnant and non -pregnant women 30.

Conclusions

The current study demonstrated increase titer of IgG, IgM in cases of rural area more than of urban area also all the cases fall in the chronic infection because high frequency of IgG and also showed increase levels of cell adhesion molecules VCAM-1 associated with increase estradiol hormone of infected women.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Science for Women, University of Babylon, Hilla, Iraq, Iraq and all experiments were carried out in accordance with
approved guidelines.

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Antibacterial applications and Comparative Study for Adsorption Phenol Red Dye Using Spinel Co1-xMxFe2O4 Nano Composites (M= Cd, Ag)

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Abstract
This work concerned with the study of adsorption of phenol red dye by using spinel Co1-xMxFe2O4 was prepared by Co-precipitation method at different ratios of (0.2:0.8, 0.5:0.5, 0.8:0.2) and calcinations at temperature 600 °C for three hours. The conclusion showed that (0.5:0.5) percentage has high activity than other ratio at different temperature. The prepared powder was differentiated by X-ray diffraction, Fourier Transform Technique (FT-IR), UV-Visible Spectroscopy, Scanning Electron Microscopy (SEM), Energy Dispersive Spectroscopy (EDS), Atomic Force Microscope (AFM), high performance liquid chromatography (HPLC) were also studied for all spinel. X-ray and Electron Microscopy studies showed the average size of the granules prepared for the composite in this manner (17.44 for Cd and 37.55 for Ag).

Keywords: Adsorption, Freundlich & Langmuir Equation, photocatalytic degradation, Co-precipitation method, nanocomposites Co1-xMxFe2O4, phenol red dye.

Introduction
The expanding enthusiasm for nanotechnology is expected to the nanostructured material with measurements for example grain estimate, layer thickness or shapes beneath 100 nm1. The bizarre properties of nanomaterials are explicit to the Nano-measurements. Nanomaterials are the materials having something like one measurement under2. In the previous two decades, overall endeavors in both the hypothesis and the exploratory examination of development, portrayal and utilizations of inorganic nanostructures including metal oxides, earthenware production and composites have brought about a develop, multidisciplinary field. Nanostructured materials are noted for their security, green science and find assorted specialized application3. Late research concentrated on the utilization of nanomaterials to tackle natural issues and to clean the earth for what’s to come. Nano-sized materials are new useful materials, which offer high explicit surface region to volume proportion and surface-dynamic locales, accordingly, can be utilized as compelling adsorbents. Besides, nanomaterials have been utilized in different natural applications, for example, in green science, photograph synergist debasement of natural color, remediation of dirtied water, toxin detecting and discovery, antibacterial action, etc. The got nanomaterials and their composites have been utilized in natural applications, for example, adsorption investigations of poisonous metal particles, expulsion of natural color from fluid arrangement and antibacterial applications. In this investigation, we have concentrated on iron oxide and Cd and Ag nanomaterials and furthermore about iron oxide-cadmium and silver blended nanocomposite. Cadmium or silver and iron oxide are the most vital clay materials. Compact disc and Ag demonstrates countless substance and physical properties. It is broadly utilized as an electrical protector, displaying extraordinarily high protection from substance specialists, just as giving superb execution as an impetus for some compound responses, in microelectronics, layer applications, and wastewater treatment. In addition, press oxide assumes an essential job in natural and organic procedures and is additionally broadly utilized in various mechanical applications.

Experimental part.
Preparation of solution.

Chemical materials used in this work were prepared by the Co-precipitation method with ratios (X = 0.0, 0.2, 0.5 and 0.8). During the synthesis, Fe(NO$_3$)$_3$·9H$_2$O, Co(NO$_3$)$_2$, Cd(NO$_3$)$_2$, Ag(NO$_3$)$_2$ and NaOH were used as the oxidizing agent. All the metal nitrates were weighed in desired stoichiometric proportions and dissolved separately in amount of distilled water. After the complete dissolution, the metal nitrates were mixed together. Afterward, entire solution was kept with constant stirring at 80°C on a magnetic stirrer for 1 hour to assure removal of NaNO$_3$ from the powder.

The produced precipitate was washed 10 times with hot deionized water to maintain the pH of the solution to about 7 (4-5). Due to the continuous evaporation of water, the solution becomes viscous. The sample was put at the ignition temperature of 120°C to form a fluffy mass. These masses were crushed and the resultant material was annealed at 600°C in a muffle furnace for 3 h for the pellet formation.

Adsorption studies.

To decide the equilibrium relationship of sum adsorbed by a unit load of adsorbent (qe) with the grouping of adsorbent staying in the medium at balance (Ce), investigations of different adsorption isotherm models are required, which can enhance the plan of a sorption framework. There is different sort of adsorption models grew, for example, Freundlich, Langmuir isothermal models, etc. The most widely recognized models, for example, Freundlich and Langmuir conditions are utilized to examination of this investigation. The underlying color focuses were differed from 5 to 70 mg/L utilizing (0.15 Cd and 0.1 Ag) g of every adsorbent in 100 ml of phenol red arrangement (normal pH) with fomentation time 60 min.

Adsorption Isotherms.

Adsorption tests were led utilizing 50 ml stoppered conical flasks at room temperature 25°C. (0.15 Cd and 0.1 Ag) mg of adsorbent was added to every flask which comprised of 10ml phenol red arrangement of different beginning focuses from color. All flasks were shaken at 6000rpm in a thermostated shaker for (120min). After decantation and filtration, the color focus was broke down by utilizing UV-obvious spectrophotometer the measure of color adsorbed was determined from the accompanying condition.

**Langmuir Isotherm.**

The Langmuir isotherm show expect monolayer inclusion of adsorbate on a homogeneous adsorbent surface. This model does not think about surface heterogeneity of the sorbent. It accept adsorption will happen just at specific site on the adsorbent. The Langmuir condition is given as:

\[
\frac{q_e a_L}{K_L} = \frac{K_L C_e}{(1+K_L C_e)}
\]

The linear form of the Langmuir isotherm is:

\[
\frac{C_e}{q_e} = \frac{1}{K_L q_{max}} + \frac{C_e}{q_{max}}
\]

where aL (Lmg-1) and KL (Lg-1) are the Langmuir constants, qmax (=KL/aL) is the most extreme adsorption limit comparing to finish monolayer inclusion (mg g-1), which relies on the quantity of adsorption locales. The values of qmax and KL are calculated from the slopes and intercepts of the straight lines of plot of Ce/qe versus Ce.

**Freundlich isotherm.**

The Freundlich isotherm demonstrate is an observational condition that depicts the surface heterogeneity of the sorbent. It considers multilayer adsorption with a heterogeneous enthusiastic circulation of dynamic destinations, joined by communications between adsorbed atoms. The Freundlich isotherm equation is given as:

\[
q_e = K_F C_e^{1/n}
\]

The linear form of the Freundlich isotherm is:

\[
\ln q_e = \ln K_F + \frac{1}{n} \ln C_e
\]

where Ce is the balance fixation (mg L-1), qe is the sum adsorbed at harmony (mg g-1) and KF and n are Freundlich constants, identified with the degree of
the adsorption and the level of nonlinearity between arrangement focus and adsorption, separately. KF and \((1/n)\) can be resolved from the direct plot of \(\ln qe\) versus \(\ln Ce\).

The essential characteristics of Langmuir isotherm can be expressed by a dimensionless constant called equilibrium parameter (RL) that is defined by the following equation\(^{(7, 12-13)}\):

\[
RL = \frac{1}{1 + aL C_0}
\]

where \(aL\) and \(C_0\) are the parameters as characterized beforehand. The estimation of RL determined from the above articulation. The idea of the adsorption procedure to be either ominous (\(RL > 1\)), direct (\(RL = 1\)), great (\(0 < RL < 1\)) or irreversible (\(RL = 0\)) (Lian et al., 2009). Here RL values acquired are recorded in table 3.2. The direct Langmuir and Freundlich plots for the adsorption of CR onto the three nanorod adsorbents are gotten by plotting \(Ce/qe\) versus \(Ce\) and \(\ln qe\) versus \(\ln Ce\), separately (given in figure 3.8). The isotherm constants and connection coefficients were determined and recorded in table 3.2. By looking at the connection coefficients \(rL^2\), it tends to be found that the exploratory harmony adsorption information are all around depicted by both the Langmuir and Freundlich models, however the Langmuir show is progressively appropriate.

**Table 1. Adsorption isotherm constants for adsorption of phenol red dye in 250C Temp.**

<table>
<thead>
<tr>
<th>Adsorbent</th>
<th>Qm</th>
<th>KL</th>
<th>R2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co0.5Cd0.5Fe2O4</td>
<td>4.4207</td>
<td>0.174</td>
<td>0.9659</td>
</tr>
<tr>
<td>Co0.5Ag0.5Fe2O4</td>
<td>4.9008</td>
<td>0.557</td>
<td>0.8817</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Adsorbent</th>
<th>Kf</th>
<th>n</th>
<th>R2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co0.5Cd0.5Fe2O4</td>
<td>0.186</td>
<td>1.333</td>
<td>0.9969</td>
</tr>
<tr>
<td>Co0.5Ag0.5Fe2O4</td>
<td>0.016</td>
<td>0.557</td>
<td>0.9292</td>
</tr>
</tbody>
</table>

**Fig 1. Langmuir isotherm for adsorption of Cd\(^{2+}\)**

\[y = 4.4207x + 2.7509\]

\[R^2 = 0.965\]

**Fig 2. Freundlich isotherm for adsorption of Cd\(^{2+}\)**

\[y = 0.7501x - 1.6785\]

\[R^2 = 0.976\]
Result and Discussion

X-ray diffraction patterns.

Solid semiconductor at crystalline state was studied by using XRD technique. In this work, X-Ray diffraction was used to study Co$_{1-x}$MX$_x$Fe$_2$O$_4$. Table 3.2 illustrates the spinel of Co$_{1-x}$Cd$_x$Fe$_2$O$_4$; the best from spinel Co$_{1-x}$Ag$_x$Fe$_2$O$_4$ in photocatalytic degradation. The characterization of spinel Co$_{1-x}$MX$_x$Fe$_2$O$_4$ at ratio 0.5:0.5 by using x-ray diffraction radiation ($\lambda = 1.54 \text{ Å}$) were characterized after treatment in the alike condition of preparing catalyst that calcination at 600 °C for four hours from fig. 3.1. Find dissimilar peaks apparent in the figure of the spectrum represent 2$\theta$ (17.44) back for spinel material.

Fourier Transition for Infrared spectrum (FT-IR).

A study of the double prepared catalyst was achieved by using Fourier Transform Infrared (FTIR). All spectra were recorded at the wavenumber ranged from 400-4000 cm$^{-1}$. Fig. 3.2. is characteristic of the sample Co$_{1-x}$MX$_x$Fe$_2$O$_4$ that appearance the peaks at (1506.46–1651.12) cm$^{-1}$ and (412.78 – 667.39) cm$^{-1}$, respectively. In the range of 800 – 400 cm$^{-1}$, two main
absorption bands with very low intensity are observed around 412.78 and 667.39 cm\(^{-1}\) and may be is caused by metal oxygen vibration in the octahedral side.

### 2.4.3. Atomic Force Microscopy.

Atomic Force Microscope (AFM) is a technique used to analyze the morphology of surface. AFM is used to characterize the surface of catalyst by determining the force between tip and surface of catalyst.

**Fig. 7** AFM 2-D, 3-D images of a:Co\(_{0.5}\)Cd\(_{0.5}\)Fe\(_2\)O\(_4\), b:Co\(_{0.5}\)Ag\(_{0.5}\)Fe\(_2\)O\(_4\).  

**Scanning Electron Microscopy**

This technique was used to study the structures of the prepared photocatalysts from the aspect of the morphology of crystals of the semiconductors using the SEM. Microscopy techniques help us to analyze the particle size distribution and the nanocrystalline size distribution. The prepared photocatalysts spinel Co\(_{0.5}\)M\(_{0.5}\)Fe\(_2\)O\(_4\).

Factors influencing Adsorption process.

Effect of adsorbent dose.

Adsorbent measurements is a standout amongst the most vital parameter that has been considered to decide the ideal condition for the execution of adsorption. Basically, insufficient measurement or overdosing would result in the poor execution in adsorption. Accordingly, it is significant to decide the ideal measurements so as to limit the dosing cost and slime development and furthermore to acquire the ideal execution in treatment. The impact of adsorbent portions on the expulsion of phenol red utilizing Co\(_{0.5}\)Cd\(_{0.5}\)Fe\(_2\)O\(_4\)and Co\(_{0.5}\)Ag\(_{0.5}\)Fe\(_2\)O\(_4\)was performed by blending the examples of various load to 100 ml of phenol red color, looking after pH=7 (pH at ordinary condition) for 60 min contact time.

The heaviness of the adsorbents was shifted in the range 0.01-0.3 g. demonstrates the UV–vis retention spectra of phenol red arrangements in the wake of being treated with various doses of the readied spinel adsorbents utilizing an underlying color convergence of 100 mg L\(^{-1}\). It is seen there is a ceaseless expulsion of phenol red with increment in adsorbent portion up to (0.15 for Cd and 0.1 for Ag) g.

This may be due to an increase in number of active sites of the adsorbent material with increasing amount of the adsorbent. Further increase in the amount of the adsorbent does not bring any considerable change in the adsorption i.e. approximately straight line is obtained. Therefore (0.15 Cd and 0.1 Ag) g was chosen as the optimum amount for all studies of the adsorbents.

**Effect of pH of phenol red solution.**

Impact of pH of phenol red arrangement pH influences both watery science and surface restricting locales of the adsorbents. To examine the impact of pH on the adsorption of phenol red color the pH extend 3–11 was picked. The pH of the test arrangements was balanced by utilizing HCl and NaOH arrangements. (0.15 Cd or 0.1 Ag) g of every adsorbent utilized in 100 ml of phenol red arrangement of every pH esteem with 60 min disturbance time. From figure 3. it is discovered that, forCo\(_{0.5}\)M\(_{0.5}\)Fe\(_2\)O\(_4\), there is no huge change in the rate adsorption by expanding pH from 3-9 and achieved most extreme at pH = 9 and after that marginally diminished at higher pH. This is expected to for higher pH arrangement; the high adversely charged adsorbent surface locales did not support the adsorption of deprotonated CR because of electrostatic repugnance 12.

**Effect of initial dye concentration on adsorption.**

The underlying focus gives essential data that defeats the mass exchange opposition of all atoms between the watery and strong phases14. The adsorption is incredibly influenced by the centralization of the arrangement, as the adsorptive responses are specifically relative to the convergence of the solute6. It this segment, (0.15 Cd and 0.1 Ag) g of every adsorbent utilized every 100 ml of phenol red arrangement (common pH) with fixation going from 5ppm to 70ppm and the unsettling time was kept 60 min. It is discovered that with the expansion in beginning color fixation, rate adsorption diminishes while the harmony adsorption limit of the adsorbent for phenol red increments with expanding starting color focus for example the more focused the color arrangement, the higher the adsorption limit. This is most likely because of a high main impetus for mass move in high color focus.
D) Effect of temperature of spinel.

Adsorption process were performed in indistinguishable way from referenced in the above passage at temperature (20, 25, 30, 45, 50) C0 to appraise the thermodynamic conduct of adsorption process, this depends in the event that the adsorption diminishes with expanding temperature, the procedure is exothermic and the other way around.

A) Effect of recovery of spinel.

Desorption of colors from adsorbent and re-age of the adsorbent is a critical issue in perspective of re-use of use of the adsorbent. With rising costs of crude materials and wastewater treatment forms, the appeal of item recuperation forms has expanded essentially. The fundamental target of the recovery procedure is to reestablish the adsorption limit of depleted adsorbent and to recoup profitable parts present in the adsorbed stage. Desorption think about was performed by blending (0.15 Cd and 0.1 Ag) g phenol red stacked CoMFe2O4(Fe: Cd or Ag = 0.5: 0.5) nanocomposite with 100 ml of phenol red arrangement and desorption was completed for 1 hours. At that point the centralization of eluted phenol red was estimated to figure the measure of phenol red desorbed. For recovery considers, progressive adsorption– desorption forms were done for three back to back cycle. The figure demonstrates that about 84.2% of Cd and 75.2% of Ag phenol red viably expelled on the primary cycle. From that point forward, the expulsion limit of the adsorbent reductions as the quantity of cycles increases15.

Conclusion

The primary object of the present work is to investigate the likelihood of utilizing spinel Co1-xMxFe2O4 as adsorbents. The procedure is unconstrained and exothermic the impact of different working parameters, for example, pH, adsorbent dose and temperature was assessed. The thermodynamic capacities are exceptionally valuable if the present outcomes are to be used on huge scale.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Babylon Education Directorate, Ministry of Education, Hilla-Iraq and all experiments were carried out in accordance with approved guidelines.

References


Preparation of Polymer Nano-composite Materials for Microwave Sensor Application

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Abstract

In this study, prepared nanocomposite materials made of polyester were prepared with a fixation hardener ratio of 0.1 g per 10 ml of polyester. This percentage was constant in all samples and addition of both chlorophyll(Cll) and lead oxide (PbO<100nm) as well as lead oxide with chlorophyll by weight percentage (0.2 ,0.5, 0.2 (Cll) with 0.5(PbO)wt.% receptivity, then study coefficient of loss of reflectivity of all samples where the results indicated that most prepared materials correct for use attenuation materials of microwaves where is reflection coefficient of all samples larger than (10dB) this show that absorption of composite materials consistence larger than 90%, then study reflection coefficient and also definition complex permittivity in the range frequencies (3-5)GHz where observed that value of the complex permittivity larger than one $\varepsilon_r > 1$.

Keywords: Nano-composite, Microwave Sensor, Application

Introduction

One of the most important uses of nanoparticles with a polymeric basis is to protect people from the side effects of radiation emitted from the mobile because the radiation caused by the excessive use of mobile phones is very dangerous, because the radio signals from cellular phones are considered carcinogens - that can cause cancer and there are symptoms And disturbances occur as a result of mobile phone radiation such as dizziness, insomnia, Parkinson’s disease, brain tumors, and many more 1,2. Mobile phones use electromagnetic radiation in the microwave or microwave range, and other digital wireless systems, such as data and communications networks, produce similar beams. The International Agency for Research on Cancer (IARC) classifies mobile radiation based on the IARC scale into category 2b (may cause cancer). Which means they may pose a risk of cancer 3,4. The constant consideration of smart phones is full of damage, but looking at smart phones continuously causes an internal headache which causes lack of sleep. According to optics specialist Andy Hepworth, ultraviolet radiation from smartphones can cause damage to the back of the eye, and continuous exposure to these rays turns on the mood, causing discomfort and lack of sleep 5. The 2012 study found that 66% of people are worried or afraid to lose their phones or move away for a short period, which leads to the use of smart phone on the charger and may cause radiation from the charger to the phone damage in the long term brain and brain 6,7. Mobile phone is one of the basics of the present day, has spread around the world speed of the missile, and gradually developed to become a laptop, you can use throughout your day tirelessly and tired. But for all the price and science also a double-edged weapon 8. Phones Portable as a time bomb unfortunately due to its great effects Harmful to our health, mobile devices open in the bedrooms cause insomnia and excessive use leads to brain damage and heart weakness The mobile inventor of the German chemist Friedhelm Weinhurst warned of the risk of leaving mobile devices open in the bedrooms on the human brain , Said in a private meeting
with him in Munich, that keeping these devices or any transmitters or receiving space in the bedrooms cause a state of insomnia, anxiety and lack of sleep and damage to the brain, which in the long term to destroy the immune system in the body. He stressed in a press statement that there are two values for the frequency of radiation emitted from the initial mobile 900 MHz and 1.8 MHz second, which puts the human body to many risks, pointing to mobile power stations equivalent to the power of radiation from a small nuclear reactor, and the electromagnetic waves resulting from the mobile Stronger than x-rays that penetrate all organs of the body. On the one hand, a group of scientists in Sweden, Germany, Australia and the United States confirm the damage caused by these waves, On the skin, on semen, on the immunity of the body and on the disappearance of insects. In our analysis the microwave loss materials have been characterized in terms of the electrical permittivity, which describes the interaction of a material with an electric field and in general is complex quantity. According to the theory of complex permittivity, when an electromagnetic field propagates within dielectric material, the electric field induces two types of electrical effects, i.e. conduction and displacement currents. The effect arising from free electrons (conduction current) gives rise to powerless, which is related to the imaginary permittivity ($\varepsilon''$); the interaction with bound charges (displacement current) induces the polarization effect, which is described by the real permittivity ($\varepsilon'$). Therefore, an increase of the real part of the complex permittivity can be mainly ascribed to dielectric relaxation and space charge polarization effect, whereas an increase of the imaginary part of the complex permittivity can be attributed to the enhanced electrical conductivity of the material. The paper is arranged in four main sections. the experimental part, Vector Network Analyzer(VNA) as shown in (Section 2), the result and discussion as shown in (Section 3), the results for optical microscope as shown in (Section 3.1), FT-IR measurements as shown in (Section 3.2), microwave absorption properties as shown in (Section4),Loss Reflectivity as shown in (Section 4.1), Reflection Coefficient as shown in (Section 4.2), complex permittivity($\varepsilon''$) as shown in (Section 4.3),complex permittivity($\varepsilon'$) as shown in (Section 4.3).

**Experimental Part**

In order to measure the microwave properties of the composite materials by means of Vector Network Analyzer (N5230C Agilent PNA-L) in the waveguide method for (3-5) GHz. In this research, the following materials have been used where you work on selecting the best ratio of hardener by selecting 10 ml of polyester to be fixed for all samples and add a percentage from hardener of polyester where the number of samples to the college in this work is (4) samples, is hardener in fixed percentage (0.1,0.2,0.3,0.4) wt.% . To choose the best ratio to be fixing in all samples After completing the samples required to select the appropriate ratio, the hardness of the samples was measured using the hardness measuring device (Shore-A)[16,17] ,Where the hardness of the samples was (71, 70, 69, 68) so the first ratio was chosen based on the hardness measurements to be constant in all samples a first sample was then two step for work the second sample by adding a chlorophyll with different weight ratios (0.2, 0.4, 0.6, 0.8) wt.% where the best chlorophyll was selected based on optical characteristic measurements using a device(UV-Spectrophotometer) to select a sample with high absorption and transmittance of up to 60% for visible light where selection of the first sample with a concentration (0.2)wt.% of chlorophyll was then three step for work the three sample by adding a Lead oxide (PbO,>100nm) with different weight ratios (0.1, 0.3, 0.5) wt.% where the best PbO ratio was selected based on optical characteristic measurements using a device (UV-Spectrophotometer) to select a sample with high absorption and transmittance of up to 60% for visible light where selection of the three sample with a concentration (0.5)wt.% of PbO was then four step for work the four sample by adding a best ratio of chlorophyll with best ratio of PbO and then The samples were then prepared and configured to test the microwave absorption using a device Vector Network Analyzer (N5230C Agilent PNA-L) where the samples were cut by 1 cm based on the size of the required waveguide.

**Vector Network Analyzer(VNA)**

Before the network analyzer, determining the reflection coefficient of a circuit required you to manually calculate the phase of the reflection coefficient one frequency at a time on a piece of paper. This manual
process required youth first find the maxima and minima of the standing voltage wave in a slotted line and repeat this process for all frequencies of interest. It is safe to say that if the vector network analyzer (VNA) had not been created, the high frequency community would look very different today. Today, the VNA characterizes high-frequency passive and active devices in their linear mode of operation by measuring their network parameters, called S-parameters, as a function of frequency. Over time, VNAs have been extended in hardware and in capability to also measure noise parameters and nonlinear characteristics, including compression, intermodulation, and hot S22 measurements. As a result, the VNA evolved into.

**Result and Discussion**

**The optical microscope**

Figure (1) show the images of (Pure, Cl, PbO, Cl+ PbO) nanocomposites materials by two magnification power, taken for samples at magnification power(10x). However, shows a clear difference to the samples as shown in the pictures. When addition proportions of Cl in films composites, the chlorophyll form a continuous network inside the polymers. When addition proportion of (PbO) nanoparticle continuous network inside the polymers and best film. This network has paths where charge carriers are allowed to pass through the paths, causing a change in the material properties. This is consistent with the results of researchers.

Fig. 1: Photomicrographs (10X) for (Pure, Cl, PbO, Cl+ PbO) composite materials

3.2 Fourier Transforms Infrared Spectroscopy Testing (FT-IR)
The Fourier transforms infrared spectroscopy (FT-IR) spectra of pure (pure, pure-Cll, pure-PbO, pure-Cll-PbO) and doped films are shown as Table (1).

**Table 1: (FT-IR) spectra of pure (pure, pure-Cll, pure-PbO, pure-Cll-PbO)**

<table>
<thead>
<tr>
<th>1- pure (polyester-hardener)</th>
<th>10ml- 0.1 wt.%</th>
<th>Fig.3(A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2- pure-Cll</td>
<td>0.2 wt.%</td>
<td>Fig.3(B)</td>
</tr>
<tr>
<td>3- pure-PbO</td>
<td>0.5 wt.%</td>
<td>Fig.3(C)</td>
</tr>
<tr>
<td>4- pure-Cll-PbO</td>
<td>(0.2,0.5) wt.%</td>
<td>Fig.3(D)</td>
</tr>
</tbody>
</table>

All spectra exhibit the characteristic absorption bands of pure. It can be noticed that some observable changes in the spectral features of the samples in the range (1718–1068) cm\(^{-1}\) (fingerprint region) apart from new absorption bands and slight changes in the intensities of some absorption bands. The new bands may be correlated likewise with defects induced by the charge transfer reaction between the polymer chain and the nanomaterials. The vibrational peaks for pure at (3254.63, 2907.09, 2852.73, and 1083.93) cm\(^{-1}\) are assigned to O–H stretching, C–H stretching, C=O stretching, C–H bend of CH\(_2\), and CH rocking of (pure-Cll), respectively and another vibrational peaks for concentrations of nanocomposites. further, the vibrational peaks found in the range (1718-1068) cm\(^{-1}\) may be attributed to nanoparticles with polymers which indicate that nanoparticles doped in the (Cll, PbO) polymers matrix.
Loss Reflectivity

Fig. (4), show that the loss of reflectivity in the first sample without the addition (pure) of the fries are few the greatest loss of reflectivity is confined to frequencies (3-3.2) GHz is limited ((-50- (-39) dB) but after the addition of chlorophyll(II) for the Sample in the case observed The energy of reflection at frequency (4.5-3.5) GHz equal ((-30 - (-43) dB). The greatest loss of reflection energy is limited ((-30- (-43) dB)

The greatest loss of reflection energy is limited (-43dB) at frequency (3.15) GHz There are values ranging (-24dB, -15dB) at frequencies (3.5-3.8) GHz and add the addition of lead oxide(PbO) The greatest loss of reflectivity is confined to frequencies (3-4) GHz is limited ((-33- (-35)) dB and add the addition of lead oxide(PbO) with chlorophyll(CII) The greatest loss of reflectivity is confined to frequency (3.7) GHz is limited (-49) dB .This means that there is high absorption of microwaves in range (3-5) GHz.

Fig. 4: Shows the reflection Coefficient with frequency when (pure, CII, PbO, PbO+CII) receptivity

Reflection Coefficient

In order to obtain materials with high attenuation of the electromagnetic waves, the coefficient of reflection should be reduced to the lowest possible value. As shown in Figure (5), the relationship between the reflection coefficient of the prepared materials where we observe that the behavior of the reflection coefficient is similar to the extent A large measure between the loss of energy reflection and frequency where we note that the lowest value of the reflection coefficient corresponds to the highest value of the loss of reflection energy and this is the axioms because the coefficient of reflection is calculated through the relationship.

\[ RC = 20 \log (\Gamma), \] where \( \Gamma \) represents the loss of reflective energy of the fallen beam. Thus, we have obtained materials with low reflection coefficients that can be used as electromagnetic wave modifiers in the (3-5) GHz package.
Fig. 5: Shows the loss of reflection energy with frequency when (pure, CII, PbO, PbO+CII) receptivity

Complex permittivity ($\varepsilon_R \varepsilon'_R$)

Fig. (6), show the behavior of complex Permittivity with frequency in the restricted range of (3-5) GHz where we observe that the behavior is similar to the behavior of the attenuation coefficient because the calculation of compound permutation was calculated using the attenuation coefficient. Where we note the values at frequency (4) GHz when (pure, CII, PbO, CII+PbO) is ($\varepsilon_r = (10.26, 13.12, 9.2)\varepsilon'_r = (10.26, 13.12, 9.2)$) respective.
Conclusions

In this study, it is possible to use composite materials to attenuate the microwave waves and absorb them completely. The results showed that the susceptibility of these materials to the absorption of microwaves is large, up to 90% observed and obtained high absorption so that the material is used to disperse these waves and reduce the impact on people, which can be used for screen mobile and as is known, the mobile produces electromagnetic radiation may be harmful to humans because of thermal effects, especially on the eye as well as mobile towers And the towers of the Internet and wireless communications send these waves within the range of frequencies (3-5)GHz so the use of this material for screen mobile to absorbs all these waves and attenuate, which is reflected positively on human life.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College Education for pure science, Iraq and all experiments were carried out in accordance with approved guidelines.

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Knowledge, Attitudes, Practices, and the Factors that Influence Breastfeeding among Mothers attending a Primary Health Center in Sulaimani City

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Abstract

This study was performed to assess knowledge, attitudes, and practices towards breastfeeding and identify factors impacting this practice among mothers. A descriptive case-series study was carried out among 220 mothers who had a child less than 2 years, in Ibrahim Pasha Health Center in Sulaimani city, between the 9th of August 2018 and 20th of November 2018. The convenience sampling method was used to select the subjects. Mean age of the mothers was 29.37 years. More than half (56.8%) of the mothers were encouraged for breastfeeding, the main encouragement factors were husbands, medical staff, and other families (45%, 22%, and 15% respectively). More than one third (37.7%) of the mothers ceased breastfeeding, the main motives were producing insufficient milk, child refusal and child’s disease (31%, 25%, and 17% respectively). The association between mode of delivery and types of feeding was statistically significant (P=0.028); exclusive breastfeeding was high in the normal delivery group. Overall, the mothers had a good knowledge and a positive attitude toward breastfeeding. Only 30.5% of the mothers started breastfeeding within the first hour after labour. An extreme number (95%) of the mothers fed colostrum to their baby. Merely 30.5% of the participants fed their babies exclusively.

Keywords: Breastfeeding, Knowledge, Attitudes, Practices, Factors, Primary health center.

Introduction

Breastfeeding is an essential public health approach for improving infant and child morbidity and mortality, reducing maternal morbidity, and supporting to control health care costs (1). Breast milk is a complex, living ideal nutritional fluid that contains antibodies, enzymes, hormones, and perfect nutrients for healthy growth and development (2). In newborns, it promotes the growth, development of cognitive skills and the immune system. Furthermore, it diminishes the risk of sudden infant death syndrome (SIDS), type 1 diabetes, and many other diseases. Besides, it decreases the mother’s risk of developing breast cancer (3). Studies have revealed that breastfeeding during the initial stages of a child’s development, motivates the immune system and enhances the child’s responses to vaccination. Reduction in the incidence of respiratory infections, gastrointestinal diseases, ear infections and improvements in teething have been noticed in children who have been breastfed exclusively for six months or more (4).

Breastfeeding should be begun within the first hour after birth, and it contains the feeding of colostrum that is recommended by world health organization (WHO) as the ideal food for the newborn (5). Breastfeeding should be introduced exclusively in the first 6 months, and to be prolonged for 2 years and beyond with other sufficient sources of nutrition. However, the practice of breastfeeding, particularly exclusive breastfeeding in the first 6 months, stays very low in most countries (3).
In the western countries, there have been risen trends of breastfeeding in the last few years. On the other hand, there has been a drop in breastfeeding in the developing countries \(^5\). Additionally, little is known about breastfeeding and obstacles women experience in the Middle East \(^6\). This study was conducted to assess knowledge, attitudes, and practices of the respondent mothers as well as to identify the factors that influence women’s decision and ability toward breastfeeding.

**Subjects and Method**

**Subjects and study design**

A descriptive case-series study was undertaken from the 9th of August 2018 to 20th of November 2018 in Ibrahim Pasha Health Centre in Sulaimani city which was highly visited by mothers. The convenience sampling method was used for the selection of the subjects. The current study involved 220 mothers. The sample size was dictated by depending on the obtainable time for conducting the study, and the number of eligible cases who visited the set of the study. Mothers who had children less than 24 months of age and visited the Ibrahim Pasha Primary Health Centre/Sulaimani were eligible to participate in this study, except the conditions which breastfeeding is contraindicated; like mother suffering from cancer, galactosemia, active tuberculosis, and psychoses.

**Statistical Analysis**

Data were analyzed using the Statistical Package for the Social Science (SPSS version 22, IBM Statistics. inc) with consideration procedures to confirm the high quality of data and minimizing error. These included testing questionnaires, data entry, regularity checked all data collection and entry. The Chi-square \((\chi^2)\) test was used for comparisons among subgroups. P-value \(\leq 0.05\) was used to prove a level of significance. Quantitative and qualitative variables were respectively expressed as mean\(\pm\) 95% confidence intervals (CI) and percentage. Texts, Tables, and Figures, were used for describing the results.

**Ethical considerations**

Ethical clearance was obtained from both Sulaimani Technical Institute and General Directorate of Health in Sulaimani city for carrying out this study. The mothers were recruited for this study informed in detail about the objective of the study and they were free to participate in the study also participation was voluntary. Verbal consent was taken from the mothers. The confidentiality of the collected data was guaranteed.

**Results**

**Factors influencing breastfeeding**

Roughly three fifths (56.8%) of mothers were encouraged for breastfeeding, while (43.2%) of the mothers were not encouraged. Several factors had a role in encouraging breastfeeding; the figure demonstrates the main factors in this study were husbands, followed by medical staff, and other families (45%, 22%, and 15% respectively) (Figure 1)

**Results**

**Factors influencing breastfeeding**

Among mothers nearly two fifths (37.7%) stopped breastfeeding, several factors influenced on stopping breastfeeding; the figure illustrates that the main reasons in the current study were producing insufficient milk, the child refused, and child’s disease (31%, 25%, and 17% respectively) (Figure 2).

![Figure 1: Relative frequency of the factors encouraging breastfeeding](image-url)
Table 1: Association between mothers’ background and type of feeding for the last child

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Type of feeding for the last child</th>
<th>P value (χ² test)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exclusive</td>
<td>Mix</td>
</tr>
<tr>
<td></td>
<td>Number (%)</td>
<td>Number (%)</td>
</tr>
<tr>
<td>Mothers age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;25</td>
<td>9 (21.4)</td>
<td>29 (69.1)</td>
</tr>
<tr>
<td>25-30</td>
<td>26 (33.8)</td>
<td>48 (62.3)</td>
</tr>
<tr>
<td>30-35</td>
<td>16 (27.6)</td>
<td>39 (67.2)</td>
</tr>
<tr>
<td>≥35</td>
<td>16 (37.2)</td>
<td>26 (60.5)</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>1 (14.3)</td>
<td>6 (85.7)</td>
</tr>
<tr>
<td>Primary</td>
<td>21 (39.6)</td>
<td>32 (60.4)</td>
</tr>
<tr>
<td>Secondary</td>
<td>12 (21.4)</td>
<td>38 (67.9)</td>
</tr>
<tr>
<td>Higher education</td>
<td>33 (31.7)</td>
<td>66 (63.5)</td>
</tr>
<tr>
<td>Employment status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>15 (28.8)</td>
<td>33 (63.5%)</td>
</tr>
<tr>
<td>Unemployed</td>
<td>52 (30.9)</td>
<td>109 (64.9%)</td>
</tr>
</tbody>
</table>
A vast majority of the study participants were aware of breastfeeding and their advantages for both babies and mothers (Table 2).

**Table 2: Mother’s knowledge regarding breastfeeding (Number = 220)**

<table>
<thead>
<tr>
<th>Mother’s knowledge items</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colostrum is important for the baby to maintain immunity (True)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>True</td>
<td>215</td>
<td>97.7</td>
</tr>
<tr>
<td>False</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Unsure</td>
<td>4</td>
<td>1.8</td>
</tr>
<tr>
<td>Breastfeeding should be continued Up to 2 years (True)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>True</td>
<td>212</td>
<td>96.4</td>
</tr>
<tr>
<td>False</td>
<td>6</td>
<td>2.7</td>
</tr>
<tr>
<td>Unsure</td>
<td>2</td>
<td>0.9</td>
</tr>
<tr>
<td>Exclusive breast milk can be given during the first 6 months (True)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>True</td>
<td>198</td>
<td>90.0</td>
</tr>
<tr>
<td>False</td>
<td>14</td>
<td>6.4</td>
</tr>
<tr>
<td>Unsure</td>
<td>8</td>
<td>3.6</td>
</tr>
<tr>
<td>Exclusive breastfeeding protects a child from diarrhea (True)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>True</td>
<td>173</td>
<td>78.6</td>
</tr>
<tr>
<td>False</td>
<td>30</td>
<td>13.7</td>
</tr>
<tr>
<td>Unsure</td>
<td>17</td>
<td>7.7</td>
</tr>
<tr>
<td>Exclusive breastfeeding prevent further conception (True)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>True</td>
<td>82</td>
<td>37.3</td>
</tr>
<tr>
<td>False</td>
<td>84</td>
<td>38.2</td>
</tr>
<tr>
<td>Unsure</td>
<td>54</td>
<td>24.5</td>
</tr>
<tr>
<td>A lactating mother should take healthy food to improve the secretion of milk (True)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>True</td>
<td>219</td>
<td>99.5</td>
</tr>
<tr>
<td>False</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Unsure</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Wash each breast with warm water before breastfeeding (True)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>True</td>
<td>203</td>
<td>92.3</td>
</tr>
</tbody>
</table>
Maternal attitudes toward breastfeeding

Overall, the study respondents had a positive attitude toward breastfeeding, while only 46.8% of mothers believed that breastfeeding had no impact on going to work and breast shape (Table 3).

Table 3: Maternal attitudes towards breastfeeding (Number = 220)

<table>
<thead>
<tr>
<th>Mothers’ attitudes items</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>The benefits of breastfeeding last only as long as the baby is breastfed (Disagree)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>73</td>
<td>33.2</td>
</tr>
<tr>
<td>Disagree</td>
<td>126</td>
<td>57.3</td>
</tr>
<tr>
<td>Unsure</td>
<td>21</td>
<td>9.5</td>
</tr>
<tr>
<td>Breastfeeding prevent going to work (Disagree)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>111</td>
<td>50.5</td>
</tr>
<tr>
<td>Disagree</td>
<td>103</td>
<td>46.8</td>
</tr>
<tr>
<td>Unsure</td>
<td>6</td>
<td>2.7</td>
</tr>
<tr>
<td>Breastfeeding can enhance intimacy between mother and child (agree)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agree</td>
<td>213</td>
<td>96.8</td>
</tr>
<tr>
<td>Disagree</td>
<td>7</td>
<td>3.2</td>
</tr>
<tr>
<td>Unsure</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Women should not breastfeed in public places such as restaurants (Disagree)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3: Maternal attitudes towards breastfeeding (Number = 220)

<table>
<thead>
<tr>
<th>Attitude</th>
<th>Agree</th>
<th>Disagree</th>
<th>Unsure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breastfeeding has an effect on the care of other family members and marital relationship (Disagree)</td>
<td>61</td>
<td>155</td>
<td>4</td>
</tr>
<tr>
<td>Breast milk is the ideal food for babies (agree)</td>
<td>217</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Formula milk is more easily digested than breast milk (Disagree)</td>
<td>14</td>
<td>193</td>
<td>13</td>
</tr>
<tr>
<td>Formula milk is as healthy for an infant as breast milk (Disagree)</td>
<td>15</td>
<td>202</td>
<td>3</td>
</tr>
<tr>
<td>Formula feeding is more convenient than breastfeeding (Disagree)</td>
<td>83</td>
<td>135</td>
<td>2</td>
</tr>
<tr>
<td>Breastfeeding will make mother’s breast sag (Disagree)</td>
<td>82</td>
<td>103</td>
<td>35</td>
</tr>
<tr>
<td>Formula feeding is a symbol of wealth (Disagree)</td>
<td>33</td>
<td>181</td>
<td>6</td>
</tr>
<tr>
<td>Breastfeeding is old fashioned (Disagree)</td>
<td>38</td>
<td>180</td>
<td>2</td>
</tr>
</tbody>
</table>

**Maternal practices towards breastfeeding**

The result reported that 32.5% of the mothers started breastfeeding within the first hour after birth. Maximum number (95%) of mothers fed colostrum to their baby. Only 30.5% of the participants fed their babies exclusively in first six months. The range of breastfeeding frequency was between 3-26 times per day, half (50.2%) of mothers fed breast milk to their baby 8-12 times per day. Minority (12.3%) of the respondents consumed drugs for improving breast milk production (Table 4).
Table 4: Maternal practices towards breastfeeding

<table>
<thead>
<tr>
<th>Practices</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initiation of breastfeeding within the first hour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(number 209)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>68</td>
<td>32.5</td>
</tr>
<tr>
<td>No</td>
<td>141</td>
<td>67.5</td>
</tr>
<tr>
<td>Colostrum feeding (number 220)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>209</td>
<td>95.0</td>
</tr>
<tr>
<td>No</td>
<td>11</td>
<td>5.0</td>
</tr>
<tr>
<td>Type of feeding within the first six months of the</td>
<td></td>
<td></td>
</tr>
<tr>
<td>last child (number 220)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exclusive</td>
<td>67</td>
<td>30.5</td>
</tr>
<tr>
<td>Mix</td>
<td>142</td>
<td>64.5</td>
</tr>
<tr>
<td>Formula milk</td>
<td>11</td>
<td>5.0</td>
</tr>
<tr>
<td>The frequency of breastfeeding per day (number 209)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 8</td>
<td>76</td>
<td>36.4</td>
</tr>
<tr>
<td>8 – 12</td>
<td>105</td>
<td>50.2</td>
</tr>
<tr>
<td>≥12</td>
<td>28</td>
<td>13.4</td>
</tr>
<tr>
<td>Maternal lactation period among those stopped</td>
<td></td>
<td></td>
</tr>
<tr>
<td>breastfeeding before 24 months (number 82)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-6 months</td>
<td>64</td>
<td>77.1</td>
</tr>
<tr>
<td>6-12 months</td>
<td>13</td>
<td>15.7</td>
</tr>
<tr>
<td>12-18 months</td>
<td>6</td>
<td>7.2</td>
</tr>
<tr>
<td>Consume drugs for improving milk production</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(number 220)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>27</td>
<td>12.3</td>
</tr>
<tr>
<td>No</td>
<td>193</td>
<td>87.7</td>
</tr>
</tbody>
</table>

Discussion

Factors influencing breastfeeding

Approximately three fifths (56.8%) of mothers were encouraged for breastfeeding. Likewise, another study was indicated that the majority of the mothers were encouraged for this practice (7). Furthermore, another study demonstrated that nearly three-quarters of mothers received health education on breastfeeding benefits (3). In the present study, several factors had affected in encouraging breastfeeding; main factors were husbands, medical staff, and other families, while a study showed the main sources of health education on breastfeeding were physicians and nurses (3). Similarly, a result of a study revealed that mothers were encouraged for breastfeeding by medical staff, another family, and husbands (7). Moreover, a result of a study revealed that the main source of information was health institution, friends and mass media (8).

Association between mothers’ background and type of children feeding

The present study showed that there was no statistically significant association between age of mothers and methods of children feeding, this finding is consistent with the results of two other studies were conducted in Nigeria, and Morocco (9, 10). However, the frequency of exclusive breastfeeding higher among mothers with high education level in comparing with other education levels, but this relationship was not statistically significant. Conversely, two studies found a significant association between exclusive breastfeeding and the mother’s education (9, 10).

Mother’s knowledge regarding breastfeeding

The bulk of the study participants were aware of breastfeeding and their benefits for both children and their mothers, our finding is in agreement with the results of two former studies were conducted in Saudi Arabia, and India (3, 11).

Maternal attitudes towards breastfeeding

Totally, the mothers had a positive attitude toward breastfeeding; this result is consistent with the result of a study was conducted in Saudi Arabia (1). While more than half of the mothers believed that breastfeeding prevents going to work. Likewise, a study found that roughly two-fifths of mothers believed that formula feeding is the better choice than breastfeeding if the mother plans to return to work (11). Approximately two-fifths of the respondents believed that breastfeeding will make mother’s breast sag. Similarly, two prior studies
reported that more than half of mothers believed that breastfeeding cause breast sag.\(^{4,12}\)

**Maternal practices towards breastfeeding**

The result reported that merely 32.5% of the participants initiated breastfeeding within the first hour after birth. Likewise, a study indicated that 28.7% of mothers started breastfeeding immediately after delivery\(^ {8}\). While another study reported that 71.2% of mothers initiated breastfeeding within the first hour after delivery\(^ {13}\). Our result could be explained from the fact that more than three fifths of mothers delivered their baby through caesarean section. A study revealed that mothers delivering their infants through caesarean section run a 1.38 times greater risk of having difficulties with breastfeeding in comparison to mothers delivering their neonates vaginally\(^ {14}\).

**Conclusions**

The main encouragement factors for breastfeeding in this study were husbands, medical staff, and other families, while the main discouraging factors were producing inadequate milk, child refusal, and the child’s disease. The minority of the respondents used drugs for improving their breast milk production. Caesarean delivery negatively affected breastfeeding practices. Nevertheless, the majority of the mothers had a good level of knowledge and positive attitude toward breastfeeding, but they were not translated into practices, less than one third of the participants fed their babies exclusively.

**Ethical Clearance:** Obtained obtained from both Sulaimani Technical Institute and General Directorate of Health in Sulaimani city.

**Financial Disclosure:** Self

**Conflict of Interest:** Nil

**References**


Molecular Typing of *Malassezia* and *Histoplasma* in Bronchoalveolar Lavage Fluid from Patients with Pulmonary Respiratory Infections

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Abstract

Pulmonary infections caused by fungal infection is one of the general serious lung disease. Its symptoms and risk vary from controlled to fatal if not treated early. The aim study isolation and identification of *Histoplasma* and *Malassezia* inhabitant lung of patients pulmonary respiratory infections. A total of 103 clinical samples were collected from the patients who attenuated the Thoracic and Respiratory Diseases Center, Tebba National Hospital and Morjan Educational Hospital in Babylon province. The samples were taken under the supervision of the physician after diagnosis of pulmonary diseases such as Tuberculosis, Pulmonary fibrosis, lung cancer, asthma, Thoracic Allergy. Lop full of bronchoalveolar lavage fluid (BAL) were Direct cultured on Sabouraud’s Dextrose Agar (SDA), microscopically and molecular identification was performed based on used specific primer pairs for *Histoplasma* and *Malassezia*. The results shown identification many yeast and molds based on cultural and molecular assay shown: A 438 out of 500 isolates of yeast were identified as *Candida* spp., 27 isolates of *Malassezia* spp. and other filamentous fungi such as Zasmidium cellare, *Aspergillus* spp., *Penicillium* spp., *Fusarium* spp., *Mucor* sp., *Alternaria* spp., *Acremonium* sp. and *Cochliobolus kusanoi*.

Key wards: Pulmonary diseases, lavage samples, molecular assay, Histoplasma, Malassezia.

Introduction

The lung exposes of chronic infection with some fungi such as *Candida*, *Histoplasma*, *Malassezia* and others molds, these fungi are capable of causing self-limiting pneumonia when inhaled. *Malassezia* species and pneumonitis have been described in children and adults with central venous catheters and in patients with preceding surgery⁸. Thus, they exist at the vary interface between commensal and pathogen such as, their interaction with the human immune system is of great interest.³. Histoplasmosis is a pulmonary fungal disease that inhales the airborne infectious conidia of the dimorphic fungus, *Histoplasma capsulatum*⁶. This yeast may causes acute pulmonary disease, disseminated disease, chronic pulmonary disease and fibrosing mediastinitis¹⁰. The aim of the study was to determine the lung fungal infections, particularly pathogenic yeast, in patients with chronic pulmonary diseases based in lavage samples and molecular diagnosis of fungal isolates based on culturing sample methods.

Material and Method

A total of 103 samples of sputum and bronchoalveolar lavage fluid (BAL) (39 sputum, 64 lavage) were collected over an approximate 6 months era from October 2018 to April 2019. Clinical samples was collected from patients who were consulted for chest respiratory diseases from Morjan educational hospital, Tebba respiratory center, advisory clinical for respiratory disease in Babylon province, Iraq. All samples were taken...
from the patient under the supervision of the concerned physician. After diagnosis of respiratory infection of the patient, an aspiration sample was taken from patients with pulmonary allergies, asthma, cancer, pulmonary fibrosis, Tuberculosis (Tb) patients. The questionnaire was used for each patient and included some important information. Questioners: Age, Gender, Nature of work, Housing, Chronic diseases, Smoking, drugs uptake were performed. The samples were collected in sterile containers and the samples were directly transferred to the laboratory for culture. Each specimen was inoculated into Sabouraud’s Dextrose Agar, by stricken on SDA, with chloramphenicol, streptomycin and erythromycin then incubated at 28 °C for 2 - 7 days. The gDNA was extracted according to the PCR procedure were as previously described by The universal primer pair used in this study was ITS5/ITS4 Forward: (5'-GGAAGTAAAAGTCGTAACAAGG-3') and Reverse (5'-TCCTCCGCTTTATTGATATGC-3'), the specific primer pairs for Malassezia: Malup (5'-AGCGGAGGAAA AGAAACT-3'), Mal down primer (5'-GCACGAAAGCTCCGGAAG-3'), and For Histoplasma: HistoAF 5’-CACGCCGTGGGGGCCTGGGAGCCT-3’, HistoAR: 5’-CGGGTGTCGCCGGACACCGGGCC-3’.20

Results and Discussion

The majority of patient samples were females 53.39% (55/103), while 46.60% (48/103) males samples. The average of patients age were ranged from (11-90) in both genders. The high infection percentage was 28.72% of the total positive samples occur between (51-60 years) and the lowest percentage of infection were 1.06% occur between (81-90 years), the high incidence percentage of fungus infection was calculated in Table (1).

Table (1): Show the percentage of fungal pneumonia based on ages and genders of patients.

<table>
<thead>
<tr>
<th>Ages(years)</th>
<th>No of female samples</th>
<th>No of male samples</th>
<th>Total Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-20</td>
<td>3</td>
<td>3</td>
<td>6.38%</td>
</tr>
<tr>
<td>21-30</td>
<td>2</td>
<td>5</td>
<td>7.44%</td>
</tr>
<tr>
<td>31-40</td>
<td>8</td>
<td>2</td>
<td>10.63%</td>
</tr>
<tr>
<td>41-50</td>
<td>11</td>
<td>7</td>
<td>19.14%</td>
</tr>
<tr>
<td>51-60</td>
<td>16</td>
<td>11</td>
<td>28.72%</td>
</tr>
<tr>
<td>61-70</td>
<td>7</td>
<td>10</td>
<td>18.08%</td>
</tr>
<tr>
<td>71-80</td>
<td>4</td>
<td>4</td>
<td>8.51%</td>
</tr>
<tr>
<td>81-90</td>
<td>1</td>
<td>-</td>
<td>1.06%</td>
</tr>
<tr>
<td>Total</td>
<td>52</td>
<td>42</td>
<td>100%</td>
</tr>
</tbody>
</table>

The result shown a total 500 isolates of yeast (85.61%), Candida spp. were the most frequent yeast with 438 isolates (83.05%), followed by Malassezia spp. with 27 isolates (5.4%), with 1 isolate of Histoplasma spp. and 21 isolates of Zasmidium cellare in its yeast form. While the fungi isolates were 84 isolates (14.38%) Table(2).
Table (2): list and frequency percentage of isolated clinical yeasts and their numeral based sources (BAL and Sputum).

<table>
<thead>
<tr>
<th>Isolated fungi</th>
<th>Number of isolates / clinical case</th>
<th>Percentage of frequency %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BAL</td>
<td>Sputum</td>
</tr>
<tr>
<td>Candida albicans</td>
<td>22</td>
<td>53</td>
</tr>
<tr>
<td>C. dubliniensis</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>C. glabrata</td>
<td>48</td>
<td>3</td>
</tr>
<tr>
<td>C. krusei</td>
<td>85</td>
<td>66</td>
</tr>
<tr>
<td>C. tropicalis</td>
<td>67</td>
<td>3</td>
</tr>
<tr>
<td>C. parapsilosis</td>
<td>55</td>
<td>24</td>
</tr>
<tr>
<td>Cryptococcus cellulolyticus</td>
<td>9</td>
<td>-</td>
</tr>
<tr>
<td>H. capsulatum</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Malassezia furfur</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>M. symopadialis</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Malassezia spp.</td>
<td>20</td>
<td>4</td>
</tr>
<tr>
<td>Saccharomyces mikatae</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Zasmidium cellare</td>
<td>21</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>500</td>
<td></td>
</tr>
</tbody>
</table>

These molds isolated in this results Table (3) referred to roles in infection and causes Fusariosis,18. The experiment had been given us that Aspergillus spp. were high frequently such as A. fumigatus, A. niger, A. oryzae, A. flavus and A. ochraceas, and its compatible with9. Several scientist(5, 17) spotted that most repeated species which effect and lead to pulmonary infection were A. fumigatus, A. flavus, A. niger and A. terreus which we disagree with them too for having A. niger as a second frequent species. Penicilliosis high frequency was and this is consonant with the study of 15.
Table (3): list and frequency percentage of clinical fungi and their numeral based sources (BAL and Sputum).

<table>
<thead>
<tr>
<th>Isolated fungi</th>
<th>Number of isolates per clinical case</th>
<th>Percentage of frequency %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BAL</td>
<td>Sputum</td>
</tr>
<tr>
<td>Aspergillus achraceas</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>A. flavus</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>A. fumigatus</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>A. niger</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>A. oryzae</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Acremonium sp.</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Alternaria spp.</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Alternaria alternaria</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>A. metachromatica</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Cochliobolus kusanoi</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Fusarium sp.</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Mucor sp.</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Penicillium chrysogenum</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Penicillium commune</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Penicillium sp.</td>
<td>-</td>
<td>9</td>
</tr>
<tr>
<td>Non identified fungi</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>84</td>
<td>100%</td>
</tr>
</tbody>
</table>

PCR Ribotyping of fungi depending on ITS region:

The results have successfully identified the targeted fungi and yeast based on amplification part of rDNA region by the primer pair ITS5 and ITS4 as in Figure (1).
Identification results of Histoplasmosis using PCR technique

The targeted species have been successfully identified using *Histoplasma* spp. primer pair: HistoAF, HistoAR. The species have been identified on a molecular weight (516bp). (data not shown).

PCR typing of the LSU rDNA region by using Mal primer pair

The results of PCR amplification of DNA from colonies of *Malassezia* species were successfully accomplished PCR-typing method for part of the LSU rDNA region by using the *Malassezia* specific primers. All *Malassezia* spp. gave monomorphic bands, approximate 605bp of PCR products Figure (2). This results similar to same results of 14 and 2.

As we mentioned that *Malassezia* spp. is not well described or discovered only view studies explained it such as
as we mentioned explained it in infants and Aguirre (2011) explained the fungemia of *Malassezia* spp. in Iraq there were no studies described it as a lung infection, patients with *Malassezia* spp. were in chronic conditions such as lung cancer or TB infection or were in a long term of drugs or antibiotics therapy such as antibacterial and antifungals.

Frequency of this yeast (*Malassezia*) in our patients samples were high as a second frequent yeast isolate and it was higher than the observation of the mentioned researchers. Infected with many lung infections leads to long terms of therapy which leads to weakness of patients immunity and this leads to the wide spread of fungal infection more widely and more dangerous and leads to one of the patient’s death causes, beside many of these fungi causes fungemia and as the lung fluid is enrich with materials that help increase growth and infection.

At the final, this study had been faced many problems; like collecting the samples was on a level of difficulty specially for BAL samples like suffering the unavailability of samples easily and quickly, sometimes the lack of response of medical staff, the presence of patients with these diseases, waiting for long time, required the presence of surgical intervention to obtain these samples, sometimes not responding to the patient and not giving samples or information about his or her illness or health status, the risk of dealing with this type of samples in relation to patients with Tuberculosis (TB) as well as BAL samples for the presence of blood and bodily fluids that are likely to carry viruses or dangerous bacteria that causes series infections like Hepatitis etc.

Likewise the interference and coexistence between yeast species leads to the difficulty of purifying and isolating the yeasts from each other and identification or diagnosing it accurately. Finally the lung diseases that occur due to fungi need to have a higher concentration and give it more importance especially within the Iraqi medical field because all of these infections lead to serious troubles (infections) besides in many cases lead to death.

**Ethical approval**: Both authors hereby declare that all actions have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

**Conflict of Interests**: The authors did not declare any conflict of interest.

**References**


Genotyping Tinea Capitis Fungi and Evaluate the Antifungal Activity of Plant Extract in Vitro

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1 M.Sc. 2 Prof. Dr. Biology Department, College of Science for Women, University of Babylon, Babylon Province, Hilla, Iraq

Abstract

Tinea capitis is a prevalent superficial fungal infection seen in developing nations predominantly in child, the aim of this study included isolating and identification of Tinea capitis fungi isolated from clinical samples who attenuate the outpatient clinics and other samples were collected from soils of barber shops, homes and mosques in Babylon / Hilla Province. 120 hairs, scales and soil were 80 clinical samples (hairs and scales), 30 soil samples, and 10 hair samples as control group. The results showed that: numbers of dermatophytes fungi were identified based on microscopic and Molecular criteria. T. mentagrophytes, T. tonsurans, M. audounii, M. canis. Also non dermatophytes fungus was Chaetomium globosum. Also three yeast species were identified: Candida albicans, Candida parapsilosis, Malassezia spp. based on molecular assays. The antimicrobial activity of plant extract antifungal shown, Capparis spinosa plant has highly antifungal activity shown inhibition on dermatophytes, followed by Furcraea foetida shown inhibition compare with activity of Fluconazole in vitro.

Key wards: Genotyping, Tinea capitis, Dermatophytes, Antifungal activity, Plant extract

Introduction

Dermatophytes are known as ring worm, dermatophytosis and Tinea (9,5). Approximately 10-15% of the world’s population has been found to have fungal infections 22. Tinea capitis is a scalp skin-attacking disease that attacks hair follicles and shafts and causes eyebrow infection. The disease is regarded a shallow mycosis or dermatophytosis form.

Tinea capitis ‘ epidemiology differs across distinct geographic regions around the globe, and the species may alter in any specified region. Hot tropical humid climates, low socioeconomic status, crowded living conditions, and bad hygiene lead to Tinea capitis ‘ enhanced incidence. It is highly communicable and may reach epidemic proportions especially in overcrowded setups (16,8). The aim of study conduct molecular typing of suspected fungi were associated with Tinea capitis samples, and those isolated from patients, and from soils of barber shops, Assessment of the effectiveness of plant extract antifungal activities and assessment of the effectiveness of conventional antifungals.

Material and Method

Collection of Specimens:

1. Hair and scalps: A 80 hair and scalps samples were collected in this study from all patients diagnosed with head lesions (clinical and barber shops). After that, the infection area was sterilized with 70% alcohol to remove the bacteria. Hair samples were collected using forceps and skin scraps from the scaly edge of the area using a surgical blade. The sample was transferred to the laboratory in sterile filter paper.

2. Soil: The soil of the barbers shops, house and mosques was collected and transported to the laboratory in sterile paper to be examined.

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3. Cultivation of Samples:

All clinical samples collected were cultured on SDA agar media that containing chloramphenicol (250mg/l), Streptomycin (150mg/l) and cyclohexomide (250mg/l) then all samples incubated at (28-30°C) for two weeks. Then after the result of culture appeared the samples were examined morphologically from where the color of colony, shape, texture and reverse pigment. Then maintained the samples by using a screw-cup slant on SDA and preserved while the study 20.

All samples that give positive results of Tinea capitis purified by taking a pure colony from culture media that obtain a mixed culture.

DNA extraction:

The isolates of yeast and filamentous fungi under interest were subjected to DNA extraction. In brief; a loop full of yeast colonies and tiny portion of mycelia were suspended in the lysis buffer supplemented by Favrogen Yeast Extraction Kit (Korea) and following up the extraction steps based on the instruction of this Kit. A dry DNA pellet dissolved in diluted rinse and preserved in - 20 °C until use (13, 12, 1).

The genomic DNA was extracted according to 13, The PCR procedure was as previously described by (13,12,1). The universal primer pair used in this study was ITS5/ITS4 Forward: (5′-GGAAGTAAAAGTCGTAACAAGG-3′) and Reverse (5′-TCCTCCGCTTATTGATATGC-3′), the specific primer pairs for Malassezia: Malup (5′-AGCGGAGGAAA AGAAACT-3′), Mal down primer (5′-GCGCGAAGGTGTCCGAAG-3′) 17,

Sequencing of Selected PRC Product

A 10 dermatophyte isolates PCR products were sent to Korea’s Macrogen Laboratory and obtained the positive sequence information for various species. The sequencing findings were subjected to those deposits in GenBank for sequence species identification for alignment with reference strains 11.

The Plant Extract Samples

Plant samples that used in this study, which comprised plant parts from the local markets for center of Babylon province. Then cleaned the plant from dust and impurities, Put in a flat bowl and leave to dry at room temperature, take a while, after the plants completely dry, then crashed by electric grinder well crashes 1.

Static Analysis

Statistical analysis was performed with the use of SPSS version20. ANOVA test was used to compare distinctions between variables, at a probability level (≤ 0.05).

Results and Discussion

Prevalence of dermatophytes among Tinea capitis sufferers:

A total of 120 samples, 110 samples were (80 hairs and scales and 30 soils) were collected from different age and genders of patients with Tinea capitis and 10 samples were collected by the same techniques from like healthy persons (as control samples), the clinical specimens were collected from private clinics in Babylon province and from barbers shops, the soil specimens were collected from the dust of the ground shops of barbers, houses and mosques. Identification results based on cultural and microscopic methods showed that 48 (60%) of 80 clinical samples were positive cases. The majority of the patients were males 38.75% (31/ 80) while, 21.25% (17/ 80) specimen from females. The samples of soils were 30 samples (27.27%), the results were 1(3.33%) out of 30 samples were positive case. While only one specimen shown positive out of 10 samples from control group.

The relations between the infection and age for both genders:

It had been registered the number and percentage of infected patients by Tinea capitis, depending on gender and age ,table (1) had shown the significant difference between genders and infection with this disease, the number of males (31)(64.58%) and the number of females reached (17)(27.08%) to the consultative of the dermatology.

It was clear from the current study, males infection with Tinea capitis was (64.58%) while in females (27.08%) it was found existence of significant differences of the infection in both sexes agreed with results of other researchers outside of Iraq, including 15 who concluded that the Tinea capitis is a disease common in children
and occurs in males more than females, and 19 in the city of New Delhi, India, 3 in Kenya and 2 in Palestine and 18 in South Africa, 23 in Kashmir, who found that Tinea capitis affects males more than females in their studies.

**Table (1) Distribution of age and gender among patients of Tinea capitis.**

<table>
<thead>
<tr>
<th>Age/year</th>
<th>Gender</th>
<th>Infection</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td></td>
<td>Number</td>
<td>percentage</td>
</tr>
<tr>
<td>1 – 10</td>
<td>18</td>
<td>37.5%</td>
</tr>
<tr>
<td>11 – 20</td>
<td>5</td>
<td>10.41%</td>
</tr>
<tr>
<td>21 - 30</td>
<td>2</td>
<td>4.16%</td>
</tr>
<tr>
<td>31 – 40</td>
<td>3</td>
<td>6.25%</td>
</tr>
<tr>
<td>41 – 50</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>51 – 60</td>
<td>3</td>
<td>6.25%</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>64.58%</td>
</tr>
</tbody>
</table>

Males’ sensitivity to tinea capitis. The elevated rate of tinea capitis in males can also be ascribed to simple sporal implantation owing to short hair and frequency sharing of comb, brushes and caps.

**The Identified fungi:**

A total of 11 fungal isolates have currently been identified based on evidence of morphological, microscopic, and molecular analysis. The dermatophytes were: *T. mentagrophytes, T. quinckeanum, T. tonsurans, M. audonii, M. persicolor, M. canis,* and non dermatophytes was: *Chaetomium globosum.* Also, two Candida spp. were *C. albicans, C. parapsilosis,* and *Malassezia* spp.

**Table (2): Fungal isolates from hair infected with Tinea capitis.**

<table>
<thead>
<tr>
<th>Fungal isolates</th>
<th>No. of isolates</th>
<th>Percentage of frequency</th>
<th>Males (%)</th>
<th>Females (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chaetomium globosum</td>
<td>3</td>
<td>6.52%</td>
<td>2(7.14%)</td>
<td>1(5.55%)</td>
</tr>
<tr>
<td>M. audounii</td>
<td>21</td>
<td>45.65%</td>
<td>12(42.85%)</td>
<td>9(32.14%)</td>
</tr>
<tr>
<td>M. canis</td>
<td>2</td>
<td>4.345</td>
<td>2(7.14%)</td>
<td>0(0%)</td>
</tr>
<tr>
<td>M. ferrugineum</td>
<td>1</td>
<td>2.175%</td>
<td>1(3.57)</td>
<td>0(0%)</td>
</tr>
<tr>
<td>M. persicolor</td>
<td>9</td>
<td>19.56%</td>
<td>4(14.28%)</td>
<td>5(27.77%)</td>
</tr>
<tr>
<td>T.mentegrophytes</td>
<td>1</td>
<td>2.17%</td>
<td>1(3.57)</td>
<td>0(0%)</td>
</tr>
<tr>
<td>T. quinckeanum</td>
<td>1</td>
<td>2.17%</td>
<td>0(0%)</td>
<td>1(5.55%)</td>
</tr>
<tr>
<td>T. tonsurans</td>
<td>5</td>
<td>10.86%</td>
<td>4(14.28%)</td>
<td>1(5.55%)</td>
</tr>
<tr>
<td>Unidentified fungi</td>
<td>3</td>
<td>6.52%</td>
<td>2(7.14%)</td>
<td>1(5.55%)</td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
<td>100%</td>
<td>28(60.86%)</td>
<td>18(39.13%)</td>
</tr>
</tbody>
</table>
Table 2 shows the types of dermatophytes isolated from the human, the most common isolate predominant was *M. audonii* which represent 21 (45.65%) of cases followed by *T. persicolor* 9 (19.56%). It showed the presence of differences between sex and species of the fungi isolated.

**Molecular identification**

**A. Molecular typing by ITS region:**

The particular results were 12 dermatophytes and non-dermatophytes based on the rDNA region ITS1-5.8S-ITS2, 28S partial sequence). The dermatophytes were: *Microsporum* spp; *Trichophyton* spp.; *Cheatomum* spp., *Candida* spp.; and *Malassezia* spp. Also, some isolates of molds Figure (1).

![Figure (1): Profile gel electrophoresis of PCR products of 12 dermatophyte and non-dermatophyte isolates of fungi amplified by ITS5/ITS4 primer: Lanes (left to right): isolate of 1- *M. audouinii* (800 bp); 2, 6, 7- *Chaetomium globosum*; 3, 4 unidentified fungi (600 bp); 5- *T. mentagrophytes* (780 bp); 8, 9- *T. queckanum* (700 bp); 10- unidentified fungi; 11- *T. tonsurans* (700 bp); 12- *M. persicolor* (700 bp), these results according to sequence analysis; 13, 14 *Candida albicans* (500, 510 bp); 15- *Candida parapsilosis* Molecular M (100bp for each step.). 1.6% agarose gel at 70 volt for one hour.](image1)

There are high variations in PCR products among of fungi under interest as in used ITS5 / ITS4 as primer pair for amplification of ITS region. ITS region consider good barcoding region due to high variation for another ward the amplification of this region show high polymorphism in PCR product. (*Chaetomium globosum*, *M. audouinii*, *M. canis*, *M. ferrugineum*, *M. persicolor*, *T. mentagrophytes*, *T. quinckeaneum*, *T. tonsurans*) these range not always require for other specific genetic analysis.

Shown that all *Malassezia* spp., shown monomorphic bands, approximate 605bp of PCR products. Figure (2), these results consistent with 17.

![Figure (2): Electrophoresis gel profile of PCR amplification products. All samples yielded a single band of approximately 605 bp.:1-3 isolates of *Malassezia* spp. Molecular marker: M1= (100bp).](image2)

The current study agreed with 7 concluding that *M. Globosa* appears to be the most prevalent pathogen responsible for Tinea capitis, as well as, also *M.furfur* identified one of causative agent to cause Tinea capitis 21.

**DNA sequence analysis:**

About 16 μl of PCR products were sent to Macrogen Laboratory in Korea for sequencing analysis. After the sequence results had been obtained, each sequence alignment with the sent isolate’s nitrogen bases sequence. They correspond to reference sequencing samples in the gene bank using NCBI Blast Nucleotide.

![Figure (3): Phylogeny construction for all identified isolates based on sequence charts with one reference strain (marked with the accession number, while our isolates have full names).](image3)
Antifungal Activity of Some Plant aqueous extracts against dermatophytes spp.

Figure (4): Inhibition growth of aqueous plant extracts compared with the antifungal fluconazole, A. Water as control treatment, B. Effect of Capparis plant, C. effect of Furcraea plant, D. effect of the antifungal Fluconazole.

In recent study 3 isolates of dermatophytes are used to study the effectively of this plants extracts, the concentration of plant aqueous extracts was (5%). The plant extracts showed inhibition of dermatophyte growth, the aqueous plant extract from Capparis gives the highest inhibition zone respectively followed by plant extract from Furcraea, while the antifungal fluconazole was less inhibited compared to those plants. The sensitivity of fungus Figure (5).

Figure (5) Comparison of antifungal agents activity between plant type (Capparis, Furcraea) and Fluconazole dermatophytes growth. The species of dermatophytes were (f1: T. tonsurans, f2: M. ferrugineum, f3: M. audonii).
Figure (5) shown that the dermatophytes strains shown significant difference of response, the highest effect of inhibition was *Capparis* and *T. tonsurans* the most fungus in response to the extract was the mean (4 cm) followed by *M. ferrugineum* (3.8 cm) and *M. audonii* (3.2 cm). *Furcraea* was less inhibited than *Capparis*; *M. audonii* was the highest fungus in response to (2.4 cm) of the plant while *T. tonsurans* and *M. ferrugineum* equal response (1.7 cm). Fluconazole was the least fungal response compared to plants and *T. tonsurans* was the highest fungus in response to antifungal (1.8 cm), followed by *M. audonii* (1.7 cm) *M. ferrugineum* the lowest fungus (11.6 cm). There were significant differences between *Capparis* plant and *Furcraea* and Fluconazole, while *Furcraea* showed no significant differences between it and the antifungal.

The conclusion of this study gave attention that particular study about Tinea capitis more producible in their result compared with survey studies of dermatophytes and non dermatophytes fungi in whole human body. The results of our study after isolated and identified 8 dermatophyte and non-dermatophyte fungi and 3 yeasts. The antifungal activity of plant extract of *Capparis* and *Furcraea* plants shown highly inhibition compared with Fluconazole, this result was light on uses natural product more effective and revealed rise of Fluconazole resistance by dermatophytes.

**Ethical Approval** : Both authors hereby declare that all actions have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

**Conflict of Interests** : The authors did not declare any conflict of interest.

**References**


Nurse’s Practices toward Nursing Intervention of Diagnostic Procedures at Neuro Surgical Hospitals in Baghdad City

Wafaa Abd Ali1, Widad K. Mohammod2

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Abstract

The study aims to evaluate nurses’ practices toward nursing intervention of diagnostic procedures at Neuro Surgical Hospitals, and to find-out the relationship between Nurses’ practices with their Socio-demographic characteristic of age, gender, and education level. A quantitative research approach has been used for this study design starting from December 7th, 2017 to September 2nd, 2019. A purposive sample was adopted including (50) male and female nurses as participants. They were working at Neuro surgical Hospitals. The study Instrument was composed of two Parts: The First Part is concerned with the socio-demographic characteristics, and the second Part includes Nurses’ Practices. Content validity of the instrument was established through a panel of (11) experts. Results have been analyzed through the use of SPSS “Statistical Package for Social Sciences” model 24.0 by using descriptive and inferential statistical methods. Findings of the present study revealed that most of the samples were within the age of (35-44) years who were accounted (34%). The age group of (25-34 years) represent (32%). 24 percent of the study sample were (45-54) years old, and only five nurses were within the age group of (18-24) years old.

Key word: Nurses, practice, diagnostic procedures, neurosurgical.

Introduction

Patients with various neurological dysfunctions can perform several diagnostic studies to detect health problems, such as EEG, EMG, MRI, and CT scan. Nurses have several roles to deliver healthcare services for neurological patients, including educating patients about the aims, to be expectations, and the side effects preceding testing. Moreover, other healthcare conditions required special considerations before performing neurological exams, including women using contraception breast-feeding women. Nurses should note results, disease progression, and patients’ response to therapy (1,2,3).

Material and Method

A quantitative research approach has been used for this study. The quasi-experimental design (pre-test and post-test) was conducted on nurses who work at neurosurgical hospitals towards selected educational program. It was conducted with application of pre-test and post-test approach to evaluate nurses’ practices regarding impact of educational program upon nursing intervention of diagnostic procedures, in addition to the application of education program. It was carried out in order to achieve the initial stated objectives. The study started from December 7th, 2017 to September 2nd, 2019. Participants were verbally informed about the aims of the study and had been asked to participate voluntarily. They also had been informed that they could refuse to answer a certain question or withdraw from the study at any time. Emphasis was placed on creating a suitable environment during interview using good communication skills with participants. The researcher constructed the questionnaire thorough reviewing of previous literature and related studies. The study instrument comprised of two parts; Socio-Demographic Data which was comprised of six items relative to the gender, age, educational status, years of experience, training of program, and number of training courses; and Nurses’ practices Form which was comprised of (35) items that concerned with nurses’ practices to evaluate nursing intervention of diagnostic Procedures at neurosurgical hospitals. Content validity for the early
developed program and the study instruments were determined using panel of (11) experts. A preliminary copy of the program and questionnaire was designed and presented to (11) experts for the determination of its validity. They were (8) faculty members from College of Nursing – University of Baghdad, (3) faculty members from Neuro Surgical Hospitals in Baghdad city. A purposive sample of (10) nurses was selected from diagnostic procedure units of working in neuro surgical hospitals to achieve the purpose of pilot study. It was applied on the nurses who had the same criteria of the original study sample and started from December 9th, 2018 to December 23th, 2018 to determine the internal consistency of questionnaire related practices of nurses concerning nursing intervention of diagnostic procedure at neuro surgical hospital. The researcher determined the internal consistency by using test – retest through the computation of Pearson correlation coefficient of the scale which was \( r = 0.88 \) for nurse’s practices \(^4\). Data were collected through direct interview with the study sample by using a constructed questionnaire. Nurses were observed while they were working in their units to provide care concerning nursing intervention by using concealed observational technique. Data were collected from February 4th, 2019 to April 3rd, 2019. The data were analyzed by using SPSS (Statistical Package for Social Sciences) version 24.0 application of the statistical analysis system. The descriptive data analysis includes Frequency (f), Percentage (%), Mean, and Standard Deviation. The inferential data analysis includes Pearson Correlation Coefficient, t-test, and ANOVA Table test with significance of p value \( \leq 0.05 \).

## Results

Table (1): Distribution of Nurses by their Demographic Characteristics

<table>
<thead>
<tr>
<th>No.</th>
<th>Demographic Characteristics of Nurses</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Gender</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>50</td>
</tr>
<tr>
<td>2</td>
<td>Age</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>18-24</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>25-34</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>35-44</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>45-54</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>50</td>
</tr>
<tr>
<td>3</td>
<td>Educational Attainment</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>Nursing College Graduate</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Institute Graduate</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Nursing Secondary School Graduate</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Nursing Primary School Graduate</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>50</td>
</tr>
<tr>
<td>4</td>
<td>Years of Experience</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>1-5 years</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>6-10 years</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>11-15 years</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>16-20 years</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>21 and more</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>50</td>
</tr>
</tbody>
</table>
It is clear from the table (1) of demographic characteristics for nurses, that the majority of the study sample are females (52%) and the remaining are male. According to their age group, the majority of the sample within the age group of (35-44) years who are accounted (34%). The age group of (25-34) years accounted for (32%). Twelve’s of the study sample are (45-54) years old who are accounted (24%), and only five nurses are within the age group of (18-24) year who are accounted (10%). Relative to their education level, equal number are graduate from medical institute and nursing secondary school who are accounted (26%), college (12%) graduate and (36%) primary school graduate (Table 1). According to the subject’s years of experiences, 30% have (11-15) years of experiences, 24% have (16-20) years of experiences, 20% have (6-10) years of experiences, 18% have (5-10) years of experiences, while the remaining 8% have (21 and more) years of experiences. Concerning training session, the majority of nurses have no training session who are accounted (74%). The remaining have training session who are accounted 26% and have one session only.

Table (2): Comparison between Nurses’ Practice (pre-post) test Related to Nursing Intervention of Electromyography

<table>
<thead>
<tr>
<th>GRAND mean of scores for nurses practice related to EMG items</th>
<th>EMG n=11</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>pre</td>
</tr>
<tr>
<td></td>
<td>MS</td>
</tr>
<tr>
<td>1- With medication that the patient avoids, some medications that affect the nervous system can alter the results of nerve planning, such as muscle relaxants and medications used to treat mental illness.</td>
<td>2.1</td>
</tr>
<tr>
<td>2- Foods that contain caffeine, such as tea and coffee, should be avoided before the test.</td>
<td>1.6</td>
</tr>
<tr>
<td>3- Wear loose clothing, allowing the test to be carried out easily, or the patient may be given a comfortable dress for wearing in the hospital.</td>
<td>2.3</td>
</tr>
<tr>
<td>4- Avoid smoking for three hours before the test.</td>
<td>1.8</td>
</tr>
<tr>
<td>5- That the patients tell the doctor the problems of bleeding or the use of blood thinners such as warfarin, or heparin.</td>
<td>2.2</td>
</tr>
<tr>
<td>6- The patient should tell the doctor if there is an ECG or if he is drinking alcohol.</td>
<td>2.1</td>
</tr>
<tr>
<td>7- Stop using skin lotions like skin moisturizers.</td>
<td>1.7</td>
</tr>
<tr>
<td>Total</td>
<td>2.1</td>
</tr>
</tbody>
</table>

Ass.=Asymptomatic significant; A.=Always (2.5 - 3); S.=Sometimes (1.50 – 2.5); N.=Never (1. – 1.50).
This table presents that there are significant differences in the mean of study sample between the pre and post-test procedure, revealing a significant improvement in nurses’ practices regarding EMG.

**Table (3): Comparison between Nurses’ Practice (pre-post) test Related to Nursing Intervention of Magnetic Resonance Imaging**

<table>
<thead>
<tr>
<th>GRAND mean of scores for nurses practice related to MRI items</th>
<th>MRI n=14</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
</tr>
<tr>
<td></td>
<td>MS Ass.</td>
</tr>
<tr>
<td>1-To reassure the patient that this procedure is painless.</td>
<td>2.3 S</td>
</tr>
<tr>
<td>2-The patient is advised to remove all metal parts and jewelry.</td>
<td>2.1 S</td>
</tr>
<tr>
<td>3-Inform the patient when testing that there is noise from radio frequency waves.</td>
<td>2.2 S</td>
</tr>
<tr>
<td>4-The nurse will continue to examine the kidney function after giving the patient the dye.</td>
<td>2.2 S</td>
</tr>
<tr>
<td>5-Make sure the patient is sensitive to the dye.</td>
<td>2.3 S</td>
</tr>
<tr>
<td>6-Encourage the patient to drink fluids after the examination and take the dye.</td>
<td>2.3 S</td>
</tr>
<tr>
<td>7-Inform the patient not to eat from (4-6) hours prior to the MRI examination.</td>
<td>1.9 S</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2.1 S</td>
</tr>
</tbody>
</table>

Ass.=Asymptomatic significant; A.=Always (2.5 - 3); S.=Sometimes (1.50 – 2.5); N.=Never (1. – 1.50).

This table presents a significant difference in the mean of the study sample between the pre and post test procedures, which reflects that there is a significant improvement in nurses’ practices regarding MRI.

**Table (4): Comparison between Nurses’ Practice (pre-post) test Related to Nursing Intervention of Computerized Tomography**

<table>
<thead>
<tr>
<th>GRAND mean of scores for nurses practice related to CT scan items</th>
<th>CT n=13</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>pre</td>
</tr>
<tr>
<td></td>
<td>MS Ass.</td>
</tr>
<tr>
<td>1-Explain method and tools briefly to the patient.</td>
<td>2.2 S</td>
</tr>
<tr>
<td>2-To reassure the patient that this procedure is painless.</td>
<td>2.1 S</td>
</tr>
<tr>
<td>3-The patient is told that the CT is with a dye.</td>
<td>2.2 S</td>
</tr>
<tr>
<td>4-Patient news that the dye is given intravenously.</td>
<td>2.2 S</td>
</tr>
<tr>
<td>5-The pathogen explains to the patient the precautions of dyeing, such as sensitivity to dye.</td>
<td>2.2 S</td>
</tr>
<tr>
<td>6-Tells the patient to remove all jewelry and pins of hair and neck.</td>
<td>2.2 S</td>
</tr>
</tbody>
</table>
7-The nurse informs the patient that he should not eat breakfast before giving the dye. 2.2 S 2.8 A
8-The nurse keeps the patient calm. 2.1 S 2.8 A
9-The nurse is sure of the test and the sensitivity test before the examination. 2.8 A 2.9 A
10-He performs kidney function tests (urea and creatinine) prior to the examination 2.1 S 2.9 A
11-Ensure that the patient is not taken for food before 4-8 hours by mouth. 2.1 S 2.8 A
12-Note any symptoms that appear on the patient such as nausea, itching, rash, allergies, headache. 2.5 S 2.8 A
13-Encourage the patient to take large amounts of fluids to get rid of the dye after the examination. 2.1 S 2.8 A
Total 2.2 S 2.8 A

Ass.=Asymptomatic significant; A.=Always (2.5 - 3); S.=Sometimes (1.50 – 2.5); N.=Never (1. – 1.50).

This table presents that there are significant differences in the mean of the study sample between the pre and post test procedures, revealing a significant improvement in nurses’ practices regarding CT.

**Table (5): Comparison between Nurses’ Practice (pre-post) test Related to Nursing Intervention of Electroencephalography**

<table>
<thead>
<tr>
<th>GRAND mean of scores for nurses practice related to EEG items</th>
<th>EEG n=12</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
</tr>
<tr>
<td></td>
<td>MS</td>
</tr>
<tr>
<td>1-The nurse reassures the patient That the move was painless.</td>
<td>2.2</td>
</tr>
<tr>
<td>2-Explain method and tools briefly to the patient.</td>
<td>1.9</td>
</tr>
<tr>
<td>3-Direct the patient to abstain from coffee, tea and chocolate to exclude dietary stimulants.</td>
<td>2</td>
</tr>
<tr>
<td>4-Urges the patient to go to sleep late.</td>
<td>1.8</td>
</tr>
<tr>
<td>5-Do not take naps before doing the examination.</td>
<td>1.8</td>
</tr>
<tr>
<td>6-The nurse will check the cleanliness of the hair.</td>
<td>2.2</td>
</tr>
<tr>
<td>7-Teach the patient not to use fat, oils or stabilizers on hair.</td>
<td>2.3</td>
</tr>
<tr>
<td>8-Urges the patient to wash his hair after the examination.</td>
<td>2.1</td>
</tr>
<tr>
<td>Total</td>
<td>2.3</td>
</tr>
</tbody>
</table>

Ass.=Asymptomatic significant; A.=Always (2.5 - 3); S.=Sometimes (1.50 – 2.5); N.=Never (1. – 1.50).
Results in table (1) presented that the sample of the study were (24) males whom accounted for (48) percent, and the remaining were females with (52) percent of the study sample. A highest proportion of the study sample (34) percent, were within age group (35 – 44) years old, and the remaining (32) percent were within age group (25 – 34), (24) percent within age group (45 – 54), and (10) percent within age group (18 – 24) respectively. Number of employees with a diploma in nursing reached (13) with (26) percent; while, 12 percent of the study sample have bachelor’s degree in nursing. Moreover, nurses who have secondary certificates were accounted for (26) percent. Those who have Primary certificates were accounted for (2) percent, and those with other certificates were accounted for (34) percent. The number of employees with years of experience (1-5) reached (9) a percentage (18%), while those with years of experience (6-10) reached (10) a percentage (20%), who had years of experience (11-15) and reached (15) a percentage (30%), and for the years of experience (16-20) reached (12) and by percentage (24%), and the last with years of experience (21 and more) reached (4) and by percentage (8%). The number of employees who took part in training session was (13) and percentage (26%), while those who did not take part in any training session reached (37) a percentage (74%). The staff who participated in training session were divided into those who participated in one session reached (7) and percentage (14%), while those who participated in two sessions reached (4) percentage (8%) , and the last with those who participated in three sessions reached (2) percentage (4%). Iannotti (2015) established a study in 12 neurocritical units on registered nurses and found that (54.54) percent of the study sample were within age group of (22 – 33) years old, and (36.36) percent were within age group of (34- 44) years old . Moreover, Iannotti (2015) reported that (90.91) percent of the study sample have (0 – 10) years of experience in neurocritical units . Table (2) presents that there are significant differences in the mean of study sample between the pre and posttest procedure, revealing a significant improvement in nurses’, practices regarding CT scan. Table (5) presents that there are significant differences in the mean of study sample between the pre and posttest procedure, which reveals that there is a significant improvement in nurses’, practices regarding EEG. The Mean knowledge related to all domain of the study for the study group participants has increased significantly in the post-test stage. In contrast, there is a minor difference in the Mean knowledge for the control group participants between pretest and posttest stage. Shehab, Ibrahim, and Abd-Elkader (2018) indicated a positive impact of an Educational Program on Nurses’ Knowledge and practice Regarding Care of neurocritical ill patients at Intensive Care Unit at Suez Canal University Hospital . The authors of this study reported a positive impact of an educational program on the total score of nurses at various concepts (p value = .001) . Elf, Carlsson, Rivas, Widnersson, and Nyholm (2019) declared that nurses play a significant role in providing care for patients undergoing EEG, which might impact the health status of patients with neurological disturbances or illnesses .

**Conclusions**

Nurses’ practices in general were poor before the implementation of an educational program in pre-test, which included their practices during the procedures. There were significant improvement in Nurses practices after the implementation of an educational program in post-test. The findings of this study indicate that the educational program for nurses was effective after the exposure to such a program, (their practice toward nursing intervention of Diagnostic procedures). Emphasis should be put on the managers of hospitals, and nursing affairs managers to monitor and follow-up, support and supervise nurses while they are working in their units. Giving the nurses of the patients’ knowledge and practices for good preparing before and after any procedure in the neurological hospitals. Emphasis is necessary on hospital managers and administrators on nursing to reward and incentive nursing staffs that are efficient and loyal in their work and to reward the good ones and punish the careless in their duties.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.
Ethical Clearance: All experimental protocols were approved under the College of Nursing and all experiments were carried out in accordance with approved guidelines.

References


Antimicrobial Study against Seven Cycles Compounds Derivatives from Pyrimidine

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¹Lecturer, ²Assistant prof., Department of pharmaceutical Chemistry/ College of Pharmacy /University of Babylon, Iraq

Abstract

The current study involves preparing newly pyrimidine derivative compound with seven membrane rings and used it to explain the antimicrobial activity of it against four isolates of four types of G+ & G– pathogenic bacteria (Staphylococcus aureus, Staphylococcus epidermidis, Escherichia coli and Klebsiella pneumonia) respectively, with two types of fungi (Aspergilus niger & Penicillium chrysogenum) by using four different concentrations (5, 10, 15 & 20 mg/ml⁻¹). The characterizations and properties of this compound have biological and pharmacological functions through the inhibition the growth of many types of organisms.

Key words: Antimicrobial activity, Schiff base, Pyrimidine.

Introduction

Heterocyclic derivatives have effective antimicrobial, anti-inflammatory and anticancer activity with different pharmacological effects. Two atoms of imine group (two-membered component) was added to maleic or phthalic anhydrides (five-membered component) lead to form a seven-membered heterocyclic compound(1,14). These products contain the seven rings with functional groups (R-N=N-R⁻) the Schiff bases have aromatic azo group are colored therefore we used them as dyes that considered as an organic compound with many antimicrobial activity ². The seven membered rings are widely present in nature with nitrogen and oxygen atoms that have medicinal activity because of their structural similarities between them and natural substances. In the industrial field, they used in polymer processes and antioxidant (3,4).

Pyrimidine is a cyclic amine with a large group of heterocyclic compounds that plays an important role in many biological functions. It is found in nucleic acids, several vitamins, co-enzymes and purines ⁵.

Azo dyes one of the important and the largest groups of synthetic organic dyes that mainly used as coloring agents for foods and cosmetics, besides to their applications in modern technology ¹.

These compounds have the ability to inhibit the replication of nucleic acid and protein synthesis that may be used against many of multidrug resistant organisms among the world (6,14).

Objectives

This study was designed to determine the antibacterial and antifungal activities of a newly synthesized compound at different concentrations against four types of pathogenic bacteria with two types of fungi in vitro laboratory conditions.

Materials and Method

1- Chemical study:

We prepared A1 compound [-2, 6 diamino-5-((4-hydroxycyclohexyl) diazenyl) pyrimidin-4-ol ] by dissolving (0.03 mol) from p-aminophenol in (0.03 ml) of concentrated HCl with (10 ml) of distilled water. Then we cooled the mixture to (0-5) °C in ice water bath. (0.03 mol) of sodium nitrate was dissolved in (10 ml) of cool distilled water and this solution was added to the mixture above step by step with continuous shaking for (15 min). The diazonium solution was added to solution contain (0.03 mol ) from Pyrimidine that dissolved in (25 ml) of ethanol and sodium hydroxide the result was formation light purple solution at pH (6-7) then we left it for one
hour, filtrated the mixture and washed the precipitate with distilled water then we recrystallized from absolute ethanol.

The S1 Schiff base \[ 4,4'-(1Z,1'Z)-((6-hydroxy-5-(4-hydroxycyclohexyl) diazenyl) pyrimidine2,4diyl) bis (azaneylylidene)) bis (methaneylylidene)) bis (2-methoxycyclohexan-1-ol) \] was prepared as following: 0.03 moles of vanillin (3-methoxy-4-hydroxy benzenes aldehyde) was dissolved in (25 ml) in absolute ethanol, then we added 1-2 drops of Glacial acetic acid with continuous shaking for (20 min) on magnetic stirrer. Then, we treated it with (0.03 mole) from A1 compound gradually to complete the process at 70 ᵒC in 7 hr. The mixture was evaporated and dried the solution for recrystallized from absolute ethanol as in scheme (1).

The B1 compound \[4,4'-(6-hydroxy-5-(4-hydroxycyclohexyl) diazenyl) pyrimidine-2,4-diy) bis(3-(4-hydroxy-3-methoxycyclohexyl) octahydrobenzo[e][1,3]oxazepine-1,5-dione) \] was prepared by dissolved of 0.03 mol from Schiff bases (S1) in (25 ml) dry benzene with continuous shaking to complete solving . Then we added (0.03 mol) from phathalic anhydride gradually to complete the process at 65 ᵒC in 15 hr. The solution was dried for recrystallized by absolute ethanol as in scheme (2).

2- Microbiological study:

The antimicrobial activity of the newly synthesized compound was examined by using 4 isolates of four types of G+ & G– pathogenic bacteria that include the following (S. aureus, S. epidermidis, E. coli and K. pneumonia) respectively, with two types of fungi A. niger & P. chrysogenum at four different concentrations (5, 10 , 15 & 20 mg/ml⁻¹) after dissolving these compounds in DMSO as solvent as in\(^7\). The antimicrobial activity was measured by minimum inhibitory concentrations in (mm).
Results and Discussion:

In this study we prepared B1 compound from the S1 Schiff base that was confirmed by IR & HNMR as in scheme (2) to determine the antibacterial and antifungal activities of it against G+ & G– bacteria with fungi by measuring the minimum inhibitory concentration (MIC) in (mm) at four different concentrations (5, 10, 15 & 20 mg/ml⁻¹) as in table (1) and figure (1).

This compound had good activity against all types of bacteria and fungi that used in this study with a significant increased against G+ especially S. aurous at (20 mg/ml⁻¹) concentration compared with others microorganisms and this is may be occurring due to their ability to damage the cell wall of the microorganisms and inhibit their function or stopping microbial replication and these results were agreements with many researches (10,11,12,13).

The presents of central ring separator play an important role in the noncovalent DNA cooperation through intermolecular interaction as formation of hydrogen bonds, which can increase the antimicrobial activity and that depend on the nature of hetero atoms in their structures and the presence of phenyloxy moiety with NH₂ as an electron releasing group(6,11,13).

Table (1) Antibacterial and antifungal activity against B1 compound at four different concentrations (5, 10, 15 &20 mg/ml⁻¹)

<table>
<thead>
<tr>
<th>Isolates number</th>
<th>Concentrations (mg/ml-1)</th>
<th>G+ bacteria Inhibition zone(mm)</th>
<th>G– bacteria Inhibition zone(mm)</th>
<th>Fungi Inhibition zone(mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>S. aureus</td>
<td>S. epidermidis</td>
<td>E. coli</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>9</td>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>15</td>
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<td>22</td>
<td>18</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>32</td>
<td>20</td>
<td>17</td>
</tr>
</tbody>
</table>
Conclusions

The present research focused on the synthesis of novel chemical derivatives to explain their antibacterial and antifungal activity that be safely used in future towered many infectious diseases.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Pharmacy, Iraq and all experiments were carried out in accordance with approved guidelines.

References

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Effect of Cupping (Al-Hijima) on Hematological and Biochemical Parameters for some Volunteers in Missan Province

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Abstract

Objective: The aim of Cupping is to extract the blood which is believed to be harmful for the body which in turn rids the body of potential harm from symptoms leading to a reduction in stressful condition. The study was performed to evaluate the effects of cupping (Hijama) on the hematological and the biochemical parameters in the patients before and after making the cupping.

Subjects and Method: The study was performed in period between (first November -2018 to May- 2019) and conducted on (30) volunteers coming to Hijama centers in different parts of Missan province in ages between (30-50) years with . Five (5ml) of venous blood samples were collected the first sample was taken before and after one week of cupping and two weeks later after cupping . Each sample of blood was separated into two tubes for hematological assessment and the serum was stored in -20°C freezer till handled for biochemical analysis ,determined lipid profile and serum electrolytes level. These parameters were performed in laboratories of Al- Sadder Teaching Hospital – Amarah City according to the standard methods that described in the Analysis Kits that used in this study was products of Spinach Company Spin react.

Results: The obtained results for hematological analysis observed significant increase in (RBCs) after one and two week of making Hijima in (p< 0.05),as compared results before making hijjama ,significant decrease in hematocrit(HCT) ,hemoglobin (Hb) ,Platelets (Plt) , neutrophiles and lymphocytes percentages after one and two week of making Hijama as compared results before making hijama . Total cholesterol were observed significant decrease in (P>0.05) after one and two weeks of hijima in compared with the total cholesterol before making the hijima ,decrease in (LDL) , (vLDL) and Triglyceride after one week and two week of hijima as compared before making the hijima .High density lipoprotein (HDL-ch) observed significant increase in (P>0.05) after one week and two weeks of making hijima as compared with (HDL-ch) before making the hijima. The biochemical analysis observed significant decrease in levels of ALP enzyme,creatine ,blood urea nitrogen and blood glucose in(P>0.05) after one and two weeks of Hijima, significant increase in levels of total proteins , AST and ALT in(P>0.05) after one and two weeks of making Al-hijima as compared with levels before making the hijima. Serum electrolytes level showed an significant decline in serum Calcium ions (Ca+2) in (P>0.05) after one and two weeks of making Al-hijima as compared to the serum calcium level before making of Al- hijama. Also observed insignificant decline in serum sodium(Na+2), chloride ions (Cl-) and potassium ions(K+) as compared to level of sodium ,chloride and potassium ions before making of Al- hijama.

Key Words: Cupping, volunteers, hematological, biochemical parameters, Hijama centers.
Introduction

In the Arab and Muslim world, Al-Hijamah is a deeply rooted religious technique supported by many authenticated sayings (hadiths) of Prophet Mohammad (PBUH) who recommended its use in human ailments more than 1400 years ago. There are three types of cupping include dry, wet, and massage cupping. In dry cupping stationary cups are placed on the skin and left for a period of five to 15 minutes in one location without incisions, while in wet cupping (hijama) the process of using a vacuum at different points on the body but with incisions in order to remove ‘harmful’ blood which lies just beneath the surface of the skin. In massage cupping, oil is applied on the skin to facilitate smooth movement and discover the areas of tension and congestion prior to applying the cup. Cupping therapy can be divided into two broad categories; dry cupping and wet cupping. Dry cupping simply pulls the local underlying tissue up into the suctioning cup, whereas wet cupping uses the same technique, but adds scarification and bloodletting. Many theories explain the mechanism of action of cupping, suggested the immunemodulation theory, cupping and acupuncture had the same mechanisms of action. Immunemodulation theory suggests that changing the microenvironment by skin stimulation could transform into biological signals and activate the neuroendocrine immune system. Suggested that skin’s mechanical stress (due to subatmospheric pressure) and local anaerobic metabolism (partial deprivation of O2), during cupping suction could produce physiological and mechanical signals which could activate or inhibit gene expression. In wet cupping therapy, superficial scarifications could activate the wound-healing mechanism and gene expression program.

Cupping therapy has reported benefits in the treatment of lower back pain, neck and shoulder pain, headache and migraine, knee pain, facial paralysis, brachialgia, carpal tunnel syndrome, hypertension, diabetes mellitus, rheumatoid arthritis, and asthma. These diseases can be categorized into localized diseases (neck pain, lower back pain, and knee pain) and systematic diseases such as diabetes mellitus, hypertension, and rheumatoid arthritis.

Material and Method

The study was performed in period between (first November -2018 to May- 2019) and conducted on (30) volunteers in ages between (30-50) years with average age (40) years contact with Hijjama centers in different parts of Missan province. Five (5ml) of venous blood samples were collected from each volunteer, the first sample was taken before cupping and second sample was taken after one week of cupping ,while the third sample was taken in two weeks later after cupping . Each sample of blood was separated into two tubes. The first tube with EDTA for hematological assessment and second blood tube was centrifugation for 10 minutes at 3000rpm, the serum was stored in -20°C freezer till handled for biochemical analysis for determined lipid profile and serum electrolytes level.

Complete blood picture were shown from the collected blood samples by automatic methods (System X kx-21n automated hematology analyzer; JAPAN CARE CO., LTD) including hemoglobin (Hb), white blood cells (WBCs), red blood cells (RBCs), Platelets and Haematocrit or packed cell volume (PCV).

Statistical Analysis

The results were expressed as mean ± standard error (SE). Statistical analyses were made with one-way analysis of variance (ANOVA) using SPSS 17. The criterion for statistical significance was (P<0.05).

Results

The obtained results for hematological analysis the blood samples collected form (30) volunteers in Hijjama centers before and after one and two week of hijjama,observed significant which increased (RBCs) after one and two week of making Hijjama as compared results before making hijjama (p<0.05),also observed significant decrease in haematocrit(HCT) ,hemoglobin (Hb) ,Platelets (Plt) , neutrophiles and lymphocytes percentages after one and two week of making Hijjama as compared with the results before making hijjama (p<0.05), Tab(1).

Lipid profile values were detected in blood samples that obtained from volunteers before and after one week and two weeks of hijjama which include total cholesterol ,LDL-ch,HDL-ch ,Triglyceride and VLDL-ch where
the total cholesterol levels were observed significant decrease in (P>0.05) after one and two weeks of hijima in compared with levels of the total cholesterol before making the hijima ,also the results observed significant decrease in Low-density lipoprotein (LDL), very Low density lipoprotein (vLDL) and Triglyceride in(P>0.05) after one week and two week of hijima as compared with the levels before making the hijima,Tab(2).

While the high density lipoprotein (HDL-ch) observed significant increase in (P>0.05) after one week and two weeks of making hijima as compared with the levels of (HDL-ch) before making the hijima,Tab(2).

Table-2: Show lipid profile parameters for the patients before and after one and two weeks of Hijima. (N:30 volunteers).

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B.Hijima</td>
</tr>
<tr>
<td>T.Cholestrol (mg/dl)</td>
<td>208.89±80.8</td>
</tr>
<tr>
<td>HDL-cholestrol(mg/dl)</td>
<td>33.98±80.8</td>
</tr>
<tr>
<td>LDL-cholestrol(mg/dl)</td>
<td>172.67±42.3</td>
</tr>
<tr>
<td>Triglycerides (mg/dl)</td>
<td>285±103.16</td>
</tr>
<tr>
<td>VLDL-cholestrol(mg/dl)</td>
<td>87.63±55.8</td>
</tr>
</tbody>
</table>

The biochemical analysis of the blood serum that obtained from volunteers before and after making Al-hijima observed significant decrease in levels of alkalinephosphatase enzyme, creatinine ,blood urea nitrogen and blood glucose in(P>0.05) after one and two weeks of making Al-hijima as compared with level of these biochemical parameters before making the hijima, Tab(3). On other hand there was significant increase in levels of total proteins , Aspartate aminotransferase and Alanin anino tranferase in(P>0.05) after one and two weeks of making Al-hijima as compared with levels of total proteins , Aspartate aminotransferase and Alanin anino tranferase before making the hijima, Tab(3).

Table-3: Show serum biochemical parameters for the patients before and after one and two weeks of Hijima.(N:30 volunteers).

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B.Hijima</td>
</tr>
<tr>
<td>Alkaline phosphatase (IU/l)</td>
<td>134.8±3.98</td>
</tr>
<tr>
<td>T.protein (gm/dl)</td>
<td>6.37±0.35</td>
</tr>
<tr>
<td>Creatinine (mg/dl)</td>
<td>1.85±0.05</td>
</tr>
<tr>
<td>Aspartate aminotransferase AST (IU/l)</td>
<td>239±94</td>
</tr>
</tbody>
</table>
Cont.. Table-3: Show serum biochemical parameters for the patients before and after one and two weeks of Hijama.(N:30 volunteers ).

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Before Hijama</th>
<th>After one week</th>
<th>After two weeks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alanin anino tranferase ALT (IU/l)</td>
<td>234 ± 45</td>
<td>289 ± 65</td>
<td>292 ± 54</td>
</tr>
<tr>
<td>Blood urea nitrogen (mg/dl)</td>
<td>14.1±3.55</td>
<td>14.4±2.29</td>
<td>13.9 ±1.85</td>
</tr>
<tr>
<td>B. Glucose (mg/dl)</td>
<td>135.3±8.2</td>
<td>110.5±8.2</td>
<td>95.8 ± 5.3</td>
</tr>
</tbody>
</table>

Table (4) and figure (1) shows the comparison of serum electrolytes level before and after one and two weeks of hijama. Blood samples obtained after hijama showed an significant decline in serum Calcium ions (Ca+2) in (P>0.05) after one and two weeks of making Al-hijama as compared to the serum calcium level before making of Al- hijama.

The results also observed insignificant decline in serum sodium(Na+2), chloride ions (Cl-) and potassium ions(K+) as compared to level of sodium, chloride and potassium ions before making of Al-hijama.

![Figure 1](image)

Discussion

Hematological analysis of the blood samples that collected from (30) volunteers in different Hijama centers in Missan province before and after one and two week of Hijama, observed significant increase in (RBCs) and decrease in haematocrit(HCT) ,hemoglobin (Hb) ,Platelets (Plt) , neutrophiles and lymphocytes percentages after one and two week of making Hijama as compared with results of these parameters before making hijama.

The results of this study were agreed with 6 who stated that RBCS will increase gradually after two weeks of cupping with significant decrease in the percentage of WBCs ,lymphocytes ,monocytes , HGB, and HCT and platelets in the human venous blood, while Abdullah et al. (2014) were found insignificantly changes in hematological levels after cupping.

1 were found slight improvement in hemoglobin levels ,RBCs,while WBCs observed with normal values duet to improvement in erythropoietin production after cupping and produced in adequate which make
hemoglobin to return to the normal values and increase production of RBCs and suggested that renal function has improved which may be related to the improved metabolism, electrolytes and appetite.

6 were reported that cupping play an important role in excretion of old RBCs and replaced by new red blood cells when red blood cells increases, also decrease in hematocrit and blood viscosity makes the blood less thicker, and increase flow of the blood. 16 showed WBCs count decline less than this decrease statistically highly significant. In addition, there was an increase in WBCs count after 2 weeks. Lipid profile values were detected in blood samples from volunteers before and after one week and two weeks of hijima which include total cholesterol ,LDL-ch,HDL-ch ,Triglyceride and VLDL-ch. 10 showed reduction of LDL and cholesterol beside increase HDL and no change of triglyceride in all of subjects were treated with cupping in one time. 12 were reported that the Patients with hyperlipidemic who subjected to cupping showed a significant decrease in total cholesterol, LDL cholesterol, triglyceride and LDL/ HDL ratio in weeks 1 and 2 respectively by comparison before cupping. While there were significant changes and increase in serum HDL cholesterol in weeks 1 and 2 after Cupping. These results agreed with 6 for the biochemical parameters, significantly lower ALP levels in the cupping blood when compared to the venous blood,.where ALP has an important role in the metabolism by permitting the cells to uptake the inorganic form of phosphate . 20 were reported that serum ALP levels significantly decreased after the cupping therapy in humans. AST and ALT levels were observed to be non- significantly increased after 3 days after cupping, this increase was followed by decrease in its levels after 2, 4, and 8 weeks of cupping. However, AST can normally be detected in many different tissues such as the muscles, liver, kidney, brain, and heart, and its levels are increased if any damage occurs to one of these tissues; therefore, it is not considered as a specific indicator for mammalian liver profiles . 18 found a significant decrease in serum creatinine and potassium level after hijama and significant improvement in chloride concentration towards normal, hence all these changes indicates that there have been improvement in renal function in patients after making Al-hijama. Random blood glucose was decreased significantly, which might be one of the reasons for decrease in fatigue and increase metabolism and improvement in appetite 17. The cupping therapy can increase the sensitivity of insulin which decreases its levels in the blood of diabetic patients; however, the adverse effects can be attributed to the health status of the animals and some species variations (17,19). Blood samples that obtained after hijama showed significant rise in serum Calcium ions (Ca+2) after one and two weeks of making Al-hijama as compared to the serum calcium level before making of Al-hijama.

**Conclusion**

Repeated cupping (hijima) therapy was useful in improve complete blood picture (CBC), improved serum lipid such as the total cholesterol, LDL and Triglyceride levels,also improve HDL-ch which observed significant increase after two weeks of hijima. Al-hijima observed significant effect on some biochemical parameters, improvement in levels of total proteins and increase activity of liver function enzymes (AST and ALT) and significant rise in serum Ca+2 with decline in Na+2 , Cl- and K+ after one and two weeks of Al-hijama, for this results that observed in this study the cupping may be consider safe technique, might be associated with decreased risk of cardiovascular disease, obesity and enhanced and improved kidney function test . So we recommend to ministry of health to encourage the practice of prophetic medicine including (Alhijama) in hospitals officially in a pure medical atmosphere to close the way in face of unqualified mal practitioners.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Nursing College, Iraq and all experiments were carried out in accordance with approved guideline

**References**


2. Ahmedi M, Siddiqui MR. The value of wet cupping as a therapy in modern medicine e an Islamic perspective. Web med entra .l 2014;5(12):


Knowledge and Attitudes of Women Toward Breast Self-Examination in Hilla City: Application Health Belief Model

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1Msc. Student, in maternal and child Health Nursing/ College of Nursing, Babylon University, Babylon Province- Iraq, 2prof, Community Nursing/ College of Nursing, Babylon University, Babylon Province- Iraq

Abstract

Background: Breast cancer in all parts of the world begins to be seen at about 20 years of age. Afterward, age specific incidence steadily rises until the menopause when geographic differences begin to be seen. In the developing world, a flattening and then a decline occur about 10–15 years after the menopause. In developed countries, the age specific incidence accelerates after the menopause, and at age 70 and above doubles that seen at 45–49 years old.

Methodology: A descriptive design study was accomplished at teaching hospitals in Babylon province. The study aimed to assess the knowledge and attitudes of the women toward the breast self- examination by the application health belief model from 25th November/ 2018 to 13th June/ 2019. A non-probability “convenient sample” of (250) women were selected from outpatients of the main teaching hospitals of the hilla city. The researcher selected 10% from the number of visitors prior to the month of data collection from each of the three hospitals.

Results: The results of the present study show that the demonstrates the distribution of women according to their knowledge about breast self-examination items. With regard to their knowledge reported (Do not know) that puberty as the age of initiation of BSE, it should be done monthly and it should be done five days after menses (59.1%), (61.6%), (70.8%) respectively. Item (1) only reported fair assessment.

Conclusions: Study focuses on clarifying the knowledge and attitudes of women regarding breast self-examination according to health belief model in hilla city hospitals.

Keywords: attitudes of women, breast self-examination

Introduction

Breast cancer is the most frequent malignancy of women worldwide. It is the leading cause of female cancer related disability and mortality. Globally, breast cancer is the most frequent cancer among women comprising about 23 % of all female cancers 1 .

The life style changes contributing to increase post-menopausal. Breast cancer are largely pre-menopausal and includes obesity, low rates of childbirth, infrequent or no lactation, early menarche, and late menopause. These factors, that are common in high-risk countries, promote a state of relative hyperestrogenism and the development of estrogen responsive tumors. The life-style factors are becoming more common in countries considered low-risk particularly in their growing urbanized communities 3 .

Breast cancer represents 10% of all cancers diagnosed worldwide annually and constituted 22% of all new cancers in women in 2000, making it by far the most common cancer in women. The incidence of breast cancer in women in high-income countries in 2000 was at least twice that of any other cancer, similar to the incidence of cancer of the cervix in low-income countries. The risk of breast cancer is low in the low-income regions of sub-Saharan Africa and in Asia, including Japan where the probability of developing...
breast cancer by the age of 75 is one third that of other high-income countries. The crude incidence of all cancers was 61.69 per 100,000 (53.31 in men and 70.59 in women). During that year, 4,115 cases of breast cancer were reported, accounting for 19.5% of all newly diagnosed malignancies and 34% of the registered female cancers, with an incidence approximating 22 per 100,000 female population. The highest frequency was observed in middle-aged women (45-49 years old), whereas the peak age-specific incidence was reported in women 50-54 years old. It has been documented that there is a tendency for the disease to be diagnosed at advanced stages, with a likely prevalence of poorly differentiated tumor forms illustrated in significantly high rates of nuclear aneuoploidy, thus yielding a mortality incidence of approximately 60%.

Breast cancer is the most common type of malignancy among the Iraqi population in general; responsible for about one third of the registered female cancers and almost one quarter of female deaths from the disease. Within the last two decades, there has been an obvious increase in the incidence rates of breast cancer, which became one of the major threats to Iraqi female health. It has a tendency to affect middle aged women in whom it is often diagnosed in advanced stages with a likely prevalence of aggressive behavior yielding high mortality incidence ratio. Breast cancer is becoming an epidemic for women in Kurdistan due to women’s lack of health awareness and breast cancer is becoming more aggressive and affects women at young ages while in other countries it is affecting women after year 50. Several risk factors for breast cancer have been identified; a family history breast cancer is one of the strongest risk factors. Breast cancer risk increases with increasing age. Breast self-exam (BSE) is considered an important public health procedure; primary prevention should be given the highest priority in the fight against cancer. The breast self-exam (BSE) in women is a topic fairly addressed by the professions of nursing and medicine, prioritizing breast cancer prevention by assuming that this illness has an increasing tendency on these days, and it is also the second pathology in the world.

Methodology

The study aimed to assess the knowledge and attitudes of the women toward the breast self-examination by the application health belief model.

Design of the Study: The study was a cross sectional descriptive through the period (from 25th November/2018 to 13th June/2019).

Sample of the Study: Sample of (250) women were included in this study was the women above age 20 years who attended and visited to the outpatients department of the main teaching hospitals of the hilla city.

Study Instrument: Throughout an extensive review of relevant review, the instrument of the study was developed and reconstructed by the researcher for achieving the study objectives. The instrument comprise of three parts

Part I: Demographical characteristics of the sample includes: age, Age of first menarche, level of education, occupation, marital status, economics status, Menstrual history, Family history of breast cancer

Part II: Knowledge of the women regarding breast self-examination.

Part III: Women’s responses to the different attitudes items according health belief model

Data Analysis: Descriptive and inferential statistical study tests used through the use of the (SPSS ver-24).
Table (1) Distribution of women according to their knowledge regarding breast self-examination

<table>
<thead>
<tr>
<th>No</th>
<th>Items</th>
<th>Yes</th>
<th>No</th>
<th>Don’t know</th>
<th>Total</th>
<th>M.S</th>
<th>S.D</th>
<th>Ass.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>F%</td>
<td>F%</td>
<td>F%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Age of breast self-examination started at puberty</td>
<td>85</td>
<td>17</td>
<td>148</td>
<td>250</td>
<td>1.75</td>
<td>.934</td>
<td>Fair</td>
</tr>
<tr>
<td></td>
<td></td>
<td>34.0</td>
<td>6.8</td>
<td>59.2</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Breast self-examination do perform monthly</td>
<td>70</td>
<td>26</td>
<td>154</td>
<td>250</td>
<td>1.66</td>
<td>.887</td>
<td>Poor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>28.0</td>
<td>10.4</td>
<td>61.6</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Breast self-examination can be performed after five days of menstrual period</td>
<td>55</td>
<td>18</td>
<td>177</td>
<td>250</td>
<td>1.51</td>
<td>.832</td>
<td>Poor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22.0</td>
<td>7.2</td>
<td>70.8</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F= frequency, %= percentage, S.D = standard deviation, M.S.= mean of score, Ass= Assessment, “ cut of point (0.66), poor (mean of score 1-1.66), fair (1.67-2.33), Good (mean of score 2.34 and more).”

Table (1) demonstrates the distribution of women according to their knowledge about breast self-examination items. With regard to their knowledge reported (Do not know) that puberty as the age of initiation of BSE, it should be done monthly and it should be done five days after menses (59.1%), (61.6%), (70.8%) respectively. Item (1) only reported fair assessment.

Table (2) Distribution of women knowledge regarding breast cancer screening

<table>
<thead>
<tr>
<th>No</th>
<th>Items</th>
<th>Yes</th>
<th>No</th>
<th>Don’t know</th>
<th>Total</th>
<th>M.S</th>
<th>S.D</th>
<th>Ass.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>F%</td>
<td>F%</td>
<td>F%</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Do you know about mammogram</td>
<td>38</td>
<td>29</td>
<td>183</td>
<td>250</td>
<td>1.42</td>
<td>.741</td>
<td>Poor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15.2</td>
<td>11.6</td>
<td>73.2</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Do you know how to perform breast self-examination</td>
<td>55</td>
<td>32</td>
<td>163</td>
<td>250</td>
<td>1.57</td>
<td>.830</td>
<td>Poor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22.0</td>
<td>12.8</td>
<td>65.2</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Do you know about clinical examination of breast</td>
<td>56</td>
<td>26</td>
<td>168</td>
<td>250</td>
<td>1.55</td>
<td>.836</td>
<td>Poor</td>
</tr>
<tr>
<td></td>
<td></td>
<td>22.4</td>
<td>10.4</td>
<td>67.2</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Is it possible for screening measures to enhance the chance of recovery</td>
<td>84</td>
<td>17</td>
<td>149</td>
<td>250</td>
<td>1.74</td>
<td>.932</td>
<td>Fair</td>
</tr>
<tr>
<td></td>
<td></td>
<td>33.6</td>
<td>6.8</td>
<td>59.6</td>
<td>100.0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

F= frequency, %=percentage, SD= standard deviation, M.S.= mean of score, Ass= Assessment, “ cut of point (0.66), poor (mean of score 1-1.66), fair (1.67-2.33), Good (mean of score 2.34 and more).”
Regarding the knowledge of screening measures Table (2) illustrates that majority of participants replayed (Do not know) about mammogram and how to perform breast self-examination (73.2%)(65.2%), and about (67.2%) (59.6%) of women reported (Do not know) about clinical breast examination and screening measure to enhance the chance of recovery, item (4) assessment results was (Fair)

Table (3) Distribution of women and their knowledge regarding breast cancer

<table>
<thead>
<tr>
<th>No</th>
<th>Items</th>
<th>Yes</th>
<th>No</th>
<th>Don’t know</th>
<th>Total</th>
<th>M.S</th>
<th>S.D</th>
<th>Ass.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Breast cancer is curable in early stages</td>
<td>181</td>
<td>17</td>
<td>52</td>
<td>250</td>
<td>2.52</td>
<td>.818</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td>Breast cancer is highly mortality without treatment</td>
<td>167</td>
<td>13</td>
<td>70</td>
<td>250</td>
<td>2.39</td>
<td>.895</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td>Painless in early stages</td>
<td>143</td>
<td>15</td>
<td>92</td>
<td>250</td>
<td>2.20</td>
<td>.950</td>
<td>fair</td>
</tr>
<tr>
<td></td>
<td>Breast cancer more common in women over 50</td>
<td>64</td>
<td>77</td>
<td>109</td>
<td>250</td>
<td>1.82</td>
<td>.814</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td>Occurs in one breast only</td>
<td>66</td>
<td>74</td>
<td>110</td>
<td>250</td>
<td>1.82</td>
<td>.822</td>
<td>fair</td>
</tr>
<tr>
<td></td>
<td>Breast cancer more common in obese women</td>
<td>63</td>
<td>66</td>
<td>121</td>
<td>250</td>
<td>1.77</td>
<td>.828</td>
<td>Fair</td>
</tr>
</tbody>
</table>

F= frequency, %=percentage, SD= standard deviation, M.S.= mean of score, Ass= Assessment, “ cut of point (0.66), poor(mean of score 1-1.66), fair(1.67-2.33), Good (mean of score 2.34 and more).”

In respect to the knowledge of breast cancer (BC) Table (3) shows that majority of women (72.4 %) answered that BC is curable in its early stages, and (66.8%) considered it as fatal if not treated, (57.2%) of them agreed that the disease is painless in early stages. (43.6%, 44.0%, 48.4%) do not know that the breast cancer more common in women over 50, occur in one breast only and this disease is more common in obese women respectively.

**Discussion**

Breast cancer (BC) in women is the a major health burden worldwide. It is the most common cause of cancer among women in both high and low income countries. According to world health organization (WHO) breast cancer has become one of the most important health problem for the women in Arab countries. Socio-demographic characteristics and other personal data have an essential effect on individuals health and beliefs about health, because those variables related to deal with the disease and has important role in prevention and coping with treatment. There are differences between age groups of the young women to old, educated – uneducated, working or not …etc. The study findings indicate that more than forty-three percent from 250 participants aged within the twenties, the usual age of women for marriage and reproduction. Women who attend the hospital are mostly within this age group. At the same time many studies mentioned that this is illegible period for most of them. One of the studies that came along with the present study done by Abed
El-Azim et al., (2016) who found that (73.9%) from the sample aged between (20-25) years. And a study carried out by (asghari;2016) among Iranian university students found that the average age of the sample was 21.76±2.6 . The current study shows that more than fifty of sample their age of menarche within twelve years with mean= 12.57, this finding is agreed with Sideeq et al., (2017) who found that among the sample underwent the study the mean age at menarche was 12.56±1.17 years. Another study result found by (Shakweer et al; 2016) stated that majority of their participants represented (84%) started menstruation (Menarche) at age range from 12-14 years.

Conclusions

Clarifying the knowledge and attitudes of women regarding breast self-examination according to health belief model in hilla city hospitals. Age of the sample distributed between (20-33) years old with mean age =33.3 and standard deviation= 1.159

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Nursing, Iraq and all experiments were carried out in accordance with approved guidelines.

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Knowledge of Parents toward Children with Attention Deficit Hyperactivity Disorder in Baghdad City

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Abstract

Attention deficit/hyperactivity disorder (ADHD) is one of the most common psychiatric disorders in child and teenage psychiatry. ADHD children are at risk for a school organization constrains a multimodal treatment database. This study surveys parent’s knowledge and attitudes towards attention deficit hyperactivity disorder. The study aimed to assess the level of the knowledge and perspective for Parents who have children with Attention Deficit Hyperactive Disorder. A non-probability, purposive sample of 75 child and 75 parents (40 mothers and 35 fathers), who had children with ADHD between the ages of (4 and 12) were selected. A descriptive study was conducted at the Child Psychiatric Unit at Ibn Rushed Psychiatric Teaching Hospital and Central Child Hospital Teaching in Baghdad City, from September 8th to October 30th, 2017. A questionnaire format used for data collection and constructed by the researcher to achieve the objectives of the study. Reliability of questionnaires was estimated through a pilot study which was carried out for the period from December 10th 2017 to December 30th 2017. Data were analyzed through the application of descriptive statistical analysis and the application of inferential statistic. The results of the study indicate that the ADHD parents are no significant association between father knowledge and socio-demographic except income, child age, gender and received medication which was correlated significantly at p-value 0.01 respectively. The researcher recommended that future researches should be directed toward teaching parents and teacher to increase their knowledge about the ADHD and provide many strategies to help them to reduce parents burden and coping.

Key words: knowledge, Attention deficit hyperactivity disorder, Parents

Introduction

Attention-deficit/hyperactivity disorder (ADHD) is a commonly diagnosed behavioral disorder of childhood that is characterized by symptoms of inattention, hyperactivity and impulsivity. There has been a dramatic increase in diagnoses of ADHD in recent years. The primary features of the disorder are inattention, hyperactivity, and impulsivity, which combine in various ways to create three different subtypes of ADHD. Predominately Inattentive, Predominantly Hyperactive-Impulsive, and a Combined type. Prevalence rates for ADHD for example in New Zealand are around 5% of school-aged children with rates for boys 3 times higher than those for girls. Similar prevalence rates are found in the U.S. and internationally. A prevalence of 3–5% in the general population is the name of a group of attention-related symptoms that are often found together, especially in children and young adults. Prevalence rates among school-age children in the United States range from roughly 4% to 12 more, the percentage of children treated for ADHD in the United States increased dramatically from the 1980s to the 1990s. Attention Deficit Hyperactivity Disorder (ADHD) is one of the most common reasons behind children referral to mental health clinics with estimated prevalence rates of 5% of school aged children. As noted ADHD is a chronic condition characterized by impairments in impulse control, sustained attention, and the regulation of behavior in response to situational demands. Educational programs which increase parents and community awareness toward ADHD should be encouraged through the media. Establishing special school or institute for ADHD children to provide special services to decrease parents’ psychological distress. Constructing a special program for children performing...
at home and in the school in cooperation with the parents. This will depend on positive reinforcement for satisfactory behavior management. Monitoring ADHD children by their teacher using special questionnaires and standards of their behavior, to measure the type and degree of the child’s behavior al distress. Establishing supportive groups allow for a personal touch where parents with similar problems and stressors might be more willing to share one to one.

**Methodology**

A descriptive-analytic study was carried out at the Child Psychiatric Units at Ibn Rushed psychiatric Teaching Hospital and Central Child Teaching Hospital in Baghdad. A purposive sample (75 children) was selected for the present study (The total number of children who had diagnosis with ADHD is 338). Seventy five parents of children with a primary diagnosis of pure ADHD were selected. The subject pool for this phase included 40 mothers and 35 fathers between the ages of 30 and 55 who had children between the ages of 4 and 12 years. Questionnaire is constructed for the purpose of the study through a review of relevant literature and consultation from a panel of experts. The questionnaire includes three parts which are distributed as follows: Part I is a covering letter to obtain the agreement of patients and their family members to participate in the present study. Part II Parents demographic characteristic that included age, level of education, level of family income and marital status. Part 3 Attention-Deficit/Hyperactivity Disorder Knowledge Survey (AKOS-R). Onto their next visit to the clinic, participants were randomly assigned to parents after receiving an educational lecture about ADHD. All participants again completed and the AKOS-R.

The validity of questionnaire was determined by exposing it to (10) expert of different fields. Reliability was determined through a pilot study that was carried out on (15) parents who had ADHD child and were visiting in the Child Psychiatric Units. The internal consistency of the instrument was determined through the computation of Spelt-half. The results of the reliability were r=0.88.

**Result and Discussion**

Table (1) show that the mother age range group were fallen within the age 30-39 years old (48%). However the majority of percentage of father’s age group were not fallen only within the age of 30-39 years (37.3%) but also within the range of 40-50 years old and shows that the most mothers were secondary school and university graduated (42.7%), (41.3%), respectively that the majority of parent’s educational score were fallen among fathers group 3 (37.3%) and group four (42.7% ) whose score levels were within higher educational groups (secondary and Colleges). Table shows that the majority of Children with ADHD (58.7%) were receiving medication up to three years, the majority of ADHD Children were among urban regions (71%) while only 9.3% of children with ADHD were from rural area. that the majority of children with ADHD were male (81.3%), this table shows that the majority of Children with ADHD (58.7%) were receiving medication up to three years. Knowledge about ADHD was comparatively low, 86% of parents agreed that children with ADHD are usually brighter than those without AHD. 58% of the parents considered the most effective treatment of school-aged children are stimulant medication, behavior modification, or a combination of the two. The attitude score towards ADHD children was also low. 76% agree that medication often reduces child’s tendency to be aggressive with others at school. 72% believe that almost all children with ADHD meet national and state standards for learning disabilities. 69.3% of parents believes that children who are hyperactivity at the age of 3 almost always become identified as having ADHD by the age of 7. 74.7% of parents unsure that in most cases, medication will help a child achieve better grades in school, also about 64% of them considered most children with ADHD, psychology treatment are not as effective as medication in improving attention and reducing disruptive behavior.
Table 1. Correlation between fathers knowledge and 'child ADHD Variables (N= 75)

<table>
<thead>
<tr>
<th>Correlation</th>
<th>Knowledge</th>
<th>Father age</th>
<th>Education father</th>
<th>Employment</th>
<th>income</th>
<th>City</th>
<th>Child age</th>
<th>Medication</th>
</tr>
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<td>Knowledge</td>
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<td></td>
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<td></td>
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<tr>
<td>Employment father</td>
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<td>-.181</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Child age</td>
<td>.087</td>
<td>.314**</td>
<td>-.123</td>
<td>.081</td>
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<td></td>
<td></td>
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<td>.082</td>
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<td></td>
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<tr>
<td>Medication</td>
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<td>-.155</td>
<td>.063</td>
<td>.344**</td>
<td>-.275</td>
<td>-.108</td>
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<td>Income</td>
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<td>.071</td>
<td>-.484**</td>
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<td>.161</td>
<td>.093</td>
<td>.148</td>
<td>-.018</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed)

*Correlation is significant at the 0.05 level (2-tailed)

The findings indicate that there is no significant association between father knowledge and ' socio-demographic except income, child age, gender and received medication which was correlated significantly at p-value 0.01 respectively.

Table 2. Correlation between mothers knowledge and 'child ADHD Variables (N= 75)

<table>
<thead>
<tr>
<th>Correlation</th>
<th>Knowledge</th>
<th>Father age</th>
<th>Education father</th>
<th>Employment</th>
<th>income</th>
<th>City</th>
<th>Child age</th>
<th>Medication</th>
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</tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>Medication</td>
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<td>-.183</td>
<td>.344**</td>
<td>-.275</td>
<td>-.108</td>
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<tr>
<td>Income</td>
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<td>-.520**</td>
<td>.268*</td>
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<td>.148</td>
<td>.018</td>
<td>1.00</td>
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</tbody>
</table>

*Correlation is significant at the 0.05 level (2-tailed).
**Correlation is significant at the 0.01 level (2-tailed).

This table shows that there is significant association between the parents knowledge and the socio demographic at p-value 0.05.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved and all experiments were carried out in accordance with approved guidelines.

References


Histopathological Changes in Liver Induced by Piroxicam Administration in Adult Male Albino Mice *Mus musculus*

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**Abstract**

**Background:** Piroxicam is one of non-steroidal anti-inflammatory drugs which is widely used in treating rheumatic disorder. **Aim of the study:** Studying the effects of piroxicam pertaining on the liver tissue to the chronic administration in male albino mice *Mus musculus* histologically and histochemically changes.

**Material and methods:** A total number of (30) adult male albino mice were utilized in this study, they were randomly distributed into three groups, the first and second groups were orally treated with concentrations (75, 150) mg/kg of piroxicam respectively for one and two months, the third group considered as control group were orally treated with distilled water, liver samples were collected every one and two months for the histological and histochemically study. **Results:** This study recorded the presence of histopathological changes in liver tissue of the treated mice with concentration 75 mg/kg represented by degeneration of hepatocyte, sinusoidal dilation, inflammatory cellular infiltration, vascular congestion in the portal vein and beginning of calcium casts formation, while the group treated with 150 mg/kg of the drug showed portal vein congestion and dilation, blood sinusoidal were highly obliterated, proliferation of bile duct and nuclei appeared pyknotic, in addition there were a remarkable decrease in the glycogen controls of cells. **Conclusion:** It could be concluded that piroxicam drugs has drastic effects on liver tissue as represented by the observed histopathological changes.

**Key words:** Piroxicam, Histopathological changes, Liver, Albino mice.

**Introduction**

Non steroidal anti-inflammatory drugs(NSAIDs) are some of the most commonly prescribed and utilized medication. These agents have proven particularly effective in the treatment of a variety of inflammatory disease. Some disease like osteoarthritis required their use for long periods of time ¹. All NSAIDs are well absorbed when given orally. They are eliminated from the body by the liver and kidney ². Piroxicam is one of the most popular (NSAIDs) belong to the oxicam group and used for the treatment of inflammatory conditions and rheumatic disorders, it is useful in the management of ankylosing spondylitis, acute musculo_skeletal disorders and dysmenorrhea, they exert their therapeutric effect by reducing prostaglandin biosynthesis through inhibition of cyclooxygenase(cox) enzymes ³.

The studies showed that piroxicam has many side effects on digestive system, represented by ulcers, gastritis ⁴, furthermore there were side effects of piroxicam on the testes of male mice ⁵, ⁶ also suggested that injecting piroxicam caused a remarkable histopathological symptoms in kidney of male albino. On the other hand, several NSAIDs drugs have been associated with liver damage ⁷. Many NSAIDs have been withdrawn from the market because of adverse hepatic drug reaction. Some cases of liver disease have been reported in patients taking piroxicam ⁸. Therefore, the present study was designed to investigated the histological effects of piroxicam on the liver of adult laboratory mice treated with the drug piroxicam.

**Material and Method**

-**Experimental animals**

A total number of (30) healthy adult albino mice *Mus musculus* and age approximately (8-10) weeks old ranging in weight from (25-30)gm, purchased from Iraqi
national center for drug control and research, Baghdad, Iraq. They were randomly distributed into three main groups of ten mice for each group, they were housed in cages and were kept in the laboratory under constant conditions for at least one week before use, they were fed a standard commercial diet.

**-Experimental design**

The drug used in this study was piroxicam in capsule form of (20)mg, concentrations (75,150)mg/kg were prepared daily and they were given orally using stomach cannula for the periods one and two months, two of the three groups were orally treated with concentrations (75,150)mg/kg respectively, the third group considered as control group were treated with 0.1ml of distilled water for two months.

**-Histological and histochemical preparations**

Animals from control and treated groups were scarified, dissected and small pieces of liver were quickly removed, then fixed in 10% formalin and bouin’s fixatives for (20-22)hours followed by changing the fixative with 70% alcohol after washing the specimens for many times, following the washing specimens were dehydrated, embedded and then sectioned to 6 µ thickness, for the histological examination, sections were stained with haematoxylin and eosin then examined under light microscope (Olympus), photographs were taken by digital camera.

In the histochemical study, sections were stained with periodic acid Schiff’s method (PAS) to demonstrate carbohydrates.

**Results**

**Histological examination in liver tissue**

**- Control group**

Section of this group appeared with normal histological structure the liver covered with thin capsule composed of loose connective tissue called Glisson’s capsule. The liver of this group are normal in shape and size (Fig.1).

Histological examination of mice livers of this group showed normal liver histology with hepatic cords or plates are arranged around central vein (Fig.2).

These hepatic cords separated from each other by blood sinusoids, the blood sinusoidal are lined with two types of cells, first type of cells represented by endothelial cell that appears flattened cell and second type of cells represented by kupffer cell that appear as a big cell with circular nuclei (Fig.1).

The portal area of liver composed of branch of portal vein, hepatic artery, bile ducts and lymphatic vessel (Fig.3).

**-Groups treated with (75)mg/kg of piroxicam**

The examination of liver sections of treated mice with(75)mg/kg of piroxicam for two periods revealed many pathological changes compared with control group. The changes are represented by degeneration of hepatocyte, hepatic sinusoidal dilation, also inflammatory cellular infiltration, few vacuoles in the cytoplasm of hepatocyte and congestion of central vein after one month of administration (Fig.4,5), while after two months of administration the cytoplasm appeared to be highly vacuolated and the nuclei of most of the hepatocytes appeared pyknotic and some nuclei appeared disappeared (Fig.6), as well as the beginning of calcium casts formation, vascular congestion in the portal vein, cellular infiltration was more intense around the portal area than the previous treatment and dilation of portal vein in the portal area (Fig.7,8,9).

**-Groups treated with (150)mg/kg of piroxicam**

The results of microscopic examination showed severe changes that represented by cellular infiltration and portal vein dilation in the periportal area, the blood sinusoidal were highly obliterated than the previous group. In addition, the nuclei of most of the hepatocytes appeared with dense clumps of chromatin and some nuclei appeared Pyknotic after one month of administration (Fig.10,11), whereas after two month of administration the changes were proliferation of bile duct, congestion of portal vein, the cellular infiltration was more intense than the previous group, detachment of basement membrane of hepatocytes and hepatocytes were swollen (hypertrophy). In addition, the cytoplasmic vacuoles were less in number. (Fig. 12,13,14).

**Histochemical changes in the liver**

Control liver sections stained with PAS method
showed a positive reaction to the stain as an indication for the existence of carbohydrates in the basement membrane of hepatocyte glycogen appeared around the cell membrane (Fig.15). Liver tissue of treated mice with (75,150) mg/kg of piroxicam after two months of administration showed decreased of glycogen content. The reaction increase with the increase of concentration and administration period (Fig.16,17)

Figure(1): Cross section of liver showing capsule(C), sinusoid(S), endothelial cells(EC), kupffer cells(KC) (H&E 10X)

Figure(2): Cross section of liver showing central vein(CV), hepatic cords(HC), hepatocyte(H) (H&E 10X)

Figure(3): Cross section of liver showing portal vein(PV), hepatic artery (HA), bile duct(BD), lymphatic vessel(LV) (H&E 40X)

Figure(4): Cross section of liver (treated group with 75mg/kg) for one month showing hepatocyte degeneration(D), hepatic sinusoidal dilation(SD), vacuole(V), infiltration of lymphocyte(In) (H&E 10X)

Figure(5): Cross section of liver (treated group with 75mg/kg) for one month showing congestion of central vein (Co), infiltration of lymphocyte(In), hepatic sinusoidal dilation(SD) (H&E 10X)

Figure(6): Cross section of liver (treated group with 75mg/kg) for two months showing hepatocytic vacuolations(V), Pyknotic nuclei(P), cytoplasm appeared darkly stained(DS) (H&E 40X)

Figure(7): Cross section of liver (treated group with 75mg/kg) for two months showing calcium casts formation(Ca), congestion of portal vein (Co) (H&E 40X)
Figure (8): Cross section of liver (treated group with 75mg/kg) for two months showing vascular congestion of portal vein (Co), infiltration of lymphocyte (In), Portal vein dilation in the portal area (PV) (H&E 40X)

Figure (9): Cross section of liver (treated group with 75mg/kg) for two months showing increased cellular infiltration (In) around of bile duct (BD), pyknotic nuclei (P) (H&E 40X)

Figure (10): Cross section of liver (treated group with 150mg/kg) for one month showing dilation of portal vein (PV), hepatic sinusoidal dilated (SD), cellular infiltration of lymphocyte (In) (H&E 40X)

Figure (11): Cross section of liver (treated group with 150mg/kg) for one month showing pyknotic nuclei (P), hypertrophy of hepatocyte (HT), clumped chromatin (Cl) (H&E 100X)

Figure (12): Cross section of liver (treated group with 150mg/kg) for two months showing infiltration of lymphocyte (In), proliferation of bile duct (BD), congestion in the portal vein (Co) (H&E 40X)

Figure (13): Cross section of liver (treated group with 150mg/kg) for two month showing detachment of basement membrane of hepatocyte (DM), hypertrophy of hepatic cells (HT), hepatocytic vaculations (V) (H&E 40X)

Figure (14): Cross section of liver (treated group with 150mg/kg) for two months showing proliferation of bile duct (BD), congestion in the portal vein (Co) (H&E 40X)
Figure (15): Cross section of liver of control group showing distribution of carbohydrate deposition (CD) in the hepatocytes with intense red color (PAS 40X)

Figure (16): Cross section of liver (treated group with 75mg/kg) for two months showing slight decrease in carbohydrate deposition (CD) (PAS 40X)

Figure (17): Cross section of liver (treated group with 150mg/kg) for two months showing severe decrease in carbohydrate deposition (CD) (PAS 40X)

Discussion

In this study, we tried to identify the effect of piroxicam depended in the liver of adult male albino mice. It was clear that its effect was time depended, there were increased effects with prolonged time of dose administration this result is in agreement with 10.

In general, NSAIDs are well known to induce hepatic injury (7,11). Also the pathological changes may lead to impaired liver function which interferes with the secretion of plasma proteins 8. This lead to decreased blood osmotic pressure with subsequent decreased drainage of tissue fluids, which explains the congestion observed in the different tissue.

The histological examination revealed that there were histopathological changes in the liver of treated groups with the concentration (75 and 150)mg/kg, the histopathological changes treated with 75 mg/kg showed vascular congestion and beginning of calcium casts formation, these findings in agreement with foundation of 12.

There was also a remarkable histopathological changes in this groups treated with piroxicam that represented by vascular congestion that may be related to the use of drug that cause an acute inflammation this lead to change the blood flow inside blood vessels, which may cause a relaxation and an extension in these blood vessels, thus the blood will accumulate into the vessels (12,13).

Result showed formation of calcium casts, this may attributed to the elevation of hydrogen peroxidase \( \text{H}_2\text{O}_2 \) that cause the nephrotoxicity which is responsible for changing the permeability of mitochondrial cellular membrane, hence the amount of calcium taken by the mitochondria will increase and with the existence of oxygen, the mitochondria will break down and the calcium will be released in the liver tissue 13.

Result also showed a remarkable cellular infiltration in the hepatic tissue. This supported 14, whose studies suggested that abundance of leucocyte, and lymphocytes, in particular, are a prominent response of body tissue facing any injurious impacts. Leukocyte elevations and adherence to the vascular endothelium have been suggested by 15 to play an important role in the pathologenesis of NSAIDs associated injury.

In this study, the vacuolation of the cytoplasm of the liver cells appeared at first in the hepatocytes of the peripheral zone of the hepatic lobules, extending gradually toward the center. This may be due to the direction of the lobular blood supply. Vacuolation and damage of liver cells were noted by other investigators following treatment with different agents 16, 17.
The present study also showed the presence of histopathological symptoms in the group treated with (150)mg/kg of piroxicam that represented by blood sinusoidal dilation, detachment of basement membrane and hypertrophy of hepatocyte, these findings in agreement with(12, 18).

Also results showed degeneration of hepatocyte and damage of hepatic cells 19 suggested that the high exposure of drug and chemicals results in cell death or apoptosis. These two factors(drug and chemical) may show either functional or structural side effects as well as the loosing of the liver capacity to stress, but when reaching the threshold, the liver cell will reach the final irreversible stage which was death.

Also results showed hypertrophy which is characterized by enlargement of cells in comparison with control group. This enlargement of cell may be due to the enlargement of the component of these cells and this swelling may mostly due to accumulation of water inside the cell 20.

Regarding the histochemical changes observed in this study under piroxicam administration, results showed a reduction in the polysaccharide in the liver tissue, the decrease in carbohydrate content was attributed by some investigators to be due to increased stress on organ, which lead to high energy consumption(10, 21), or may be due to the depletion of mucopolysaccharide in tissue which is attributed to the turbulence of Golgi apparatus 22.

It is clear form this study that piroxicum has toxic effects on the liver tissue as represented by the observed histopathological damages.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Baghdad university, Iraq and all experiments were carried out in accordance with approved guidelines.

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Prevalence of Negative Exploratory Laparotomy in Some the Hospitals of Al-Russafa Side of Baghdad City

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Abstract

Not all abdominal trauma need laparotomy thus this study has been conducted to evaluate the prevalence of negative laparotomy in some of the hospitals of Al-Russafa side of Baghdad city. A retrospective cross-section study was be conducted in four hospital (Baghdad Teach hospital, Al-kindy, Al-sadder, Al-emam Ali hospital) in Baghdad city. The period for data collection are (8) months from February to September 2014. Data was analyzed using the SPSS.

This study revealed that the distribution of –ve labratomy are ( 6) for AL-Sadder hospital and (4) for other hospitals in sample with (12%) for Al-sadder hospital ,(11.76 %) for Al-emam Ali and Baghdad hospitals, and (8) for Al –kindy hospital,The results of this study indicated that one ten of all expletory lapratomy was negative lapratomy. The prevalence distribution of expletory lapratomy are difference between hospitals of Al-russafa and also there is difference in the prevalence of –ve expletory lapratomy among these hospitals.

Based on this study Reliance on algorithm for patients with abdominal trauma should be to identify injuries requiring surgical repair, and to avoid unnecessary laparotomy. In addition provide imaging modalities and other investigative techniques in all hospitals and training of medical staff working in hospitals on focal assessment sonography for trauma program(FAST).

Key words: exploratory laparotomy, negative lapratomy, prevalence.

Introduction

“Exploratory laparotomy defined as a laparotomy process that purpose for obtaining information that is not available by clinical diagnostic tools. It is usually performed in patients with acute, or unexplained abdominal pain, in patients who complained persistant abdominal trauma, and in patients with a malignancy” ¹² Exploratory laparotomy indications included acute-onset abdominal pain and clinical results of intra-abdominal pathology necessitating emergency surgery, and abdominal trauma associated with shock, Peritoneal irritation and Hemodynamically unstable trauma patients ¹³ Availability of good imaging instruments and facilities (C.T.U.S) have restricted or reduced the use of exploratory laparotomy in these cases ⁴⁵⁶ “The essential contraindication for exploratory laparotomy is unsuitable for general anesthesia. Peritonitis with severe sepsis, advanced malignancy, and other conditions may maker patient’s unfit for general anesthesia ¹. “Non therapeutic exploratory laparotomy is associated with significant long-term morbidity, including adhesive intestinal obstruction and incisional hernia,For most cases the non-therapeutic laparotomy rate will be unacceptably high. With the incidence of consequent with a negative laparotomy of 12% - 41%, with remain

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in the hospital of 4-8 days, this lead to health risk to the patient and economic burden to hospitals" (7, 8, 9). Trauma is one of the common reasons of death because of the increase of violence in our society, and is a major economic and health problem. The abdomen is the third most common injured region, Abdominal trauma is classified as either blunt or penetrating , and not all abdominal trauma need laparotomy” (10, 11,12).

In the past two decades from exploration, the trend has moved in to selective approach “(13,14,15), laparotomy for penetrating abdominal stab wounds leads to unnecessary operations in 38–40% of patients “(16, 17).” The goal of any algorithm for patients with abdominal trauma should be to identify injuries requiring surgical repair, and avoid inappropriate laparotomy with its linked morbidity” (18-19). This study aimed to provide data on prevalence of expletory laparatomy among patient with abdominal trauma in random sample of some of AL-russafa side of Baghdad city hospitals, and the –ve expletory laparatomy among those patients.

Method

Setting of the study: This study was be conducted in four hospital in some of ALrusafa side of Bghdad (Baghdad Teach hospital, Al-kindy, Al-sadder, Al-emam Ali hospital) in Baghdad city.

Design of the study: A retrospective cross- section study.

Duration of the study: The period for data collection are (8) months from February to September 2014.

Study sample: The data were collected retrospectively from case sheet for (168) patients with abdominal trauma and exploratory laparotomy were done for them. Data collection were carried out from four main general hospitals that selected randomly from eight main general hospitals in Alrusafa side of Baghdad.

Inclusion criteria:- All patients with abdominal trauma and exploratory laparotomy were done for them.

Exclusion criteria:- Patients were done exploratory laparotomy and without abdominal trauma.

Data analysis: Data was put in computer file for storage and statistical tables were used to represent the frequency and percentage of the results. Statistical data obtained were analyzed using Statistical package for the social sciences (SPSS version 16).

Findings

Figure (1) displays the percent of exploratory laparotomy. Among the 168 cases, 18(11%) of -ve laparotomy and 150 (89%) of +ve laparotomy, the study found The study found the prevalence of –ve expletory laparotomy (10.7%) 18 cases and +ve expletory laparotomy are (89.3%) 150 cases from total number of the sample. High prevalence of –ve expletory laparotomy lead to economic burden to health institutions in addition to the burden on the patients (7,8,9). Navasaria and colleagues at south africa, they assessed 86 patients with abdominal stabs where expletory laparotomy done for them, there were 7 negative laparotomies (8.1%) 20. Other study at Al-Zahra hospital in Isfahan show the penetrated anterior abdominal fascia without visceral evisceration and in the absence of signs of peritoneal irritation, rate of negative laparatomy was 82 percent 3. Other study done at the Los Angeles County, University of Southern California Medical Center,over the six year study period a total of 1871 laparotomies were performed, of which 73 (3.9%) were negative” 21. High percent of unnecessary laparatomy in our study may due to lack of imaging and other investigative techniques and depend on physical examination for case evaluation in our hospitals.
Figure (1) Distribution of the patients according to type of exploratory laparotomy

The total of exploratory laparotomy was (168) in four main general hospitals in Alresafa side of Baghdad during the period of the study.

Table (1) show that Al-kindy and Al-sadder hospitals have (50) exploratory laparotomy, these number is large compared with other Al-russafa side of Baghdad city hospitals. This may because it cover a large population density, the high violence and explosions in the coverage area for these hospitals. And Al-emam Ali and Baghdad hospitals have (34) exploratory laparotomy. The cases that done laparotomy in AL-emam Ali hospital are lower than Al-sadder hospital(50laprotomies) inspite of the both hospitals located in the same geographical area and provided medical health services to the same population.

this difference may be due to restoration done in Al-emam Ali hospital and limitation of surgical bed number. Number of laprotomies in Bagdad hospital 34 laprotomies, this low number in spite of this hospital is center teaching hospital in Baghdad with large bed number and good resources, this low number of laprotomies may because of the distance from the area where the explosions abound and away from large population density.

Table (1): Distribution the patient according to hospitals that exploratory laparotomy done.

<table>
<thead>
<tr>
<th>Hospitals</th>
<th>NO. of exploratory laparotomy</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al-kindy</td>
<td>50</td>
<td>30%</td>
</tr>
<tr>
<td>Al-sadder</td>
<td>50</td>
<td>30%</td>
</tr>
<tr>
<td>Al-emam Ali</td>
<td>34</td>
<td>20%</td>
</tr>
<tr>
<td>Baghdad hospital</td>
<td>34</td>
<td>20%</td>
</tr>
<tr>
<td>Total</td>
<td>168</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table (2) The distribution of –ve labratomy are (6) for AL-Sadder hospital and (4) for other hospitals in sample with (12%) for Al-sadder hospital, (11.76 %) for Al-emam Ali and Baghdad hospitals, and (8%) for Al-kindy hospital. The percentage of –ve lapratomy in Alkindy hospital was 8% and this low number comparative with other hospitals, this may because surgeon and doctors in emergency unit well trained on
U/S examination for trauma, fast (focused assessment sonography for trauma) which is one of important tools to reduced negative laparotomy “(22,23,24),

Table (2): The distribution of study sample according to (+ve and ve) exploratory laparotomy finding.

<table>
<thead>
<tr>
<th>Hospitals</th>
<th>No. of exploratory laparotomy</th>
<th>No. of +ve laparotomy</th>
<th>No. of -ve laparotomy</th>
<th>% of –ve laparotomy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al-kindy</td>
<td>50</td>
<td>46</td>
<td>4</td>
<td>8 %</td>
</tr>
<tr>
<td>Al-sadder</td>
<td>50</td>
<td>44</td>
<td>6</td>
<td>12 %</td>
</tr>
<tr>
<td>Al-emam Ali</td>
<td>34</td>
<td>30</td>
<td>4</td>
<td>11.76 %</td>
</tr>
<tr>
<td>Baghdad hospital</td>
<td>34</td>
<td>30</td>
<td>4</td>
<td>11.76 %</td>
</tr>
</tbody>
</table>

**Conclusion**

The present study was concluded that one ten of of all exploratory laparotomy was negative laparotomy.

The prevalence distribution of exploratory laparotomy are difference between hospitals of Al-russafa and also there is difference in the prevalence of –ve exploratory laparotomy among these hospitals.

**Recommendations:-**

1. Reliance on algorithm for patients with abdominal trauma, should be to identify injuries requiring surgical repair, and to avoid unnecessary laparotomy.

2. Provide imaging tools and other diagnostic techniques (C.T,U.S,M.R.I) in all hospitals

3. Training of medical and health staff working in hospitals on focal assessment sonography for trauma program (FAST).

**Ethical Clearance:** At the beginning of the study we obtained an official approval ethical to conduct study from the Ministry of Health (MOH) and Directory of Health / Baghdad Al-Rusafa.

**Conflict of Interest:** Nil

**Source of Funding:** Nil

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Cloning, Sequencing and Expression of the *Brucella Melitensis* Novel Lomr Protein

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Abstract

**Aim:** Brucellosis is a zoonotic infection transmitted from animal to human directly by the animal or indirectly from their products. It is worldwide distribution especially in the middle east including Iraq and Kurdistan Region. **Materials and methods:** The gene coding for the outer membrane protein assembly factor LomR of 18kDa, now designated of *Brucella melitensis* 16M was cloned and sequenced. Cloning of insert DNA from bacteria into pET-28, allowed the selection of a plasmid bearing a 5.5-kb NcoI fragment that seemed to contain the entire omp gene under control of its own promoter. **Results:** LomR was localized within a region between the NcoI and XhoI insert of approximately 396 bp. The reliability of the constructed plasmid was established by restriction enzyme mapping and sequencing. LomR was expressed after induction with IPTG in Escherichia coli BL21. Recombinant LomR was purified by chromatography through Ni-agarose. Sequencing of this region revealed an open reading frame of 390 bp encoding a protein of 132 amino acids and a predicted molecular mass of 20 KDa. **Conclusion:** The availability of recombinant LomR and the identification of the antigenic determinant recognized will allow the evaluation of their potential protective activity and their potential for the development of subunit vaccine against brucellosis.

**Keywords:** (PCR, cloning, LomR, DNA, Gene, Protein, expression, Brucella melitensis)

Introduction

Brucella types are facultative intracellular gram-negative bacterial pathogens that infect both phagocytic and nonphagocytic cells. *Brucella abortus* causes abortion and economic losses in dairy cattle and furthermore different zoonotic diseases in human. *Brucella melitensis* is the most pathogenic species for people and may cause premature births in sheep, goats, and cows. Immunization of sheep and goats against *B. melitensis* with live attenuated smooth *B. melitensis* Rev. 1, the strain most generally use for disease control, this bacterium needs to oppose oxygen consumption. Without treatment, brucellosis may get continuous, bringing about restricted disease of liver, spleen or brain.

*Brucella melitensis* Rev.1 vaccine induces abortions when applied during pregnancy, is virulent for humans, and elicits antibodies to smooth lipopolysaccharide (LPS) of Brucella interfering in serodiagnosis. Moreover, Rev.1 is resistant to streptomycin, an antibiotic used to treat the disease. Effective brucellosis vaccines not interfering in the diagnosis of infected animals would represent a major breakthrough.

The sickness remains a general medical issue and results in serious monetary misfortunes regarding loss of fetus and loss of animals.

There is significant financial weight of brucellosis reflecting, either the expenses of accomplishing and keeping up illness free status, or the expense of infection regarding loss of profitability and control costs. Over numerous years Brucella taxonomists
built up a characterization framework that perceived six established species dependent on unpretentious phenotypic and antigenic contrasts and differential host specificity. Accordingly generally *B. abortus* (cow), *B. melitensis* (caprine and ovine), *B. ovis* (ovine), *B. canis* (canine), *B. suis* (porcine, rangiferine, leporine) and *B. neotomae* (rat) are perceived. 4.

The live attenuated strain *B. melitensis* Rev.1 is viewed as the best immunization accessible for the prophylaxis of brucellosis in sheep 5.

During the last two decades, a number of *Brucella* antigens have been identified, such as Omp16, Omp19, Omp25, Omp31, SurA, Dnak, trigger factor (TF), ribosomal protein L7L12, bacterioferritin (BFR) P39, and lumazine synthase BLS 9. These antigens were selected based on empirical screening approaches that are typically laborious and expensive and require strict safety precautions and particular lab facilities, as the relevant species of *Brucella* are classified as biosafety level 3 microorganisms. This insufficiency of the empirical methods represents a great need for a rational and comprehensive approach to discover potential antigen candidates that can be used to develop a safe and effective anti *Brucella* vaccine. In any case, its utilization is known to invigorate counter acting agent reactions in sheep serum by the current ordinary serological tests from those saw in *B. melitensis*-infected sheep. These tests, of which the most ordinarily utilized are the Rose Bengal test, the seroagglutination test, and the complement fixation test, chiefly measure antibodies against the immunodominant smooth lipopolysaccharide (S-LPS) 7.

Hence, a noteworthy objective in immunological investigations of brucellosis has been the ID of protein antigens valuable for analysis and conceivably helpful for recognizing the immunological reactions of infected animals from those of animal inoculated with live attenuated strains. The aim of this work was to discover antigen candidates conserved among the three pathogenic species. In the present study we purified a protein that is a part of the *Brucella melitensis* membrane to try using it later as antigen for diagnosis and control concepts.

**Materials and Method**

**Ethical statement:** This study was performed in strict accordance to the ethical committee condition of the university of Sulaimani, college of veterinary medicine.

**Bacterial strains**

Bacterial strains E. Coli XI blue and BL21 (DE3) a gift from (Genetic department, Tehran University of Medical Sciences) were used for expression of LomR recombinant protein. Bacterial strains were routinely grown at 37°C in LB broth or agar.

**Cloning and DNA sequencing LomR gene:**

Bacterial DNA from cultures of *B. melitensis* 16M full-grown all night was isolate using a Qiagen DNA taking out kit. The DNA was checked using agarose gel electrophoresis, and the purity and quantity were calculated using a spectrophotometer. The section encoding the LomR gene, consisting of 554 bp, was amplified and legated into pET-28a.DNA of recombinant phages pET-28a expressing was recovered following the protocol of Maniatis *et al.* for the rapid, small-scale isolation of DNA. Plasmid DNA was then incise with NcoI and XhoI restriction fragments were ligated into pET-28a (Promega) cut with NcoI. Competent *E. coli* DH5α cells (Promega) were transformed with recombinant plasmid DNA as described by Maniatis *et al*. Then spread on LB-kanamycin (50 mg ml) plate’s one positive colony was further selected for restriction analysis of the insert containing the gene coding for LomR. Restriction analysis was done with the following enzymes of the multiple cloning site sequence of pET-28a NcoI, XhoI.

**Expression and Purification of recombinant LomR protein.**

The ligated product was then used to change the expression host *E. coli* BL21. The exponential-phase culture of the established LomR clone was induced with different IPTG concentrations of 0.5, 1.0, 1.5 and 2.0 mM, and checked for expression at hourly intervals up to 5 h. Induced cells, as well as uninduced cells exposed to the identical conditions, were lysed in 1× lysis buffer (PBS) and analysed by 10% PAGE, as described by Laemmli (1970). In order to find out the location of the expressed recombinant protein, the bacterial cell suspension was sonicated for 10 min with a pulse interval of 8 s. The
sonicated extract was centrifuged at 14000 rpm for 30 min at 4 °C. The supernatant and cell pellet, with suitable controls and molecular mass markers, were analyzed by 12% SDS-PAGE. After verification of the solubility, the protein was purified by His-tag binding affinity to Ni-NTA agarose. Purification of the cell lysate was carried out using a ROTH (Germany) Ni-NTA spin column with a native purification protocol as specified by the maker, and mass purification was approved by gel filtration affinity column chromatography using Ni-NTA Super flow (ROTH). The purified protein was checked by SDS-PAGE followed by coomassie blue staining, and protein concentration was expected by the Bradford method using BSA as a standard.

Results:

Cloning and sequencing of DNA coding for rLomR protein

Genome DNA ready from B. melitensis was use as guide in the PCR by using Prime DNA polymerase. Outcome show that single band through accurate molecular weight has been augmented for LomR gene. Fig 1

![Fig 1](image1.png)

Fig. 1. Confirmation of cloning, expression and purification of LomR. Lane 1: pET-28a+ LomR, Lane2: pET-LomR digested with XhoI and MluI, Lane 3: molecular marker. Digestion Conditions Digestion in water-bath, 37°C for 40 minutes about 300ng plasmid digested 1% Agarose gel.

Cloning of the B. melitensis LomR gene

Viewing of the recombinant pET-28a plasmids were passed with restriction digestion and sequenced (Fig. 1). Insertions were excised from recombinant pET-28a with positive results and sub cloned into pET28a (+). Cloned plasmids were examined with restriction digestion XhoI and NcoI restriction enzyme and plasmid sequencing.

Expression of rLomR in E. coli

Expression of induced cells was checked, at hourly intervals up to 4 hours after induction with 1mM IPTG (Fig 2).

![Fig 2](image2.png)

Fig 2. SDS-PAGE analysis of LomR purification. Lane 1: molecular weight marker, Lane 2: E.coli BL21 with pET-28a+ LomR before IPTG induction, Lane 3: Ecoli BL21 with pET-28a+ LomR after IPTG induction –Lane 4: eluted recombinant protein with elution buffer containing 500m M Imidazole.
**Discussion**

Brucellosis is an extensive zoonotic disease that can communicate a disease to variety of farm animals and wildlife. This disease is widespread in many countries and it leads to cost-effective losses. Rev1 and S19 are Brucella typical vaccines which used generally. They are live attenuated bacteria strains. These vaccines have some harm, such as weak inducible for immune system and have potential of human infection. Based on this data, the detection of immunogenic bacterial constituent is vital component of subunit vaccine and diagnostic development process. Surface proteins of the bacteria have been reported to take part in significant role through Brucella infection and inducing immune response. Commonly, successful vaccines against their bacteria mainly induce antibodies against surface composition. These surface proteins of the bacteria have been thought of as helpful antigens for progress of both diagnostic reagent and vaccine candidates. Antigen based diagnosis of brucellosis has not been basically used and so antibody based diagnosis is only efficient substitute that can be used in laboratories. The antibodies against different Brucella antigens can be detected in sera from little days of infection and up to 3 months.

Selection and production of new vaccine candidates are the primary practical steps toward introducing new vaccines. During the last two decades, a number of *Brucella* antigens have been identified, such as Omp16, Omp19, Omp25, Omp31, SurA, Dnak, trigger factor (TF), ribosomal protein L7L12, bacterioferritin (BFR) P39, and lumazine synthase BLS.

The OMPs of Brucella spp. have been broadly characterized as immunogenic and protective Ags. Yet studies have been focused on the major OMPs. Immunization with purified recombinant LOmp16 or L-Omp19 protein plus IFA induced protection against B. abortus infection prompted us to study in further detail different aspects that we consider important at the moment of choosing an Ag for further commercial use as a vaccine. In this regard, the capacity to manufacture an Ag that is molecularly defined and pure is highly beneficial in terms of safety, effectiveness, and large-scale production.

At present, native antigens like, complete cell extract and lipopolysaccharides have been used in serological assays. RBPT which is based on the stained complete cell heat killed acidified bacteria is used for early screening. Although RBPT has high sensitivity but low specificity because these antigens show cross reactivity with other bacteria like E. coli O: 159, Y. enterocolitica O: 9, Vibrio cholera, and Salmonella spp.

The gene of LomR was PCR synthesized and cloned into the pET28a (+) expression system. The system provides assistance for best expression of Brucella melitensis 16M outer membrane proteins.

**Conclusion**

The outer membrane resembling protein LomR protein is a novel protein that expressed. These expressed recombinant proteins have been intended to be fused with 6-His tags at their N terminal. In this study, all expressed proteins were confirmed by SDS-PAGE. Purified recombinant proteins with Ni-NTA agarose resins arranged like truth folding proteins. Purified 21 KDa proteins candidate for diagnostic purpose. This recombinant protein will be examd later in vivo model to test their immune stimulation.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the college of veterinary medicine, Iraq and all experiments were carried out in accordance with approved guidelines.

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Attitudes of Secondary School Students toward Health Promotion Behaviors in Al- Hilla City

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Abstract

Objectives To identify the school students sociodemographic characteristics . To assess the attitude of participants toward health promotion .

Methodology: A cross-sectional descriptive study consisting of (177) students, to Attitudes of Secondary School Students toward Health Promotion Behaviors of secondary school student in Al- Hilla City

Result: Analysis of data reveals that there is a (67.8%) of adolescent have a normal body mass index, and (15.8) have underweight, (12.4%) overweight, while(4%) only have obesity.

Conclusion: Most of the students maintained normal weight status according to their BMI. Most of students aged at middle adolescence period, males more than females, majority of students were un married, at fourth grade, most of them were urban residence and ordered as 2nd member in the family, majority of them were not smoking and live with their parents.

Keywords: Attitudes of Secondary School Students toward Health Promotion.

Introduction

A huge proportion of the world’s population more than 1.75 billion young, aged between 10 and 24 years. Adolescents (aged 10 to 19 years) have specific health and development needs, and many face challenges that hinder their wellbeing, including poverty, a lack of access to health information and services, and unsafe environments. Interventions that address their needs can save lives and foster a new generation of productive adults who can help their communities progress. Many boys and girls in developing countries enter adolescence undernourished, making them more vulnerable to disease and early death. Adolescents are neither children nor adults; their needs can be easily overlooked in policies. Health interventions for adolescents cannot be effectively implemented without the appropriate policy and legal environment and its effective application.

Often defined by its age range (which is thought to extend from age nine or ten through the early twenties), adolescence represents a sensitive developmental period for learning about and adopting a wide range of health behaviors.

A good health-promoting behavior depends on the living habits adopted during early years. Adolescents are at a dynamic transition period bridging childhood to adulthood, characterized by rapid, interrelated changes in body, mind and social relationships. Most discussions concerning adolescents health promotion include the topic of improved bio-psychosocial wellbeing for example enhancing regular exercise, nutrition, stress management, spiritual life and interpersonal relationship behaviors. People tend to change their attitudes and lifestyle due to the physical, mental, and social problems as well as the mechanical life, one example of this sport as a social factor in controlling and curing a lot of social difficulties and injuries. According to scientists healthy and routine physical activities not only prevent and cure diseases, they are cheap and useful instruments in controlling stress, depression and...
aggression of present life 17

Methodology

Study Design: A cross-sectional descriptive study

Attitudes of Secondary School Students toward Health Promotion Behaviors in Al-Hilla City. Randomly sample of (177) students from secondary schools were selected. All of these adolescent measured by their weight, height, body mass index. The content credibility of the instrument was estimated through a panel of (14) experts, the stability of the items was based on the internal consistency of the questionnaire was evaluated by calculating Alpha Cronbach’ which as= 0.79. Data analysis: Through the used descriptive statistical (SPSS) version 24 analysis approach that includes, frequencies, percentages, mean of scores, standard deviation.

Result of the Study

Table (1). Distribution of Adolescents by their Body Mass Index

<table>
<thead>
<tr>
<th>BMI</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under weight</td>
<td>28</td>
<td>15.8</td>
</tr>
<tr>
<td>Normal weight</td>
<td>120</td>
<td>67.8</td>
</tr>
<tr>
<td>Overweight</td>
<td>22</td>
<td>12.4</td>
</tr>
<tr>
<td>Obese</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>177</td>
<td>100</td>
</tr>
</tbody>
</table>

This table describe the weight status according the body mass index categories. (67.8%) of adolescents have normal weight status, (15.8) of them have underweight, (12.4%) of them have overweight and only (4%) of them were obese. The adolescents have a positive attitude when response to the items of the nutritional domains and the total mean was (2.34) at positive attitude of assessment. According to the social support domain, they have a positive attitude and the total mean was (2.37). According to the health responsibility domain, they have a positive attitude and the total mean was (2.36). According to the Life appreciation domain, they have a positive attitude and the total mean was (2.68). According to the exercise domain, they have a neutral attitude and the total mean was (2.22). According to the Stress management domain, they have a positive attitude and the total mean was (2.44). Finally the grand mean of all the domains was (2.4) and that indicate the adolescents had a positive attitude toward health promotion behaviors according to the level of assessment.

Discussion of the Study Results

Distribution of the Students by their Body Mass Index

In respect to the Body Mass Index results indicated that mostly participants have normal weight status, and only few of them reported as obese. The body built and weight abnormalities either low or high is considered nowadays the subject of concern because of its seriousness and this documented by so many agencies especially when it affect this age group due to the future effects and outcomes. This result disagreed with the findings of 1 they found that the prevalence of obesity was 21.3% and 22.3% respectively among adolescents’ students.

Part-3-Adolescent’s Attitudes toward Health Promotion Behaviors: Concerning the nutritional behaviors of the students, a positive nutritional attitudes were found. Most of students agree about eating three meals daily and snacks, choosing foods without too much oil, include dietary fiber (e.g. Fruits or vegetables), Drink at least 1500 cc of water daily (or 6-8 cups), Each meal includes five food groups (bread, meat, milk, fruit and vegetable) and eat breakfast daily. Kollatage et al., (2011) supported our findings, they found 83.2% of the respondents eating regular breakfast, and 62.6% have regular light lunch.

In regard to the social support behavior domain of the students, they believe in the social support behavior positively according to the mean (2.37). Most of students agree about speaking up and sharing feelings with others, caring about other people, talking about concerns with others, make an effort to smile or laugh every day, enjoy keeping in touch with relatives, make an effort to have good friendships and disagree with talking about troubles to others. 3 clarified that students reported a high scores when response to social support scale.

According to the present study, the health responsibility behavior of the students, and according to their answers shows positive healthy responsibility behavior at the mean (2.36). Most of students agree
about read food labels when shopping, watching weight, discuss health concerns with a doctor or nurse, observe body at least monthly, brushing teeth and using dental floss after meals, wash hands before meals, read health information and make an effort to choose foods without preservatives. Those vital results are supported by 4 who identified that high percentage of students gained high scores at healthy responsibility behaviors.

The same table demonstrated the attitude regarding the life appreciation behavior of the students, results show a positive attitude mean (2.68). Most of students agree about make an effort to like myself, make an effort to feel happy and content, usually think positively, make an effort to understand strengths weaknesses and accept them, make an attempt to correct the defects, make an effort to know what’s important for the human, make an effort to feel interesting and challenged every day and make an effort to believe that life has purpose. The present results supported by 6 when they revealed that students had high total scores when response to life appreciation scale. Concerning the exercise behavior of the students, they have neutral attitude toward exercise behavior. Most of students partially agree about perform stretching exercise daily, also they are agree about exercising rigorously 30 minutes at least 3 times per week, participating in physical fitness class at school weekly, warm up before rigorous exercise and make an effort to stand or sit up straight. Keskin et al., (2017) supported the findings of the present study, they found that a large number of the students (63.9%) had a habit of doing sports regularly and the number of students who practice sports in a sports club is considerably high (43.8%).

The stress management behavior of the students is another crucial domain, the present study findings revealed that mean of scores of attitudes show positive result. This may be due to social and cultural relationships, students agree about most of the items. Such as make an effort to spend time daily for relaxation, make an effort to determine the source of stress, make an effort to watch mood changes, sleep for 6–8 hours each night, make schedules and set priorities and try not to lose control when things happen that are unfair. The results came along with 4 who agreed that students had good stress management behavior.

**Conclusion**

1. Most of students aged at middle adolescence period, males more than females, majority of students were un married, at fourth grade, most of them were urban residence and ordered as 2nd member in the family, majority of them were not smoking and live with their parents.

2. Mostly their family’s income was insufficient, high percentage of student’s fathers education was bachelor degree and mothers had secondary school graduated, most of fathers were employer occupation and mothers were housewives.

3. Most of the students maintained normal weight status according to their BMI.

4. The students scored positive and neutral attitudes in most of the domains and sub-domains of the health promotion scale.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Faculty of Nursing, Iraq and all experiments were carried out in accordance with approved guidelines.

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Investigation of \textit{mec} A and (\textit{tst-1}) Genes Among \textit{Staphylococcus aureus} Isolated from Skin Infection in Al-Diwaniyah Iraq

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Abstract

In this study one handered and five samples were collected from skin infection in hospital Diwaniyah Dermatology Consultancy in Al-Diwaniyah governorate. from December 2018 to April 2019. All samples were cultured and Identified by using phenotyping tests. The results revealed that 41 isolates were \textit{Staph. spp.} and 30 Isolates out of them Diagnosed \textit{Staphylococcus aureus} by using (API staph). Virulence factors were explicated by using polymerase chain reaction (PCR) methicillin-resistant \textit{staphylococcus aureus} (MRSA), were identified by detecting (\textit{mec}A gene), which revealed that all skin infections were MRSA (100%). Also, toxic shock syndrome toxin (TSST) were identified by using PCR to detect (tst-1 gene 326 bp.), which revealed that 23 isolate were positive out of 30 isolate (76.33%).

Keywords: Investigation, \textit{mec} A and (\textit{tst-1}) Genes, \textit{Staphylococcus aureus}

Introduction

Many patients who are hospital reviewers suffer from Skin lesions and considered an important health problem \textsuperscript{1}. \textit{S.aureus} is one of the most important pathogens found in most places and also found naturally on human skin and is associated with a wide range of skin diseases The threat of this \textit{S. aureus} is its morbidity, which is the factor of virulence produced \textsuperscript{2}. The skin invasion of \textit{S.aureus} either an essential internal source or external source \textsuperscript{3}. The emergence of strains of \textit{S.aureus} resistant to antibiotics such as MRSA is a global problem in clinical medicine \textsuperscript{4}. Staphylococcal resistance to penicillin is mediated by producing penicillinase. Staphylococcal cassates chromosome mec (SCCmec) is a family of mobile genetic elements of \textit{S. aureus} \textsuperscript{5}. Resistance is given by the \textit{mec}A gene by a protein associated with penicillin (PBP2a or PBP2), which has less affinity for act with $\beta$-lactams; allowing resistance to all $\beta$-lactam antibiotics, this mobile gene component has been acquired by different strains in separate gene transfer events, indicating that there is no common ancestor for the different MRSA strains. \textsuperscript{6} Toxic shock syndrome is a condition caused by this bacterial toxins, the primary mechanism involves the production of high-contrast antigens during topical Staphylococcal infection. The progression of the disease arises from superantigen toxin that activating multicellular T cells \textsuperscript{7}.

Material and Method

The study was conducted on patients with skin lesion caused by \textit{Staphylococcus aureus} in Al-Diwaniyah city / Iraq / 2019 and collected 105 samples included male and female. Patients (children, young and adults) range in age from 1 to 60 years in AL-Diwaniyah Teaching Hospital.

Isolation and Identification:

One handered and five samples were collected through a questionnaire (name, sex, age,) from skin lesion by transport media swab, then cultured on conventional media (blood agar, mannitol salt agar). This dishes were incubated at 37 °C for 18-24 and 48 h respectively, and diagnosed by biochemical testing. The diagnosis were isolates basis on phenotypic, catalase, oxidase, and coagulase. These isolates were recognized based on common biochemical tests. (API Staph), that differentiate between species belonging to staphylococcal \textsuperscript{8}.

antimicrobial susceptibility:
Bacterial DNA Extraction :-

The extraction DNA has been done according to the manufacturer instructions.

Table (1) Primers used for mecA and tst-1 genes amplification

<table>
<thead>
<tr>
<th>Primer</th>
<th>Primer Oligonucleotide sequence, 5’ to 3’</th>
<th>(bp)</th>
</tr>
</thead>
<tbody>
<tr>
<td>mecA</td>
<td>F 5’- TGAGTTGAACCTGGTGAAGTT - 3’</td>
<td>855 bp</td>
</tr>
<tr>
<td></td>
<td>R 5’-TGGTATGTGGAAGTTAGATTGG- 3’</td>
<td></td>
</tr>
<tr>
<td>tst -1</td>
<td>F 5’-ACCCCTGTTCCCTTATCATC- 3’</td>
<td>326 bp</td>
</tr>
<tr>
<td></td>
<td>R 5’-TTTTCGATTGTGTAACGCC- 3’</td>
<td></td>
</tr>
</tbody>
</table>

Table (2) Polymerase Chain Reaction :-

<table>
<thead>
<tr>
<th>Step</th>
<th>Temperature</th>
<th>Time</th>
<th>Cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>mecA</td>
<td>Initial denaturation</td>
<td>94.0C0</td>
<td>5 min</td>
</tr>
<tr>
<td></td>
<td>Denaturation</td>
<td>94.0C0</td>
<td>1 min</td>
</tr>
<tr>
<td></td>
<td>Annealing</td>
<td>57.0C0</td>
<td>2 min</td>
</tr>
<tr>
<td></td>
<td>Extension</td>
<td>72.0C0</td>
<td>1 min</td>
</tr>
<tr>
<td></td>
<td>Final Extension</td>
<td>72.0C0</td>
<td>5 min</td>
</tr>
<tr>
<td></td>
<td>Hold</td>
<td>4 0C</td>
<td>Forever</td>
</tr>
<tr>
<td>Tst-1</td>
<td>Initial denaturation</td>
<td>94.0C0</td>
<td>5 min</td>
</tr>
<tr>
<td></td>
<td>Denaturation</td>
<td>94.0C0</td>
<td>45 Sec</td>
</tr>
<tr>
<td></td>
<td>Annealing</td>
<td>50.0C0</td>
<td>45Sec</td>
</tr>
<tr>
<td></td>
<td>Extension</td>
<td>72.0C0</td>
<td>45 seC</td>
</tr>
<tr>
<td></td>
<td>Final Extension</td>
<td>72.0C0</td>
<td>10 min</td>
</tr>
<tr>
<td></td>
<td>Hold</td>
<td>4 0C</td>
<td>Forever</td>
</tr>
</tbody>
</table>

Table (3) Polymerase chain Reaction mastermix components

<table>
<thead>
<tr>
<th>PCR Master mix</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>DNA template</td>
<td>5µL</td>
</tr>
<tr>
<td>Forward primer (10pmol/µL)</td>
<td>1.5µL</td>
</tr>
<tr>
<td>Reverse primer (10pmol/µL)</td>
<td>1.5µL</td>
</tr>
<tr>
<td>PCR water</td>
<td>4.5µL</td>
</tr>
<tr>
<td>Master mix</td>
<td>12.5 µL</td>
</tr>
<tr>
<td>Total volume</td>
<td>25 µL</td>
</tr>
</tbody>
</table>
To determine the presence of the desirable amplicon, electrophoresis that in 1.5% gel agarose stained with adding ethidium bromide, and the products that visualized using a UV transil-luminator.

**Statistical analyses:** the used, Chi square, were performed. A p-value less than 0.05 was considered statistically significant.

**Results:** In this study 30 isolates of *S.aureus* out of 105 isolates. were isolated from skin lesion such as abscesses, boils, pimples and folliculitis at Al-Diwaniyah Teaching Hospital, which was determined by phenotypic characteristics and via biochemical testing then confirmed. Ten different antibacterial were used against *S.aureus*. Resistance showed against some antibiotic, (30 isolates 100 %) resistant to each Ampicillin, pencillin, cefoxatin, azithromycin, and trimethoprim, resistance was moderate to levofloxacin, chloramphenicol (12 isolates 40 %) clindamycin (15 isolates 50 %) While lowest resistance to Amikin (2 isolates 6.66). But they are wholly active vancomycin (30 isolates 100%). Polymerase chain reaction (PCR) used for amplification of *mecA* and *tst-1* genes. All the isolates from *Staphylococcus aureus* appeared to be carriers of *mecA* gene, which were 100 % by using specific primer 855 bp as figure (1). While were results *tsst* that shown 23(76.66%) samples from the out of 30 isolates was positive by using specific primer 326 bp as figure (2).

![Figure (1) Ethidium bromide Gel electrophoresis (1.5%) of PCR of MecA amplicon product. (1-30) all positive for this *mecA* gene with amplicon size(855 bp) in skin lesion isolates of *Staphylococcus aureus* for 1 hr. at 80 volts.](image1)

![Figure (2) Ethidium bromide Gel electrophoresis (1.5%) of PCR of tst-1 amplicon product. (1,2,3,5,6,7,13,14,15,16,17,18,19,20,21,22,23,25,26,27,28,29,30) were positive for this gene, (4,8,9,10,11,12,24) were negative for tst-1 gene with amplicon size(320 bp) in skin lesion isolates of *Staphylococcus aureus* for 1 hr. at 80 volts.](image2)
Discussion

The most commonly utilized antimicrobial substances in present clinical treatment procedures are β-lactams with intervention that includes inhibition of the last phase of the synthesis of bacterial cell-wall. These medicines have a smooth bactericidal with time-relied activities. They usually have excellent via-blood dissemination and little toxicity. Changes in the initial molecule resulted to the introduction of new substances with a wider antimicrobial action profile; however, in certain clinical environments, the use and effectiveness of beta-lactams are restricted because of increased bacterial resistance against those drugs 10.

Resistance to β-lactams can be induced by various genes; however, the most well-known worldwide distributed gene is mecA. The staphylococcal cassette chromosome has a gene called mecA which codes for PBP that is responsible of resistance against β-lactam antibiotics 11.

The action of the PBPs is manifested by their enzymatic activities due to inhibition-binding to β-lactams which results in destruction in the β-lactam chemical action properties. The PBP binding to β-lactams is occurred via the similarity present between the chemical structure of β-lactams and the chemical structure of the backbone of the sugar-amino acid that is an important part of the peptidoglycan 12.

Resistance via the presence of mecA can be induced due to random use of antibiotics in various clinical conditions; however, resistance to certain antibiotics due to this gene were found to occur even with no previously exposure to those antibiotics 13 suggesting different means by which bacterial species can acquire such genetic resistance. One of the most important tools that bacteria employ to receive resistance is horizontal genetic transferr (HGT). Bitrus et al., 14 have recognized that mecA gene can be transmitted from methicillin resistant S. aureus to susceptible strains via HGT, and this confirms that resistance can be present even with no previous history use of certain antibiotics. S. aureus can generate pathogenicity by employing various bacterial techniques; however, it can enhance potential damages to human body via harboring important genes such as toxic shock syndrome toxin (tst-1) gene. The work of this gene is recognized by its coding for an extracellular toxin that induce toxic shock syndrome. The health condition is characterized by the presence of severe symptoms such as fever, hypotension, rash, and malfunctioning of some body organs. In infants, TSS can generate Kawasaki syndrome, TSS-like exanthematos disease, and sudden infant death syndrome. The nowadays-reports refer to increasing the worldwide distribution of the tst-1 gene to even higher levels than the already known elevated spreading 15. It has been found that this gene has genetic variations which might suggest different virulence levels 16.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Microbiology, Iraq and all experiments were carried out in accordance with approved guideline.

References

6- Khan M F. Brief History of Staphylococcus
aureus: A Focus to Antibiotic Resistance. EC Microbiology, 2017;5:36-39


Electroencephalogram and Visual Evoked Potential Changes in Patients with Primary Headaches

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Abstract

This study was a case/control study in which a total of (450) subjects, into (150) with primary headache ( male and female) and this was included in this study, 128 with migraine headache, 22 with non-migraine headache and 300 were normal, as control group. The electrophysiological tests were done at the neurophysiology unit of Mirjan Teaching hospital in Babylon City, during the period from 28 / October/ 2014 until 22 / May/2015. This study reveals that involvement of the migraine are more than that of the non-migraine in headache patients when compared with control group and when compared between the migraine and non-migraine headache patients. The most common EEG changes in headaches patients were diffuse slowing and spike wave of back ground activity, in such a way that 54 (42.2%) migraine patients had abnormal EEG changes, in comparison to 4 (18.2%) of non-migraine patients. Visual evoked potential (VEP) was dependable marker for central nervous system affection in primary headache (migraine and non-migraine ) and the most common abnormalities were prolonged latency and amplitude is stay in normal ranged (5-10) µ.volt.

Keywords: EEG, VEP, migraine headache, non-migraine headache.

Introduction

Headache is defined as a pain arising from the head or upper neck of the body. The pain originates from the tissues and structures that surround the brain because the brain itself has no nerves that give rise to the sensation of pain (pain fibers) 1 . Headaches can radiate across the head from a central point or have a pincering vise-like quality. They can be sharp, throbbing or dull, appear gradually or suddenly and last for multiple days or less than an hour 2.

All headaches are considered primary headaches or secondary headaches. Primary headaches are not associated with other diseases. Examples of primary headaches are migraine headaches Typically the headache affects one half of the head, is pulsating in nature, and lasts from 2 to 72 hours. Associated symptoms may include nausea, vomiting, and sensitivity to light, sound, or smell. The pain is generally made worse by physical activity 3.

Migraines are believed to be due to a mixture of environmental and genetic factors. About two-thirds of cases run in families. Changing hormone levels may also play a role, as migraines affect slightly more boys than girls before puberty, but about two to three times more women than men (4,5). The risk of migraines usually decreases during pregnancy.

Subjects And Methods:

This study was carried out through the period from October 2014 to May 2015, In the brain alone planning and optic nerve, as well as in consultation nervous in Mirjan Hospital in the city of Babylon. By using the history, as a cross section observational study, we select (150) patients with primary headache, in addition to (300) healthy control subjects, underwent EEG and VEP study with age and sex matched healthy control group
should be selected for this study. All of them met the criteria of episodic headache (migraine with, without aura & non migraine) according to the international classification of headache disorder.

Subjects:

Two groups of subjects were studied:

The control group:

This group comprised thirty hundred healthy volunteers, (135 males and 165 females) ranging in age from (9 to 67) years, with a mean age of (30.40±7.38) years.

The patients group:

One hundred and fifty headache patients were selected all types of primary headache in Mirjan Teaching Hospital, they were (43 males and 107 females) ranging in age from (7 to 69) years with a mean age of (31.23±12.38) year.

Methods:

All the subjects were approved for:

- Electrophysiological tests:
  - Visual evoked potential (VEP).
  - Electroencephalography (EEG).

Visual Evoked Potentials (VEPs) Study:

Visual Evoked Potential test was carried out in a dark, quite room, with the subjects sitting comfortably on a chair and advised not to move or blink continuously during the test in order to decrease muscle contraction artifacts from eyes and skeletal muscles which blur the evoked potential waves, thus it is of paramount importance to avoid such artifact.

Instrumentation:

Using in this study Evoked Potential machine, serial no.GH 17 H9NW315431B, model 171S, (Italy) was used for electrophysiological analysis of the VEP using the VEP program. The VEP system include four channel preamplifiers which are connected to plasma screen as a photo-stimulator source.

Procedure:

Recording Visual Evoked Potentials:

The subject is call him to sit on the chair while made recording and told him to see in same level of the red point sited in the center of the screen, and the space between his state and the screen is fixed at rate equal to 100 cm.

The patient should asked him to cleaning and lesser his hair then asked him to sleep on the bed then begin applying gel on the surface of electrodes (to made skin impedance slighter) on the subsequent positions: on the right side from the beside of the head and about five centimeters from frontal side placed the three electrodes (F7,T3,T5), in the anther side(left side) placed the three other electrodes (F8,T4,T6), and then placed the five electrodes from the right side also, in frontal side (Fp1,F3,C3,P3,O1), and then placed the five electrodes from left frontal side (Fp2,F4,C4,P4,O2). At the end all of these electrodes were connected to the referential inputs by electrode cables.

Stimulation:

The full-field checkerboard pattern reversal (black and white checkerboard pattern), displaying at a rate of 3.5 reversals/second (Hz). Mean luminance of the screen was fixed at 60-cd/m and contrast level of 100%. With visual angle of 16 (degrees) subtended by the stimulus field. The checkerboard size was selected according to the visual acuity of the subject between 60-90 (minutes). Each eye was stimulated separately by covering the other eye with a gauze patch (Monocular testing). VEP tests were filtered and amplified by the VEP computer program, and averaged of 200 runs according to response clearance. The amplifier bandwidth was 0.1 – 100 Hz, with amplifier sensitivity of 2 µV and sweep speed of 500 msec/Div. Two series of examination of each eye were done to ensure reproducibility of the traces and results of VEP. During the test, the fixation point of the eye was kept on a target on the center of the screen (red dot), the subjects eye lids were fully opened to allow maximum amount of face and neck muscles, avoiding swallowing, moving tongue, speaking and frequent blinking, in order to minimize the artifacts during the
recording procedure.

**Electroencephalography (EEG) study:**

Electroneurodiagnostics is the study and recording of electrical activity in the brain and nervous system. Tests are performed by technologists who record information on paper or computer, and the results are then interpreted by a specially trained physician.

Brain cells continually send messages to each other that can be picked up as small electrical impulses on the scalp. The process of picking up and recording the impulses is known as an EEG.

The billions of nerve cells in your brain produce very small electrical signals that form patterns called brain waves. During an EEG, small electrodes and wires are attached to your head. The electrodes detect your brain waves and the EEG machine amplifies the signals and records them in a wave pattern on graph paper or a computer screen. A normal EEG means that you have a normal pattern of brain D wave activity. An abnormal reading means that abnormal patterns of brain activity are being produced and picked up.

**EEG Procedure:**

Electrical impulses in the brain are evaluated using an EEG. The test measures this electrical activity through several electrodes placed on your scalp. An electrode is a conductor through which an electric current can pass safely. The electrodes transfer information from your brain through wires to an amplifier and a machine that measures and records the data. The test is administered at a hospital, at your healthcare provider’s office, or at a laboratory by a specialized technician. The test usually involves the following steps:

You will be asked to lie down on your back in a reclining chair or on a bed. The technician will measure your head and use a pencil to mark where electrodes will be attached to your scalp. These spots are then scrubbed with a special cream that helps the electrodes get a high-quality reading.

**Results**

In this study, the overall mean age of patients with headache and control was (31.23±12.38) and (30.40±7.38) years old, respectively, the distribution of patients and control by sex, (28.7%) and (47.3%) of patients and control were males, as shown in the Figure 4.

In this study, the differences between patients with headache and control by EEG changes were significant differences between patients and control by EEG. Patients with headache were 30 times more likely to have an abnormal EEG, as shown in Table 1.

In this study, the differences of patients with headache types and control during hyperventilation and photic stimulation of EEG. 24%, 14.66%, 1%, 1%, as shown in Figure 5.

Table 2 shows the Mean Differences of VEP amplitude parameter by Patients with Headache and Control Groups. There were significant mean differences of VEP Amplitude RT and LT by study groups. Table 3 shows the Differences of Patients with Headache and Control Groups by VEP latency and waves morphology. There were significant differences of Patients with Headache and Control Groups by RT Latency Positive1, RT Latency Negative1, LT Latency Positive1, LT Latency Negative1, RT Latency Positive2, and wave morphology. Case group were 6, 2, 19, 3, 13 and 24 times to have abnormal right latency 1 positive and negative and left latency 1 positive and negative, right latency 2 positive and abnormal wave morphology, respectively.

In this study, the distribution of patients by types of headache (71.30%), (13.3%), (10.0%), (2.7%), (2.0%) and (0.7%) of the patients had migraine without aura, migraine with aura, tension headache, cluster headache, chronic headache and TAC headache, respectively, as shown in Figure 1.

In this study, the distribution of different EEG abnormalities in different types of migraine. Spike 25.96%, poly spike 12.96%, sharp 12.96%, slow 48.14%, as shown in Figure 2. In this study, we show the distribution of different EEG abnormalities in different types of Non-migraine. Spike 0.0%, poly spike 0.0%, sharp 4.54%, slow 13.63%, as shown in Figure 3.
Table 1: Differences of Patients with Headache and Control by EEG Findings.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Study Groups</th>
<th>$\chi^2$</th>
<th>P Values</th>
<th>Odds Ratio (95% C.I.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Patients with headache (%)</td>
<td>Control</td>
<td>(%)</td>
<td></td>
</tr>
<tr>
<td>EEG Normal</td>
<td>92 (61.3) 58 (38.7)</td>
<td>294 (98.0) 6 (2.0)</td>
<td>110.20</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>EEG Abnormal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p value ≤ 0.05 is significant

EEG = Electroencephalography

$\chi^2$ = Chi-Square, C.I. = Confidence Interval

Table 2: Mean Differences of VEP amplitude by Patients with Headache and Control Groups.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Study groups</th>
<th>Mean</th>
<th>S.D</th>
<th>t-test</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>VEP Amplitude RT (µ volt)</td>
<td>Case</td>
<td>7.47</td>
<td>2.25</td>
<td>8.622</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>6.22</td>
<td>0.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VEP Amplitude LT (µ volt)</td>
<td>Case</td>
<td>6.75</td>
<td>1.60</td>
<td>2.876</td>
<td>0.004*</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>6.37</td>
<td>1.15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p value ≤ 0.05 is significant

VEP = Visual Evoked Potential

RT = Right, LT = left

S.D = Standard deviation
Table 3: Differences of Patients with Headache and Control Groups by VEP latency and Waves Morphology.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Study Groups</th>
<th>χ²</th>
<th>P values</th>
<th>Odds Ratio (C.I. 95%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Case (%)</td>
<td>Control (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT Latency Positive1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal &lt; 75 (m.sec)</td>
<td>103 (68.7)</td>
<td>281 (93.7)</td>
<td>49.938</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Abnormal ≥ 75 (m.sec)</td>
<td>47 (31.3)</td>
<td>19 (6.3)</td>
<td>6.749 (3.783-12.037)</td>
<td></td>
</tr>
<tr>
<td>RT Latency Negative1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal &lt; 110 (m.sec)</td>
<td>107 (71.3)</td>
<td>262 (87.3)</td>
<td>17.344</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Abnormal ≥ 110 (m.sec)</td>
<td>43 (28.7)</td>
<td>38 (12.7)</td>
<td>2.771 (1.696-4.527)</td>
<td></td>
</tr>
<tr>
<td>LT Latency Positive1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal &lt; 75 (m.sec)</td>
<td>79 (52.7)</td>
<td>287 (95.7)</td>
<td>121.79</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Abnormal ≥ 75 (m.sec)</td>
<td>71 (47.3)</td>
<td>13 (4.2)</td>
<td>19.841 (10.45-37.69)</td>
<td></td>
</tr>
<tr>
<td>LT Latency Negative1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal &lt; 110 (m.sec)</td>
<td>102 (68.0)</td>
<td>261 (87.0)</td>
<td>23.148</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Abnormal ≥ 110 (m.sec)</td>
<td>48 (32.0)</td>
<td>39 (13.0)</td>
<td>3.149 (1.948-5.092)</td>
<td></td>
</tr>
<tr>
<td>RT Latency Positive2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal &lt; 145 (m.sec)</td>
<td>130 (86.7)</td>
<td>99 (33.0)</td>
<td>115.24</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Abnormal ≥ 145 (m.sec)</td>
<td>20 (13.3)</td>
<td>201 (67.0)</td>
<td>13.19 (7.78-22.39)</td>
<td></td>
</tr>
<tr>
<td>LT Latency Positive2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal &lt; 145 (m.sec)</td>
<td>127 (84.7)</td>
<td>265 (88.3)</td>
<td>1.197</td>
<td>0.274</td>
</tr>
<tr>
<td>Abnormal ≥ 145 (m.sec)</td>
<td>23 (15.3)</td>
<td>35 (11.7)</td>
<td>0.729 (0.414-1.286)</td>
<td></td>
</tr>
<tr>
<td>Wave Morphology</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal</td>
<td>120 (80.0)</td>
<td>297 (99.0)</td>
<td>53.123</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Abnormal</td>
<td>30 (20.0)</td>
<td>3 (1.0)</td>
<td>24.75 (7.413-82.635)</td>
<td></td>
</tr>
</tbody>
</table>

*p value ≤ 0.05 is significant,

**reference group

RT = Right, LT = Left

χ² = Chi-Square

C.I. = Confidence Interval
Fig. 1: Distribution of Patients by types of Headache.

Fig. 2: The distribution of different EEG abnormalities in different types of migraine.

Fig. 3: The distribution of different EEG abnormalities in different types of non-migraine.
Discussion

Concerning the gender distribution, we have found that migraine is more common in females than males in different age groups at ratio of about 2.3:1. We found in figure (4) that female (47.30%) was susceptible to infected headache more than male (28.70%) in compared to control group. These findings are agreed with 20 who found females 2:1 for headache, as well as with other studies of 21 and also agreed with 22 who found that female to male ratio is about 3:1, but 23 found female to male ratio 3:2 , so that there is a significant preponderance in females over males, this may be attributed to hormonal changes that occur in females mainly estrogen 24. we found higher incidence of migraine without aura, then followed by migraine with aura, tension headache, cluster headache, chronic daily headache, trigeminal autonomic cephalgia (TAC). (66.0%), (13.3%), (10.0%), (2.7%), (2.0%) and (0.7%). This agreement with (Stephen L. Hauser, MD, 2006) who found Migraine without aura is more common than migraine with aura in our study group with ratio of 2:1.

Conclusion

This study stated that EEG, the significant abnormal findings in patients with migraine headaches are more than patients with non-migraine headaches. The abnormal EEG findings in migraine patients were found mainly during hyperventilation and photic stimulation. Epileptic discharge were found in about of the whole migraine patients represented by spike and wave, polyspike and sharp waves respectively, 25.69%, 12.69%, 12.69%. In VEP, regarding the latency of P75, N100 and P 145 there were significantly higher in patients with headache in compared to the control group, while there were significant changes related to the amplitude, but stay in normal range.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Hilla Teaching Hospital Neurosurgical department, Iraq and all experiments were carried out in accordance with approved guidelines.

References


Effect of Percutaneous Coronary Intervention (PCI) upon Lung Functions among Patients with Ischemic Heart Disease at Al-Najaf Cardiac Center: Correlation Study

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Abstract

Objectives: The study objectives to detect the effect of angioplasty upon lung functions among patients with ischemic heart disease and to find out the relationship between the patients lung functions and their demographic and clinical characteristics.

Methodology: A descriptive (correlation) design was conducted on the Al-Najaf center for cardiac surgery and catheterization. Starting from 1st April 2019 to 1st October 2019. In order to detect the effect of angioplasty on lung functions among patients with ischemic heart disease. A non-probability (purposive) sample of (52) patients, those who admitted to angioplasty unit and coronary care unit without any respiratory diseases. Patients were ischemic heart disease. The patients’ demographic and clinical data collected through the utilization the semi-structured questionnaire and by means of interview technique with the subject, while the pulmonary functions test collected by using spirometer instrument. Data was analyzed by using descriptive statistic (percentage and Frequencies) and inferential (person’s correlation coefficient, independent sample t-test, and paired t-test).

Results: The results shows that there is a high significant relationship between the pulmonary functions pre and post cardiac catheterization, and most the patients with low PFTs post angioplasty.

Conclusions: The present study recommended the nurses whose work at the open Heart Center should teach the patient undergoing cardiac catheterization breathing exercises to increase the lung capacity as particular and the respiratory system as general and the patient should be given oxygen for at least 60 minutes before and after cardiac catheterization to ensure an increase in the oxygen level and perfusion in the body tissues.

Keywords: Percutaneous Coronary Intervention, Patients, Ischemic Heart Disease.

Introduction

Ischemic heart disease it is the most common cause of death in most western countries. Ischemia means a “reduced blood supply”. The coronary arteries supply blood to the heart muscle and no alternative blood supply exists, so a blockage in the coronary arteries reduces the supply of blood to heart muscle. The vascular narrowing or closure is predominantly caused by the covering of atheromatous plaques within the wall of the artery rupturing, in turn leading to a heart attack (Heart attacks caused by just artery narrowing are rare). A heart attack causes damage to heart muscle by cutting off its blood supply. Most ischemic heart disease is caused...
functions. Analgesics and sedatives in combination may impair the patient also leads to major changes in pulmonary changes in rib cage and hemodynamics. The posture of sedation agent impairs pulmonary functions by the capacity and by changes in lung mechanics. Induction alveoli. This is maintained by utilizing ventilatory reserve bypass grafting. The primary task of the lungs is to maintain oxygenation of the blood and eliminate carbon dioxide through the network of capillaries alongside alveoli. This is maintained by utilizing ventilatory reserve capacity and by changes in lung mechanics. Induction of sedation agent impairs pulmonary functions by the impaired level of consciousness, depression of reflexes, changes in rib cage and hemodynamics. The posture of the patient also leads to major changes in pulmonary functions. Analgesics and sedatives in combination may exacerbate the effects. Many studies have shown the associations of reduced lung function with future risk of mortality, respiratory outcome, and cardiovascular outcomes. In current practice, forced expiratory volume in 1 s (FEV₁) is considered to be abnormal when it is lower than –2 standard deviations from the population mean for age, height, and sex. However, there is little data on whether mild abnormalities in lung function, within clinically normal range, are associated with similar increases in poor health outcomes. Furthermore, it was found that pulmonary impairment is more frequent after cardiac surgery and major cardiac procedures. Deterioration in pulmonary function is a common complication following CABG surgery and there is still speculation to the precise causative factors thereof.

**Methodology**

A descriptive correlation design was conducted at Al-Najaf center for cardiac surgery and catheterization. Starting from 1st April 2019 to 1 October 2019. In order to detect the effect of Percutaneous Coronary Intervention (PCI) on lung function among of patient with ischemic heart disease and find out the relationship between the patient lung function and their demographic and clinical characteristics. An official permission is approval is issued from the Ministry of Health/AL-Najaf Health Directorate \ Al-Najaf center for cardiac surgery and catheterization. The study is conducted at Al-Najaf center for cardiac surgery and catheterization. A non-probability (purposive) sample of (52) patients, those who admitted to angioplasty unit and coronary care unit without any respiratory diseases. Patients were ischemic heart disease. The pulmonary functions measures for each patients’ sample pre-angioplasty and post-angioplasty. Questionnaire form was developed by the researcher to obtain appropriate answers which including Part I: demographical data include: (age, gender, smoke, occupation, residency, weight, height, body mass index), Part II: clinical data include : (diagnosis, duration, and chronic disease), and Part III: include items about pulmonary function as following: forced vital capacity (The volume of air that can be maximally forcefully exhaled), forced expiration volume (volume that has been exhaled at the end of the first second of forced expiration), peak expiration flow rate (It is the peak flow rate during expiration) and this measures by spirometer is an apparatus for measuring the volume of air inspired and expired by the lungs. It measures ventilation, the movement of air into and out of the lungs. Spirometer is the mainly piece of equipment used for basic pulmonary function tests, measuring lung function, specifically the amount and speed of air that can be inhaled and exhaled. Spirometer with flow
volume loops assesses the mechanical properties of the respiratory system by measuring the expiratory volumes and flow rates. This test requires the patient to make a maximal inspiratory & expiratory effort. The patient in a sitting position breathes into a mouth piece and nose clips are placed to prevent air leak. It is essential that the patient gives full effort during testing. In this study the pulmonary function test was made to each patient before entering the operating room and after leaving the operating room to comparison between two results depending on the forced vital capacity, forced expiratory volume, and peak expiratory flow. At each assessment time, spirometer was performed at least three times to be able to meet the criteria of the European Respiratory Society (ERS). The validity of an instrument concerns its ability to gather the data that it is intended to gather. Content validity for the early developed instrument is determined through the use of panel of experts (who have more than 5 years of experience at their jobs field). A preliminary copy of the questionnaire was designed and presented to (6) experts. The data were interred into Spss (version 22) in order to describe the statistical results as follow (Frequency distribution, Bar chart, and independent t-test).

Study Results

Table (1) summery statistics for the study sample

demographic data

<table>
<thead>
<tr>
<th>Demographic Data</th>
<th>Rating And Intervals</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age / years</td>
<td>30-39</td>
<td>4</td>
<td>7.7</td>
</tr>
<tr>
<td></td>
<td>40.00 - 49.00</td>
<td>11</td>
<td>21.2</td>
</tr>
<tr>
<td></td>
<td>50.00+</td>
<td>37</td>
<td>71.2</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>42</td>
<td>80.8</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>10</td>
<td>19.2</td>
</tr>
<tr>
<td>Smoking</td>
<td>non</td>
<td>28</td>
<td>53.8</td>
</tr>
<tr>
<td></td>
<td>Past</td>
<td>14</td>
<td>26.9</td>
</tr>
<tr>
<td></td>
<td>Passive</td>
<td>1</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td>Smokers</td>
<td>9</td>
<td>17.3</td>
</tr>
<tr>
<td>Occupation</td>
<td>Governmental</td>
<td>10</td>
<td>19.2</td>
</tr>
<tr>
<td></td>
<td>Free job</td>
<td>6</td>
<td>11.5</td>
</tr>
<tr>
<td></td>
<td>Retired</td>
<td>12</td>
<td>23.1</td>
</tr>
<tr>
<td></td>
<td>Housewife</td>
<td>7</td>
<td>13.5</td>
</tr>
<tr>
<td></td>
<td>Jobless</td>
<td>17</td>
<td>32.7</td>
</tr>
<tr>
<td>Residency</td>
<td>Rural</td>
<td>16</td>
<td>30.8</td>
</tr>
<tr>
<td></td>
<td>Urban</td>
<td>36</td>
<td>69.2</td>
</tr>
<tr>
<td>BMI</td>
<td>Normal</td>
<td>11</td>
<td>21.2</td>
</tr>
<tr>
<td></td>
<td>Overweight</td>
<td>24</td>
<td>46.2</td>
</tr>
<tr>
<td></td>
<td>Obese</td>
<td>17</td>
<td>32.7</td>
</tr>
</tbody>
</table>

Table (1) shows that higher of patient are within the age interval 50 and more years old (71%) and lower ratio of patients are in the age interval about <=39 years old(7.7%), most the study sample was male (80.8%), significant of body mass index is overweight (46.2%), more than third of the study sample with jobless is (32.7%), most of patient are non-smoker (53.8%).
## Table (2) distribution of the study sample by their clinical data

<table>
<thead>
<tr>
<th>Clinical Data</th>
<th>Rating And Intervals</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical diagnosis</td>
<td>Angina</td>
<td>30</td>
<td>57.7</td>
</tr>
<tr>
<td></td>
<td>Myocardial infraction</td>
<td>22</td>
<td>42.3</td>
</tr>
<tr>
<td>Duration / years</td>
<td>Less than 1</td>
<td>26</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>1.00 - 5.00</td>
<td>21</td>
<td>41.2</td>
</tr>
<tr>
<td></td>
<td>6.00 - 10.00</td>
<td>2</td>
<td>3.9</td>
</tr>
<tr>
<td></td>
<td>11.00+</td>
<td>3</td>
<td>5.9</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>No</td>
<td>28</td>
<td>53.8</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>24</td>
<td>46.2</td>
</tr>
<tr>
<td>Hypertension</td>
<td>No</td>
<td>20</td>
<td>38.5</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>32</td>
<td>61.5</td>
</tr>
</tbody>
</table>

This table show the more of the sample diagnosed with angina (57.7%), the duration of the ischemic heart disease for sample was less than 1 year (49%). Finally, in the above table the result show the majority group of the study sample are within the hypertension (61.5%).

## Table (3) Assessment of Patient’s Lung Function Test Pre and Post Coronary Angioplasty

<table>
<thead>
<tr>
<th>Lungs’ capacities Statistics</th>
<th>Post-procedure</th>
<th>Pre-procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PEF</td>
<td>FVC</td>
</tr>
<tr>
<td>Mean</td>
<td>3.99</td>
<td>2.09</td>
</tr>
<tr>
<td>St. dev.</td>
<td>1.64</td>
<td>0.82</td>
</tr>
</tbody>
</table>

*PEF= peak expiratory flow (PEF), FVC= Forced expiratory volume, FEV= Forced expiratory volume, St. dev.= standard deviation
This table shows that there is slow redaction in the mean between per and post cardiac angioplasty.

Table (4) Mean Difference of Patients Lungs’ Capacities Pre and Post Coronary Angioplasty

<table>
<thead>
<tr>
<th>Lungs Capacities</th>
<th>Pairs</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>t-value</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FEV</td>
<td>Pre Procedure</td>
<td>2.24</td>
<td>0.89</td>
<td>3.312</td>
<td>51</td>
<td>0.002 HS</td>
</tr>
<tr>
<td></td>
<td>Post Procedure</td>
<td>1.93</td>
<td>0.71</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FVC</td>
<td>Pre Procedure</td>
<td>2.43</td>
<td>1.01</td>
<td>3.306</td>
<td>51</td>
<td>0.002 HS</td>
</tr>
<tr>
<td></td>
<td>Post Procedure</td>
<td>2.09</td>
<td>0.82</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PEF</td>
<td>Pre Procedure</td>
<td>4.18</td>
<td>2.20</td>
<td>0.762</td>
<td>51</td>
<td>0.45   NS</td>
</tr>
<tr>
<td></td>
<td>Post Procedure</td>
<td>3.98</td>
<td>1.64</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*PEF= peak expiratory flow (PEF), FVC= Forced expiratory volume, FEV= Forced expiratory volume, St. dev.= standard deviation, df= degree of freedom, p-value= probability value, HS= highly significant, NS= non-significant.

This table indicates that there is high significant difference for the pulmonary functions pre and post cardiac catheterization at p value (0.05).

![Figure (4) mean difference of patients’ lungs capacities pre and post procedure](image)

**Discussion**

The primary function of the lungs is to provide an adequate gas exchange for maintaining normal oxygen content in blood and eliminate carbon dioxide. This is achieved by optimizing lung volumes to meet higher metabolic demand during the peri-operative period. The factors affecting pulmonary function include loss of consciousness, mode of ventilation (spontaneous or mechanical), posture of patient, actions of anesthetic agents and drugs, used during anesthesia on respiratory smooth muscles and secretions. This study was made to describe the PFTs complications as result cardiac disease and cardiac surgery and procedures and to detect...
the underlying causative factors. Spirometer test had been used as it is an objective, valid and reliable method to measure the PFTs. In addition, it is a non-invasive method that can be handled without any inconvenience to the patient especially after surgery Handojo et al. (2006) agreed with that with present study. In the table (1) and (2); the most of patient are within the age interval 50 and more years old (71%), (80.8%) were male, and the majority group of the study sample within the hypertension (61.5%). The study done by Nozari and Khazaeipour, (2012); their study results showed that the Mean age of men was 58±8.37 (35-75) years, and (48.69%) with history of hypertension. Asimakopoulos et al, (2005) reported that the range of age for patients underwent CABG procedure was between 55 to 75 years old. While other study has reported the mean of age was 57.6 years old (Reents, 2014). Marshal et Al., (2019) mentioned that the mean of age of all participants was 57.6 ± 4.6 years old. In this study, men were noted in 22 patients (62.9%) compared to 13 (37.1%) women. Majority of patients underwent CABG is men with comparison of 80% to 20% between men and women. Furthermore; table 3 & table 4 distinguished that there is high significant difference for the pulmonary functions pre and post coronary angioplasty. Which nearly similar to the results of the study done by Arabaci et al., (2003) found that after PCI the PFTs values decreased significantly in smokers and non-smokers patients but the deterioration in the smoker group was highly significant. In their study, patients in both groups developed a severe restrictive pulmonary defect after coronary artery catheterization (P< 0.0001 for both), but this restriction was also statistically significant in the smoking group compared to non-smokers after surgery. They applied comparison t-test between the smokers and non-smokers but did not correlate the factor of smoking habit with the pulmonary function as had been done in the current study. Önemlidir, (2018) claimed that the respiratory functions affecting morbidity and mortality in open heart surgery are the most important preoperative risk factors. After cardiopulmonary bypass, pulmonary function tests, especially in FEV1 and FVC, are reduced by 60-70 %. Impaired respiratory functions return to normal after 3-4 months. In addition to the poor pulmonary gas exchange it produces after cardiac catheterization. Chandra et al. (2006) found a significant deterioration in the pre discharge Spiro-metric values of FVC, FEV1, peak expiratory flow rate, flow rate at 25–75% of expired vital capacity.

**Conclusion**

The researchers are concluded that PCI and IHD result in low PFTs values of restrictive pattern. This study is documented that the patients post coronary angioplasty had lower PFTs values than pre coronary angioplasty. No definite causative factor appeared to be responsible for those results although mechanical deficiency. More comprehensive investigation is required to resolve the case.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Department of Adult nursing, College of nursing, Kufa University, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Role of Fractional CO₂ Laser in Treatment of Keloid and Hypertrophic Scar used Alone and in Combination with Intralesional Steroids

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Abstract

Background: The hypertrophic and keloid scars are thick, raised, disfiguring areas of skin with abnormal prolonged inflammatory response of wound healing process and overproduction of collagen. Carbon dioxide (CO₂) laser has been used in the treatment of hypertrophic scar and keloids for more than 20 years.

Aim of Study: To evaluate the effect of (CO₂) laser in treatment of keloid and hypertrophic scar with use of intralesional triamcinolone acetonide (kenacort) 40 mg/ml as adjuvant therapy.

Methodology: The study was done on 22 patients in Imam al-Sadiq teaching hospital in Hilla city with dividing the patients randomly into two groups, one group treated with four sessions of intralesional corticosteroids and the second group treated with four sessions of intralesional corticosteroids with carbon dioxide laser.

Keywords: Hypertrophic scar, Keloid scar, CO₂ laser, Corticosteroid.

Introduction

The scar is an area of fibrous tissue that replace the normal skin tissue after an injury. Deregulation of the process of wound healing that is complex, regulated response to the injury leads to development of scar. Despite both hypertrophic and keloid scar are common but the keloid scar is more challenging to treatment and may have significant physical and psychological impacts on patients life. The scar biology is less well understood till now and search for the ideal treatment still continues and despite the different types of treatments including radiation, pressure therapy, cryotherapy, intralesional steroid or interferone, topical silicon and many other lines of treatment, no one is 100% curative as the first line treatment. Parameters that used to assess the scar clinically involve scar colour, blood flow, erythema, itching, skin hardness, extension beyond the wound margin and healing spontaneously. Hypertrophic scar is more common than keloid. Its erythematous, itchy, elevated lesion and less nodular than keloid scar and it is not extend beyond the wound margin and may heal alone and its size depends on the size and depth of the original wound. The origin of word keloid from the Greek word Chele which means pincers of crab, the suffix oid means like, so it called keloid because it grows in pincers of crab like lesion. Keloid scars are erythematous, nodular lesions extend beyond the margin of the injured site and not regress spontaneously. The pathogenesis of keloids involve hyperproliferative state due to abnormal molecular and cellular driving with four folds decrease in cell apoptosis and increase in survival marker AKT. Keloid scar may develop due to trauma, burn, injury or spontaneously as reported in patients with bethlem myopathy due to mutation in collagen type four. Hypertrophic scar results from injury, burn, surgery and unlike keloid scar, it is more linear in nature and within the wound margins. Keloid is a dermal lesion with excessive collagen and glycosaminoglycan around the wound with increase tissue growth factor B1 and the studies show increase in the incidence of keloid in patients who receive tissue growth factor B1 treatment and decrease incidence in those who receive anti tissue growth factor B1. Keloid is common in young
black female as polypoidal, glistening hairless nodule with different size and by histology it composed of irregularly arranged thick, large collagen fibers, increase elastic tissue in dermis, no involvement of epidermis or papillary dermis and normal number of fibroblast cells while in hypertrophic scar there is fine collagen fibers parallel to epidermis, absent elastic tissue in dermis and flat epidermis.  

Carbon dioxide laser to be developed and is still one of the useful types that used in resurfacing of skin, it exerts its effect by production of mid-infrared energy at primary band of (10,600 nm). It consist of mixture of carbon dioxide, nitrogen and helium. The rule of nitrogen is to increase efficiency by exciting the CO₂, causing more light emission while the helium allows the returning of CO₂ to the ground state and fostering heat transfer. The target of carbon dioxide laser involves the water content of the cell resulting in vaporization of intracellular water and ablation of cell, also it causes denaturation of collagen protein and collagen contraction and decrease to one third of its original length. The biochemical changes seen after laser resurfacing include increase in procollagen (1 and 3), increase in several cytokines like interleukin 1 beta, tumor necrosis factor alpha, transforming factor beta. Low complication rate had been seen with use of fractional CO₂ laser even after repeating it after (1-6) minutes but the complication rate increase with 3 concurrent treatments of multiple body locations. Laser safety must be taken seriously because of the combination of high output power and an invisible beam with high voltage supplies cause real risk of heart damage from the direct or reflected beam more to anterior structure of eye including cornea, lens, vitrous body but unlikely to reach to retina.

Clinical features hypertrophic and keloid scars regarding colour, site and size were shown in table (1) and figure (1).

### Table (1): Features of scar.

<table>
<thead>
<tr>
<th>Type</th>
<th>Size</th>
<th>Colour</th>
<th>Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertrophic</td>
<td>1 - 30 (cm)</td>
<td>Red</td>
<td>Cheek</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brown</td>
<td>Neck</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dark red</td>
<td>Chest</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dark brown</td>
<td>Back</td>
</tr>
<tr>
<td>Keloid scar</td>
<td>1 - 5 (cm)</td>
<td>Brown</td>
<td>Cheek</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dark red</td>
<td>Chest</td>
</tr>
</tbody>
</table>

The goal of study to measure the results of use fractional CO₂ laser followed by intralesional triamcinolone acetonide (kenacort), 40 mg/ml in one group of hypertrophic scar patients and to compare it with another group of patients used intralesional steroid injection alone. The duration of treatment was every month sessions with a total course of 4 months. Each patient subjected to topical anaesthetic gel by topical lidocaine 8% for (0.5-1) hour before starting laser and intralesional steroid injection. Fractional CO₂ laser parameters used for patients in the study regarding wavelength, power and pulse duration.

The energy used by CO₂ laser depending on the site of hypertrophic scar, and depth of ablation (µm) was shown in table (2). Regarding the combination treatment group, five minutes after the completion of CO₂ laser session, intralesional steroid was injected until blanching of scar was happened.

### Table (2): Energy used for different sites.

<table>
<thead>
<tr>
<th>Site of lesion</th>
<th>Energy(mJ)</th>
<th>Depth of ablation(µm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>hand</td>
<td>15</td>
<td>190</td>
</tr>
<tr>
<td>Under breast</td>
<td>25</td>
<td>330</td>
</tr>
<tr>
<td>Pre sternal area</td>
<td>25 - 30</td>
<td>380</td>
</tr>
<tr>
<td>Neck</td>
<td>30</td>
<td>400</td>
</tr>
<tr>
<td>Axilla</td>
<td>30 - 60</td>
<td>560</td>
</tr>
<tr>
<td>Cheek and Limb</td>
<td>60</td>
<td>720</td>
</tr>
</tbody>
</table>
After the sessions of laser, ice packs were put on the lesions for (5-10) minutes, patients also instructed to use moisturising cream (Arden healing and soothing cream) twice/day to prevent development of erythema and swelling following laser therapy.

Three blinded observers evaluated photographs taken both at baseline and at 4 months following the final session. Photographs were obtained using (I phone high resolution camera). The observers determined which photograph was before and after. They evaluated the improvement in the appearance and degree of hypertrophy.

![Figure (1): Number of patients according to cause of scar.](image1)

![Figure (2): Site of scar and laser energy used for each site.](image2)

The degree of improvement was utilised according to the following 4-point scale:

- Improvement for < 25% was 0
- Improvement for 25-50% was 1
- Improvement for 50-75% was 2
- Improvement for > 75% was 3

In our study, mild response to treatment considered if degree of improvement < 25 % , moderate response to treatment if degree of improvement for 25-75% and a good response if degree of improvement > 75% .

**Results**

A total 22 patients with hypertrophic scars and keloids were exposed to treatment by fractional CO₂ laser therapy in combination with intralesional steroid and with intralesional steroid alone. There was 13 males and 9 females , their age ranged from (14 – 37) years , the duration of the scar ranged from 6 months – 20 years .The patient were divided into two equal groups. The first group (11 patients; seven males and four females ) received combination therapy with CO₂ laser and intralesional steroid, the second group (11 patients, six males and five females) received intralesional steroid alone. Every patient in each group subjected to four
sessions every month.

The overall average improvement score including hypertrophy, texture and colour improvement for both treatment groups was seen in figure (3). Three blinded investigators were determined at four months post treatment.

![Figure (3): Average general improvement score as determined by investigators.](image)

Average general score assessed by the 4 blinded observes for first group was 2.8 corresponding to (2- 3) scale. The highest average improvement score was 3 which seen in 7 of 11 patients figure (4).

![Figure (4): The score of improvement as resolved by three investigators at four months post treatment.](image)

The overall average improvement score for the second group (intralesional steroid alone).

The highest average overall improve score was 2.5 which was seen in 2 of 11 patients.

Treatment was tolerable by patients and no adverse effects were reported except mild pain and transient erythema in some patients immediately after treatment.

**Discussion**

Keloid and hypertrophic scar are improper body responses to trauma resulting in itchy, painful nodular lesion that may cause serious functional and cosmetic disability. Different lines of treatments have been used for both keloid and hypertrophic scars, among them are: surgical excision with or without grafting, pressure therapy, interferon, topical and local corticosteroid, local injection of bleomycin, laser therapy, silicone gel sheeting, onion extract gel and other therapies directed at collagen synthesis. Corticosteroid was used for the treatment of pathological scars since the mid-1960s, still have major rule in the regression of hypertrophic scars and keloids. Although there are multiple lines of
treatment of scar but still some of patient not response well to any one of these lines completely and no one of them was 100% curative, make the search for new treatment continue 23.

Steroid injections have been shown to cause regression in scar by its anti-inflammatory effect, increase tissue hypoxia and decrease fibroblast this lead to decrease synthesis of collagen and glycosaminoglycan 24. The most common steroid that used in treatment of scar is triamcinolone acetonide (10-40 mg /ml) alone or with lidocaine to decrease pain, once or twice monthly sessions are required for treatment 25.

Despite the few randomized, prospective studies, the intrallesional steroid represent the first line therapy for keloid scar and second line therapy for hypertrophic with response rate 50-100% and recurrence rate 9-50% 26.

Manuskuatti and Fitzpatrick showed that the use of intrallesional steroid with contratubex together are more effective than steroid alone in treating hypertrophic and keloid scar with lower side effects 27.

Recent advance in laser application provide another option in treating scar with fractional ablative laser that produce zone of ablation with different depth followed by wound healing process leading to collagen remodelling also remove the fibrotic tissue. This application also used postoperative to enhance delivery of the drug and other substance.

The result of our study indicated that the combination same - session treatment with both fractional carbon dioxide laser and intrallesional steroid in treatment of hypertrophic and keloid scar was more effective and efficient than intrallesional steroid alone. Various aspects of scar parameters like texture and hypertrophy were improved with this treatment.

**Conclusion**

The combination of same-session treatment with fractional carbon dioxide laser and intrallesional steroid produce an efficient and more effective therapy in treatment of hypertrophic and keloid scars.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** ll experimental protocols were approved under the University of Babylon – Hammurabi Medical College and all experiments were carried out in accordance with approved guidelines.

**References**

Isolation, Amplification Approaches of Human Pokemon gene (ZBTB7) and Incorporation into Yeast Vector

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Abstract

The transcription repressor protein ZBTB7 (FB11, BTB-ZF protein LRF) known as a Pokemon is critical factor in oncogenesis which is encoded by ZBTB7 gene. ZBTB7 processes by controlling the pathways that are required to transform normal cell to cancerous one. It produces its effects by repressing the function of other proteins including a tumor suppressor protein ARF leading to lymphomas and other oncogenic effects and present in very high level in certain type of B cell. So the structural study of the translation product of this gene is an important task to know about the carcinoferous effect of ZBTB7 along with their interactive pattern with co-repressor which prone transcription repression by stopping the activity of transcription factors. In the present project DNA binding domain of ZBTB7 gene’s cDNA is developed and cloned into suitable yeast vector.

Keywords: Isolation, amplification, Pokemon gene (ZBTB7), yeast vector

Introduction

Many cells normally undergo a programmed form of death (apoptosis). Activated oncogenes can cause those cells to survive and proliferate instead. Most oncogenes require an additional step, such as mutations in another gene, or environmental factors, such as viral infection, to cause cancer 1. The first oncogene was discovered in 1970 and was termed src (pronounced sarc as in sarcoma) 2. Src was in fact first discovered as an oncogene in a chicken retrovirus. Experiments performed by Dr G. Steve Martin of the University of California, Berkeley demonstrated that the SRC was indeed the oncogene of the virus. 3 In 1976 Drs. J. Michael Bishop and Harold E. Varmus of the University of California, San Francisco demonstrated that oncogenes were defective proto-oncogenes, found in many organisms including humans. For this discovery Bishop and Varmus were awarded the Nobel Prize in 1989. Since the 1970s, dozens of oncogenes have been identified in human cancer. Many cancer drugs target those DNA sequences and their products 4. Most, if not all, cancer cells contain genetic damage that appears to be the responsible event leading to tumorigenesis. The genetic damage present in a parental tumorigenic cell is maintained (i.e. not correctable) such that it is a heritable trait of all cells of subsequent generations. Genetic damage found in cancer cells is of two types:

1. Dominant and the genes have been termed proto-oncogenes. The distinction between the terms proto-oncogene and oncogene relates to the activity of the protein product of the gene. A proto-oncogene is a gene whose protein product has the capacity to induce cellular transformation given it sustains some genetic insult. An oncogene is a gene that has sustained some genetic damage and, therefore, produces a protein capable that were originally identified as resident in transforming retroviruses were initially designated as c–indicative of the cellular origin as opposed to of cellular transformation.

The process of activation of proto-oncogenes to oncogenes can include retroviral transduction or retroviral integration (see below), point mutations, insertion mutations, gene amplification, chromosomal translocation and/or protein-protein interactions.

Proto-oncogenes can be classified into many different groups based upon their normal function within cells or based upon sequence homology to other known proteins. As predicted, proto-oncogenes have been identified at all levels of the various signal transduction
cascades that control cell growth, proliferation and differentiation. The list of proto-oncogenes identified to date is too lengthy to include here, therefore, only those genes that have been highly characterized are described. Proto-oncogenes \( v \)- to signify original identification in retroviruses.

2. **Recessive** and the genes variously termed tumor suppressors, growth suppressors, recessive oncogenes or anti-oncogenes.

Given the complexity of inducing and regulating cellular growth, proliferation and differentiation, it was suspected for many years that genetic damage to genes encoding growth factors, growth factor receptors and/or the proteins of the various signal transduction cascades would lead to cellular transformation \(^5\). This suspicion has proven true with the identification of numerous genes, whose products function in cellular signaling, that are involved in some way in the genesis of the tumorigenic state. The majority of these proto-oncogenes were identified by either of two means: as the transforming genes (oncogenes) of transforming retroviruses or through transfection of DNA from tumor cell lines into non-transformed cell lines and screening for resultant tumorigenesis.

**Pokemon Linked to Aggressive Tumors**

The investigators have confirmed Pokémon’s cancer-causing role by inserting the oncogene into mice. Pokemon does its damage by repressing the function of other proteins, including a tumor suppressor called “ARF.”

The mice used developed aggressive, fatal forms of lymphoma. In further work, using a technique called “tissue micro arrays” to study tumor samples from people with many types of cancer, the researchers have confirmed that Pokemon is present in very high levels in certain types of B-cell and T-cell lymphomas. They also found that tumors with high levels of Pokemon protein were much more likely to be aggressive. \(^6\)

“Pokemon is a member of a family of proteins that are known to be transcription factors and are mutated in human cancer,” according Takahiro Maeda, MD, PhD, a postdoctoral research fellow in Dr. Pandolfi’s laboratory who was the paper’s first author. “It is likely that the protein plays a role in solid tumors as well, and we now have means to specifically interfere with the activity of these transcription factors.”

**Gene Amplification**

An example of gene amplification, which usually occurs during tumor progression, is the amplification of the dihydrofolate reductase gene (\( DHFR \)) in methotrexate-resistant acute lymphoblastic leukemia. Amplification of \( DHFR \) is accompanied by cytogenetic alterations that mirror amplification of oncogenes. The amplified DNA segment usually involves several hundred kilobases and can contain many genes. Members of four different oncogene families are often amplified: MYC, cyclin D1 (or CCND1), EGFR, and RAS \(^7\). \( MYC \) is amplified in small-cell lung cancer, breast cancer, esophageal cancer, cervical cancer, ovarian cancer, and head and neck cancer, whereas amplification of \( NMYC \) correlates with an advanced tumor stage. The \( t(11;14) \) translocation juxtaposes \( CCND1 \) and immunoglobulin enhancer elements and is characteristic of mantle-cell lymphoma. \( CCND1 \) amplification also occurs in breast, esophageal, hepatocellular, and head and neck cancer. \( EGFR \) (\( ERBB1 \)) is amplified in glioblastoma and head and neck cancer. Amplification of \( ERBB2 \) (also called \( HER2/neu \)) in breast cancer correlates with a poor prognosis.\(^5\) A monoclonal antibody against the product of this oncogene (trastuzumab) is effective in breast cancers that overexpress \( HER2/neu \).

**Chromosomal Rearrangements**

Recurring chromosomal rearrangements are often detected in hematologic malignancies as well as in some solid tumors. These rearrangements consist mainly of chromosomal translocations and, less frequently, chromosomal inversions. Chromosomal rearrangements can lead to hematologic malignancy via two different mechanisms:

1. the transcriptional activation of protooncogenes or
2. the creation of fusion genes.

**Gene Activation**

The \( t(8;14)(q24;q32) \) translocation, found in about 85% of cases of
Burkitt lymphoma, is a well-characterized example of the transcriptional activation of a protooncogene. This chromosomal rearrangement places the \textit{c-myc} gene, located at chromosome band 8q24, under control of regulatory elements from the immunoglobulin heavy chain locus located at 14q32.98 The resulting transcriptional activation of \textit{c-myc}, which encodes a nuclear protein involved in the regulation of cell proliferation, plays a critical role in the development of Burkitt lymphoma. The \textit{c-myc} gene is also activated in some cases of Burkitt lymphoma by translocations involving immunoglobulin light-chain genes. These are t(2;8)(p12;q24), involving the \kappa locus located at 2p12, and t(8;22)(q24;q11), involving the \kappa locus at 22q11.

Although the position of the chromosomal breakpoints relative to the \textit{c-myc} gene may vary considerably in individual cases of Burkitt lymphoma,

**Gene Fusion**

The first example of gene fusion was discovered through the cloning of the breakpoint of the Philadelphia chromosome in chronic myelogenous leukemia (CML). The t(9;22)(q34;q11) translocation in CML fuses the \textit{c-abl} gene, normally located at 9q34, with the \textit{bcr} gene at 22q11 (Figure 6-7). The \textit{bcr/abl} fusion, created on the der(22) chromosome, encodes a chimeric protein of 210 kDa, with increased tyrosine kinase activity and abnormal cellular localization. The precise mechanism by which the \textit{bcr/abl} fusion protein contributes to the expansion of the neoplastic myeloid clone is not yet known. The t(9;22) translocation is also found in up to 20% of cases of acute lymphoblastic leukemia (ALL). In these cases, the breakpoint in the \textit{bcr} gene differs somewhat from that found in CML, resulting in a 185 kDa \textit{bcr/abl} fusion protein.

It is unclear at this time why the slightly smaller \textit{bcr/abl} fusion protein leads to such a large difference in neoplastic phenotype. In addition to \textit{c-abl}, two other genes encoding tyrosine kinases are involved in distinct gene fusion events in hematologic malignancy. The various partners in \textit{ALL1} fusions encode a diverse group of proteins, some of which appear to be nuclear proteins with DNA-binding motifs. The \textit{ALL1} fusion protein consists of the aminoterminus of one of a variety of fusion partners. It appears that the critical feature in all \textit{ALL1} fusions, including self-fusion, is the uncoupling of the \textit{ALL1} amino-terminal domains from the remainder of the \textit{ALL1} protein. Solid tumors, especially sarcomas, sometimes have consistent chromosomal translocations that correlate with specific histologic types of tumors. In general, translocations in solid tumors result in gene fusions that encode chimeric oncoproteins. Studies thus far indicate that in sarcomas, the majority of genes fused by translocations encode transcription factors. In myxoid liposarcomas, the t(12;16)(q13;p11) fuses the \textit{FUS} (\textit{TLS}) gene at 16p11 with the \textit{CHOP} gene at 12q13. The \textit{FUS} protein contains a transactivation domain that is contributed to the \textit{FUS/CHOP} fusion protein. The \textit{CHOP} protein, which is a dominant inhibitor of transcription, contributes a protein-binding domain and a presumptive DNA-binding domain to the fusion. Despite knowledge of these structural features, the mechanism of action of the \textit{FUS/CHOP} oncoproteins is not yet known.

**Oncogenes in Cancer Initiation and Progression**

When chronic myelogenous leukemia converts to acute leukemia, the malignant clone acquires an additional t(9;22) translocation, an isochromosome, or trisomy of chromosome 8. When follicular lymphoma becomes aggressive, the lymphoma cells often bear a t(8;14) translocation in addition to the original t(14;18) translocation. These findings support the hypothesis that most hematopoietic tumors and soft-tissue sarcomas are initiated by the activation of an oncogene, followed by alterations in tumor-suppressor genes and other oncogenes. In contrast, most carcinomas are initiated by the loss of function of a tumor-suppressor gene, followed by alterations in oncogenes and additional tumor-suppressor genes. This multistep process in human cancer has also been found in mouse models carrying activated oncogenes or inactivated tumor-suppressor genes, in which the duration and aggressiveness of the disease can be changed by introducing into the mouse genome the same sequential genetic alterations observed in human tumors. Methylation of \textit{CpG} islands located in the promoter regions of a number of tumor-suppressor genes has also been considered an important epigenetic step in the process of carcinogenesis. This topic will be covered later in this series.
Oncogenes as Therapeutic Targets

Oncogenic proteins in cancer cells can be targeted by small molecules and, when the oncogenic protein is expressed on the cell surface, by monoclonal antibodies. Table 1 contains a summary of the targets and drugs (small molecules and monoclonal antibodies) being used in the treatment of a variety of human cancers.

Table 1. Cancer Therapies That Target Oncogenic Proteins.

<table>
<thead>
<tr>
<th>Anticancer Drug</th>
<th>Target</th>
<th>Disease</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Monoclonal antibodies</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trastuzumab (Herceptin, Genentech)</td>
<td>ERBB2</td>
<td>Breast cancer</td>
</tr>
<tr>
<td>Cetuximab (Erbitux, ImClone)</td>
<td>EGFR</td>
<td>Colorectal cancer</td>
</tr>
<tr>
<td>Bevacizumab (Avastin, Genentech)</td>
<td>VEGF</td>
<td>Colorectal cancer, non-small-cell lung cancer</td>
</tr>
<tr>
<td><strong>Small molecules</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Imatinib (Gleevec, Novartis)</td>
<td>ABL, PDGFR, KIT</td>
<td>Chronic myelogenous leukemia, gastrointestinal stromal tumors, chordoma</td>
</tr>
<tr>
<td>Gefitinib (Iressa, AstraZeneca)</td>
<td>EGFR</td>
<td>Non–small-cell lung cancer</td>
</tr>
<tr>
<td>Erlotinib (Tarceva, Genentech)</td>
<td>EGFR</td>
<td>Non–small-cell lung cancer</td>
</tr>
<tr>
<td>Sorafenib (Nexavar, Bayer/Onyx)</td>
<td>VEGFR, PDGFR, FLT3</td>
<td>Renal-cell carcinoma</td>
</tr>
<tr>
<td>Sunitinib (Sutent, Pfizer)</td>
<td>VEGFR, PDGFR, FLT3</td>
<td>Gastrointestinal stromal tumors, renal-cell carcinoma</td>
</tr>
</tbody>
</table>

* EGFR denotes epidermal growth factor receptor, FLT3 FMS-like tyrosine kinase 3, PDGFR platelet-derived growth factor receptor, and VEGF vascular endothelial growth factor.

Imatinib targets the initial step of the multistep process in chronic myelogenous leukemia. The same drug can affect the KIT and PDGFR receptor kinases. Of particular interest are inhibitors of the BCL2 family, which can induce the apoptotic death of cancer cells. In acute promyelocytic leukemia, which is initiated by a t(15;17) chromosome translocation that fuses the PML gene to RARα (a nuclear receptor for retinoic acids; see Table 2 in the Supplementary Appendix), retinoic acid can induce terminal differentiation and death of APL cells. This modality is called differentiation therapy.

Materials and Method

DNA Preparation from Frozen Tissue

**Reagents**

- Chloroform
- EDTA, 0.5 M
- Ethanol, absolute
- Propanol
- Phosphate Buffered Saline (PBS), 1X
- Sodium dodecyl sulfate (SDS) solution, 10%
- DNA buffer (Tris-EDTA)
- 1 M Tris pH 8.0 20 ml
- 0.5 M EDTA 20 ml
- Sterile water 100 ml

**Procedure**

1. Put 5 mg of tissue in a petri dish with buffer and divide the tissue into pieces.
2. Take them in centrifuge tubes and keep it in 4°C
for 5 mins

3. Centrifuge for 2 min at 1500 rpm.

4. Remove the supernatant, and wash twice with 1 ml 1X PBS

5. (It is possible to store the pellet at -80°C; in that case, add 1 ml 1X PBS and resuspend the pellet)

6. Remove supernatant and resuspend the pellet in 2.06 ml DNA-buffer.

7. 25 μl 10% SDS, shake gently, and incubate overnight at 35°C temperature

8. If there are still some tissue pieces visible, add 20 μl of 10% SDS and incubate for another 5 hr at 45°C.

9. Add 2.4 ml of Propanol, shake by hand for 5-10 min, and centrifuge at 3000 rpm for 5 min.

10. Pipette the supernatant into a new tube, add 1.2 ml Propanol, and 1.2 ml chloroform shake by hand for 5-10 min, and centrifuge at 3000 rpm for 5 min.

11. Pipette the supernatant into a new tube, add 2.4 ml chloroform shake by hand for 5-10 min, and centrifuge at 3000 rpm for 5 min.

12. Pipette the supernatant into a new tube, add 25 μl 3 M sodium acetate (pH 5.2) and 5 ml ethanol, shake gently centrifuge it for DNA precipitates.

13. Wash the DNA in 70% ethanol and dry it.

14. Dissolve the DNA in 0.5-1 ml sterile water overnight at 4°C.

RESTRICTION DIGESTION OF YEAST VECTOR

- To the restriction enzyme containing vial, 25 μl of yeast plasmid is added.

- To the above tube, 25 μl of 2% assay buffer is added.

- The contents are mixed by tapping the vial for few seconds or briefly spinning at low speed in a micro-centrifuge.

- The vial was incubated in a 37°C water bath for 1 hour. After 1 hour the vial is removed from water bath and 10 μl of gel loading dye is added into the vial and kept on ice.

- 10 μl of λDNA from the vial containing only λDNA substrate is transferred into a fresh 1.5 ml appendorff tube.

- Now the sample in all the appendorff tubes is loaded in different wells of 1% agarose gel. When sample loading is over start the electrophoresis set up.

DNA ELECTROPHORESIS

- Measure 1 g Agarose powder and take it in a 500 ml flask.

- Add 100 ml TAE Buffer to the flask.

- Melt the agarose in a microwave or hot water bath until the solution becomes clear. (if using a microwave, heat the solution for several short intervals - only until the solution starts to boil).

- Let the solution cool to about 50-55°C, swirling the flask occasionally so it cools evenly.

- Place the combs in the gel casting tray.

- Pour the melted agarose solution into the casting tray and let cool until it is solid (it should appear milky white).

- Carefully pull out the combs.

- Place the gel in the electrophoresis chamber.

- Add enough TAE Buffer so that there is about 2-3 mm of buffer over the gel.

Loading the gel

- Add 10 μl of each sample to 2 μl of 6X Sample Loading Buffer (make sure the order in which each sample is loaded be recorded).

- Carefully pipette the mixture into separate wells in the gel.

- Pipette 5 μl of the DNA ladder standard into another well of the gel.

Running the gel

- Place the lid on the gel box, connecting the
· Connect the electrode wires to the power supply, making sure the positive (red) and negative (black) are correctly connected.

· Turn on the power supply and maintain around 100 volts.

· Check to make sure the current is running through the buffer by looking for bubble formation on each electrode.

· Check to make sure that the current is running in the correct direction by observing the movement of the blue loading dye – this will take a couple of minutes (it will run in the same direction as the DNA).

· Let the power run until the blue dye approaches the end of the gel.

· Turn off the power.

· Disconnect the wires from the power supply.

· Remove the lid of the electrophoresis chamber.

· Carefully remove the gel.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Ministry of education and all experiments were carried out in accordance with approved guidelines.

References


The Risk Factors of Recurrent Aphthous Ulceration among Patients in Misan Governorate

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Abstract

Recurrent aphthous ulceration (RAU) is the most common oral mucosal disease which characterized by recurrent episodes of multiple or solitary painful ulcerations without association with systemic diseases. The objectives of our study were to investigate the relation of RAU to demographical, education level and smoking habit. The study was conducted on 120 patients, personal data (age, sex), site, level of education and smoking habit were taken. The results showed that females were affected more than males, the buccal mucosa and tongue (58 %, 24%) respectively were the most common site of occurrence. There was higher prevalence rate of RAU among patients with higher educational level (60%) and in non-smokers (93.3%).

Keywords: Risk factors, recurrent aphthous ulceration, patients

Introduction

Ulceration is one of the most common complaints of patients who attend seeking medical advice with an oral problem and the differential diagnosis is extensive. Ulcers of different causes may have very similar clinical appearance and a few important key questions in the history provide useful diagnostic clues ¹. A mouth ulcer, also termed an oral ulcer, or a mucosal ulcer, is an ulcer that occurs on the mucous membrane of the oral cavity. Mouth ulcers are very common, occurring in association with many diseases and by many different mechanisms, but usually there is no serious underlying cause ². The two most common causes of oral ulceration are local trauma (e.g. rubbing from a sharp edge on a filling) and aphthous stomatitis (“canker sores”), a condition characterized by recurrent formation of oral ulcers for largely unknown reasons ³. Mouth ulcers often cause pain and discomfort, and may alter the person’s choice of food while healing occurs (e.g. avoiding acidic or spicy foods and beverages). They may occur singly or multiple ulcers may occur at the same time (a “crop” of ulcers). Once formed, the ulcer may be maintained by inflammation and/or secondary infection. Rarely, a mouth ulcer that does not heal for many weeks may be a sign of oral cancer ⁴. Oral ulcerations prevalence is estimated 25% of the global population and thought to be affected by aphthous ulcers which is one of the most common causes of oral ulceration. In the UK, 20% of the population and 4% in USA. are believed to be affected by recurrent aphthous ulceration. Aphthous ulceration is more common in women those under the age of 40 and in non-smokers patients ⁵.

Aims of Study

The study has been done to investigate the most common risk factors of recurrent oral ulcers in relation to demographical data (Gender, age group), site, education level and smoking habit.

Patients & Method

The source of data is from out patients attending the private clinics and including patients referred from other specialties the study was conducted through the period 2018-2019. The number of cases were 120 of oral ulcers included in the study. The patients data are collected by taking history, detailed clinical examination and relevant investigations. Clinical diagnosis is confirmed by blood tests and biopsy for histopathological examination. The
patients aged between 10-70 years of both the sexes were included. All individuals underwent an interview in which they had to answer specific questions include personal data (age, sex), site of occurrence, smoking habit and family history and level of education [(level 0 (illiterate), level 1 (primary school), level 2 (secondary school), level 3 (university and postgraduate),

Statistical analysis was performed using SPSS program version 20. Associations between categorical variables were tested using chi-square test; Statistical significance was set at P < 0.05.

**Results**

The total number of patients were 120. The study conducted through the period 2018-2019. The age range of the patients was between 10-79 years, with mean age of (34.27). 56 (46.7%) of participants were males and 64 (53.3%) were females, with male/female ratios of 0.8:1. Patients were divided in to 7 age groups (10 years for each interval). Accordingly, more than half of patients 64 (53.3%) were in the 2nd and 3rd age group.

**Tab. (1). Distribution by age and sex**

<table>
<thead>
<tr>
<th>Age</th>
<th>Male N(%)</th>
<th>Female N(%)</th>
<th>Total N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-19</td>
<td>4</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>20-29</td>
<td>16</td>
<td>21</td>
<td>37</td>
</tr>
<tr>
<td>30-39</td>
<td>12</td>
<td>15</td>
<td>27</td>
</tr>
<tr>
<td>40-49</td>
<td>6</td>
<td>9</td>
<td>15</td>
</tr>
<tr>
<td>50-59</td>
<td>4</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>60-69</td>
<td>6</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>70-79</td>
<td>8</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>56</td>
<td>64</td>
<td>120</td>
</tr>
</tbody>
</table>

Approximately 60% of patients have positive family history of RAU.

Lips and buccal mucosae were the commonest sites of ulcerations (58.3%), followed by tongue (24%), floor of mouth (10.8%), gingiva and palate (5%).

Prevalence of RAU was increased as the level of education is increased (level 0=5.8%, level 1= 17.5%, level 2=21.6, level 3=55%).

In relation to smoking habit, the incidence of RAU was higher in non-smokers than in smokers. It was (93.3%) in non-smokers while (6.7%) in smokers.

**Table (2). Relation of RAU to family history, site of occurrence, Level of education and smoking**

<table>
<thead>
<tr>
<th>Family history</th>
<th>Male No.</th>
<th>Female No.</th>
<th>Total No.( % )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>30</td>
<td>42</td>
<td>72 (60)</td>
</tr>
<tr>
<td>No</td>
<td>26</td>
<td>22</td>
<td>48 (40)</td>
</tr>
<tr>
<td>Lip and cheek</td>
<td>33</td>
<td>37</td>
<td>70 (58.3)</td>
</tr>
<tr>
<td>tongue</td>
<td>13</td>
<td>16</td>
<td>29 (24)</td>
</tr>
</tbody>
</table>
**Discussion**

Epidemiological studies shown considerable variation in the prevalence of RAU among different regions throughout the world. The prevalence range among different populations has been documented as 5-66%.\(^6\) It was reported (25.2%) in Iran\(^{11}\), (25.5%) in Turkey\(^{12}\) and 17.7% in Sweden\(^7\) but lower than the prevalence reported in Jordan (5%)\(^8\). These variations could be explained due to the fact that different methodologies used (whether it is registered when the lesion is present, or it’s done through the clinical history\(^9\) socioeconomic level\(^{10}\), genetic predisposition, lifestyle of patients and stress\(^8\). In present study RAU was more common among females than males (p<0.004). Several other studies showed higher prevalence of RAU among females\(^8\). In relation to the female predisposition to RAU, some authors have suggested that this association is related to hormonal rates\(^{11}\). As a minority of women with RAU have cyclical oral ulceration related to the luteal phase of the menstrual cycle\(^{12}\) and also a decrease in its incidence during pregnancy, thus relating the episodes of RAU to progesterone levels\(^{13}\). On the contrary, Rivera-Hidalgo et al.\(^8\) found a higher prevalence of RAU among males, although without statistical significance. There is some evidence that the disease has a higher prevalence in younger adults, decreasing in both incidence and severity with age\(^{14}\). In this study, the most commonly affected age group was 20-29 years, the prevalence is decreasing as the age is increasing. This result is in accordance with the finding of Davatchi et al.\(^{15}\) in Iran.

Regarding family history of RAU, a genetic predisposition for the development of aphthous ulcer is strongly suggested, as in one study about 40% of patients have a family history and these individuals develop ulcers earlier and are of more severe nature\(^{16}\). Various associations with HLA antigens and RAU have been reported. These associations vary with specific racial and ethnic origins\(^{17}\). A number of several other studies have shown a familiar trend in the development of RAU\(^{18}\) and the correlation is also greater in identical twins\(^{19}\), demonstrating the existence of a genetic influence in the episodes. Similarly, in this study, 60% of patients reported that other family member suffered previously from RAU.

This study demarcates that lips and buccal mucosa were the commonest sites of RAU which are in accordance with the finding of Safadi\(^{20}\) in Jordan. This may probably because these 2 sites are thin delicate mucosa and more prone to trauma.

Educational level had great impact on the prevalence of RAU; prevalence of RAU is increasing as the level of education is increasing and the highest prevalence rate was among students. This finding supports the role of

<table>
<thead>
<tr>
<th>Floor of mouth</th>
<th>5</th>
<th>8</th>
<th>13 (10.8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gingiva and palate</td>
<td>3</td>
<td>3</td>
<td>6 (5)</td>
</tr>
<tr>
<td>Level of education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level 0</td>
<td>5</td>
<td>2</td>
<td>7 (5.8)</td>
</tr>
<tr>
<td>Level 1</td>
<td>11</td>
<td>14</td>
<td>25 (17.8)</td>
</tr>
<tr>
<td>Level 2</td>
<td>11</td>
<td>11</td>
<td>22 (21.6)</td>
</tr>
<tr>
<td>Level 3</td>
<td>29</td>
<td>37</td>
<td>66 (55)</td>
</tr>
<tr>
<td>Smoking habit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoker</td>
<td>8</td>
<td>0</td>
<td>8 (6.7)</td>
</tr>
<tr>
<td>Non-smoker</td>
<td>48</td>
<td>64</td>
<td>112 (93.3)</td>
</tr>
</tbody>
</table>

**Table (2). Relation of RAU to family history, site of occurrence, Level of education and smoking**
stress and anxiety in occurrence of RAU among educated patients, especially during school exam.

An inverse relationship between tobacco use and the appearance of RAU has been observed in the literature. Some researchers thought that smoking has protective effect and this protective effect is related to the increased keratinization of the oral mucosa in smokers and that this keratin layer acts as a mechanical and chemical barrier against trauma or microbes. Few investigators suggested that smokers may be less psychologically stressed than nonsmokers and that some psychological trigger might affect RAU development. The association found in this study between heavy cigarette smoking and less prevalence of RAU suggests that smoking may play a role in preventing the occurrence of RAU. Although such lower prevalence of RAU in the heavy smokers shouldn’t encourage smokers who suffer from RAU to increase their consumption.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Department of Anatomy, faculty of medicine, university of Misan, Misan, Iraq and all experiments were carried out in accordance with approved guidelines.

**References**

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Macular Thickness and Its relation with Age and Gender in Healthy Eyes Using Cirrus-HD Optical Coherence Tomography

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Abstract

Purpose of the Study: To provide a normative data for macular thickness in healthy Iraqi eyes using Zeiss cirrus HD-OCT and to determine the effects of age and gender on their measurements.

Materials and Methods: Two hundred healthy adult volunteers (≥20 years), four hundred eyes underwent macular cube scanning using Zeiss cirrus-HD OCT. Macular thickness from all 9 regions of the Early Treatment Diabetic Retinopathy Study map was documented for each subject. Variations in macular thickness by age and gender were determined.

Results: The mean age of volunteers was 37±10.4 (range 21-67) years. The mean of central foveal thickness was 254.6±17.3 Mm, the mean macular thickness was 279.0 ± 10.7 Mm, and the macular volume was 10.0 ± 0.4 mm3. Females were found to have a significantly thinner macula (P< 0.001) than males in all 9 ETDRS regions except outer inferior quadrant. Central foveal thickness was found to have very weak correlation with age which was not statistically significant. All other macular regions, mean macular thickness and volume showed statistically significant nonlinear reduction with age (p value<0.001).

Keywords: Macular Thickness, Healthy Eyes, OCT

Introduction

Macular edema is a common cause of impaired vision, and the degree of deterioration in visual acuity is significantly correlated with the degree of increment in macular thickness. This increase in retinal thickness due to fluid accumulation is happened in many ocular diseases or interventions like diabetic retinopathy, age-related macular degeneration, post intraocular surgery, central serous chorio-retinopathy (CSCR), retinal vein occlusion and intraocular inflammatory conditions. Traditional investigations that used for evaluating macular thickening or oedema, such as slit lamp biomicroscopy, fundus photography and fluorescein angiography (FA), can provide only qualitative information, which is relatively insensitive to subtle changes in macular thickness. Many studies showed significant differences in macular thickness amongst subjects of different race, gender and age.

Macular changes with increasing age involve alterations in its function, structure and blood supply. Many genetic and environmental factors may enhance the aging process or induce an irreversible and progressive loss of central vision. Some of these factors seem to be affected by sex hormones. Gender related differences exist in both healthy and diseased eyes. It has been suggested that the macula is thinner in females than males.

Background on OCT: Optical coherence tomography (OCT) has revolutionized ophthalmic clinical practice. OCT uses low coherence interferometry of light to examine the retina in vivo (10). With progression of this technology, a true, non-contact, non-invasive “optical biopsy” of the posterior segment of the eye is achievable.

Macular map on OCT: According to early treatment diabetic retinopathy study map(11), macula is divided into 9 regions with 3 concentric rings measuring...
1 mm (innermost ring), 3 mm (inner ring) and 6 mm in diameter (outer ring) centered on the fovea. The innermost 1 mm ring is the fovea while the inner 3 mm inner ring and outermost 6 mm ring are further divided into four equal regions.

Figure 1. Example of macular thickness measurements obtained with Cirrus HD OCT system.(12)

Subjects and Methods

Subjects: In this cross sectional study, four-hundred eyes of two-hundred healthy Iraqi volunteers, underwent macular thickness measurements by OCT at Ibn-Alhaithem Teaching Eye Hospital between April 2017 and February 2018 and the measures were matched for age and gender. Each volunteer was informed of the purpose of the study, and a verbal informed consent was obtained from all participants before examination. Each one underwent a complete medical history, ophthalmic history and examination, including (best corrected visual acuity by Snellen’s chart, applanation tonometry by Goldman tonometer, slit lamp biomicroscopic examination, dilated fundus examination by non-contact 90 D slit lamp indirect lens) then referred to be examined by OCT.

Inclusion Criteria:

1. Age range between 20 and 70 years.
2. Best corrected visual acuity (BCVA) ≥6/6 using snellen’s chart.
3. Refractive error between -1 and +1 diopter.
4. Intra ocular pressure less than 21 mmHg.

Exclusion Criteria:

1. Age less than 20 and more than 70.
2. Best corrected visual acuity (BCVA) worse than 6/6 using snellen’s chart.
3. Intraocular pressure more than 21 mmHg or any
evidence of glaucoma.

4- Eyes with a media opacity that obscures OCT view or signal of OCT less than 6.

5- Eyes with retinopathy due to any diseases like hypertension, diabetes or neuro-ophthalmological disorders or previous uveitic attacks.

6- Patients with history of interventional ocular surgeries or laser.

Optical coherence tomography scanning: All the volunteers were examined by the same OCT device (cirrus HD OCT Carl Zeiss Meditec, Dublin, CA, model 5000 and software version 7.0). this OCT has a Speed of 27,000 A-scans/second, axial resolution of 5 Mm, single compact unit and contour maps of ILM-RPE. Pupillary dilatation was done by using topical tropicamide 1% eye drops, imaging was performed 2 times for each subject, on the same day, by same experienced operator trained in using the Cirrus HD OCT system.

Macular thickness measurements: The macular thickness map protocol was used for macular thickness measurements. It consists of a series of 6 to 24 equally spaced line scans covering an area of 6×6 mm in the macular region displayed with numeric averages of thickness measurements for each of the 9 map regions within a 6×6 mm area centered on the fovea, as defined by the ETDRS(11).

Statistical analysis: Data were analyzed using the statistical package for social sciences (SPSS) version 24. Descriptive statistics presented as simple frequencies, percentages, mean and standard deviation. Independent sample or student’s t test for two groups was used to compare means between males and females while ANOVA test (analysis of variance) was used to compare the means across the age groups. The mean difference was calculated to assess the variation in the values in both gender and across the age groups. The predicted relationship between age and retinal thickness, in fovea, pericentral and peripheral ring of macula assessed using fractional polynomial multiple linear regression. Level of significance of ≤ 0.05 considered significant difference or correlation.

Results

Age and gender distribution of the study: Two hundred participants were enrolled in this study with a mean age of 37.9 ± 10.4 (range: 21 – 67) years. Males represented 64% of the studied group, (Table 3.1.). A total of 400 eyes were examined.

Table 1. Age and gender distribution of the studied group (N = 200)

<table>
<thead>
<tr>
<th>Variable</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21 – 30</td>
<td>49</td>
<td>24.5</td>
</tr>
<tr>
<td>31 – 40</td>
<td>84</td>
<td>42.0</td>
</tr>
<tr>
<td>41 – 50</td>
<td>36</td>
<td>18.0</td>
</tr>
<tr>
<td>&gt; 50</td>
<td>31</td>
<td>15.5</td>
</tr>
<tr>
<td>Mean ± SD*</td>
<td>35.9 ± 12.4</td>
<td>-</td>
</tr>
<tr>
<td>Range</td>
<td>21 – 67</td>
<td>-</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>128</td>
<td>64.0</td>
</tr>
<tr>
<td>Female</td>
<td>72</td>
<td>36.0</td>
</tr>
</tbody>
</table>

Distribution of the macular thickness: Table 2. summarizes the mean values of retinal thickness at central foveal and other 8 quadrants, the mean reported retinal thickness varied according to the quadrant where it measured, It ranges from thicker value of (325μm) at inner nasal , to the thinner value of (254.6μm) at the central foveal. The table also involves mean macular thickness and macular volume in the last 2 lines.
Table 2. Distribution of macular thickness of total eyes according in different quadrants from thicker quadrant toward thinner one (N = 400)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean μm</th>
<th>SD</th>
<th>Minimum μm</th>
<th>Maximum μm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner nasal</td>
<td>325.0</td>
<td>15.2</td>
<td>241</td>
<td>367</td>
</tr>
<tr>
<td>Inner superior</td>
<td>323.9</td>
<td>15.1</td>
<td>290</td>
<td>378</td>
</tr>
<tr>
<td>Inner inferior</td>
<td>321.2</td>
<td>14.9</td>
<td>289</td>
<td>382</td>
</tr>
<tr>
<td>Inner temporal</td>
<td>310.5</td>
<td>14.5</td>
<td>278</td>
<td>367</td>
</tr>
<tr>
<td>Outer nasal</td>
<td>295.7</td>
<td>15.3</td>
<td>236</td>
<td>346</td>
</tr>
<tr>
<td>Outer superior</td>
<td>277.6</td>
<td>14.8</td>
<td>171</td>
<td>330</td>
</tr>
<tr>
<td>Outer inferior</td>
<td>269.1</td>
<td>14.2</td>
<td>206</td>
<td>374</td>
</tr>
<tr>
<td>Outer temporal</td>
<td>261.7</td>
<td>13.4</td>
<td>206</td>
<td>309</td>
</tr>
<tr>
<td>Central foveal</td>
<td>254.6</td>
<td>17.3</td>
<td>218</td>
<td>295</td>
</tr>
<tr>
<td>Mean macular thickness</td>
<td>279.0</td>
<td>10.7</td>
<td>257</td>
<td>316</td>
</tr>
<tr>
<td>volume cube (mm3)</td>
<td>10.0</td>
<td>0.4</td>
<td>9.3</td>
<td>11.4</td>
</tr>
</tbody>
</table>

Comparison of macular thickness on basis of gender: The comparison of retinal thickness in both genders revealed significant difference in all measurements that males are likely to have thicker macular measurements than females (p value <0.001) in all parameters (mean macular thickness, central foveal thickness and macular volume). Also males have thicker measurements in other eight quadrants than females (p value <0.001) except Outer inferior quadrant at which males had relatively higher thickness but the difference did not reach the statistical significance, (P>0.05), (Table 3).

Table 3. Comparison of mean macular thickness in different quadrants between both genders in the studied group (N = 200)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Male Mean μm</th>
<th>Male SD</th>
<th>Female Mean μm</th>
<th>Female SD</th>
<th>mean difference</th>
<th>t test</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central foveal</td>
<td>262.1</td>
<td>18.4</td>
<td>241.4</td>
<td>9.2</td>
<td>20.7</td>
<td>9.29</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Inner nasal</td>
<td>328.5</td>
<td>15.6</td>
<td>318.8</td>
<td>12.4</td>
<td>9.7</td>
<td>6.40</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Inner inferior</td>
<td>324.2</td>
<td>14.8</td>
<td>315.9</td>
<td>13.6</td>
<td>8.3</td>
<td>5.57</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Inner temporal</td>
<td>314.2</td>
<td>14.8</td>
<td>303.9</td>
<td>11.3</td>
<td>10.3</td>
<td>7.24</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>
Comparison of macular thickness on basis of age: Further assessment of the retinal thickness across different age groups which categorized in decades, revealed a significant correlation between retinal thickness and age; in all quadrants, retinal thickness was thicker in younger age groups of 40 years and younger, and became thinner with advancing age above 40 years of life, (P<0.001), in all comparisons across the age groups and the 8 quadrants. The central foveal was insignificantly different across the age, (P>0.05). (Table 4).

Table 3. Comparison of mean macular thickness in different quadrants between both genders in the studied group (N = 200)

<table>
<thead>
<tr>
<th>Quadrant</th>
<th>Mean μm</th>
<th>SD</th>
<th>Mean μm</th>
<th>SD</th>
<th>Mean μm</th>
<th>SD</th>
<th>Mean μm</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central foveal</td>
<td>250.2</td>
<td>26.8</td>
<td>258.1</td>
<td>33.4</td>
<td>247.6</td>
<td>30.6</td>
<td>254.6</td>
<td>22.7</td>
</tr>
<tr>
<td>Inner nasal</td>
<td>327.8</td>
<td>13.1</td>
<td>328.5</td>
<td>17.2</td>
<td>318.7</td>
<td>13.2</td>
<td>318.6</td>
<td>9.8</td>
</tr>
<tr>
<td>Inner inferior</td>
<td>322.6</td>
<td>13.2</td>
<td>324.1</td>
<td>16.3</td>
<td>315.6</td>
<td>13.4</td>
<td>318.0</td>
<td>12.8</td>
</tr>
<tr>
<td>Inner temporal</td>
<td>311.2</td>
<td>13.1</td>
<td>313.5</td>
<td>16.7</td>
<td>305.3</td>
<td>12.9</td>
<td>307.1</td>
<td>8.9</td>
</tr>
<tr>
<td>Inner superior</td>
<td>324.3</td>
<td>12.8</td>
<td>328.7</td>
<td>16.8</td>
<td>317.2</td>
<td>13.2</td>
<td>317.9</td>
<td>9.8</td>
</tr>
<tr>
<td>Outer nasal</td>
<td>298.6</td>
<td>15.7</td>
<td>296.5</td>
<td>17.2</td>
<td>294.8</td>
<td>11.0</td>
<td>289.8</td>
<td>11.9</td>
</tr>
<tr>
<td>Outer inferior</td>
<td>270.1</td>
<td>15.0</td>
<td>270.0</td>
<td>13.2</td>
<td>269.9</td>
<td>17.3</td>
<td>264.1</td>
<td>9.9</td>
</tr>
<tr>
<td>Outer temporal</td>
<td>259.8</td>
<td>11.5</td>
<td>264.3</td>
<td>15.3</td>
<td>261.5</td>
<td>11.8</td>
<td>258.1</td>
<td>11.3</td>
</tr>
<tr>
<td>Outer superior</td>
<td>276.9</td>
<td>12.4</td>
<td>281.2</td>
<td>15.3</td>
<td>276.8</td>
<td>13.3</td>
<td>269.6</td>
<td>15.9</td>
</tr>
<tr>
<td>Mean macular thickness</td>
<td>279.5</td>
<td>10.5</td>
<td>281.7</td>
<td>11.4</td>
<td>276.4</td>
<td>9.8</td>
<td>273.9</td>
<td>7.3</td>
</tr>
<tr>
<td>Volume cube (mm3)</td>
<td>10.0</td>
<td>0.4</td>
<td>10.1</td>
<td>0.4</td>
<td>9.9</td>
<td>0.4</td>
<td>9.8</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Comparison of mean macular thickness in different quadrants between both genders in the studied group (N = 200)

<table>
<thead>
<tr>
<th>Age (year)</th>
<th>21 – 30</th>
<th>31 – 40</th>
<th>41 - 50</th>
<th>&gt; 50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central foveal</td>
<td>Mean μm</td>
<td>SD</td>
<td>Mean μm</td>
<td>SD</td>
</tr>
<tr>
<td>Inner nasal</td>
<td>250.2</td>
<td>26.8</td>
<td>258.1</td>
<td>33.4</td>
</tr>
<tr>
<td>Inner inferior</td>
<td>327.8</td>
<td>13.1</td>
<td>328.5</td>
<td>17.2</td>
</tr>
<tr>
<td>Inner temporal</td>
<td>322.6</td>
<td>13.2</td>
<td>324.1</td>
<td>16.3</td>
</tr>
<tr>
<td>Inner superior</td>
<td>311.2</td>
<td>13.1</td>
<td>313.5</td>
<td>16.7</td>
</tr>
<tr>
<td>Outer nasal</td>
<td>298.6</td>
<td>15.7</td>
<td>296.5</td>
<td>17.2</td>
</tr>
<tr>
<td>Outer inferior</td>
<td>270.1</td>
<td>15.0</td>
<td>270.0</td>
<td>13.2</td>
</tr>
<tr>
<td>Outer temporal</td>
<td>259.8</td>
<td>11.5</td>
<td>264.3</td>
<td>15.3</td>
</tr>
<tr>
<td>Outer superior</td>
<td>276.9</td>
<td>12.4</td>
<td>281.2</td>
<td>15.3</td>
</tr>
<tr>
<td>Mean macular thickness</td>
<td>279.5</td>
<td>10.5</td>
<td>281.7</td>
<td>11.4</td>
</tr>
<tr>
<td>Volume cube (mm3)</td>
<td>10.0</td>
<td>0.4</td>
<td>10.1</td>
<td>0.4</td>
</tr>
</tbody>
</table>
Discussion

Normal Macular Tomography: In present study, the central foveal thickness was 254.6 ± 17.3 μm, mean macular thickness was 279.0 ± 10.7 μm and macular volume was 10.0 ± 0.4 mm³. The fovea (innermost 1 mm ring) was the thinnest area of macula. The inner macula (inner 3 mm ring) was thicker in all four quadrants i.e. superior, inferior nasal and temporal compared to outer macula (outermost 6 mm ring), thus the retina thinned towards the periphery. The nasal macula (inner and outer) was found to be significantly thicker than the temporal macula (table 2). The nasal quadrant (325 ± 15.2 μm) was the thickest in the inner region of the macula, followed by the superior (323.9 ± 15.1 μm), inferior (321.2 ± 14.9 μm) and temporal (310.5 ± 14.5 μm) quadrants. In the outer region, the nasal quadrant (295.7 ± 15.3 μm) also was the thickest, followed by the superior (277.6 ± 14.8 μm), inferior (269.1 ± 14.2 μm) and temporal (261.7 ± 13.4 μm) quadrants. These patterns were consistently present in both genders and across all age groups; this attributed to the presence of papillomacular bundle in the nasal macula, so it has the thickest nerve fiber layer than other quadrants, then it comes the superior and inferior arcuate bundling of the nerve fibers and lastly the temporal macula, our results in agreement with other studies (13,14).

Comparison of Macular Thickness on basis of age: In our study, the central foveal thickness did not correlate significantly with age (p value 0.11) as in (table 4). Regarding mean macular thickness and macular volume measurements were significantly thicker in age groups 40 years and less and became thinner in age groups more than 40 years (p value <0.001) as in (table 4). Regarding macular thickness in other eight quadrants of macula (inner and outer rings) was also thicker in age groups 40 years and less and became thinner in age groups 40 years and more (decreased with age) with p value <0.05 as in (table 4). These results suggest that inner and outer macular regions are thick in young adults, whereas macular thickness tends to have less variable in older adults with a smaller magnitude in thickness changes from the foveola toward the central macula and inner and outer macular regions.

Comparison of macular thickness on basis of gender: Our study showed that central foveal thickness, mean macular thickness and macular volume were greater in males as compared to females (P<0.05) than males in all 9 ETDRS regions except outer inferior quadrant which was not statistically significant (p value 0.125). The central foveal thickness was found to be 262.1 ±18.4 μm vs 241.4 ±20.7 μm for males vs females, the average macular thickness was found to be 281.5±11.2μm vs 274.5±8.1 μm for males vs females and the macular volume was found to be 10.1±0.4 mm³ vs 9.9±0.3mm³ for males versus females. Tewari et al. (19) and Grover et al. (20) showed no significant difference was seen in the foveal thickness, mean macular thickness and macular volume in men and women which may be due to differences in ethnicity of study subjects or differences in study design. However, other similar studies (18,14) found males to have significantly higher mean macular thickness, foveal thickness and macular volume as compared to females which were in partial agreement with our study as outer inferior quadrant was not statistically significantly.

Conclusion

The macular thickness was determined in 9 ETDRS regions. The fovea was the thinnest area. Using the criteria of mean ± 2 SDs, which includes 95% of the population, we suggest that 237.7 μm to 272 μm be taken as the normal range for central foveal thickness in the Iraqi population for Zeiss cirrus HD OCT. Females were found to have a significantly thinner macula (P<0.001) than males in all 9 ETDRS regions except outer inferior quadrant. Central foveal thickness was found to have very weak correlation with age which was not statistically significant.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved and all experiments were carried out in accordance with approved guidelines.

References
Effectiveness of an Education Program on Knowledge of Primary School Teachers toward Mumps Disease

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Abstract

This study aims to determine the effectiveness of an education program on primary school teachers’ knowledge toward mumps disease and to identify the relationship between the primary school teachers’ knowledge and some demographic variables. Quantitative research a quasi-experimental design (pre-post tests) has been used in the present study for the period of January 2018 to the end of June 2019. A nonprobability (purposive sample) sample of 60 teachers has been selected from 30 primary schools in Holy Kerbala City. The sample of the study was divided into two groups: (30) teachers for the study group, who have been exposed to the education program, and (30) teachers for the control group, who not exposed to the education program. The groups are almost matched relative to their characteristics. The questionnaire was submitted to the teachers for the pre-test before the implementation of the program. Post-test I was conducted immediately after that. Post-test II was conducted two months later. The findings of the data analysis indicate that the teachers’ knowledge among the study group improves as a result of the implementation of the education program. Among the control group, there is no significant difference in the level of teachers’ knowledge. The study recommends the cooperation between the Ministry of Education with the Ministry of Health to develop a national plan regarding mumps and other communicable diseases to raise the awareness of the school community (students, teaching, and non-teaching staff, and parents) regarding this diseases.

Keywords: Effectiveness, Primary School Teachers, Knowledge, Mumps

Introduction

Mumps is an acute disease of children and young adults, caused by a paramyxovirus of which there is only a single serotype. Mumps virus infection produces no symptoms in about one-third of infected persons¹. The hallmark of infection is swelling of the parotid gland. Aseptic meningitis and encephalitis are common complications of mumps together with orchitis and oophoritis, which can arise in adult men and women, respectively; other complications include deafness and pancreatitis. Clinical diagnosis can be based on the classic parotid swelling; however, this feature is not present in all cases of mumps and can also occur in various other disorders².

The points of arguments related to this research topic that mumps virus is a highly infectious pathological agent, despite the use of vaccination, outbreaks continue to occur worldwide and affect all age groups. There is no specific treatment for mumps. Someone may ask what is the need for this research and what is important for the community? This contagious disease is widely distributed in low- and medium-income countries like Iraq, mumps is an insignificant and neglected public health problem because of poor documentation of clinical cases and lack of published epidemiologic studies. By the end of 2015 around 12957 mumps cases were reported in Iraq, the numbers of incident cases increased dramatically in the year 2016 (73919 case) this was unexpectedly very high as compared with numbers in neighboring countries in the same period as documented by WHO update report; Saudi Arabia 14, Syrian Arab Republic 84, Jordan 168, Kuwait 318, and 344 in Turkey³.

Methodology

Quantitative research a quasi-experimental design (pre-post tests) has been used in the present study for the period of January 2018 to the end of June 2019. A nonprobability (purposive sample) sample of 60 teachers has been selected from 30 primary schools in
Holy Kerbala City. The sample of the study was divided into two groups: (30) teachers for the study group, who have been exposed to the education program, and (30) teachers for the control group, who not exposed to the education program. The groups are almost matched relative to their characteristics. The education program for teachers has been constructed according to the results of the assessment of the teacher’s needs to knowledge about mumps and from review the related literature. The questionnaire involved two parts: the first, demographic data of teachers such as age, gender, and specialization, level of education, years of employment, participation in training course or workshop toward communicable diseases and second part, concerning teachers’ knowledge about mumps in primary schools were comprised of (36) items divided to (6) items related to knowledge about anatomy and physiological of salivary glands, general knowledge about mumps (5) items, knowledge about signs and symptoms of mumps disease (7) items, knowledge about diagnosis and complications of mumps disease (6) items, knowledge about mode of transmission for mumps infection (6) items, knowledge about prevention and treatment of mumps disease. The content validity has been determined through the panel of 17 experts their specialties fields are nursing and medicine. The reliability of the questionnaire is determined through the use of pre-posttest technique and computing of correlation coefficients ($r=0.93$). The questionnaire was submitted to the teachers for the pretest before the implementation of the program. Post-test I was conducted immediately after that. Post-test II was conducted two months late. the data of the study were analyzed through the use of Statistical Package for Social Science Program (IBM SPSS) version 24 24 through a statistical approach that includes (frequency, percentage, Mean of score (M.S.) and standard deviation (SD) and an Inferential statistical approach that includes (ANOVA and t-test). Results were determined as significant at (P<0.05).

**Results and Discussion**

**The demographic characteristics of sample:**

The majority of teachers among study group are with age (28-43) years old 50% in study group while 40 % in control group from same age groups. This result is consistent with Ahmed and Hameed, (2013) who revealed that the majority of the studied teachers at age 25-44 years old. The findings reveal that more of teachers are females among the study and control group with a percentage of (73.3%) this result agrees with Ganpatrao’s study in 2014 that indicate about (73%) of teachers were females in the sample of the study. Regarding the variable of specialty, more of teachers are specialized with sciences among the study group (70%) and control group (73.3%). This result coincides with the findings of Faraj and Khalifa (2014) who has been selected the same specialty (teachers of sciences) for study. The level of education refers to diploma among teachers of both groups; the study group (70%) and control group (73.3%) while (30% and 26.3 %) of them in sequentially for the study and control groups with bachelor’s degree. These findings getting close to Hussein (2018) when study academic achievement showed that (60%) of teachers in the study group were graduates of teachers’ preparation institute while more than half of them in the control group were graduates of colleges (56.7%)². Regarding years of employment, the highest percentage among the study group reveal (11-18) years (33.3%), while the same percentage among control group that reveals (27-34) years. This result agrees with Ail, 2018 in the study group but disagrees in control group, (50%) of teachers in the study group have work experience of (11-13) years and (26.8%) of teachers in control group who have (4-6) years of employment. When calculating the total number of for training courses from 60 teachers the results indicate (28.3 %) from them were participated in training courses related to communicable diseases (only 8.3% among the study group and 20 % among the control group).This result agrees with Khalifa and Faraj (2010) about (28) of the sample have participated in training courses.

**The effectiveness of an education program about teacher’s knowledge concerning mumps diseases:**

Determination the effectiveness of the education program has been employed through the comparison between the levels of teachers’ knowledge before and after their participation in the education program by the findings of pre-test and post-test 1 and through the comparison between the levels of teachers’ knowledge after period of time from post-test1 by the findings of post-test 1 and post-test 2. The findings of the data analysis indicate that the teachers’ knowledge among the study group improves as a result of the implementation of the education program. Among the control group, there is no significant difference in the level of teachers’ knowledge.
This result agrees with the study of Hussein in 2018 has been showed that the effectiveness of educational program on teachers’ knowledge about early detection of communicable diseases; the program is highly effective as shown by high significant differences among teachers’ knowledge in post-test 1 and post-test 2 in the study group whereas no significant differences have been seen among periods of control group which means that the program is effective on teachers’ knowledge. Which supported through Al- Jourani ‘s (2014) study indicates the successful implementation of an educational program to improve teacher’s knowledge concerning communicable diseases. He said that “There were significant statistical differences in teacher knowledge, practices, and attitudes after implementation of the communicable diseases control educational program compared with their knowledge, practices, and attitudes in the period before the implementation of the program.”

The relationship between teachers’ knowledge and their demographic variables: The demographic variables are attributes of subjects that are collected to describe the sample, in this study some demographic variables regarded teachers at primary schools are selected included age, gender, specialty, level of education, years of employment, participation in the training course, and course’s duration. During the following paragraphs will discuss the relationship between these demographic variables with the items of study which included anatomy and physiology of the salivary glands, general knowledge about mumps, signs and symptoms of mumps, diagnosis and complication of mumps, mode of mumps transmission, prevention and treatment of mumps and overall knowledge. Concerning the relationship between teachers’ knowledge about mumps disease and their demographic variables, the study in table (2) confirms that no significant association between teachers’ knowledge improvement effect result after application of the program, while there was a significant association between the prevention and treatment of mumps with their level of education, also between the symptoms, signs, diagnosis, and complication of mumps with their participation in training courses and duration of training courses, %: Percentage

<table>
<thead>
<tr>
<th>Knowledge Group</th>
<th>Sources of Variance</th>
<th>Sum of Square</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>P ≤ 0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Group</td>
<td>Post-test I</td>
<td>Between Group</td>
<td>112.367</td>
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<td>26.243</td>
<td>71.036</td>
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<td></td>
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<td>6.027</td>
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<tr>
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<tr>
<td></td>
<td>Post-test II</td>
<td>Between Group</td>
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<td>18</td>
<td>104.241</td>
<td>4.031</td>
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<tr>
<td></td>
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<td>25.861</td>
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<tr>
<td></td>
<td></td>
<td>Total</td>
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<td></td>
</tr>
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<td>Post-test I</td>
<td>Between Group</td>
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<td>124.826</td>
<td>1.584</td>
</tr>
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<td>Within Group</td>
<td>945.417</td>
<td>12</td>
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<td></td>
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<tr>
<td></td>
<td>Post-test II</td>
<td>Between Group</td>
<td>963.533</td>
<td>17</td>
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<td></td>
<td></td>
<td>Within Group</td>
<td>451.833</td>
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<tr>
<td></td>
<td></td>
<td>Total</td>
<td>1415.367</td>
<td>29</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

df: Degree of freedom, F: F-Statistic, P: Probability value
Figure 1: Effectiveness of Education Program on Level of Teachers’ Knowledge at Primary School about Mumps

Table 2: Summary Statistics of Significant Relationship between Teachers’ Knowledge about Mumps and their Demographic Variables

<table>
<thead>
<tr>
<th>Demographic variables</th>
<th>Study Group (N=30) / Significance P ≤ 0.05</th>
<th>Control Group (N=30) / Significance P ≤ 0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age</td>
<td>Gender</td>
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<tr>
<td>Anatomy &amp; physiology</td>
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<td>.600</td>
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<tr>
<td></td>
<td>(N.S)</td>
<td>(N.S)</td>
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<tr>
<td>General knowledge</td>
<td>.309</td>
<td>.898</td>
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<tr>
<td>about mumps</td>
<td>(N.S)</td>
<td>(N.S)</td>
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<tr>
<td>Symptoms &amp; signs of</td>
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<td>.724</td>
</tr>
<tr>
<td>mumps</td>
<td>(N.S)</td>
<td>(N.S)</td>
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<td>Diagnosis &amp;</td>
<td>.638</td>
<td>.278</td>
</tr>
<tr>
<td>complication of mumps</td>
<td>(N.S)</td>
<td>(N.S)</td>
</tr>
<tr>
<td>transmission</td>
<td>(N.S)</td>
<td>(N.S)</td>
</tr>
<tr>
<td>Prevention &amp; treatment</td>
<td>.745</td>
<td>.073</td>
</tr>
<tr>
<td>of mumps</td>
<td>(N.S)</td>
<td>(S)</td>
</tr>
<tr>
<td>Overall knowledge</td>
<td>.611</td>
<td>.132</td>
</tr>
<tr>
<td></td>
<td>(N.S)</td>
<td>(N.S)</td>
</tr>
</tbody>
</table>

P: Probability value, S: Significance, N.S: Not Significance, H.S: High significant
Conclusion

Generally, the pre-test evaluation of teachers’ knowledge relating to mumps disease at the primary schools, indicates a poor level of overall knowledge but there are significant improvements in teachers’ knowledge about mumps disease after the implementation of the education program. The study recommends the cooperation between the Ministry of Education with the Ministry of Health to develop a national plan regarding mumps and other communicable diseases to raise the awareness of the school community (students, teaching, and non-teaching staff, and parents) regarding this disease.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Faculty of Nursing, University of Baghdad. Iraq and all experiments were carried out in accordance with approved guidelines.

References

7. Faraj, R. K., & Khalifa, M. F. Assessment of Science Teachers’ Awareness towards Communicable Diseases Control in Baghdad City Primary Schools. nursing national Iraqi specility.2014; 27(2), 7-16.
10. Al-Jourani, K. R. Effectiveness of health education program on science teachers’ level of awareness communicable diseases control in primary schools in Baghdad city. 2014; (Doctoral dissertation, University of Baghdad).
Effects of Cement Dust on Electrolytes and Osmolality in Serum and Urine of Kufa Cement Factory workers

Noor Amer Hakim AL-Mamoori1, Nada Saad Naji AL-Taee2

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Abstract

Cement industry is considered one of the serious pollutants in the environment inducing different kinds of health problems among workers. However, there have been few studies examining the adverse effects of cement dust on the levels of electrolytes and osmolality among workers. In the current study, we investigated the potential impacts of the cement dust on the levels of electrolytes and osmolality in both serum and urine among workers of Kufa Cement Factory. The workers were grouped into three groups according to their departments. The workers, who were aged between 38-48 years, were grouped into oven workers (N=20), mills workers (N=16) and control workers (N=22). While workers who were aged between 49-59 years, were also grouped into oven workers (N=14), mills workers (N=13) and control workers (N=9). Serum and urine samples were collected from all studied subjects. Regardless of age groups, the results showed that the levels of serum sodium and potassium were significantly increased among workers at the oven and mills departments compared to control. While the levels of blood serum calcium and osmolality were significantly reduced among workers at the oven and mills departments compared to control group. In the urine samples, the levels of sodium were significantly higher among oven workers compared to the findings in both mills and control. While the levels of calcium and osmolality were significantly higher in both oven and mills workers compared to the control.

Keywords: Cement dust, electrolyte, osmolality, blood serum, urine

Introduction

The demand for cement are increasing with the increasing population; resultant in a rapid growth of cement industry. Like all other industrial processes cement manufacturing involves the generation of waste materials that are of concern from both health point and environmental of view1. Based on the massive amount of gases being used and emitted; cement industry can be measured as one of the serious pollutants in the environment2. It has been suggested that the effects of cement dust and its gasses on the subject’s health can be varied according to different factors3. Duration time of the exposure which is shown to be positively correlated with the negative effects4,5. Work place of the subjects as workers at the oven or packing departments are more influenced than others3,6,7. In addition , residency of the people as people that live near the cement factory are more targeted than others8,1. The cement dust and its gasses can invade human’s body through different routes such as inhalation, ingestion, and absorption through the skin9. There are considerable evidences showing the adverse effects of the cement dust and its gasses on the human health. Previous research indicated that cement dust had induced several bad impacts on the different internal organs such as liver , lung and kidney among workers at the cement factory. To date, there have been few studies performed investigating the potential effects of cement dusts and its gasses on the levels of electrolytes and osmolality in both serum and urine among workers in different work places at the Cement Factory3,6,7. Therefore, in the current study we
investigated the potential effects of cement dust on the levels on several electrolytes (sodium, potassium and calcium) and the osmolality in both serum and urine among workers at the different sections of Kufa cement factory.

**Material and Method**

**Criteria of participants**

A sample of 325 workers aged between 38 and 59 years was selected among workers of Kufa cement factory. About 120 of blood serum sample aged between 38-48 years were divided to:

- A1: worker in ovens department N=(20),
- A2: worker in mills department N=(16),
- A3: control department N=22,

while the rest sample of blood serum aged between 49-59 years were divided to:

- B1: worker in ovens department N=(14),
- B2: worker in mills department N=(13),
- B3: control department N=9.

In addition to workers aged between 49 and 59 years was selected among workers of Kufa cement factory. About 120 of urine sample aged between 38-48 years were divided to:

- C1: worker in ovens department=20,
- C2: worker in mills department=16,
- C3: control department=22,

aged between 49-59 years were divided to:

- D1: worker in ovens department=14,
- D2: worker in mills department=13,
- D3: control department=9.

**Collection of Data**

The data were collected using a self-administered questionnaire and it is built on several axes: (name - age - work section - height and weight - duration of exposure - smoking case - the family history and diabetes). The Criteria for selecting workers were that no one should suffer any medical complication such as heart disease, stroke or any other disorder. Blood samples were collected from all studied workers by venipuncture approach. Five milliliters were drawn of each worker and collected in a gel tube. The collected bloods were then centrifuged at 3000/rpm for 15 minutes, then serum was kept at -20 for later analysis of serum electrolytes and osmolality. Urine samples were also collected from every worker at 10 a.m. The collected urine was split into two tubes. The first tube was directly used for the electrolytes measurements, while the other one was centrifuge at 3000 /rpm for 15 minutes. The supernatant was then for osmolality measurement.

**Methods of measuring electrolytes and osmolality**

Serum micro-minerals (mg/L) were determined from all samples in serum and urine. Sodium was measurement by ELZA. While measurement potassium and calcium was measured by test kits and spectrophotometer device. Randox and spectrum laboratories. Osmolality (mosm/Kg) was determined by using standardized procedures of single-sample Micro- Osmometer device.

**Statistical Analysis**

All data were checked for normality using Shapiro-Wilk test. One way ANOVA was used for normal distributed data, while Kruskal-Wallis test was performed for not-normal distributed data. In these models, the group was fitted as a fixed factor, while the dependent variables like the values of electrolytes and osmolality were included as a response. The statistical outcomes were expressed as a Mean ± Standard deviation. A post hoc test was also used for detecting the significant differences among groups, P<0.05 was considered as statistically significant. Minitab version 18 (USA) was used to analyze the data in the current study.

**Results and Discussion**

**Electrolytes and osmolality in serum:**

In the current study, we examined the potential effects of cement dust on the health of workers by measuring their electrolytes in both serum and urine. The results indicated that the levels of serum sodium among workers with age group 1 in both oven and mills department were significantly higher (p<0.05) compared to the values observed in the control group (table 1). While in the age group 2, the significant difference was disappeared between workers in mills department and control group (table 2). These results are consistent with previous studies. High levels of serum sodium observed among workers in both oven and mills departments may indicate that the cement dust could cause this elevation. It has been suggested that the concentration of serum sodium that exceeds 145 mg/dL can be physiologically considered higher. The results of the current study indicated the effects of cement dust were almost the same in both age groups. However, The picture was an opposite direction in terms of the levels of serum calcium and osmolality. The workers in both oven and mills department had significantly
(p<0.05) decreased the serum calcium and osmolality compared to the values found in the control group (see table 1,2). Although the exact reason for the lowering serum osmolality is unknown, reduction of other factors (not measured in our study) that may drive the serum osmolality could explain why the serum osmolality was significantly decreased among workers. It has been suggested that the serum osmolality is influenced by several factors\textsuperscript{11,12}. Another possible explanation for such reduction observed in serum osmolality could be indirect effect of cement dust on the lung function especially forced expiratory volume and then this effect could be behind the reduction of serum osmolality\textsuperscript{13}. The changes in serum osmolality have been observed among workers exposed to different kinds of pollutants. Levels of serum potassium was significantly increased (p<0.05) among workers with age group 1 in oven department compared to what have been seen among workers in both mills and control departments (table1). However, levels of serum potassium was only significantly different (p<0.05) to that observed among workers in control group with age group 2 (table 2).

**Table 1: the levels of electrolytes and osmolality measured in serum among workers aged between 38-48 years in Kufa Cement Factory.**

<table>
<thead>
<tr>
<th>Markers</th>
<th>Mean±SD</th>
<th>Mean±SD</th>
<th>Mean±SD</th>
<th>LSD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ovens</td>
<td>Mills</td>
<td>Control</td>
<td></td>
</tr>
<tr>
<td>Serum Sodium</td>
<td>146.42±1.86</td>
<td>145.73±2.23</td>
<td>137.12±1.90</td>
<td>3.95</td>
</tr>
<tr>
<td>Serum Potassium</td>
<td>6.74±1.46</td>
<td>4.87±1.07</td>
<td>4.08±0.64</td>
<td>1.23</td>
</tr>
<tr>
<td>Serum Calcium</td>
<td>6.51±0.63</td>
<td>6.93±1.53</td>
<td>8.44±1.30</td>
<td>1.42</td>
</tr>
<tr>
<td>Serum Osmolality</td>
<td>121.95±9.5</td>
<td>114.68±6.18</td>
<td>292.22±12.02</td>
<td>97.24</td>
</tr>
</tbody>
</table>

The various letters refer *significance at P<0.05

**Table 2: the levels of electrolytes and osmolality measured in serum among workers aged between 49-59 years in Kufa Cement Factory.**

<table>
<thead>
<tr>
<th>Markers</th>
<th>Mean±SD</th>
<th>Mean±SD</th>
<th>Mean±SD</th>
<th>LSD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ovens</td>
<td>Mills</td>
<td>Control</td>
<td></td>
</tr>
<tr>
<td>Serum Sodium</td>
<td>145.12±3.08</td>
<td>145.24±4.69</td>
<td>137.35±1.49</td>
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<tr>
<td>Serum Potassium</td>
<td>4.94±1.11</td>
<td>5.21±1.13</td>
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<tr>
<td>Serum Calcium</td>
<td>6.64±0.58</td>
<td>6.61±1.31</td>
<td>9.51±1.36</td>
<td>1.20</td>
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<tr>
<td>Serum Osmolality</td>
<td>118.14±6.82</td>
<td>118.84±9.62</td>
<td>297.55±11.38</td>
<td>83.44</td>
</tr>
</tbody>
</table>

The various letters refer *significance at P<0.05

**Electrolytes and osmolality in urine:**
The results indicated that the levels of urine sodium among workers with age group 1 in the oven department were significantly higher (p<0.05) compared to the values observed in both mills and control departments (table 3). The changes observed in the findings measured with age group 2 were also followed the same path. Levels of urine sodium among workers in the oven department were significantly higher (p<0.05) compared to the values observed in both mills and control departments (table 4). This elevation was in the same direction to what we have seen in the levels of sodium measured in the serum of the same subjects, suggesting that the pollutants derived from the cement dust could cause this elevation in both serum and urine. To our knowledge, this is the first study examining the potential effects of cement dust on the levels of electrolytes in the urine. Our results also indicated the subjects with high levels of sodium in their serum had increased the levels of osmolality measured in their urine. One possible explanation for such link is that the hypernatremia found in the serum of the workers in both oven and mills department could induce the body to secret more sodium and other electrolytes like calcium in the urine and hence increase the ratio of these solutes in the secreted urine which ultimately leading to increase the osmolality. Levels of urine potassium was significantly different (p<0.05) among the two groups within both age groups in which the lowest levels were observed in the control, while the highest levels were found among workers in the mills department (table 3, 4). Levels of urine calcium among workers with in both age groups in the oven and mills department were significantly higher (p<0.001) compared to the values observed in the control group (table 3, 4). This picture was also correct for the findings of urine osmolality. The levels of urine osmolality within both age groups were significantly (p<0.001) lower in both oven and mills workers compared to the findings in the control group (table 3, 4). The current study had highlighted the role of cement dusts on the levels of the electrolytes and osmolality among workers at the cement factory. This study also expanded our awareness towards the serious effects of the pollutants a rounded us.

Table 3: the levels of electrolytes and osmolality measured in urine among workers aged between 38-48 years in Kufa Cement Factory.

<table>
<thead>
<tr>
<th>Markers</th>
<th>G1, Mean±SD</th>
<th>G2, Mean±SD</th>
<th>G3, Mean±SD</th>
<th>LSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ovens Urine Sodium</td>
<td>146.18±3.72</td>
<td>135.44±8.98</td>
<td>139.81±3.89</td>
<td>5.30</td>
</tr>
<tr>
<td>Mills Urine Potassium</td>
<td>6.58±1.73</td>
<td>11.57±1.63</td>
<td>3.96±0.67</td>
<td>1.94</td>
</tr>
<tr>
<td>Control Urine Calcium</td>
<td>7.70±1.72</td>
<td>6.81±1.89</td>
<td>4.76±1.38</td>
<td>2.01</td>
</tr>
<tr>
<td>Ovens Urine Osmolality</td>
<td>352.5±50.76</td>
<td>384.5±85.66</td>
<td>293.5±20.88</td>
<td>56.01</td>
</tr>
</tbody>
</table>

Table 4: the levels of electrolytes and osmolality measured in urine among workers aged between 49-59 years in Kufa Cement Factory.

<table>
<thead>
<tr>
<th>Markers</th>
<th>G1, Mean±SD</th>
<th>G2, Mean±SD</th>
<th>G3, Mean±SD</th>
<th>LSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ovens Urine Sodium</td>
<td>145.60±4.13</td>
<td>138.97±5.70</td>
<td>126.59±26.41</td>
<td>7.01</td>
</tr>
<tr>
<td>Mills Urine Potassium</td>
<td>6.69±1.89</td>
<td>11.41±1.55</td>
<td>3.99±1.03</td>
<td>2.56</td>
</tr>
<tr>
<td>Control Urine Calcium</td>
<td>7.25±2.42</td>
<td>7.36±2.26</td>
<td>3.66±1.33</td>
<td>3.01</td>
</tr>
<tr>
<td>Ovens Urine Osmolality</td>
<td>420.57±100</td>
<td>489.15±82.31</td>
<td>295.88±11.92</td>
<td>114.05</td>
</tr>
</tbody>
</table>
Conclusions

Levels of the electrolytes and osmolality measured in both serum and urine were significantly influenced by cement dust among workers came from different departments. These results should encourage the workers to protect themselves by following the safety instructions which ultimately constrain the possible adverse effects caused by cement dust. In addition, workers at cement factories should be a ware of using some of antioxidant supplementations which could mitigate the potential oxidative damage by cement derived molecules.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Environmental Sciences and all experiments were carried out in accordance with approved guidelines.

References
Assessment of Risk Factor for Developing Acute Kidney Injury in the Setting of Acute ST Elevation Myocardial Infarction

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Abstract

Background: An acute kidney injury (AKI) is a recognized complication in patients with ST elevation myocardial infarction (STEMI) by several mechanisms and it adversely affects morbidity and mortality on long-term bases (¹, ², and ³). Few studies have investigated which patients with STEMI are at risk of developing AKI (⁶), and this study is aiming to do this assessment.

Patients and Methods: We enrolled patients with STEMI who were admitted to the CCU. KDIGO definitions was utilized to search for development of AKI in these patients throughout their stay in the CCU (their baseline serum creatinine was measured and traced daily thereafter; and their urine output was monitored). Common epidemiological and some relevant medical parameters were recorded for all patients.

Results and conclusion: low baseline systolic blood pressure, ejection fraction % and estimated glomerular filtration rate (eGFR); in addition to use of diuretics; are the major risk factors for the development of AKI in the setting of STEMI.

Keywords: acute kidney injury, ST elevation myocardial infarction

Introduction

Deterioration in renal function is well recognized in patients struck by STEMI; and it is important to know what parameters or risk factors would make patients more vulnerable to such complication. These are investigated by some researchers who found that severity and hemodynamic impairment due to STEMI is the most important predictor (¹). Acute kidney injury- previously called “acute renal failure “– affects many patients with acute myocardial infarction (AMI) especially with cardiogenic shock and is associated with high morbidity and mortality (²,³). AKI that complicate AMI is supposed to be mediated by hemodynamic changes that activate renin-angiotensin-aldosterone system, sympathetic nervous system and anti-diuretic hormone release (²). So, patients taking ACE inhibitors/ARBs are most susceptible to hemodynamically mediated AKI as blocking angiotensin action with ACE inhibitors or ARBs decreases efferent arteriolar tone and decreases glomerular capillary perfusion pressure specially when blood volume is reduced for any reason as in case of intravascular volume depletion caused by diuretics use which may result in prerenal azotemia. Prolonged renal hypoperfusion may lead to acute tubular necrosis (ATN) (⁵). Use of contrast media and other nephrotoxic agents play a role in development of AKI (⁵). It was difficult to study the outcomes of these conditions because the diagnosis of acute kidney injury has not been standardized. Rodrigues et al reported finding more than 30 definitions of “acute renal failure” in the medical literature; this variety causes confusion and made it difficult to compare the results of multiple literatures that were published by different authors (⁷-¹¹). New definitions have been set to standardize the diagnosis of acute renal failure. These established the concept of acute kidney injury by emphasizing the subtle but important differences between the terms “acute kidney injury” and “acute renal failure” One important distinction between these is that injury precedes failure.

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Several studies have shown that small increases in serum creatinine levels during hospitalization are associated with a worse prognosis for the patients. In 2012, the Kidney Disease Improving Global Outcomes (KDIGO) Clinical Practice Guidelines for AKI were designed to compile information systematically on this topic by experts in the field. In short, AKI is defined as increase in serum creatinine by ≥0.3 mg/dl within 48 hours OR increase in serum creatinine to ≥1.5-fold the baseline, which is known or presumed to have occurred within the prior 7 days OR Urine volume <0.5 ml/kg/h for 6 hours (12-17). Few studies have investigated the risk factors for developing AKI in early periods after AMI; and these revealed that AKI development (as evidenced by increase in serum creatinine) is associated with high morbidity and mortality (18-20). The effect of pre-existing impaired estimated glomerular filtration on occurrence of AKI and mortality with AMI in such patients remains controversial (21, 22).

**Myocardial infarction:** In industrialized countries; acute myocardial infarction (AMI) is one of the most common diagnoses in hospitalized patients. AMI related deaths occur before reaching the hospital exceeds 50% but in-hospital mortality has declined from 10% to about 6% over the past decade with 15% 1-year mortality specially in elderly group (23). ST-segment elevation myocardial infarction (STEMI) is a clinical syndrome defined by characteristic symptoms of myocardial ischemia in association with persistent electrocardiographic (ECG) ST elevation and subsequent release of biomarkers of myocardial necrosis (24).

**Cardiorenal Syndrome (CRS):** Although many definitions has been proposed ; the term (cardiorenal syndrome) can simply be thought to reflect the interplay between abnormalities of heart and kidney function, with deteriorating function of one organ while therapy is administered to preserve the other; so this term is being recognized increasingly as a complication of acute decompensation of heart failure (ADHF). About 30% of patients hospitalized with ADHF have abnormal baseline renal function, with associated increase in morbidity and mortality (28-30).

**Patients & Methods**

This is a cross sectional study, done at al-Sadr teaching hospital between April 1, 2015 and December 31, 2015.

**Inclusion criteria:** Patients enrolled in the study were those who were admitted to the coronary care unit with the diagnosis of acute ST elevation myocardial infarction, with no exclusion criteria.

**Exclusion criteria:**

1. Patients who were referred to the cardiac center for doing primary percutaneous intervention (PCI).
2. Presence of obstructive uropathy (depending on baseline clinical presentation and investigations).
3. Patients on maintenance dialysis.
4. Patients who died on arrival before doing the required management.

**Data collection:** Acute STEMI was diagnosed according to the Third universal definition of myocardial infarction 2012 depending on symptoms, ECG abnormalities and cardiac enzymes. (38).

The following data were collected for each patient:

1. Age ,sex, history of H.T ,history of D.M, history of coronary artery disease, history of dyslipideamia, smoking and drug history.

2. Serum creatinine level was measured for every patient on admission and daily thereafter during the stay period in the coronary care unit, with continuous monitoring of urine output. Estimated GFR (eGFR) was calculated using the CKD-EPI CREATININE 2009 EQUATION.

3. Systolic and diastolic blood pressures monitored using mercurial sphygmomanometer.

4. Troponin I was assessed by rapid test cassette (Halogen Company).

5. Ejection fraction (EF) was calculated by 2D echocardiography.

6. Abdominal ultrasound was done to assess renal status and to exclude urinary tract obstruction.

AKI was defined according to KDIGO – AKI Work Group guidelines (39).
Statistical analysis: Statistical package for the social sciences version 21.0 was used for analysis of data (SPSS inc.2013). All variables were examined for normally distribution and descriptive statistics presented as frequency and proportion for categorical variables and as mean ± standard deviation for continuous variables. A student’s t-test and analysis of variances tests were used to compare means. Chi square test was used to compare frequencies and proportions. Level of significant (P. value (was set at ≤ 0.05 to be considered as significant difference or correlation.

Results

A total of 55 patients were included and forty of them were males (72.7%) as illustrated in Table-1 which also revealed prevalence of important comorbidities in the study group and different therapeutic interventions used. In addition to baseline serum creatinine (and hence eGFR); some other parameters were also recorded initially on admission, and outlined in Table-2. The patients enrolled were monitored for development of acute kidney injury; where only seven out of fifty five had developed AKI. Table-3 reveals the correlation between the site of AMI and the development of AKI; and there were no significant relation. Table-4 reveals association between AKI occurrence and all variables recorded for the study group, where patients who developed AKI were more likely to have lower mean systolic blood pressure, ejection fraction and eGFR. Moreover; diuretic use revealed the same significant association.

Discussion: Most of the study group lies between the age of 51-70 yrs. and the majority were males which is well expected as male are known risk group for coronary artery disease. The main prevalent risk factors in the history of the studied group (in order of frequency) are hypertension, diabetes mellitus, dyslipidemias and smoking (Table-1). All patients in the study were prescribed Aspirin, clopidogrel and an anticoagulant; while 40 of them were candidate to undergo thrombolysis according to guidelines which reflect good access to the facility in the recommended time limit for use of thrombolytics. Because of its favorable role in improving outcome of patients with STEMI; ACEi were prescribed for the majority (72.5%) of studied group, while less than 20% were in need for adding diuretics, which possibly reflects good outcome due to successful reperfusion achieved by thrombolytics in about 80% of patients. Although about 70% of patients had history of hypertension before the heart attack; we noticed that mean blood pressure was only 130.7 mmHg (+/- 23.7) which may be related to myocardial depression secondary to acute MI as evidenced by reduced mean ejection fraction of 48.5%. All patients were well above eGFR of 60 ml/min/1.73m² and hence accepted renal function and will provide good media for searching for future development of acute kidney injury. We found that patients with inferior MI comprise the largest portion when compared to other sites of MI, followed by those with anterior MI (19 patients). During their in-hospital stay we monitored the patients for development of acute kidney injury; and found that seven patients developed features of acute kidney injury. All of those patients were treated conservatively except one who required dialysis. Similarly, Ying Liao et al, had found that incidence of AKI in AMI patients were 12.1 %\(^{(15)}\).

Table 1. Illustration of demographic features, risk factors and therapeutic interventions of the studied group (N=55)

<table>
<thead>
<tr>
<th>Variable</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 50</td>
<td>15</td>
<td>27.3</td>
</tr>
<tr>
<td>51 - 60</td>
<td>21</td>
<td>38.2</td>
</tr>
<tr>
<td>61 - 70</td>
<td>14</td>
<td>25.5</td>
</tr>
<tr>
<td>&gt; 70</td>
<td>5</td>
<td>9.1</td>
</tr>
</tbody>
</table>
Table 1. Illustration of demographic features, risk factors and therapeutic interventions of the studied group (N=55)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Male</th>
<th>40</th>
<th>72.7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Female</td>
<td>15</td>
<td>27.3</td>
</tr>
<tr>
<td>Smoking</td>
<td>Smoker</td>
<td>19</td>
<td>34.5</td>
</tr>
<tr>
<td></td>
<td>Non-smoker</td>
<td>36</td>
<td>65.5</td>
</tr>
<tr>
<td>History of Hypertension</td>
<td></td>
<td>29</td>
<td>69.0</td>
</tr>
<tr>
<td>History of Diabetes Mellitus</td>
<td></td>
<td>25</td>
<td>59.5</td>
</tr>
<tr>
<td>History of Coronary Artery Disease</td>
<td></td>
<td>14</td>
<td>33.3</td>
</tr>
<tr>
<td>History of Dyslipidemias</td>
<td></td>
<td>22</td>
<td>52.4</td>
</tr>
<tr>
<td>Use of Aspirin</td>
<td></td>
<td>55</td>
<td>100.0</td>
</tr>
<tr>
<td>Use of Clopidogrel</td>
<td></td>
<td>55</td>
<td>100.0</td>
</tr>
<tr>
<td>Use of Anticoagulant</td>
<td></td>
<td>55</td>
<td>100.0</td>
</tr>
<tr>
<td>Use of Thrombolytic</td>
<td></td>
<td>40</td>
<td>78.4</td>
</tr>
<tr>
<td>Use of ACEi*</td>
<td></td>
<td>37</td>
<td>72.5</td>
</tr>
<tr>
<td>Use of Diuretic</td>
<td></td>
<td>10</td>
<td>19.6</td>
</tr>
<tr>
<td>Need for RRT**</td>
<td></td>
<td>1</td>
<td>1.8</td>
</tr>
</tbody>
</table>

*angiotensin converting enzyme inhibitor
**renal replacement therapy

Table 2. Illustration of clinical parameters and investigations recorded for the studied group (N=55)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic blood pressure</td>
<td>130.7</td>
<td>23.7</td>
</tr>
<tr>
<td>Heart rate</td>
<td>83.9</td>
<td>10.1</td>
</tr>
<tr>
<td>Ejection Fraction %</td>
<td>48.5</td>
<td>10.2</td>
</tr>
<tr>
<td>White Blood Cell count</td>
<td>10.2</td>
<td>2.9</td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>12.9</td>
<td>1.4</td>
</tr>
<tr>
<td>Baseline serum creatinine</td>
<td>0.78</td>
<td>.24</td>
</tr>
<tr>
<td>eGFR*</td>
<td>92.1</td>
<td>25.5</td>
</tr>
</tbody>
</table>

*estimated glomerular filtration rate
Table 3. Correlation between site of myocardial infarction and development of acute kidney injury (N=55)

<table>
<thead>
<tr>
<th>Site of MI</th>
<th>Acute kidney injury</th>
<th></th>
<th></th>
<th>Total</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>Count</td>
<td>Row N %</td>
<td>No</td>
<td>Count</td>
<td>Row N %</td>
</tr>
<tr>
<td>Inferior</td>
<td>Yes</td>
<td>3</td>
<td>13.0</td>
<td>No</td>
<td>20</td>
<td>87.0</td>
</tr>
<tr>
<td>Anterior</td>
<td>Yes</td>
<td>2</td>
<td>10.5</td>
<td>No</td>
<td>17</td>
<td>89.5</td>
</tr>
<tr>
<td>Antero-septal</td>
<td>Yes</td>
<td>2</td>
<td>22.2</td>
<td>No</td>
<td>7</td>
<td>77.8</td>
</tr>
<tr>
<td>Antero-lateral</td>
<td>Yes</td>
<td>0</td>
<td>0.0</td>
<td>No</td>
<td>2</td>
<td>100.0</td>
</tr>
<tr>
<td>Lateral</td>
<td>Yes</td>
<td>0</td>
<td>0.0</td>
<td>No</td>
<td>2</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>Yes</td>
<td>7</td>
<td>12.7</td>
<td>No</td>
<td>48</td>
<td>87.3</td>
</tr>
</tbody>
</table>

P value = 0.857

Table 4. Correlation matrix for the correlation between incidence of AKI and patients’ variables (N = 55)

<table>
<thead>
<tr>
<th>Variable</th>
<th>R**</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.122</td>
<td>0.375</td>
</tr>
<tr>
<td>Sex</td>
<td>0.011</td>
<td>0.936</td>
</tr>
<tr>
<td>Smoking</td>
<td>0.067</td>
<td>0.628</td>
</tr>
<tr>
<td>Hypertension</td>
<td>-0.185</td>
<td>0.177</td>
</tr>
<tr>
<td>Diabetes Mellitus</td>
<td>-0.020</td>
<td>0.885</td>
</tr>
<tr>
<td>Coronary Artery Disease</td>
<td>0.153</td>
<td>0.266</td>
</tr>
<tr>
<td>Dyslipidemias</td>
<td>0.022</td>
<td>0.872</td>
</tr>
<tr>
<td>Systolic Blood Pressure</td>
<td>-0.337</td>
<td>0.012*</td>
</tr>
<tr>
<td>Heart rate</td>
<td>-0.091</td>
<td>0.507</td>
</tr>
<tr>
<td>Ejection Fraction %</td>
<td>-0.316</td>
<td>0.019*</td>
</tr>
<tr>
<td>eGFR</td>
<td>-0.456</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Baseline Creatinine</td>
<td>0.160</td>
<td>0.244</td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>0.048</td>
<td>0.729</td>
</tr>
<tr>
<td>White Blood Cell count</td>
<td>-0.025</td>
<td>0.858</td>
</tr>
<tr>
<td>Angiotensin Converting Enzyme inhibitors</td>
<td>-0.082</td>
<td>0.550</td>
</tr>
<tr>
<td>Diuretic</td>
<td>0.386</td>
<td>0.004*</td>
</tr>
<tr>
<td>Thrombolytic</td>
<td>-0.011</td>
<td>0.936</td>
</tr>
<tr>
<td>Hospital stay</td>
<td>-0.023</td>
<td>0.870</td>
</tr>
<tr>
<td>Death</td>
<td>0.217</td>
<td>0.111</td>
</tr>
</tbody>
</table>

* Significant at P<0.05, ** R: correlation coefficient
Conclusions

1. Low baseline systolic blood pressure, ejection fraction % and eGFR are the major risk factors for the development of acute kidney injury in the setting of ST elevation myocardial infarction.

2. Use of diuretics in the setting of ST elevation myocardial infarction is associated with high risk of development of acute kidney injury.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: In our research, all protocols were approved under the Al-hakeem General Hospital, Najaf, Iraq and all methods were carried out in accordance with approved guidelines.

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Psychological Factors Associated with Relapse in Psychotic Patients attending Teaching Hospitals in AL_Furat Al-Awsat Governorates

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¹Ph.D., ²Prof. Department of Psychiatry and Mental Health Nursing, College of Nursing, University of Babylon, Hillah City, Iraq

Abstract

Background: Relapse demonstrates a large problem in general health; the relapse effects on the family and the client together social contact with other people and financially.

Objectives: To find out the relationship between the Psychological factors of relapse and sociodemographic data of psychotic patients attending teaching hospitals in AL_Furat Al-Awsat Governorates.

Methodology: The design was (Descriptive-Correlational) used to describe the variables and the relationships that occur among them in this study. The sample was (a non-probability) purposive of (181) relapsed psychotic patients were selected from our patients centers from teaching hospitals in AL_Furat Al-Awsat Governorates, during the period from 9th May 2019 to 20th August 2019. The instrument included two parts: sociodemographic variables and the psychological factors associated with relapse. The researcher used descriptive statistics tools such as frequency, percentage, mean of score and used in inferential statistics such as Chi-Square.

Results: The findings of the study indicate that (45.86%) of the sample their diagnosis was schizophrenia, (25.97%) were schizoaffective and (11.60%) were major depressive disorder with psychotic features. Also, the findings of the study indicate that (39.2%) of the study samples they have poor psychological factors, (34.8%) they have moderate psychological factors and (26%) they have good psychological factors.

Conclusion: There is a high significant relationship between the most sociodemographic data and psychological factor (that included high express emotion and stigma factors).

Keywords: Psychological Factors, Relapse, Psychotic patients.

Introduction

Mental illness indicates a wide range of mental health situations that influence behavior, mood, and thinking. Mental disorders lead to a negative perspective in daily life events like; work, relationships, and school, mental illnesses responsible for suffering in society (1). Psychotic disorders were a set of mental diseases described through hallucinations, delusions, emotion and other problems of thought (2). Relapse: it is a returning to a previously diagnosed state of mental illness and regains the symptoms appeared, (it is a recurrence of symptoms of a disease after a period of improvement) (3). Relapse can occur at any time during treatment and recovery, and relapse can be expected in 70% of patients after the first episode (4). Relapse demonstrates a large problem in general health; the relapse effects on the family and the client together social contact with other people and financially. The relapse in mental disorders is extremely painful and costly for the patient and his family as well as for the community. These frequent readmissions are strain on the health institutions and on the Ministry of Health Budget (5). The risk of relapse can lead to a victim of violence and crime, (especially when responding to command hallucinations), substance abuse, poverty, homelessness and poor quality of life for such individuals (6). Frequent relapse of psychosis is
a main cause of significantly increased hospitalization costs compared to other costly outpatient services and drug expensive (7).

**Objectives**

1. To assess the type of diagnosis with most relapse rate.
2. To identify the psychological factors that contribute with most relapse clients.
3. To find out the relationship between the psychological factors of relapse and sociodemographic data of psychotic patients.

**I. Methodology:**

✓ **Design of the study:** A descriptive-correlational was used to describe the variables and the relationships that occur among them in this study. This design was carried out to accomplish the aims of this study using assessment method on psychotic patients attending the out patients clinic of teaching hospitals in AL_Furat Al-Awsat Governorates, during the period from 9th May 2019 to 20th August 2019.

✓ **Sample of the study:** The sample was (a non-probability) purposive of (181) relapsed psychotic patients were selected from teaching hospital out patients center in AL_Furat Al-Awsat Governorates.

✓ **Study instrument:** A questionnaire was created by the researcher to reach the study objectives. A large body of relevant literature were extensively reviewed to find the appropriate tool for the current study.

- All the instrument domains are measured and rated on three levels rating as a 3-point Likert scale from 1 to 3 respectively; 1 indicates never, 2 indicates sometimes, and 3 indicates always.

- The psychological factors associated with relapse of patients with psychotic illnesses are determined based on the mean of items scores. Effect levels of these domains were measured as follow:
  - Low effect = 1-1.66 (Low effect = 1-1.66 (1 - 2.34-3)).
  - Moderate effect = 1.67-2.33 (Moderate effect = 1.67-2.33 (2.34-3)).

✓ The instrument included two parts: sociodemographic variables and the psychological factors associated with relapse.

**Part1: The Socio-demographic information:**

This part includes: (gender, age, age at diagnosis, duration of disease, level of education, social status, occupation, monthly income, type of living, residence, family type, who give care to the patients, number of relapses, admitted to the hospital, type of diagnosis).

**Part 2: Psychological Factors associated with relapse:**

Includes the association psychological factors with psychotic patients relapse:

- **Psychological factors:** consists of (13) items, divided to (2) domains:
  - High express emotion (8 items).
  - Stigma subdomain (5 items).

✓ **Data Analysis:** The results of the study were analyzed and assessed using the Statistical Package for Social Sciences program (SPSS, Version 26). The researcher used descriptive statistics tools such as frequency, percentage, mean of score and used in inferential statistics such as Chi-Square.

**Results**

<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Schizoaffective</td>
<td>47</td>
<td>26</td>
</tr>
<tr>
<td>Schizophrenia</td>
<td>83</td>
<td>45.9</td>
</tr>
<tr>
<td>Major depressive disorder with psychotic features</td>
<td>21</td>
<td>11.6</td>
</tr>
<tr>
<td>Bipolar Disorder</td>
<td>16</td>
<td>8.8</td>
</tr>
<tr>
<td>Delusional Disorder</td>
<td>6</td>
<td>3.3</td>
</tr>
<tr>
<td>Postpartum Psychosis</td>
<td>5</td>
<td>2.8</td>
</tr>
<tr>
<td>Substance/medication-induced psychotic disorder</td>
<td>3</td>
<td>1.7</td>
</tr>
<tr>
<td>Total</td>
<td>181</td>
<td>100</td>
</tr>
</tbody>
</table>
(Table 1): Descriptive the samples according to types of diagnosis.

This table shows (45.9%) of the sample their diagnosis was schizophrenia, (26%) were schizoaffective and (11.6%) were major depressive disorder with psychotic features.

<table>
<thead>
<tr>
<th>No.</th>
<th>Levels (Psychological factors)</th>
<th>F.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Good</td>
<td>47</td>
<td>26</td>
</tr>
<tr>
<td>2</td>
<td>Moderate</td>
<td>63</td>
<td>34.8</td>
</tr>
<tr>
<td>3</td>
<td>Poor</td>
<td>71</td>
<td>39.2</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>181</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2: Psychological Factors associated with relapse of psychotic patients.

This table show (39.2%) they have poor psychological factors, (34.8%) they have moderate psychological factors and (26%) they have good psychological factors.

This table shows that there is a highly significant relation in (gender, age, social status, occupation, residence, who give care to the patients, number of relapses and admitted to the hospital) with (psychological factors) at $p \leq 0.05$. Also, this table shows that there is a significant relation in (age at diagnosis, duration of disease, level of education) with (psychological factors) at $p \leq 0.05$. While this table shows that there is non-significant relation in (monthly income, type of living and family type) with (psychological factors) at $p > 0.05$.

Discussion

The results shows that (45.9%) of the study samples have schizophrenia, (26%) have schizoaffective and (11.6%) have major depressive disorder with psychotic features. (Table 1). This result comes with (Fikreyesus, et al., 2016) they found that (72.5%) have schizophrenia, (14.2%) have brief psychotic and (13.3%) have schizophreniform and schizoaffective. Also, this result was agree with (Hui C, et al, 2013) they found that nearly one-fourth ($n = 70$) of respondents with diagnosis of schizophrenia had relapse. This is due to the fact that first episode psychosis showed that the diagnosis of schizophrenia was associated with high risk of relapse and elevated severity level, also the nature of the disease according to previous studies, is more severe and less responsive to treatment and suffer many relapses.

The psychological factors included (high express emotion and stigma factors). (Table 2). The result of our study shows that (39.2%) of the study samples they have poor level of psychological factors, (34.8%) they have moderate level of psychological factors and (26%) they have good level of psychological factors. This result was supported by (Linszen, et al, 1991) who found that high express emotion is the major risk factor for psychotic relapse in patients with a first-psychotic episode. This is due to the fact that the nature of psychotic patients and discrimination against them could cause interpersonal relationships to deteriorate and reduced social contacts and they haven’t any close friends, so many may have no one to turn to for help. When the stigma was severed may be affects the patients seeking to treatment which leading poor adherence to treatment which subsequently results in frequent relapse.

The result shows that there is a high significant relationship in psychological factors with gender at $p$ value (.000). This result was agree with (Sachit & Al-juboori, 2013) they found a significant relationship between high express emotion level and age. While this result was disagree with (Samuel, A. 2017) he found non-significant relationship in internalized stigma with age at $p$ value (.000). This result may be because our community thought about stigma especially with female patients which lead them to keep them in the home instead of sending them to the hospital.

The result shows that there is a high significant relationship in psychological factors with age at $p$ value (.000). This result was agree with (Sachit & Al-juboori, 2013) they found a significant relationship in internalized stigma with age at $p$ value (.000). This is because most of the samples in the study were between the ages of 38-47 years who were significantly affected by psychological factors.

The result shows that there is a significant relationship in psychological factors with level of education at $p$ value (.010). This result was agree with (Sachit & Al-juboori, 2013) they found a significant relationship in psychological factors.
relationship between high express emotion level and level of education (11). Also, this result was agree with (Brohan E, et., al 2010) they found a higher level of education may improve self-esteem and thus limit the impact of illness on internalized stigma (14). This result may be due to frequency of psychotic episodes in a patient result in decrease in level of education due to conflict of school attending resulting from recurrent relapse and deterioration in cognitive functions.

The result shows that there is a high significant relationship in psychological factors with social status at p value (.000). This result was agree with (Sachit & Al-juboori, 2013) who found a significant relationship between high express emotion level and social status (11). While this result was disagree with (Samuel, A. 2017) he found non-significant relationship in internalized stigma with marital status at p value (.000) (10). This result may be due to the fact that most families deal with their patients in a manner that exposes them to strong express emotions, who are more likely to experience relapse more than patients with less express emotions. Examples that include high express emotions are hostility and intense criticism by parents for not benefiting from their patients and unable to rely on themselves. Incapability to regularly function and the extreme assistance and tolerance that must be received from the husband, family and brother, all these reasons may lead to a relapse of the patient.

The result shows that there is a high significant relationship in psychological factors with occupation at p value (.000). This result was agree with (Sachit & Al-juboori, 2013) who found a significant relationship between high express emotion level and employment (11). This result may be due to the fact was that stigmatized people have a low level of self-esteem, and therefore tend to consider themselves inefficient, reducing their chances of finding work and were likely to be unemployed. For workers, they face hostility and reduced responsibilities and may lose their jobs due to inefficiency (12).

The result shows that there is non-significant relationship in psychological factors with monthly income at p value (.653). This result was disagree with (Sachit & Al-juboori, 2013) they found a significant relationship between high express emotion level and income (11). Also, this result was disagree with (Samuel, A. 2017) he study income a high significantly related to internalized stigma (10).

The result shows that there is non-significant relationship in psychological factors with type of living at p value (.891). This is due to the fact that most of the study sample live with their families like parents or brothers and most of them have housing so there is no relationship with the high rate of relapses.

The result shows that there is a high significant relationship in psychological factors with occupation at p value (.000). This result was supported by (Chaurotia, et al, 2016) they found that long distance is a significant relationship to the patient’s failure with compliance to treatment, especially for those living away from the hospital such as rural areas. This is due to the fact that most of the study samples were taken from the city center (13).

The result shows that there is non-significant relationship in psychological factors with family type at p value (.147). This result was agree with (Samuel, A. 2017) he found non-significant relationship in internalized stigma with living situation at p value (.000) (10). While this result was disagree with Sachit (2013) they study found a high significant relationship between high express emotion level and family size (11).

The result shows that there is a high significant relationship in psychological factors with who give care to the patients at p value (.000). This result was agree with (Sachit & Al-juboori, 2013) they found a significant relationship between high express emotion level and caring responsibility (11). This result may be due to the fact that all the previous studies support that the psychiatric patient, especially in psychosis, needs to be followed up by the family, but most of the samples in this study were followed by their brothers, so they were may be the reason of relapse due to neglect, poor follow-up and not to give them treatment and the adoption of incorrect methods and far from treatment, such as witches and charlatans.

The result shows that there is a high significant relationship in psychological factors with admitted to the hospital at p value (.008). This result may be due to the fact that psychotic patients who weren’t compliant
to treatment do have increased risk for violence. This is due to the result of most of the patients in the study who violently violated them before admitting to the hospital and receiving treatment for the first time and very affecting their social relationships, especially if the target of the violence is the employer or a family member, friend or teacher and husband. Therefore, most families are forced to bring the patient for not tolerating the harm of the patient to others. Family use in this manner increases the severity and relapse of the illness.

Conclusions

The majority of samples were diagnosed with schizophrenia. All psychotic patients have non-significant relationship between type of living of sociodemographic data with psychological factors. There is a high significant relationship between the most sociodemographic data and psychological factor (that included high express emotion and stigma factors).

Recommendations:

1. Providing psychological units in educational hospitals in AL_Furat Al-Awsat region to enter the patients who need hospital admission to provide care for them and be equipped with doctors, nurses, medication and all the necessary supplies.

2. Providing qualified nurses in the field of psychiatric nursing to follow up patients who need hospitalization.

3. Educational program for families of psychiatric patients about the importance of caring for the mentally ill patient and not feeling stigmatized, because mental illness is like any other diseases and needs treatment to Reducing or eliminating symptoms that cause family embarrassment.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved and all experiments were carried out in accordance with approved guidelines.

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4. Wairimu N, Nairobi O. Factors Associated with Relapse in Patients with Schizophrenia Atmathari Hospital, Nairobi. 2011; 1-2; 7-9.
Unmet Supportive Care Needs of General Cancer in Kurdistan Region- Iraq

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Abstract

Background: Cancer is a class of diseases or disorders characterized by uncontrolled division of cells.

Objective: The study aims to determine the SCNs of cancer patients in Iraq.

Methodology: The present cross-sectional study and data was conducted in Rezgary teaching and Nankaly Oncology Hospital in the Kurdistan Federal Region of Iraq. A total of 300 eligible cancer patients were invited to participate in the study from February to August, 2018. Eligibility criteria included: 18 years or above; having a definite diagnosis of any type of cancer; physically or mentally able to participate in the study; and being aware of exact diagnosis for at least three months.

Results: In 15 items of the SCNs, more than 60% of the participants reported that their needs were unmet. Most frequently, unmet needs were related to health system and information, physical and daily living, psychological, and patient care and support domains, and most met needs were related to physical and daily activity domains.

Conclusions: Kurdish cancer patients had many unmet needs and there is a need for establishing additional supportive care services and educational programs to increase quality of life in Kurdistan Region- Iraq.

Key words: Cancer patient, Supportive Care Needs, Kurdistan region.

Introduction

Cancer is the second leading cause of death worldwide, with an estimated global health burden of 193.6 million disability-adjusted life years. 1 As a result, the diagnosis of cancer may be experienced as a stressful event that negatively impacts many aspects of patients’ lives.2 Rapid changes occurred in the lifestyles of Kurdish people that affected patterns and rates of cancer trends in Kurdistan. Additionally the populations suffer from the cumulative impacts of three vicious wars in Iraq, including targeted genocide against the Kurds and the use of chemical weapons, creating long-term environmental pollution and increasing cancer incidence aside from their immediate casualties with especially high rates of hematological malignancies. Tentative published data evidences the increasing cancer Prevalence in Kurdistan 3, 4-6 Aside from their oncology condition, cancer patients often experience many ancillary problems, including negative physical symptoms, social isolation, spiritual suffering, and often psychological distress. 7, 8 This underpins the need for a wide range of robust supportive care services. 2, 9 Supportive care services can be defined as services designed to help patients, their families, and caregivers with their experiences during the diagnosis, treatment, follow-up, and palliative stages of the cancer journey. 6 Nowadays, providing supportive care is considered to be of equal significance to diagnosis and treatment of cancer, and it involves more holistic healthcare provision compared to the biomedical approach that dominates...
mainstream oncology treatment.\textsuperscript{11} The first step in planning any supportive care services for cancer patients is identifying their supportive care needs (SCNs).\textsuperscript{10,12}

SCNs are a culture-dependent concept. Therefore, in order to develop an effective supportive care program, cultural issues must be considered.\textsuperscript{19} In an extensive review of the literature, we identified no previous studies that have investigated the SCNs of cancer patients in Iraq or any other Middle Eastern countries. Therefore, this study aims to determine the SCNs of cancer patients in Iraq.

**Materials and Method**

This study was conducted in Rezgary teaching and Nankaly Oncology Hospital in the Kurdistan Federal Region of Iraq. Both hospitals are educational centers affiliated to Hawler Medical University, a referral center for sub-special cancer treatment.

A total of 300 eligible cancer patients were invited to participate in the study from February to August, 2018. Eligibility criteria included: 18 years or above; having a definite diagnosis of any type of cancer; physically or mentally able to participate in the study; and being aware of exact diagnosis for at least three months.

Participants completed an instrument consisting of two parts. The first part assessed basic demographic and disease-related characteristics of participants. Information on medical treatments was obtained from the patients’ health records. The second part consisted of a SCNs Survey (SCNS). The long form of SCNS was used to investigate the SCNs of cancer patients; it is diverted from previous studies.\textsuperscript{20} This scale contains 48 items addressing five domains of needs: psychological (11 items), health system and information (15 items), physical and daily living (7 items), patient care and support (8 items), sexuality (3 items), and no specific items (4 items). Patients reported their SCNs in each item based on a five point Likert scale (1 = not applicable or no need, 2 = satisfied, 3 = low need, 4 = moderate need, 5 = high need). To determine the SCNs, the five point Likert scale was dichotomized to unmet need (if the response was moderate need or high need) or no need (if the response was not applicable, satisfied, or low need). This scoring system has been widely used in previous research.\textsuperscript{19}

Two independent English-Kurdish translators translated the English version of the SCN SF48 into Kurdish. The questionnaire was reviewed by eight academic staff at Hawler Medical University/College of Nursing for face and content validity, and minor revisions were made based on their comments. The internal reliability coefficients (Cronbach’s alpha values) of the translated questionnaire were substantial, greater than 0.90) when piloted with 25 cancer patients.

Data analysis was performed using SPSS version 22 (SPSS Inc, Chicago, Illinois). Descriptive statistics including frequency, percentage, mean, and standard deviation were used to analyze the demographic characteristics, cancer-related information, and unmet and met SCNs of participants.

**Results**

**Table 1. Top 15 unmet SCNs of cancer patients**

<table>
<thead>
<tr>
<th>Items</th>
<th>Domain</th>
<th>Number</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of energy and tiredness</td>
<td>P&amp;D</td>
<td>251</td>
<td>83.7</td>
</tr>
<tr>
<td>Concerns about the worries of those close to you</td>
<td>Psycho</td>
<td>249</td>
<td>83</td>
</tr>
<tr>
<td>Being given information (written, diagrams, drawings) about aspects of managing your illness and side-effects at home</td>
<td>H &amp;I</td>
<td>249</td>
<td>83.0</td>
</tr>
<tr>
<td>Being informed about your test results as soon as feasible</td>
<td>H &amp;I</td>
<td>244</td>
<td>81.3</td>
</tr>
<tr>
<td>Being adequately informed about the benefits and side-effects of treatments before you choose to have them</td>
<td>H &amp;I</td>
<td>241</td>
<td>80.3</td>
</tr>
</tbody>
</table>
Participants mean scores in the SCNS domains are reported in Table 2. As shown in this table, in four domains (health system and information, physical and daily living, psychological, and patient care and support), the participants gained scores of more than 10, indicating that most of the participants have many unmet needs; only the sexuality domain had a score of less than 10.

Table 2. The score of participants in each domain on SCNs survey

<table>
<thead>
<tr>
<th>Domains</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychological</td>
<td>28.4</td>
<td>7.98</td>
</tr>
<tr>
<td>Sexuality</td>
<td>7.72</td>
<td>3.36</td>
</tr>
<tr>
<td>Physical and daily activity</td>
<td>35.56</td>
<td>9.50</td>
</tr>
<tr>
<td>Health system and information</td>
<td>36.42</td>
<td>8.15</td>
</tr>
<tr>
<td>No specific</td>
<td>6.07</td>
<td>2.11</td>
</tr>
<tr>
<td>Patient care and support</td>
<td>14.27</td>
<td>4.68</td>
</tr>
</tbody>
</table>

The 10 most frequently met needs of participants are reported in Table 3. More than 70% of the participants reported that they have no needs in these items.

Table 3. Top 10 most frequently met needs of participants

<table>
<thead>
<tr>
<th>Items</th>
<th>Domain</th>
<th>Number</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Itching</td>
<td>P &amp; D</td>
<td>253</td>
<td>84.3</td>
</tr>
<tr>
<td>Being treated like a person, not just another case</td>
<td>H &amp; I</td>
<td>252</td>
<td>84</td>
</tr>
<tr>
<td>Keeping a positive outlook</td>
<td>Psycho</td>
<td>233</td>
<td>77.7</td>
</tr>
<tr>
<td>Nausea and vomiting</td>
<td>P &amp; D</td>
<td>219</td>
<td>73.0</td>
</tr>
<tr>
<td>Swelling of: arms, legs or abdomen</td>
<td>P &amp; D</td>
<td>217</td>
<td>72.3</td>
</tr>
<tr>
<td>Being treated in a hospital or clinic that is as physically pleasant as possible</td>
<td>H &amp; I</td>
<td>204</td>
<td>68</td>
</tr>
</tbody>
</table>
Discussion

To our knowledge, this is the first study that has investigated the SCNs of cancer patients in the Kurdistan Federal Region, and indeed Iraq in general. The results demonstrate that Kurdish cancer patients have many unmet SCNs, especially in the domains of health system, information, physical and daily living. Most of the participants reported unmet SCNs in 13 items of SCNs.

In an extensive review of the literature, it was found that some studies reported that cancer patients have low needs; 10, 16 but most studies highlight that cancer patients in both non-Western 15-18 and Western countries 9, 17, 14 have many SCNs. None of the analyzed studies reported such high levels of needs as reported by the participants of our study.

The results of our study demonstrate that 6 out of 15 most frequently unmet SCNs of cancer patients are related to the health system and information domain. This finding is to some degree different with previous studies conducted in the Western countries that reported health system and information domain as the second or third domain in which cancer patients’ needs are not met. 5, 9, and 13 In contrast, the results of some studies in Southwest Asia showed that the needs from health care and information domain are between the most frequent unmet SCNs of cancer patients. 15, 17, and 18 Similarly, the results of a comparative study showed that Hong Kong breast cancer patients rated health system and information needs as the most frequent unmet SCNs, while German women consider needs from physical and daily living and psychological needs to be the most frequent unmet supportive care they experienced. 16 Therefore, this finding supports that the SCNs are a culture-dependent issue.

The results of our study also indicated that psychological needs are the second category of unmet SCNs of Kurdish cancer patients, after needs from health system and information. This finding is consistent with the results of other studies in non-Western countries. 15, 18 It should be noted that Kurdish cancer patients are often unaware of the prognosis of their diseases, and consider cancer to be a conventional curable disease. Consequently, it can be inferred that the nondisclosure of cancer prognosis for most Kurdish cancer patients may explain the unusually low level of psychological SCNs found among Kurdish cancer patients.

There are limitations to our study. This study was conducted in two oncology centers in the Kurdistan Region of Iraq; even though the setting comprises the main referral center for a large province in northern of Iraq, it does not include all areas of Iraq. The findings related to no specific SCNs ought to be interpreted with caution, considering the taboo associated with sexual issues in Iraq and Kurdish culture. Further studies are necessary that investigate the SCNs of different cultures in the Middle East; using other data collection methods, including private interviews, which may increase the validity of results in the sexual domain of SCNs.

Conclusion

This study highlights that Kurdish cancer patients have many unmet needs in all domains of SCNs. These findings indicate that programs and services to address the SCNs are urgently needed. Future research in Iraq should shed light on the particular SCNs of patients in cultural contexts, to help tailor more comprehensive and holistic care, particularly for cancer patients, in order to improve the quality of healthcare services provided.

Conflicts of Interest: there is no
**Funding section:** this study funding by Hawler Medical University, College of Nursing.

**Ethical considerations:** The research project was approved by the Ethics Committee of Hawler Medical University, College of Nursing (Project No. 3, approval date: 2016/03/16).

**References**


Studying The Effect of *Mentha Longifolia* Plant Extract In Inhibition Growth of Some Bacteria and Inhibiting the Emergence Fourth Stage Larvae of Mosquitoes Aedes Aegypti

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Abstract

This study make as research about activity of secondary compounds in *Mentha longifolia* plant extracts as crude, the effect of crude extract of *Mentha longifolia* leaves make as inhibitory growth factor for two types of bacteria Staphylococcus aureus and Escherichia coli, and inhibit emerge four stage larvae of mosquitoes. Watery and alcohol plant extracts of *Mentha longifolia* leaves were prepared, were appear variation effect in bacteria, the water plant extract show simple effect in Staph. aureus, while alcohol extract show clear effect in E. coli. In state of emerge four stage larva of mosquitoes, there are clear effect for alcohol extract in larvae comparing with water extract.

*Keywords:* *Mentha longifolia, plant extract, inhibition growth, bacteria.*

Introduction

Plant extracts of various types are an important and effective tool for the development and progress of studies and scientific research at present. The studies took the plant extracts of today a great place and space. The man turned to seek a way to get rid of the pain and disease with compounds with a few side effects and began to treat some herbs and plants that are believed to be connected to healing. One of the important tests in which plant extracts and their inhibitory effects are used are bacteria, which are small organisms and very important to humans because of their damage and benefits in many aspects. *Staphylococci* are Gram-positive bacteria, with diameters of 0.5 – 1.5 μm and characterised by individual cocci, which divide in more than one plane to form grape-like clusters. To date, there are 32 species and eight sub-species in the genus *Staphylococcus*, many of which preferentially colonise the human body.

The staphylococci are non-motile, non-spore forming facultative anaerobes that grow by aerobic respiration or by fermentation. Most species have a relative complex nutritional requirement, however, in general they require an organic source of nitrogen, supplied by 5 to 12 essential amino acids, e.g. arginine, valine, and B vitamins, including thiamine and nicotinamide.

Staph. aureus is an opportunistic pathogen and a hospital pathogen. It is often acute and fatal. If untreated, the infection may spread to the surrounding tissue or through bacteremia and blood clots to other sites to include other organs. The other intestinal bacteria that cause diarrhea is *E. coli*, a Gram negative bacilli, non-sporing, motile, some of which have the ability to form capsules and are a member of the intestinal family enterobacteriaceae. Their colonies appear to be small, slightly convex, that kill at 55 °C for an hour, but some of them can resist the temperature of pasteurization (2-8) m for 30 minutes. Although the therapeutic effects of many herbs have not been proven in practice, research is continuing to learn more about how these plants work and to identify the effective ingredients given by the therapeutic properties. Scientists hope that these research will reveal new, effective plant ingredients that can someday form the basis of cancer-fighting drugs and AIDS. The treatment of medicinal plants in today’s place and place in the great science of medicine preferred herbs and medicinal plants and no pharmacy in the world devoid of herbal medicines, so we find in Europe pharmacies especially to describe medicinal herbs, knowing that more medicines and chemical drugs are of plant origin, For patients who use herbs and
medicinal plants to treat their diseases, thus avoiding the side effects caused by the chemical drugs, as well as that the active substances in plants reduced and easy and the objects can interact with them gently in its natural form. As a result of the ongoing increase in scientific research on the importance of the plant kingdom as the inexhaustible source of organic compounds of medicinal importance against microorganisms, many studies have been conducted in the use of plants as anti-bacterial agents that cause wounds and assist in the healing and healing of wounds. In many tropical and subtropical countries diseases transmitted by arthropods are among the major causes of illness and deaths (WHO, 1992). Mosquitoes serve as vector for various tropical and subtropical diseases which cause destructive effects to human health (WHO, 1998). The most common disease associated with mosquitoes are Japanese encephalitis, chikungunya, filariasis, malaria, dengue and yellow fever. Chemical pesticides are still one of the most important means in the control of insect pests. However, the intensive use of different pesticides in plant protection programs has led to environmental malfunction and the emergence of pests and resistant strains and their high toxicity and toxicity in the environment and its harmful effects on humans and animals. Not to distinguish between harmful insects and beneficial, resulting in an imbalance in the ecosystem and the cumulative nature of chemical pesticides in the food chain and the high economic costs in the manufacture and its effects on the genetic side of the plant cell and contamination of surface water to river and sea and air pollution.

Therefore, specialists are trying to find alternative methods such as the use of biological control methods, genetic control and the use of pesticides of plant origin.

Plant extracts are natural plant compounds that affect several methods, either as direct substances, toxic or infertile, or organized for the growth of the insect or modified their behavior and found many chemical groups have an anti-feeding effect or to lay eggs in many insects.

**Material & Methods**

**Preparation of raw extracts of mentha longifolia leaves**

Preparation of hot water extract for Mentha longifolia leaves for the purpose of obtaining the hot water extract of the leaves of the Mentha longifolia plant, a method of was followed with some modifications and as follows:

- Place 50 gm. of the Mentha longifolia leaves in a volumetric flask of 1 liter
- Add 500 ml containers of distilled water and close the hole by the cellophane.
- Place the beaker in the vibrator and let it blend well, at room temperature, and quickly (60 cycles, min).
- After 24 hours, the solution was filtered using medical gauze first and then with filter paper Wattman No. 1.
- Distribute the leachate in the centrifugal discharge tubes at a speed of 3000 cycles/minute for 10 minutes.
- Ignore the precipitate and take the leak to the rotary evaporator device for the purpose of concentration and then the weight of the extracted raw extract.

**Preparation of the crude extract of ethanol for the leaves of the Mentha longifolia**

Follow the steps of preparing the raw water extract to obtain a dry plant extract. Ethyl alcohol was used with 80% distillation of distilled water. (Anessiny and Perez, 1993) except for the difference in time period where the solution was placed in the vibrator for 72 hours rather than 24 hours.

**Preparation of a medium to activate the bacteria**

Dissolve 0.13 g of nutrient broth in 10 ml of distilled water in a vial of volume. The mixture should be placed in the autoclave after closing the bottle with medical cotton for the purpose of sterilization and then left to cool a sample of Staph. aureus is activated by a needle isolated to the center and placed in the bottle after closing tightly to the incubator where incubated 37 °C for 24 hours and the same method was followed to prepare the activation medium E. coli bacteria and applied this paragraph in the room sterile hood.
Preparation of concentrations of extracts

* Concentration of 200 mg / ml

2 g of the extract and add to 10 ml of distilled water in the baker where the mixture is then blended after being placed in a bottle of volume and using the method of dilution obtained the following concentrations:

100 mg / ml , 50 mg / ml and 25 mg / ml

Preparation of the agricultural medium used for the growth of bacteria

Mueller-Hinton agar was found to dissolve 12.16 g of sugar in 320 distilled water in a conical flask and sealed the flask with cotton and sterilized with a sterilizer.

Left for 10 minutes to cool down. The medium was then poured into the Petri dishes near the flame to ensure that the germs did not enter and contaminate the dishes and left until the medium solidified. The diffusion method was followed by well diffusion in the medium of mm6 by means of the thorny fellini, the dishes were fertilize by a swab immersed in a bacterial suspension with a mass equivalent to the standard McFarland tube in tightly sealed tubes that passed on the surface of the center homogeneously except for the inside and sides of the well.

Effect of extracts used to inhibit the onset of mosquitoes

A concentration of 1% of concentrations used in the treatment of bacteria was prepared.

Treatment of fourth stage larvae

The fourth phase larvae were treated after isolating them from the sample by ten larvae per replicate (and repeaters for each concentration) in 100 mL plastic dishes. After the desired concentrations were prepared in other dishes, they were transferred using a boring cloth and the dishes were monitored for one week to calculate the percentage of inhibition that could result effect of extracts.

Result and Discussion

The inhibitory effect of the types of Mentha longifolia extracts

The effect of plant extracts used in this study showed at the two types of gram positive bacteria Staph. aureus and the negative E. coli by using the diffusion method of drilling has different effect on the two types of bacteria.

Effect of plant extracts on bacteria Staphylococcus aureus:

The results in Table (1) show that there is a slight inhibitory effect of the hot water and alcohol extracts of Mentha longifolia leaves in bacteria. We note that treatment with concentration (25-50-100-200 mg / ml) of two types of extracts have no effect in inhibiting the growth of bacteria, compared with 18.2 + 0.5 when using Gentamicin.

Table (1): shows the effect of hot water and alcohol extracts of Mentha longifolia leaves in bacteria Staph. aureus:

<table>
<thead>
<tr>
<th>Concentrate mg / cm 3</th>
<th>rate of inhibition diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hot water extract</td>
<td>Alcohol extract</td>
</tr>
<tr>
<td>200</td>
<td>-</td>
</tr>
<tr>
<td>100</td>
<td>-</td>
</tr>
<tr>
<td>50</td>
<td>-</td>
</tr>
<tr>
<td>25</td>
<td>-</td>
</tr>
<tr>
<td>Gentamicin)10mg/ ml</td>
<td>18.3+0.5</td>
</tr>
</tbody>
</table>

The reason for the low and ineffective inhibition of the studied plant extracts may be due to plant extracts may contain compounds that inhibit the growth of some microorganisms, but some may lose its ability.

In addition to the reduction of this activity originally in some plant extracts or during certain reactions. The method of preparation and concentration of plant extracts is an important and influential factor in the inhibitory action of each extract.

The study were agreed with Majid & Al- Shatti (2002), who found that there was no effect of water extract in Staph. aureus bacteria at a concentration of 10%.
Effect of plant extracts in bacteria Escherichia coli:

The hot water extract of the Mentha longifolia leaves has no effect in bacteria. With the alcohol extract, the rate of inhibition increased with increasing concentration. Inhibition with 25 mg/ml concentration was 3.95 and increased with 50 mg/ml concentration to 4.75, 6.45 and 6.35 with concentrations of 100 and 200 mg/ml, respectively. This was not consistent with Akroum et al. (2009) and there was no effect of alcoholic extract in the inhibition of bacterial growth. Gentamycin 10 mg/ml, which reached 17.3.

Table (2): Shows the effect of alcohol extract on bacteria E. coli:

<table>
<thead>
<tr>
<th>Concentrate mg / cm³</th>
<th>Rate of inhibition diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>6.35±0.48</td>
</tr>
<tr>
<td>100</td>
<td>6.45±3.4</td>
</tr>
<tr>
<td>50</td>
<td>4.75±0.24</td>
</tr>
<tr>
<td>25</td>
<td>3.95±1.1</td>
</tr>
<tr>
<td>(ml/10mg) Gentamicin</td>
<td>17.3±0.6</td>
</tr>
</tbody>
</table>

The high effect of the ethanol extract may be due to the high content of flavonoids, which are known to have a strong effect against bacteria (Cushnie et al., 2003; Martini et al., 2004).

The results obtained have confirmed the benefits offered by medicinal plants. In fact, some of the flavonoids found in them have shown a significant antibacterial activity and the effect of acute toxicity is very low.

Ethanol extract has a significantly greater effect than the water extract the degree of polarity of the solvents used as the coefficient of extinction. For water 9 and ethanol 5.2 polarity index.

The polarity of the solvent by choosing another solvent may increase its effectiveness in dissolving active compounds.

Effect of the extracts on inhibiting the emergence of fourth stage larvae of mosquito Aedes aegypti:

The first three concentrations of the alcohol extract were 100% inhibition, while the concentration of 25 was 81.6.

When using the water extract, when the concentrations were used 25 mg/ml, the percentage of inhibition was 13.6% and increased with concentration increased to 57.1% when using concentration 200 mg/ml. As shown in table (3), we will notice a positive relationship between the concentrations used for two types of extracts.

Table (3): Shows the effect of treatment of fourth stage larvae of mosquitoes with Mentha longifolia extracts in percentage of inhibition of onset:

<table>
<thead>
<tr>
<th>Concentration mg/ml</th>
<th>Water extract</th>
<th>Alcohol extract</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>57.1</td>
<td>100</td>
</tr>
<tr>
<td>100</td>
<td>51.2</td>
<td>100</td>
</tr>
<tr>
<td>50</td>
<td>44.6</td>
<td>100</td>
</tr>
<tr>
<td>25</td>
<td>13.6</td>
<td>81.6</td>
</tr>
</tbody>
</table>

Accidental loss can be attributed to the fact that active compounds can be concentrated in the channel. These substances may interfere with the functioning of the endocrine system, leading to malfunction. The process of growth and increase in insect loss.

Conclusions

1. The hot water extract of the leaves of the Mentha longifolia crushed has a inhibitory effect on the positive bacteria of the gram stain.

2. Alcoholic extract showed a disincentive effect on the bacteria.

3. The alcohol extract has a clear effect in inhibiting the larvae of the fourth phase mosquitoes compared to the water extract.
Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the ALSafwa University College, Iraq and all experiments were carried out in accordance with approved guidelines.

References
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Relationship between H. Pylori Patients and Autoimmune Thyroid Disease

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Abstract
Autoimmune Thyroid Disease (AITD) Autoimmune Thyroid Disease is one of the diseases, more common in women than men, caused by a combination of reasons discussed later. In this study, we have tried to understand how Autoimmune Thyroid Disease is related to H. pylori or Helicobacter Pylori. We have discussed the pathology and the manner in which AITD is developed.

This report depicts the relationship between Helicobacter pylori (H. pylori) and Autoimmune Thyroid Disease or Autoimmune Thyroiditis. However, some other reports concerning the relationship between H. pylori infection and Autoimmune Thyroiditis are conflicting. We’ve discussed how AITD is developed, along with the causes and effects of the disease. In this study, we’ve also aimed at determining the presence of H. pylori bacteria in AITD patients, particularly in Hashimoto’s Thyroiditis and Grave’s disease two of the commonly occurring thyroid diseases. The manner in which AITD develops is multi-factorial and H. pylori infection is reported more in AITD patients (adults). H. pylori is said to be involved usually in non-gastrointestinal conditions.

Keywords: Helicobacter pylori infection, H. pylori, Autoimmune Thyroid Disease, Cag-A, Grave’s Disease, Hashimoto’s Thyroiditis

Introduction
Thyroid is a tiny gland located in the front portion of the neck that produces organ-controlling hormones. These can be any organs in the body. When there’s deficiency of these hormones in the body, the functioning of the body is affected, which in turn affects your energy level and mood, along with gain in weight. If the thyroid is inflamed, the condition is known as Thyroiditis. In some cases, the antibodies produced in by the body attacks the thyroid accidentally. This condition is known as autoimmune thyroiditis. It is also known as chronic lymphocytic thyroiditis.

The commonly occurring Autoimmune Thyroid Disease (AITD) or Autoimmune Thyroiditis are:

- Grave’s Disease (GD)
- Hashimoto’s Thyroiditis (HT)
- Atrophic Thyroiditis (AT)
- Painless Thyroiditis (PT) or Silent Thyroiditis (ST)
- Subacute Lymphocytic Thyroiditis (SLT) or Postpartum Thyroiditis (PPT)

The presence of autoantibodies against Thyroglobulin (TgAbs), TPO-Ab, and Thyrotropin Receptor (TRAbs) was a typical marker of GD and HT. The pathogenesis of Grave’s Disease (GD) and Hashimoto’s Thyroiditis (HT) is nearly same, in which the autoantibodies act against Thyroglobulin (TgAbs), Thyroperoxidase (TPO-Ab) and Thyrotropin Receptor (TRAbs).
Figure 1. Pathogenesis for Grave’s Disease is described in the above diagram. The role of H. pylori is showed for the commencement of Grave’s Disease.

**Causes of Autoimmune Thyroiditis**

The Autoimmune Thyroid Disease is said to be caused by both genetic and environmental factors. The H. pylori bacteria mirror the antigen present in the thyroid cells and play a major role on the onset of AITDs. According to the data captured, the H. pylori bacteria have predominantly affected people in the third world countries. Its presence seemed to be profound in older people. It proliferates with age in some people. Apart from being the causative factor for the commencement of AITDs, these motile bacteria also cause diseases related to abdomen, such as ulcer (gastroduodenal ulcer), gastritis, and carcinoma. An individual has the tendency to get autoimmune thyroiditis for a combination of reasons given below 3:

- If you are a woman
- You are middle-aged
- If you are suffering from any of the other autoimmune disorders such as:
  - Lupus
  - Type 1 diabetes
  - Rheumatoid arthritis
- If a person having autoimmune thyroiditis is related to you
- If you are affected by environmental radiation

**Helicobacter pylori (H. pylori or Hp)**

Helicobacter pylori is a gram-negative gastric pathogen that causes disorders such as gastritis, gastric & duodenal ulcers, gastric mucosa-related lymphoid tissue lymphoma, and gastric cancer. Moreover, it has been proved that H. pylori infection can bring about autoimmune processes against mucosa, with resulting autoimmune gastritis. Also, H. pylori is believed to be involved in the pathogenesis of non-gastrointestinal condition, including rosacea, ischemic heart disease, and Type 1 diabetes. Finally, H. pylori infection is seen in most of the adult AITD patients 4.

**H. pylori-specific Antibody Determination**

Antibodies to H. pylori was identified during the first diagnosis in patients affected by Autoimmune Thyroid Disease. In patients having Turner Syndrome, serology for H. pylori was assessed in cases without thyroid autoimmunity and well before the emergence of autoantibodies.
Gastric mucosa that contains glands and gastric pits is the primary target of Helicobacter pylori that groups and destroys surface epithelium and brings about a chronic inflammatory reaction in lamina propria, a thin layer of loose connective tissue that lies beneath the epithelium. Lamina propria and epithelium collectively constitute mucosa. Gland atrophy and intestinal metaplasia are two of the long-term consequences of this process. The H. pylori prompts antibodies that are cross-reacting with epithelial components of gastric mucosa, periglandular T cells, and elevated glandular cell apoptosis that might bring about diffuse, restricted corpus fundus, and atrophic gastritis of autoimmune type. Some of the clinical consequences of H. pylori include Achlorhydria with secondary hypergastrinemia, with or without pernicious anemia, and elevated risk for gastric enterochromaffin.

This examination suggested that thyroid gland might be another target for H. pylori-invoked immune-inflammatory response and Autoimmune Thyroid Disease might be its consequence. Significantly increased existence of H. pylori was identified in patients having Autoimmune Thyroid Disease, with or without Turner Syndrome.

### Material & Methods

The current study was carried out on 100 subjects in the age group of 30 to 70 years. The serum levels of Thyroxine (T4), Thyroid Stimulating Hormone (TSH), Thyroid Peroxidase Antibody (TPO-Ab), and H. pylori Immunoglobin G (IgG) antibody were also tested. All the subjects that had a history/family history related to thyroid disease were not considered for the study.

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Sex(Female/male)</th>
<th>Age</th>
<th>Smokers(Yes/No)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>100</td>
<td>92/10</td>
<td>49.2 ± 4.7</td>
<td>42/62</td>
</tr>
<tr>
<td>GD</td>
<td>56</td>
<td>52/5</td>
<td>48.6 ± 3.8</td>
<td>24/33</td>
</tr>
<tr>
<td>HT</td>
<td>66</td>
<td>58/6</td>
<td>50.4 ± 9.8</td>
<td>28/35</td>
</tr>
<tr>
<td>AITDs</td>
<td>100</td>
<td>112/10</td>
<td>49.4 ± 6.8</td>
<td>54/64</td>
</tr>
</tbody>
</table>

### Laboratory test

The thyroid test was carried out in the lab that included T4 test, TSH test, and TPO-Ab test. The concentration of serum TPO-Ab was fixed using BRAHMS anti-TPO on Radioimmunoassay, maintaining the sensitivity of the solution at about 30 U/mL. As a conclusion, the TPO-Ab of over 60 U/mL was calculated as positive.

In the laboratory, the H. pylori bacteria were considered, in order to measure the presence of anti-H. pylori IgG. This complete test included solid phase, 2-step, and chemiluminescent enzyme immunoassay.

A careful examination is necessary to detect H. pylori as it helps in the diagnosis of H. pylori bacteria infection. An invasive procedure was carried out since it helps better diagnose a disease. Because H. pylori has a role to play in gastroduodenal ulcer, an invasive procedure was carried out in some cases, especially in people whose age ranges from 32 to 45. The invasive procedure comprised of historical test, culture test, and rapid urease test.

### Findings

The thyroid autoimmunity was considered positive regardless of whether there is thyroid dysfunction or not. The presence of IgG antibodies and Helicobacter pylori was considered:

- Conclusive for 1.6 U/mL or more
- Ambiguous for 0.8 U/mL to 1.6 U/mL
- Negative for 0.8 U/mL or less
The H. pylori and IgG were ignored for ambiguous cases.

**Examination of H. pylori Present in Stool Samples**

All the samples were tested in the lab and the diagnosis of the subjects were perplexing. The samples were proved with the help of the same kind of amplified enzyme immunoassay in order to determine the H. pylori antigens. The test value >0.155 was considered positive for H. pylori.

**Exposure of Cag-A Antibodies**

Cag-A (Cytotoxin-associated gene A) is a H. pylori virulence factor. All the raw samples were taken for ELISA (enzyme-linked immunosorbent assay). Because the value for anti-Cag-A immunoglobulin-G for those samples was over 15 U/mL Cag-A was considered positive.

**Results**

The H. pylori bacteria were present in the stool samples of the one hundred patients who were diagnosed with Autoimmunity Thyroid Disease. Out of these 100 patients, 89% had Grave’s Disease and 74% of them had Hashimoto’s Thyroiditis and about 54% of them had a p value of < 0.0001.

When immunoassay test was carried out, the results were positive for patients who had H. pylori bacteria infection in gastric mucosa in the past than for cases that didn’t have H. pylori bacteria infection. Also, there was no correlation between smoking and presence of H. pylori bacteria infection.

83% of H. pylori-positive patients who had Grave’s Disease and 89.5% of H. pylori-positive patients who had Hashimoto’s Thyroiditis were positive for Cag-A antigens. The result showed significant difference when compared for the presence of Cag-A H. pylori-positive patients.

**Table 2. shows HP-positivity and Cag-A-positivity in patients of different groups**

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>HP-</th>
<th>HP+</th>
<th>CagA+ CagA-</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>100</td>
<td>54</td>
<td>46</td>
<td>24 CagA+ 23 CagA-</td>
<td>24/100</td>
</tr>
<tr>
<td>GD Total</td>
<td>56</td>
<td>9</td>
<td>48c</td>
<td>35b CagA- 7</td>
<td>46c/58</td>
</tr>
<tr>
<td>HT Total</td>
<td>60</td>
<td>31</td>
<td>282</td>
<td>28b CagA- 3</td>
<td>28a/62</td>
</tr>
<tr>
<td>AITDs Total</td>
<td>100</td>
<td>42</td>
<td>712</td>
<td>64c CagA- 10</td>
<td>64c/110</td>
</tr>
</tbody>
</table>

The H. pylori bacteria are present globally, affecting close to 50% of the population, in the developed nation. Cag-A has found to be the most fatal antigen. According to a recent study, a significant correlation was seen for Cag-A carrier for H. pylori strains and for Grave’s Disease. The results were not dependent on the hormone levels of the patients who were examined.

On the other side, many studies have demonstrated the association between microorganisms and Hashimoto’s Thyroiditis (HT), where there were conflicting results and a few other studies have shown a significant correlation. So, to avoid any discrepancy and correctly analyze the infection caused by the H. pylori bacteria, a number of techniques we’re used. With the serological test for H. pylori, distinguishing between the past and present condition was not possible whereas the 13-C urea breath test or immunoassay test, done with fresh stool samples, helped determine the present condition of the H. pylori bacteria infection. These procedures come under the non-invasive method of examination. Apart from this, if the analogous antigenic sites were present for Cag-A and TPO, the obtained results were false positive.
Apart from this, other thyroid tests were performed in patients with Hashimoto’s Thyroiditis, such as Frank Hypothyroidism test. However, this test wasn’t found to be a reliable one. On doing the stool antigen test, we were able conclude that there was some Correlation between patients with H. pylori and hyperthyroid GD patients. However, such a correlation was not seen been patients with H. pylori (HT) and hyperthyroid patients.

In the result, it was noticed that the presence of Cag-A was proportionately present in both the groups – GD and HD. These results were in agreement with the previous observation for TH patients. Other factors such as subclinical or Frank Hypothyroidism may mislead the conclusion of the study. The stool antigen test clearly showed the correlation between, pylori and hyperthyroid GD patients.

**Discussion**

According to recent studies, we learned that there was a significant correlation between Cag-A carrier, H. pylori strains, and Grave’s Disease and the results did not depend on the hormonal status of the cases considered for study. There may be other studies that show a positive relationship between H. pylori and Hashimoto’s Thyroiditis. According to some observations, gastroduodenal tract need not necessarily be the only cause of attracting H. pylori infection. A number of studies gave a convincing explanation about the correlation between H. pylori infection and Autoimmune Thyroid Disease. One such study declares that people having a history of Atrophic Thyroiditis are at the risk of attracting H. pylori infection. In our current study, we looked into the presence of Cag-A antibodies, monoclonal antibodies for Cag-A, having H. pylori strains had Thyroid glandular cells, which in turn contain an endogenous peroxidase.

Further, when the infected bacteria were cultured, it was observed that it became more susceptible to thyroid disease. It was observed that patients who possessed thyroid disease had the tendency to have autoantibodies against thyroid cells, such as thyroglobulin and mitochondrial peroxidase.

According to a recent study by Tom et. Al, H. pylori can encode genes for an endogenous peroxidase and facilitates the immune system of an individual by promoting the bacterial enzyme activity, which in turn reacts with the receptors on human tissues. Subsequently, the serum autoantibody titer for peroxidase and thyroglobulin was tested and Thyroid Stimulating Hormone (TSH) receptors were monitored. In the process, the receptors kept decreasing after H. pylori bacteria were reacted. In one case, the titer reduced sixteen-fold after H. pylori.

A few microorganisms give rise to complicate carbohydrates, which resemble the constituents of Glycoconjugate that can be seen on the superficial surface of human blood cells and CD4 on the cells of other organs.

According to Hein HO et.al, genes have the specificity for H. pylori infection as well as duodental ulcer development. Ultimately, we can conclude that the inflammation brought about by the bacteria H. pylori has induces a few pathological changes like increased TLC, neutrophils, and basophilis. The association of H. pylori infection, particularly by strains that articulate Cag-A with autoimmune thyroid diseases is not coincidental and further study is necessary.

**Conclusion**

According to a study, the thyroid gland might be a target for H. pylori-invoked immune-inflammatory response and Autoimmune Thyroid Disease might be its consequence. An increased existence of H. pylori bacteria was identified in Autoimmune Thyroid Disease. The H. pylori bacteria were present in the stool samples of the one hundred patients who were diagnosed with Autoimmune Thyroid Disease. Out of 100 patients, 89% had Grave’s Disease and 74% of them had Hashimoto’s Thyroiditis. It was also concluded that there was a correlation between H. pylori and Grave Disease and HT. By eliminating H. pylori infection, we can reduce thyroid autoantibodies. The existence of TPO-Ab (Thyroid Peroxidase Antibody) was more frequent in cases having H. pylori infection.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Department of Community
Health Technologies and all experiments were carried out in accordance with approved guidelines.

**References**


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Female Adolescents Knowledge Regarding Reproductive Health

Ibtisam Sahib Asal 1, May Sallal Sahib 2, Manal Saheb Hamza3, R.N. Kadhim Hussein Jassim4


Abstract

Background: Adolescence as the period of human growth and development that occurs after childhood from 10 to 19 years of age. The physical and psychological wellbeing is vital for knowledge of this group considering their health.

Method: The study was conducted among girls aged 16–20 years in female secondary school in AL-Hilla city. Collected about 141 samples so we collected these samples to educate and increase of awareness of reproductive health. We use a developed and well-constructed questionnaire, the data collected by the methods of self-administered technique. We used accurate details to know the percentage of adolescent girls on the concept of reproductive health and discuss the concept of puberty with their parents, teachers, sisters or brothers as well as knowledge of diseases related to the reproductive system.

Result: Sixty-eight percent have low knowledge about the concept of reproductive health. This means that they are risky factors to have reproductive diseases such as UTI or STD for the lack of awareness of how to take care and maintain of themselves and all of that because their lack of education and knowledge about the reproductive health and this constitutes a negative impact on the concept of reproductive health.

Keyword: Knowledge, Reproductive health, adolescent, Female

Introduction

Adolescence is a period of life during which individuals reach sexual maturity. It is the period of transition from childhood to adulthood and it is often characterized by biological and psychosocial changes as well as sexual experimentation 1. Globally, adolescents constitute about one billion of the world’s population, with 75% living in developing nations. 4 With the rapid expansion of mobile phone ownership in low- and middle-income countries (LMICs) over the past decade, the field of mobile health (mHealth) has emerged as a novel and potentially cost-effective way to increase access to health information and improve health knowledge as well as health outcomes 5. According to national data, receipt of contraceptive, sexually transmitted disease and/or gynecological services from a provider differs by age, gender, insurance coverage, sexual experience, and number of partners. It is imperative to begin identifying the social, psychological and logistical barriers that prevent diseases. 6 In Kenya, the site of this study, the 2008 census reported that about 33% of the population lived in urban areas and about 72% of the Kenya urban population lived in slum areas with poor access to clean water and sanitation. The period of transition from childhood to adulthood is called adolescent and it is often characterized by physical and psychosocial changes as well as sexual experimentation. About a billion of world’s population of adolescent age grouped constitutes this group. The physical and psychological wellbeing is vital for knowledge of this group considering their health. An earlier study shows the lack of knowledge Leeds to negative results considering pregnancies, abortion and its complication and sexually transmitted infection. The concept of reproductive health gained currency in the 1980s as a symbol of a fresh perspective on women’s rights and family planning. The premise of this perspective is the principle that every woman has
a right to reproductive health, that is, to regulate her fertility safety and effectively to understand of disease, disability, or death associated with her sexuality and reproduction and to bear and rear healthy children.

Adolescent must a knowledge certain facts regarding their health such as the concept of contraception, safe sexual practices, healthy pregnancy and postpartum behaviors and preventive care is important to keep women healthy and leading productive lives. Adolescents have to keep in mind certain facts considering the use of condom, use of contraception, decision to keep a pregnancy, use of safe abortions. Services are some of choices and reproductive health decisions adolescent make. Ignorance of health literacy has been increasingly recognized as an important area of focus for women’s reproductive health. Knowing about reproductive health services is essential to enable them make informed choices. The type of choices made by these young adults could either impact positively or negatively on their lives, their families and the society at large. According to the 2014 Chana demographic and health survey (GDHS) about 14% of the female aged 15:19 years had begun child bearing. Of these 14% about 11% have had a life births and 3% were pregnant at the time of survey (8).In sub-Saharan Africa, where a fourth of all adolescent are reported to have sexual experience, education of sexual and reproductive health are generally reported to be low. This study aims to assess the female Adolescents’s knowledge regarding productive health

Methods

Design of the study: Descriptive design survey study was conducted through September 2019 to the end of Jan 2019.

Study setting: Female Secondary School in Al- Hilla City

Samples of the Study: Female Secondary School in Al- Hilla City, total student were (200 students) for all stages, researchers sent to (300 students) the accepted papers were (141) participants which estimated about (30% from total students)

Instrument of the Study: Data were collected through using construction questionnaire after did some adjustment on questionnaire like reducing the scale from five to three scale, and delete some points from demographical data (“Increasing the number of scale categories did not necessarily improve performance”. The questionnaire divided into two sections, first one: demographical data (gender, age, educational qualification, monthly income). The second one consists from items. all these had Cronbach’s alpha coefficients (CCα) 0.73

Data Collection: With using a developed and well-constructed questionnaire, the data collected by the method of self-administered technique. In addition, the researchers met all the principals to clarify the points which were not clear.

The Statistical Analysis: The questions all that used in collecting data were checked out for any mistake or error and scrutinized, then it transferred and computerized and coded by their numbers in Microsoft excel 2016. Data of the 250 participant’s were entered and analyzed by means of the statistical package for social sciences (SPSS), 24.0, 2016.

Ethical Consideration: All participants were informed fully about current study and its aims and then a voluntary verbal consent was obtained from the participants in order to participate in the study. Besides, it has been taken into account the confidentiality of information obtained from students,

The study was approved by the ethical consideration committee in Babylon health department. Participants voluntarily accepted and were warned in detail of the nature of the paper,

Results

(65.7%) of the female students age group was Early Adolescent aged, (43.6%) were 4th class, and (95.0%) were mother alive and (88.6%) were father alive
Table (1) shows the total score of nursing student’s knowledge regarding Islamic eating guidelines.

<table>
<thead>
<tr>
<th>Sources of information about puberty. I mean the ways in which boys’ and girls’ bodies change during teenage years from many sources?</th>
<th>Frequency</th>
<th>percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>School teacher</td>
<td>24</td>
<td>17.1</td>
</tr>
<tr>
<td>Father</td>
<td>7</td>
<td>5.0</td>
</tr>
<tr>
<td>Mother</td>
<td>83</td>
<td>89.3</td>
</tr>
<tr>
<td>Sister</td>
<td>14</td>
<td>10.0</td>
</tr>
<tr>
<td>Friends</td>
<td>6</td>
<td>4.3</td>
</tr>
<tr>
<td>Books</td>
<td>3</td>
<td>2.1</td>
</tr>
<tr>
<td>Doctors</td>
<td>3</td>
<td>2.1</td>
</tr>
<tr>
<td>Total</td>
<td>140</td>
<td>100.0</td>
</tr>
</tbody>
</table>

This table shows sources of information about puberty, (59.3%) they take it from mothers, (17.1%) from school teacher.

Table (2) identify the total scores of female student knowledge about productive health

<table>
<thead>
<tr>
<th>Total Knowledge Scores</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Knowledge</td>
<td>96</td>
<td>68.6</td>
</tr>
<tr>
<td>Moderate Knowledge</td>
<td>38</td>
<td>27.1</td>
</tr>
<tr>
<td>High Knowledge</td>
<td>6</td>
<td>4.3</td>
</tr>
<tr>
<td>Total</td>
<td>140</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Discussions

This study aims to assess the female adolescents’ knowledge regarding productive health; according to the results of the study most responses had low level of student’s knowledge.

Adolescents in study conducted by Joseph Maaminu Kyilleh (2018) said generally engaged in risky reproductive health choices that can negatively affect their reproductive health. Adolescents in this part of Ghana have challenges utilizing available reproductive health services because of socio-cultural and health system barriers, that agree with this results of Iraqi female sources of knowledge.

Adolescents’ knowledge and access to reproductive health services is important for their physical and psychosocial wellbeing. It has been found in an earlier study that the lack of knowledge about the consequences of unprotected premarital sex among adolescent females predisposed them to unwanted pregnancies, unsafe abortion and its complications, and sexually transmitted infections.

Knowledge on reproductive health services is essential to enable them make informed choices. The type of choices made by these young adults could either impact positively or negatively on their lives, their families and the society at large. Adolescent girls face substantial sexual and reproductive health risks, including unintended pregnancy, unsafe abortion, and HIV infection.

The Shujaaz comic book that was familiar to about a third of the young people surveyed was a targeted media approach that seemed to be attractive to urban youth. The comic covered themes that were relevant to young people while at the same time it used slang and language
that young people are comfortable with. Prior research suggests that targeted print media is more effective than more generalized print media where the messages are not specific to a health behavior or to a target population.

**Conclusion**

Study concludes that most female adolescents had low knowledge regarding productive health, which correlated for student’s age, sources of knowledge as weak correlation.

**Recommendations:**

Take care of the parents and especially the earliest of them to the class under consideration taking into account the need to explain and communicate the idea of physiological changes in the immersion of the late childhood and adolescent like giving the girls in the first menstrual cycle some recommendation and instructions. On the other hand, we would like to draw the role of the teaching staff, especially the role of guidance in following these aspects, taking into consideration in the terms of educating this group with such changes.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Babylon Health directorate and all experiments were carried out in accordance with approved guidelines.

**References**


Estimation of Phenylalanine Hydroxylase Activity in Patients with Chronic Renal Failure

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Abstract

Renal failure is a serious disease that affects the kidney and leads to different chemical changes and most cases lead to death. The aim of the study is to measure the activity of phenylalanine hydroxyls (PAH), and biochemical variables (urea, creatinine, and albumin) in the blood and urine of healthy and chronic renal failure (CRF) individuals. The study included 80 patients aged between 78 and 20 years and 80 healthy subjects between the ages of 23-65 years. The results showed significant differences in the activity of PAH at P ≤ 0.0001 in sera and urine chronic renal failure patients compared to healthy, as the activity significantly decreased in sera of patients with CRF and increased in urine. The mean activity of PAH was 54.67 ± 6.03 (IU / ml) in sera for CRF patients, whereas in healthy individuals it was 120.83 ± 23.21 (IU / ml), and the average activity of enzyme was 61.34 ± 7.12 in urine of patients with CRF compared with 33.87 ± 3.08 ( IU / ml) in healthy individuals. The activity of PAH enzyme was compared according to age groups, showing a decrease in the age group more than 45 years more than those in the age group less than 45 years with significant differences. In conclusion, the current study demonstrated that CRF is associated with loss of secretory function, and metabolism Endocrine actions in the kidneys, seems likely to lose renal activity phenylalanine hydroxylase.

Keyword: Chronic renal failure, phenylalanine, phenylalanine hydroxylase, renal function tests.

Introduction

It develops chronic kidney disease (CKD) is usually over many years, with a long latent period when the disease is clinically silent, and is characterized by the gradual substitution of the structure of the natural kidney fibrous tissue. When these structural changes become apparent, it leads to a decline in the ability of the kidneys to process wastes in the blood and perform other functions. We knew the results of Kidney Disease Outcomes Quality Initiative (KDOQI) of the National Foundation for the kidneys (NKF) on chronic kidney disease (CKD) as damage to the kidney (structural or functional) or low filtration glomerular rate of less than 60 ml / min / 1.73 m2 for 3 months or more. KDOQI company also established a classification system of five stages for CRF, which primarily depends on the glomerular filtration rate. During the early stages patients may show a normal or slight decrease in the rate of glomerular filtration (GFR) and albuminuria; later it progresses, leading to end-stage kidney disease (ESRD) or renal failure. Diagnosis, evaluation and treatment mainly on the vital indicators that assess kidney function depends. Glomerular filtration rate (GFR) is still the ideal brand for kidney function. Measuring GFR may take a long time, and therefore GFR is usually estimated from equations that take into account internal filtration markers such as serum creatinine and cystatin C. Other biomarkers such as albuminuria may precede decreased kidney function and have shown strong associations with disease progression. The results showed that new biomarkers appeared with a promise to detect kidney damage before the signs currently used.

An important enzymes that revealed modern clinical studies reported in patients with infections, inflammation and general immune activity is phenylalanine hydroxylase. The involvement of this data down regulating the activity of phenylalanine hydroxylase by oxidative stress in immune activation in vivo.
The activity of this enzyme was found in the liver, kidney(6,7), and pancreas cells of mice, in a previous study, laboratory enzyme activity was measured in mouse tissues, was the majority for the effectiveness of phenylalanine hydroxylase in the liver. Both kidneys combined, 10% of total body enzyme activity, and pancreatic activity of phenylalanine hydroxylase formed a low fraction of total phenylalanine hydroxylase activity in the body 7.

Mammalian PheH is active as a homotetramer 8, each consists of three polypeptide monomer zones are the regulatory domain of the terminal N, and the domain’s central catalyst, and the terminal tetramerization of the C domain containing the α-helix is used to tangle monomers 9. The structures of the regulatory domains of PAH have an ACT domain 8. While the dimeric shape structure of the rat PAH contains both catalytic and regulatory domains but lacks the C-terminal remnants 24 needed to form a tetramer. Phenylalanine PAH activation involves a consensual change in which the remnants of the N-terminal move away from the active site 9.

Phenylalanine hydroxylase (PAH) is a key enzyme in the catabolism and disposal of phenylalanine, therefore is responsible for serum Phe levels 10. PAH stimulates the hydroxylation of L-phenylalanine (L-Phe) to L-tyrosine (L-Tyr), It is a mixed-function oxidase depends on the iron, used cofactor tetrahydrobiopterin (BH4) as a reducing agent to provide the two electrons needed for the reaction (11,12), by molecular division of O2, add one atom to the phenylalanine ring and convert the other into water 13. This interaction in humans is vital to prevent the accumulation of neurotoxicity amounts of L-Phe (14,15).

Materials and Method

1- Subjects: Between October 1st 2018 and April 31, 2019,160 subjects were recruited in this study, and 80 consecutive patients(37female & 43 male) diagnosed by expert physicians to be CRF from Murjan Medical City, plus 80 without kidney failure( 46 female & 34 male) as a control group.

2- Sample collection:

Serum Preparation

Five ml of blood was obtained from each subject by puncturing the vein in a sitting or lying position, then slowly pushed into disposable tubes containing a separating gel. Blood in the gel containing tubes was allowed to coagulate at room temperature and then centrifuge at 1000 x g for approximately 15 min and then the supernatant was obtained and stored at -20 °C until analysis 8.

Urine Preparation

I attended a sample urine obtained in plastic packaging after being deposition of salts and impurities other by using the centrifuged at1000 cycles / minute (10 minutes) and directly measure to the activity of the enzyme.

Methods Used

The activity of PAH enzyme was measured based on Bublitze (1969) (154) method, which includes the addition of enzyme DMBH4 and the phenylalanine based on tyrosine in the presence of PAH enzyme. Orange Absorption measured at 450 nm wavelength. This absorption is directly proportional to the enzyme activity.

Solutions of the Materials Used: The phenylbenzene base substance (Phe) dissolved in the Tris HCl regulating solution to adjust pH = 7.2, Catalase enzyme solution (CAT), DL- Dithiotheritol Solution (DTT), DMPH4 solution (6,7-dimethyl-5,6,7,8-tetrahydropterine), Trichloroacetic acid (TCA), HNO3 20%, Reagent 1-Nitroso-2-naphtol (NNS) 0.1%, Standard tyrosine solution.

The concentration of urea was determined by the use of the diagnostic tool provided by CAM TECH MEDICAL and spectral method, Creatinine concentration is determined by Jaffe reaction by the use of Biolabo- Franc Diagnostic Kit and Serum albumin is administered by the use of a diagnostic kit equipped by the French company Biolabo.

The Lowry method 16 was used to measure protein concentration in urine and using Bovin serum albumin (BSA) as standard protein.

Statistical Analysis

The data is calculated and analyzed using the Statistical Package for Social Sciences (SPSS) version
Results

The study included (80) cases suffering from chronic renal failure by taking a blood and urine samples from patients, also included (80) samples of healthy persons as a comparison group. The overall mean age of patients with CRF and control were (60.16±13.20) and (57.12±12.71) years old, respectively. Table (1) shows the differences between patients with chronic renal failure and control by social and demographic characteristics.

Table 1: Differences between patients and controls in residence, occupational status and educational status

<table>
<thead>
<tr>
<th>Variable</th>
<th>Study Groups</th>
<th>X2</th>
<th>P-value</th>
<th>Odds ratio 95% C.I</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Patients%</td>
<td>Control%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>34(42.5)</td>
<td>37(46.25)</td>
<td>0.227</td>
<td>0.633(0.623-2.173)</td>
</tr>
<tr>
<td>Male</td>
<td>46(57.5)</td>
<td>43(53.75)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban area</td>
<td>55(68.75)</td>
<td>42(52.50)</td>
<td>4.424</td>
<td>0.035(1.044-3.794)</td>
</tr>
<tr>
<td>Rural area</td>
<td>25(31.25)</td>
<td>38(47.50)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupational status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>10(12.50)</td>
<td>20(25.00)</td>
<td>4.103</td>
<td>0.0428(1.014-5.371)</td>
</tr>
<tr>
<td>Non-Employed</td>
<td>70(87.50)</td>
<td>60(75.00)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educational status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>35(43.75)</td>
<td>28(35.00)</td>
<td>1.283</td>
<td>0.257(0.366-1.309)</td>
</tr>
<tr>
<td>Education</td>
<td>45(56.25)</td>
<td>52(65.00)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

P<0.05 is significant

Table (2) demonstrated the vital advantage in various chronic renal failure patients and control group, that there was a significant difference (P <0.001) in B. urea, creatinine S. albumin, as a significant difference (P <0.001) was recorded in the urine of patients and healthy people.
Table (2): Biomarker level of (urea, creatinine, albumin)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Normal</th>
<th>Patient</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean± SD</td>
<td>Mean± SD</td>
<td></td>
</tr>
<tr>
<td>Urea (mg / dl)</td>
<td>Blood</td>
<td>2.01± 23.16</td>
<td>67.42 ± 7.10</td>
</tr>
<tr>
<td></td>
<td>Urine</td>
<td>28.86 ± 1.05</td>
<td>13.10 ± 0.35</td>
</tr>
<tr>
<td>Creatinine (mg/dl)</td>
<td>Blood</td>
<td>0.074±1.10</td>
<td>4.71 ± 0.31</td>
</tr>
<tr>
<td></td>
<td>Urine</td>
<td>3.21± 139.42</td>
<td>2.81 ± 0.08</td>
</tr>
<tr>
<td>Albumine (g/L)</td>
<td>Blood</td>
<td>43.83 ± 12.02</td>
<td>2.73±25.05</td>
</tr>
<tr>
<td></td>
<td>Urine</td>
<td>0.179 ± 0.03</td>
<td>12.14 ± 1.28</td>
</tr>
</tbody>
</table>

The activity of phenylalanine hydroxylase in the blood and urine of CRF patients and with healthy people was measured and compared using the Bublitze method (1969) \(^{17}\). When compared statistically, there were statistically significant differences between the activity of the enzyme in patients compared to the health level of probability \( p \leq 0.001 \) in the blood and urine, where the enzyme is less effective in patients with CRF in the blood while increasing the effectiveness of the enzyme in the urine as shown in Table (3).

Table (3): Activity PAH enzyme in blood and urine of CRF patients and healthy individuals

<table>
<thead>
<tr>
<th>State</th>
<th>Activity PAH IU / ml (mean ± SD)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal (Blood)</td>
<td>120.83 ± 23.21</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>CRF (Blood)</td>
<td>54.67 ± 6.03</td>
<td></td>
</tr>
<tr>
<td>Normal (Urine)</td>
<td>33.87 ± 3.08</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>CRF (Urine)</td>
<td>61.34 ± 7.12</td>
<td></td>
</tr>
</tbody>
</table>

The activity of PAH enzyme in blood and urine in males and females according to different age groups has been studied. Tables (4) shows the mean and standard deviation of the effect of age and sex and their interaction on enzyme activity, the results showed that there were significant differences between patients and healthy individuals, as well as significant differences between the age groups of patients. When comparing healthy and chronic kidney failure patients by age group, the enzyme activity in the blood was decreased for both age groups (age <45 yr.) And (age> 45 yr.), and over 45 years of age were more than people in the age group less than 45 years, as Increased enzyme efficiency in diuresis has been shown for both groups, the rise of the enzyme PAH for those over 45 years older than the age group under 45 years.
Figure 1: Activity of PAH enzyme in blood for CRF patients and control by age group

Figure 2: Activity of PAH enzyme in urine for CRF patients and control by age group

Figure (3): Activity of PAH enzyme in the blood of patients with CRF compared to control group by sex
Discussion

The number of people with CRF in the city was higher in rural areas. This is due to several factors including environmental pollution\textsuperscript{(18,19)} unhealthy eating habits, urban adoption of fast food \textsuperscript{(20,21)}, and canned foods \textsuperscript{22}. In addition to psychological and economic factors, all these factors affect the occurrence of many diseases, including kidney failure\textsuperscript{(23,24)}. This is consistent with the studies that have pointed to the high activity of the enzyme PAH in healthy blood and decline in urine and vice versa in patients with renal failure, as in the Diem K and his group (1970) \textsuperscript{26} and Daphnis E and his group (2001) \textsuperscript{27} in both males and females, as well as Pregnant women as in Lindheimer MD and his group (2001) \textsuperscript{28}. The presence of significant differences between the age groups of patients corresponds to studies that showed that the most vulnerable to kidney failure are those aged between 50-67 years and men are more likely to develop kidney failure compared to women \textsuperscript{29}, unlike some studies that proved that women are more vulnerable The renal failure of men and the nature of the effectiveness of the kidney on glomerular filtration is less than men \textsuperscript{30,31}. Unlike some studies that have shown that women are more likely to have kidney failure in men and the nature of kidney effectiveness on glomerular filtration is lower than men \textsuperscript{30}

Conclusion

Our study provides data that patients with CRF impaired renal function may also alter PAH enzyme activity. However, results need to be confirmed by further investigation.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Al-Furat Al-Awast Technical University/ Babylon Technical Institute, Iraq and all experiments were carried out in accordance with approved guidelines.

References


Hand Hygiene Practices and Infection Control Measures among Emergency Units Health Care Providers

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Abstract

Background: Emergency units is a main part for hospital admission. It is the front line of the healthcare systems in the response to emergencies and public disasters, so the infection preventive measures practices can be easily overlooked or neglected by immediate and life threatening issues.

Objectives: To assess the practices of health care providers regarding hand hygiene.

Methodology: A descriptive cross-sectional study design carried out from the period between (Sep. 2018 to Aug. 2019). The study has been conducted in the emergency units at Al-Hilla teaching hospitals. Non probability (purposive) sample of (125) health care providers who work in the emergency unit were selected, (110) nurses, (15) physicians were selected related to special criteria. Special checklist prepared, inter-observer reliability calculated the statistical results recorded (r: 0.90), which is statistically accepted.

Results: The results shows that the higher percentage of the study sample 104 (83.2%) were between (20-30) years age group, 73 (58.4%) were male, while most of the study sample 67 (53.6%) were Bachelor or postgraduate degree holder, related to the study sample marital status, the higher percentage 64 (51.2%) were married. Overall hand washing practices which consider as the most important measures to control of infection were poor (1.61 0.748).

Conclusion: Regarding to the healthcare providers practices in hand washing with respect to the infection control measures during their daily caring in the emergency units the statistical results show low level of practices.

Recommendation: Effective educational program should take place for all healthcare providers by task based strategies to utilize the practices include bedside procedures.

Keyword: Infection control, measures, practices, emergency unit.

Introduction

Hand hygiene strategy is a cornerstone in the infection control protocols, the hands of healthcare providers are essential vehicle to transmit the infection to the patient. Hand hygiene recognize as treating interventional strategy to reduce the transmission of the pathogens in the healthcare climate. Hand hygiene practices decrease the incidence of the respiratory tract, gastrointestinal and skin infections. Recently alcohol-based practices included with hand hygiene strategy¹. Semmelweis and Holmes pointed that infectious diseases were transmitted by contaminated hands of healthcare providers, he suggested hand scrubbing should be performed with chlorinated solution prior to any direct handling with the patient particularly after leaving the autopsy laboratory, after this procedure the mortality rate decreased to (13%). Semmelweis, intervention consider as a model of epidemiological directed strategies to prevent infection².

In America recommended that even antimicrobial soap or any antiseptic agent which may use for hands cleaning when leaving the patients units with multi
drug resistant bacteria. Recently their guidelines which published in 2002, focused on the issue of alcohol – based hand rubbing where accessible standard directed to hand washing practices for the healthcare setting.

Geneva’s university hospital study many basics strategies focusing on alcohol hand rub, the applied study shows significant improvement of healthcare providers compliance related to hand hygiene which reduce the hospital associated infections.

One of the factors which effecting hand hygiene non-compliance is dermatitis, skin irritation and pain, which may produce by abrasive cleansers when used for several times during shift time prevent healthcare providers from washing their hands before, during, after providing care for their patients.

Objectives: To assess the practices of health care providers regarding hand hygiene.

Methodology: A descriptive (observational) cross-sectional study design is selected to study the phenomena of interest related to assessing the infection control measures practices for emergency unit healthcare providers.

Setting: The study has been conducted in the emergency units in the following teaching hospitals in four teaching hospitals at Al-Hilla city.

Sample: Non probability (purposive) sample of (125) health care providers who work in the emergency unit were selected, (110) nurses, (15) physicians related to special criteria.

Checklist: Special checklist prepared after comprehensive reviewing of related literature. Standard infection control measures practices adopted after modification to make it suitable for emergency unit healthcare providers, divided to three parts:

Part I: Consist of the demographical characteristics of the study sample includes: (6) Items: (Gender, age, educational level, marital status, residency, specialty).

Part II: Includes general informations related to (Years of experience, years of experience in emergency unit, training courses related to Infection Control).

Part III: Consists of (8) items related to hand hygiene.

Validity: Content validity obtained for the checklist by (9) expert panel to determine the relevancy, and clarity of the checklist to study the phenomena of interest.

Pilot study: A pilot study carried out to define the reliability of the checklist , (10) healthcare providers who work in the emergency unit included in this study, after obtaining their consent to participate in the study, each participant expose to three observation from three observer at the same time. Those (10) healthcare providers were excluded from the study sample.

Reliability of the checklist: Inter-rater or inter-observer reliability applied to obtain the stability of the checklist content/ when many observers award consistent estimation for the same phenomenon, it is a score of how much homogeneity or consensus exists in the ratings given by various judges. The researcher and two colleagues who graduate from nursing college to perform this step, each participant in the pilot study exposed to observed from three observers at the same time for each practice, the statistical results recorded (r: 0.90), which is statistically accepted.

Ethical consideration: Ethical consideration in quantitative research is one of the most important elements, this type of researches commonly use of human subjects. The consent may be given in written or oral form depending on the nature of the research. Ethical standards also protect the confidentiality and anonymity of the subjects. The formal agreement obtained from the study sample related to special agreement form.

Data collection: Self-report method adopted as a method to complete the first and second parts of the prepared checklist, which takes about (5 to 10) minutes. While the third parts needs one to seven days to complete three observation for each participant. The data collection extended about (56) days, it started from (18 of May and ended in 5 July. 2019).
## Results

Table (1): Distribution of the study sample related to their employment characteristics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Number of participants</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specialty</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Nurses</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Registered Nurse (academic)</td>
<td>52</td>
<td>41.6</td>
</tr>
<tr>
<td>Clinical Nurse</td>
<td>44</td>
<td>35.2</td>
</tr>
<tr>
<td>Practical Nurse</td>
<td>14</td>
<td>11.2</td>
</tr>
<tr>
<td><strong>Physicians</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specialist</td>
<td>2</td>
<td>1.6</td>
</tr>
<tr>
<td>Permanent</td>
<td>5</td>
<td>4.0</td>
</tr>
<tr>
<td>Rotator</td>
<td>8</td>
<td>6.4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>125</td>
<td>100%</td>
</tr>
</tbody>
</table>

Years of Experience  
11-20  
21-30

Years of Experience in Emergency  
6-10  
11-15  
16-20

Table (1) Shows that the most of the sample who agree to participate in the study 52 (41.6%) were academic nurses, related to the years of experience in the field 112 (89.6%) were between (1 to 10) years of experience, 111 (88.8%) of the study sample were with ≤ 5 years of experience in the emergency units.

Table (2): Practical level of the study sample related to infection control measures (hand washing)

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Always Do</th>
<th>Sometimes Do</th>
<th>Never Do</th>
<th>Mean ±SD</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Hand must be immediately washed before and after each episode of direct contact with patient during care.</td>
<td>00 00</td>
<td>2 1.6</td>
<td>123 98.4</td>
<td>1.02±0.126</td>
<td>Poor Practice</td>
</tr>
<tr>
<td>2</td>
<td>After contact with a source of microorganisms (body fluid substance, mucous membranes).</td>
<td>106 84.8</td>
<td>00 00</td>
<td>19 15.2</td>
<td>2.70±0.721</td>
<td>Good Practice</td>
</tr>
</tbody>
</table>
Table (2): Practical level of the study sample related to infection control measures (hand washing)

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Always Do</th>
<th>Sometimes Do</th>
<th>Never Do</th>
<th>Mean ±SD</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>After contact between different patients.</td>
<td>34</td>
<td>27.2</td>
<td>13</td>
<td>10.4</td>
<td>78</td>
</tr>
<tr>
<td>4</td>
<td>After removing gloves</td>
<td>83</td>
<td>66.4</td>
<td>0</td>
<td>0</td>
<td>42</td>
</tr>
<tr>
<td>5</td>
<td>Dry with paper towel, reusable sterile or single use towels</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>125</td>
</tr>
<tr>
<td>6</td>
<td>Turn off the water using clean, dry paper towel</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>125</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

MS (Poor Practice =1-1.6, Fair Practice = 1.7-2.3, Good Practice = 2.4-3)

Table (2) This table presented that the most of the study sample shows poor practices within four items (1, 3, 5, 6), while just one item recorded good practice (2), a fair practice recorded for item (4), overall hand washing practices which consider as the most important measures to control of infection were poor (1.61 0.748).

Table (3): practical level of the study sample related to infection control measures (hand antisepsis).

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Always Do F</th>
<th>%</th>
<th>Sometimes Do F</th>
<th>%</th>
<th>Never Do F</th>
<th>%</th>
<th>Mean ±SD</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Using before performance of invasive procedure</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>125</td>
<td>100</td>
<td>1.00±0.00</td>
<td>Poor Practice</td>
</tr>
<tr>
<td>2</td>
<td>Hand antiseptic between care of different patient</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>125</td>
<td>100</td>
<td>1.00±0.00</td>
<td>Poor Practice</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1.00±0.00</td>
<td>Poor Practice</td>
</tr>
</tbody>
</table>

MS (Poor Practice =1-1.6, Fair Practice = 1.7-2.3, Good Practice = 2.4-3)

Table (3) Shows that most of the study sample recorded poor level of practice related to hand antisepsis (1.00 0.00).

Discussion

The majority of sample were male, while most of the study sample in Kilic, 2016, were female, the disagree in this point is regarding the cultural status of our country and the stressful of emergency unit that needs so much effort that is difficult to a female to manage it. Regarding the educational level most of the sample (53.6%) were with high educational level (bachelor and post graduate), which agree with a study carried out by , in Jordan related to healthcare providers in emergency department that shows the majority of sample (59.5%) were hold a Bachelor degree. The results shows that most of the sample (51.2%) were single, while regarding to Kilic, 2016, the majority (53.2%) were married, the reason behind this disagreement is because the healthcare providers that included in this study were young and newly graduated. Table (1) Shows that the majority (41.6%) were Nurses who work in emergency unit, this findings
agree with Kilic, 2016, that presents (68.5%) were nurses working at emergency unit. 

Regarding to the years of experience the results show that (89.6%) have (1 to 10) years of experience which almost all of them spent (5 or less) years in the emergency unit, Al Bashtawy, 2016, in his study mention that the majority (43.2%) have about (5) years of experience in emergency unit. 

Table (2) Represent that most of the sample shows poor practice regarding hand washing that considered as key element of infection control, a longitudinal quantitative study in Brazil carried out by Zottele, 2017, about the healthcare professional compliance related to hand hygiene in an emergency room, shows that hand hygiene compliance was low, he suggested multidisciplinary approach is necessary to develop learning and compliance related to hand hygiene 

Table (3) This table shows that majority of the healthcare providers who participate in the study related to hand anti sepsis for not visible soiled hands in the emergency units were poor (100%), these findings seems to be similar with a study carried out in Boston which carried out by Venkatesh, 2011, this study, concluded that adequate supply of hand rub solutions, and training program does not ensure adequate performance of hand antisepsis still this issue needs focus program to improve adherence. 

Infection control measures and its compliance issue, commonly needs special knowledge and training for the move, its compliance requires change in the personal behavior to obtain this results the healthcare personnel needs educational and training programs and proper environmental and facilities to practice properly, while continuous monitoring and evaluation needed to maintain correct practices in order to improve quality of care and patients safety.

### Conclusion

Regarding to the healthcare providers practices with respect to the infection control measures during their daily caring in the emergency units the statistical results show low level of practices related to hand hygiene.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Adult Nursing Department-College of nursing\University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

### References


Genipin Cross-Linked Chitosan / Polyvinyl Alcohol blend for Biomedical Engineering

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Abstract

Chitosan/polyvinyl alcohol cross-linked with genipin at different concentrations were utilized to synthesize films by solvent casting for bone tissue engineering applications. Fourier transform infrared spectroscopy (FTIR), swelling degree, degradation rate, contact angle, tensile strength was investigated. The results revealed a decrease in swelling degree, degradation rate, contact angle with an increased genipin concentration, while tensile strength increased. It can be indicated that cross-linked CS/ PVA with genipin could be applied in application for tissue engineering.

Keyword: chitosan, degradability, lysozyme enzyme.

Introduction

Regenerative medicine is a specialized field for restoring, safeguard and improvement body functions 1. Scaffold materials are a significant component for regenerative medicine because it can mimic with cells of tissue that contribute to the construction of new tissues 2,3. Chitosan, a polysaccharide biomaterial which amalgamates adorable group physiochemical and biological properties that authorize to utilized for variety applications 4. Chitosan can be used in body of human due to biocompatible, biodegradable, and biomedical 5. Chemical modification of chitosan is required to enhance properties to concur with application 6. Polyvinylalcohol is hydrophilic material utilized in vitro and vivo medical application due to biocompatibility 7. PVA blended with many natural polymers such as chitosan, gelatin due to its ability to form film 8. Genipin is naturally cross linker have been used for biomedical applications due to its susceptibility and biocompatibility to form crosslinked products stable and biocompatible 9. Physical and mechanical properties for chitosan biomaterials can be improvement by crosslinking remediation because of amino and hydroxyl groups for chitosan have capability to construct amide, ester linkages 10. Bones have capability to renew but existence of obstacles such loss of bone due to injury or disease may hinder this ability so bone tissue engineering can solve this problem 11. The purpose of the present research is improvement the blend of chitosan/poly (vinyl alcohol) films properties crosslinked with different concentrations of genipin. Dimida s. et.al, studied the effect of natural crosslinking genipin with different concentration for chitosan scaffold in (PBS) phosphate buffer saline solution that containing lysozyme enzyme. Rate of degradation of scaffolds was degreased with genipin concentrations 12. Kadhm A. et.al, studied enzymatic degradation of chitosan blend. The weight loss of chitosan blend increased through four weeks. Degradation rate of chitosan improvement by addition of genipin 13. Bi L.et.al, prepared the scaffolds of chitosan and collagen with various concentration of genipin to investigate the degradation rate of scaffolds from 7 to 21 day. Results shown that, degradation behavior of the scaffolds was decreased when the concentration of genipin increased 14.

Experimental:

Materials

Chitosan (CS) powder with deacetylation degree(75%), molecular weight (161) g/mol importation
from Xianm Shaanxi (China), Acetic acid 99% importation from Chem-lab NV (Belgium), Ethanol (EtOH, 99.9 %) from Schkarau (Spain), polyvinyl alcohol molecular weight (1300-2300) from CDH (India), Genipin importation from (CN Lab Nutrition), Asian Group (China), (PBS) pH7.2 from HIMEDIA (India). lysozyme enzyme was (LZ, ≥ 90 % proteins, activity ≥ 40 000 U/mg ) from CDH (India).

**Prepare of blended Films:**

Chitosan (CS) powder was dissolved in acetic acid aqueous solution (2%) via magnetic stirred at 1400 rpm, 50°C for 1hr. polyvinyl alcohol powder was dissolved in distilled water via magnetic stirred at 1400 rpm, 120°C. The blend films was prepared by mixing two polymers at ratio (80:20). Genipin added at concentration (0.2%, 0.4%, 0.6% wt.) to the polymer blend. Table 1 indicated the composition of the polymer blend. The polymer blend solution was casted in petri dish and after 3day the films dried at room temperature.

**Fourier transform infrared spectroscopy:**

The FTIR spectra was carried out on FTIR microscopy (Bruker, Germany) to determine the vibration of function groups of blended films.

**Degree of Swelling:**

Swelling degree was utilized to assay the swelling degree of blended films according to ASTM D4546-08. The blended films inundation in solution of (PBS) pH 7.2 for 24h at room temperature. Swollen blended films were taken away, then removing the surplus solution by a filter paper. The swelling degree was determined by using the Eq (1).

\[
\text{Degree of swelling (\%)} = \times 100 \quad (1)
\]

Where, \( w_1 \), \( w_2 \) were weights of dried, swollen samples, respectively.

**Degradation rate:**

To study the enzymatic degradation behavior, blended films were submerged in (PBS) solution that containing lysozyme enzyme 0.0001 g/L according to ASTM F1635-04a. And incubated at 37°C for 6 weeks. The solution was revived every three days. Blended films removed from solution after each week, then washed by phosphate buffer saline solution (PBS), dried and then weight. Degradation rate was determined by the Eq. (2).

\[
\text{Weight loss (\%)} = \times 100 \quad (2)
\]

Where \( w_0 \) dry weight of film before degradation rate and \( w_f \) the dry weight of film after degradation rate.

**contact angle test:**

Knowledge the extreme time of blended films to become more hydrophilic was very significant so as to boost the cell attachment with the blended films. The method consist of measuring contact angle of the water droplet on surface blended films (Young-Laplace fitting method) according to ASTM standard D5946-04.

**Tensile test:**

According ASTM Standard Method D 882-0 the tensile test was determined. According to this standard, the samples have length 80 mm, the width of the sample 10mm, the thickness (0.25-0.3 mm) and the crosshead speed was fixed at 1 mm/min.

**Results**

**FTIR:**

Figure 1 illustrated the FTIR of films blended. Peaks at 3388 and 2924 cm\(^{-1}\) was linked to C-H and N-H stretching band, respectively. The peak noticed at 1631 cm\(^{-1}\) was correlated to N-H stretching in amide II. chitosan blended with PVA, peak at 1743 cm\(^{-1}\) was noticed illustrated the reaction between O-H to PVA and N-H to chitosan, see figure 1. CS: PVA crosslinked with genipin peaks at 1253 cm\(^{-1}\), 1405 cm\(^{-1}\), and 1629 cm\(^{-1}\) related to C-O, CH3, and C=C bonds, respectively. This indicate the reaction between carboxymethel group of genipine with amine group of chitosan.
Swelling Degree:

Figure 2 shows swelling degree of blended films submerged in phosphate buffer saline solution. The assay indicated the cells can fasten with the blended films. Incorporation of two polymer CS: PVA forming flexible network which give swelling to the blended films. With an increased genipin concentration, swelling degree decreased due to increase bonding forces between the blended polymers resulting from increase cross-link density. This manner may be demonstrate by reaction between the crossliker genipin and –NH$_2$ that reduces of amino groups concentrations, resulting reduction of reaction with water.
Degradation Rate:

Biodegradability is a significant property for films in biomedical applications. Enzymatic degradation rate of CS: PVA blended films and CS: PVA cross-linked with natural crosslinker genipin were investigated. Figure 3 shows weight loss for CS: PVA blended films and CS: PVA cross-linked blended films. The results show that the degradation rate of CS: PVA blended films was completely degraded after 3 weeks while CS: PVA cross-linked films was decreased through 6 weeks due to limited breakthrough of lysozyme through the films resulting in the increase cross-like density. However, significant change was indicated between the films with and without cross-linker additions 12.

Contact Angle:

The wettability of the films was investigated via contact angle analysis. Water contact angle of films are shown in Table 2. The average contact angle of CS: PVA films reveals the hydrophilic nature of chitosan. Decrease of average contact angle has been attributed to increase cross linker concentration make it more hydrophilic. It is obvious that genipin addition affected the hydrophilicity of the blended films because its addition decreased contact angle value. This is may be due to the high cognition between molecules of genipin and water considering that both of them are polar. Amendment in hydrophilicity of the films lead to good cells attachment 12.

Tensile Test:

The tensile strength and elongation (%) of CS: PVA blended films and CS: PVA cross-linked were indicated in Figures 4 and 5. The results investigated that the tensile strength of CS: PVA blended films increased as crosslinker concentration increased while elongation (%) varied thus due to formation intermolecular hydrogen bonds between carboxymethyl group of genipin and amine group of chitosan that form secondary amid 22.
Conclusion

Chitosan/Polyvinyl alcohol has been invented with Genipin as natural crossliker. Crosslinked chitosan/polyvinyl alcohol films by using different concentrations of Genipin enhanced mechanical and physical properties appropriate for application tissue engineering. The investigation has discovered that combination of genipin to chitosan/polyvinyl alcohol enhanced the swelling degree, degradation rate, contact angle and tensile strength. This study allowed use chitosan/polyvinyl alcohol crosslinked with genipin for bone tissue engineering.
Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Technology / Materials Engineering Department, Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

References


Assessment of Primary Dysmenorrhea and Its Effect on the Quality of Life among Female Students at University of Babylon

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Abstract

Objectives: The objectives of this study were to assess primary dysmenorrhea condition among participants. In addition to, find out the correlation between primary dysmenorrhea and quality of life of among female students at Babylon of University.

Methodology: A cross sectional study design used in this applied quantitative research through the period of 4 August 2019 to 22 October 2019. The study conducted in Babylon province, Iraq at University of Babylon. Four faculties has been selected randomly as setting of current study. The total participants were (N=145) females students, selected as 20% from each faculty, by using purposive non-probability sampling approach. The data collected by using an adapted questionnaire and analyzed electronically by using SPSS program.

Result: The findings of the present study revealed that (89%) of participants were unmarried. Almost the entire of sample had family history of primary dysmenorrhea. According to NPRS scale for assessing pain intensity (62.1%) with severe primary dysmenorrhea. The study’s finding found out a negative significant correlation between primary dysmenorrhea intensity and overall quality of life scale at P≤0.05 (r= - 0.642, P=0.000).

Conclusion: Primary dysmenorrhea is a very common problem among female students at university of Babylon; it affects their quality of life. QoL decreases with the increase in the severity of primary dysmenorrhea.

Keywords: primary dysmenorrhea, quality of life.

Introduction

The transformation of females from childhood to sexual maturity and become capable of production termed as puberty. Throughout this transitional phase several alterations will take place which include hormonal, psychological, cognitive and physical changes besides to the evolution and sexual developments, these changes occur synchronously. The prime physiological change in girl life is the onset of menarche which is special event of females’ life due to the first occurrence of menstruation. Menstrual cycle is natural phenomenon, it is a significant signal of females’ health, and it’s an important indicator of endocrine function. There are several structures of women’s body that will cooperate with each other in order to initiate the menstrual blood flow, these structures are: hypothalamus, pituitary gland, ovaries, and uterus. One of most common menstrual disorders is dysmenorrhea; is episode of uterine cramp in the lower abdominal segment, immediately before or during cycle, dysmenorrhea variance among women. There is lack in the understanding of menstrual cycle disorders especially dysmenorrhea. Furthermore, lack of knowledge related to this condition among young girl

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because they received scarce education on dysmenorrhea. Dysmenorrhea either primary which mean it’s not related to pathological reasons or secondary related to pathological reasons. Primary dysmenorrhea (PD) occurs because of excessive amount of prostaglandin which produced during the disintegration of pre-menstrual uterine endometrium. While, the pain caused by a disorder in the women’s reproductive organs, such as endometriosis, adenomyosis, uterine fibroid, or infections, called secondary dysmenorrhea. Pain severity may be measured by using scaled as “no pain, mild pain, moderate pain, severe pain and worst possible pain”. Yet, data on experience of menstrual cycle and its influence on the health conditions, quality of life (QoL) and social integration among females in developing countries are still insufficient.

Objectives of the Study

1. Assessment primary dysmenorrhea among female students.
2. Find out the correlation between primary dysmenorrhea and quality of life of among female students at Babylon of University.

Methodology

A cross sectional study design used to apply quantitative research through the period of of 4 August 2019 to 22 October 2019. The study conducted in Babylon province, at university of Babylon. 4 faculties selected randomly. The total participants were (N=145) female students their age between (18-25) years old female students selected as 20% from each faculty, by using purposive non-probability sampling approach. The questionnaire was constructed and developed as a tool for data collection, and it includes three parts; the first part was sociodemographic data of female students. Second part was Numeric pain rating scale to assess the intensity of primary dysmenorrhea. The third was SF-36 Health Survey of quality of life scale consists of 36 items divided into seven sub-scales (General health domain, Limitation of activities domain, Physical health problem domain, Emotional health problems domain, Social activities domain, Pain domain, and Energy and emotion domain). These domains are rated on (3 level type Likert scale) included (always, sometimes, and never) and scored as (1, 2, 3) respectively. Positive items in the QoL scale reversed for the statistical purposes. The items of SF-36 rated based on a 3-level Likert scale, which was determined according to the mean of items’ scores to poor quality of life (1 - 1.66), fair quality of life (1.67 - 2.33) and good quality of life (2.34 - 3).

Mean of scores calculated as follow:

\[ M.S = \frac{\sum S f}{N} \]

where M.S = mean of scores, f = frequencies, S = scores, N = numbers of samples.

Range of Score = 0.66

Methods of Data Analysis

The data of the present study analyzed electronically via the Statistical program (SPSS) version 25. The method that used in this program aimed to find out the descriptive and inferential statistic such as frequencies, percentage, correlation coefficient, and chi-square and Pearson correlation of entering data in order to achieve the objectives of the study.

Result

Table (1) Distribution of female students by their demographical characteristics (N=145)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Groups</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>18 - 21</td>
<td>89</td>
<td>61.4</td>
</tr>
<tr>
<td></td>
<td>22 - 25</td>
<td>56</td>
<td>38.6</td>
</tr>
<tr>
<td></td>
<td>Mean = 21.01</td>
<td>S.D. = 1.557</td>
<td></td>
</tr>
</tbody>
</table>
**Table (1) Distribution of female students by their demographical characteristics (N=145)**

<table>
<thead>
<tr>
<th>Demographic Characteristic</th>
<th>Frequency (f)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>College’s grade</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First grade</td>
<td>23</td>
<td>15.9</td>
</tr>
<tr>
<td>Second grade</td>
<td>61</td>
<td>42.1</td>
</tr>
<tr>
<td>Third grade</td>
<td>14</td>
<td>9.7</td>
</tr>
<tr>
<td>Fourth grade</td>
<td>47</td>
<td>32.4</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working</td>
<td>11</td>
<td>7.6</td>
</tr>
<tr>
<td>Not working</td>
<td>134</td>
<td>92.4</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>16</td>
<td>11.0</td>
</tr>
<tr>
<td>Un married</td>
<td>129</td>
<td>89.0</td>
</tr>
<tr>
<td>Socioeconomic status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfied</td>
<td>83</td>
<td>57.2</td>
</tr>
<tr>
<td>Satisfied to some extent</td>
<td>54</td>
<td>37.2</td>
</tr>
<tr>
<td>Not Satisfied</td>
<td>8</td>
<td>5.5</td>
</tr>
<tr>
<td>Address</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>123</td>
<td>84.8</td>
</tr>
<tr>
<td>Rural</td>
<td>22</td>
<td>15.2</td>
</tr>
<tr>
<td>Residency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living with family</td>
<td>139</td>
<td>95.9</td>
</tr>
<tr>
<td>Dormitory</td>
<td>4</td>
<td>2.8</td>
</tr>
<tr>
<td>Live with others</td>
<td>2</td>
<td>1.4</td>
</tr>
<tr>
<td>Body Mass Index</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below weight (BMI&lt;18.5)</td>
<td>6</td>
<td>4.1</td>
</tr>
<tr>
<td>Normal weight (18.5&lt; BMI&lt;25)</td>
<td>93</td>
<td>64.1</td>
</tr>
<tr>
<td>Over weight (BMI &gt; 25)</td>
<td>46</td>
<td>31.7</td>
</tr>
</tbody>
</table>

f= frequency, %= percentage, SD= standard deviation

Table (1) reveals that a (61.1%) of the sample were within the age group (18-21) years old, the highest percentage represented (42.1%) of the female students are in second grade. According to the occupational status majority of participants (92.4%) were not working. The largest proportion of them sample were unmarried represented (89%). The table shows that (57.2%) were satisfied with their socio-economic condition; with respect to the sample address it has been found that (84.8%) of them live in the urban. Majority of them (95.9%) living with their families. Finally, (64.1%) of study sample were recorded a BMI (18.5< BMI< 25).
Table (2): Numeric pain rating scale for assessing the intensity of primary dysmenorrhea in the female students (N=145)

<table>
<thead>
<tr>
<th>Dysmenorrhea intensity</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>18</td>
<td>12.4%</td>
</tr>
<tr>
<td>Moderate</td>
<td>37</td>
<td>25.5%</td>
</tr>
<tr>
<td>Severe</td>
<td>90</td>
<td>62.1%</td>
</tr>
<tr>
<td>Total</td>
<td>145</td>
<td>100%</td>
</tr>
</tbody>
</table>

f= frequency, %= percentage

As shown in table (2), the highest percentage represented (62.1%) of the sample experience severe pain.

Table (3): Correlation between quality of life & primary dysmenorrhea

<table>
<thead>
<tr>
<th>Quality of life</th>
<th>Primary dysmenorrhea intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r</td>
</tr>
<tr>
<td></td>
<td>-0.642**</td>
</tr>
</tbody>
</table>

r= (Pearson correlation), sig= (significant).

In this table Pearson correlation coefficient used in order to illustrate that there is a negative significant correlation between intensity of P.D. and QoL among female students at \( P \leq 0.05 \) (\( r = -0.642, \ P = 0.000 \)). The outcome of statistical test demonstrates that there is significant correlation between the average scores of study subjects with P.D. and overall QoL scale.

Table (4): Pain relievers’ history used with primary dysmenorrhea (N=145)

<table>
<thead>
<tr>
<th>Pain reliever</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacological</td>
<td>89</td>
<td>61.4%</td>
</tr>
<tr>
<td>Non pharmacological</td>
<td>54</td>
<td>37.2%</td>
</tr>
<tr>
<td>Hormonal therapy</td>
<td>2</td>
<td>1.4%</td>
</tr>
</tbody>
</table>

f= frequency, %= percentage

Table No. (4) Shows that highest percentage of the sample constitutes (61.4%) used pharmacological relievers for primary dysmenorrhea during their menstrual period.
Table (5): Menstrual characteristics for female students with primary dysmenorrhea (N=145)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Groups</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of Menarche</td>
<td>10-12 years</td>
<td>51</td>
<td>35%</td>
</tr>
<tr>
<td></td>
<td>13-15 years</td>
<td>88</td>
<td>61%</td>
</tr>
<tr>
<td></td>
<td>Above 15 years</td>
<td>6</td>
<td>4%</td>
</tr>
<tr>
<td>Mean =13.15</td>
<td>SD = 1.249</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration of Cycle</td>
<td>3-5 Day</td>
<td>76</td>
<td>52.5%</td>
</tr>
<tr>
<td></td>
<td>6-8 Day</td>
<td>69</td>
<td>47.5%</td>
</tr>
<tr>
<td>Mean = 5.57</td>
<td>SD = 1.279</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of Cycle</td>
<td>Regular</td>
<td>90</td>
<td>62.1%</td>
</tr>
<tr>
<td></td>
<td>Irregular</td>
<td>55</td>
<td>37.9%</td>
</tr>
</tbody>
</table>

f = frequency, %= percentage

The table shows that highest percentage represented (61%) of the sample their age of menarche were between (13-15) years old; (52%) their duration of menstrual cycle between (3-5) days. Moreover, a (62.1%) of sample were with regular interval of menstrual cycle.

**Discussion**

Many studies and literatures emphasize that the sociodemographic characteristics are relate to most of the nursing subjects because nursing as a science deals with human being, people life, and health issues in different age groups and situations, the present study deals with the primary dysmenorrhea and its effect on QoL of female students; result show in Table (1), that high percent of sample undergone the study with (61.4%) which consider the largest proportion are within age group (18-21) and, their mean (21.01) (SD ± 1.557) this may due to criteria of selection of the current study’s sample, and the lawful age of students in colleges and universities; this result consistent with A cross-sectional study on (240 ) undergraduate female students at the University of Hong Kong by Chia et al. (2013) who studied the primary dysmenorrhea among university’s students; their findings show that mean and SD of age is (20.1 ± 1.4).

In regard to the place of residency it has been found about (84.8%) of female students were living in urban as display in Table (1) and that finding is matches with a cross-sectional study by Tawfeek (2008), who select (322) females students from different colleges , her result show that (273) of them from urban and the rest were from rural areas; while, findings of a cross-sectional study by Aziem et al. (2011) , on (900) girls from (8) schools; show that (469) were of rural residence while (431) were urban ones. The current study results revealed that (89%) of the sample were un married , and (11%) are married that congruent with a descriptive study at University of Jos by Emmanuel et al. ( 2013), their findings were (228 of 245) un married females students. The findings of the present study showed that more than fifty percent were satisfied with their socio-economic condition, which form the highest value, on the other hand, Assefa et al. (2016) a cross-sectional study in Ethiopia ; on (440) participants, it exhibited that (50.1%) stated as satisfied to some extent; this variance may belong to the contentment that widely spreading in Iraqi community and that not indicated in necessary that they are with good socio-economic status but it give them sense of satisfying of what they have. In the light of this study and regarding the BMI a high percentage of respondents were showed normal weight, this finding in line with Shaik et al. (2015)which contributes, to a number of diseases affecting women’s future health. The objective of this study is to assess the mean age at menarche in girls of ages 9-16 and observe its relationship with their body mass index and other covariates in Riyadh, Saudi Arabia.
304 female students of both private and governmental schools in Riyadh, Saudi Arabia, during March –May 2013. Data on demographics, socioeconomic status, physical activity, diet, and age at menarche were collected from students and their mothers, using self-administered questionnaires. Physical examinations were conducted to collect the anthropometric measurements. Results: Out of 304 students with a mean age (SD their study about the cross-sectional study was conducted among (304) female students of both private and governmental schools; it confirmed that the majority (79.9%) had BMI within the standard range, while only (4.9%) of students were under-weight and the prevalence of obesity & overweight (4.9%) & (10.2%), respectively.

Table (2) demonstrated the result of Numeric Pain Rating Scale for assessing pain severity; which shows the highest proportion reported sever pain as (62.1%) then followed by moderate as (25.5%), and finally mild as (12.4%) with mean (6.88) and SD (2.21). It’s well known that even with mild level of pain the quality of life of girls may be affected. The study’s finding is not consistent to Kazama et al. (2015) who found that only (17.7%) of their participants experience severe primary dysmenorrhea during their period, in their cross-sectional study that targeting female junior high school students in different cities in Japan, a total of (2,819) female students attended the (28) schools. This result seem to be close to findings of the study conducted by Faramarzi & Salmalian (2014) in Iran on (360) medical science female students, they verified that their outcomes show that the number of students who drank tea was (72 %). The onset of menstruation is a part of maturation process, after retrieved articles documenting the menstrual history related to primary dysmenorrhea, studies revealed that the history of first period vary according to the country and the climate as well as the geographical area. It has been appeared from the current study that Mean and SD of menarche’s age for females was (13 ± 1), usual menstrual duration (per days) was (5±1) and more than half of the respondents were with regular menstrual period as illustrate in Table (5); a study conducted in Johannesburg, South Africa by Iacovides (2013) on (20) females showed that Mean and SD of the age of menarche was (13 ± 2) and Mean & SD for menstrual period duration was (5 ± 1) these finding similar to current study’s findings. In addition to a correlative study in Mansoura city, Egypt by Mohamed & Mansour (2013)

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Nursing, Iraq and all experiments were carried out in accordance with approved guidelines.

References


Vitamin D Level Status and Hypertension among Old Adult Iraqi People in Al Hillah City

Ismael Hasan Jawad, Hasan Alwan Baiee

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Abstract

Background: Vitamin D has different biological actions in the body. Vitamin D has the pleiotropic effects in multiple organ systems, and vitamin D deficiency was suggested to be associated with high blood pressure according to previous reports. Several interventional studies have examined the effect of vitamin D supplementation on high blood pressure patients.

Objective: to identify Vitamin D level and its correlate with hypertension among old adults.

Methodology: This was across sectional descriptive observational study included convenient sample of elderly people in Hilla City, Babylon province, the period of the study started from the first of January through August 2019, a pretested semi structured questionnaire was used to interview the participants who attended primary health centers after obtaining their verbal consents, the sample included (300) old adult of both gender, serum level of Vitamin D was assessed by chemo immunoassay method, the blood pressure was measured single handy by the researcher using mercury sphygmomanometer to diagnose hypertension.

Results: The study included 300 participants 83.0% of the study sample had either insufficiency or deficiency of Vitamin D level. Hypertensive people had significant Vitamin D Deficiency (both deficiency and insufficiency of vitamin D, 81% and 70% respectively as compared to normotensive participants, this difference was statistically significant p<0.05.

Conclusion: there was a significant inverse relationship between vitamin D level and blood pressure.

Keywords: Vitamin D levels, Hypertension, Old adults, Iraq

Introduction

There is a remarkable increase in incidence of cardiovascular diseases in both lower- and middle-income countries including Iraq, hypertension is also increasing. Arterial hypertension is an important and serious public health problem which is responsible for 6% of deaths globally every year and can result in devastating complications such as peripheral vascular disease, heart failure, stroke, and renal failure. Vitamin D deficiency has been blamed to be a risk factor of arterial hypertension for both systolic and diastolic blood pressure.

Since elderly population have low intake of vitamin D, limited exposure to sunlight, and insufficient capacity in their skin to produce vitamin D, they are at high risk of deficiency and related complications including hypertension. There is a growing body of evidence from animal and clinical studies that vitamin D-mediated reduction of hypertension involves increased activation of the renin–angiotensin–aldosterone system other studies reported that vitamin D can be taken as a drug for hypertensive patients mainly by the elderly people, the gold standard of epidemiological studies of vitamin D blood levels and hypertension have been null.

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University of Babylon College of Nursing,
email: hassanbaey@yahoo.com
This study was conducted to identify the prevalence of Vitamin D Deficiency (VDD) among hypertensive patients and non-hypertensive to estimate the association between these variables.

**Methodology**

This was a cross-sectional descriptive observational study included a non-probability (convenient sample) of elders (>65 years both women and men) in Hilla City, Babylon province, Iraq. The period of the study started from the first of January through August 2019, the sample size was calculated according to the sample size calculation equation with 95% confidence level, 300 elderly people participated voluntarily in this study, all of them agreed to participate after explaining the objective of the study by the researcher (response rate 100%). This study was approved by the Ethics Committee of College of nursing - University of Babylon, a pretested questionnaire was used to interview the participants after obtaining their verbal consents, the sample included old adults, apparently health & not receiving vitamin D supplement, serum level of Vitamin D that made by chemo immunoassay method (maglumi instrument). Data about demographic characteristics, drug uses, number of chronic diseases, as well as measurement of mean systolic and diastolic blood pressure of each participant were done single handy by the researcher himself. Blood pressure was measured in the sitting position. Patients were kept seated quietly for at least 5 min in a chair. Blood pressure was measured using a sphygmomanometer with an appropriate cuff the cutoff values, blood pressure more than 140/90 considered hypertension in this study or those who diagnosed previously as hypertensive and taking antihypertensive drugs. Vitamin D levels are divided into three categories: deficient < 20 ng/ml, insufficient between 23-29 ng/ml and normal level 30-100 ng/ml. Data were analyzed by using the (spss) package version 23. The chi-square test was used to test the associations between variables. The association considered statistically significant when the P-value is less than 0.05.

**Results**

The study included 300 participants, 83.0% of the study sample had either insufficiency or deficiency of Vitamin D level. The proportion of adults with hypertension were more common among participants with deficient and insufficient vitamin D, 81% and 70% respectively, the difference was significant p<0.05.

**Table (1) Frequency distribution of the mean age of the study group.**

<table>
<thead>
<tr>
<th>Age group (year)</th>
<th>N (%)</th>
<th>Mean age</th>
</tr>
</thead>
<tbody>
<tr>
<td>65-69 years</td>
<td>168 (56)</td>
<td>67 years</td>
</tr>
<tr>
<td>70-74 years</td>
<td>84 (28)</td>
<td>73 years</td>
</tr>
<tr>
<td>75-80 and more</td>
<td>48 (16)</td>
<td>78 years</td>
</tr>
<tr>
<td>Total</td>
<td>300(100%)</td>
<td>70.44</td>
</tr>
</tbody>
</table>

Table (1) shows the distribution of elders according to their age and mean age of the study groups, 65-69 year group is the dominant age group, the overall mean age and the standard deviation are 70.44±3.9
Table (2) Means of vitamin D level according to gender.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Mean (ng/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>19.5</td>
</tr>
<tr>
<td>Male</td>
<td>25.8</td>
</tr>
<tr>
<td>Male and female</td>
<td>22.5</td>
</tr>
</tbody>
</table>

Table (2) and figure (1) show the frequency distribution of the study participants according to the means of vitamin D level by gender the mean of vitamin D level among females is lower than vitamin D level among males.

Figure (1) Means of vitamin D level by gender.

Figure (2) Frequency distribution of the study group by age.

Figure (2) shows the distribution of the elders according to age group, most of the participants in the age group 65-69 years (56%).
Table (3) Association between Vitamin D level and Hypertension among males.

<table>
<thead>
<tr>
<th>Study variables</th>
<th>Vitamin D level among male</th>
<th>χ²</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Deficiency (0-20 ng/ml)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>37 (54.4%)</td>
<td>57.99</td>
<td>&lt; 0.002*</td>
</tr>
<tr>
<td>No</td>
<td>31 (45.6%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total (%)</td>
<td>68 (68%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table (3) shows that 87% of old males have low serum vitamin D level (less than 30ng/ml) most of them with deficient level, this table also explains a positive highly significant association between low vitamin D and having high blood pressure (Hypertension) among elderly males chi square =57.99, df=2, p<0.002, there is an inverse relationship between the two variables.

Table (4) Association between Vitamin D and Hypertension among females.

<table>
<thead>
<tr>
<th>Study variables</th>
<th>Vitamin D level among female</th>
<th>χ²</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Deficiency (0-20 ng/ml)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hypertension</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>90 (66.1%)</td>
<td>59.11</td>
<td>&lt; 0.001*</td>
</tr>
<tr>
<td>No</td>
<td>46 (33.9%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total No.(100%)</td>
<td>136 (68%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This table (4) shows the prevalence of VDD among old adult women (79%), a highly statistically significant association between low Vitamin D level (less than 30 ng/ml) and Hypertension among elderly females, chi square value=59.1, df=2, p<0.001.
Discussion

This study examined vitamin D serum levels in apparently healthy old adults both males and females in Hilla city – Babylon province, Iraq, in order to determine the prevalence of vitamin D deficiency and its association with blood pressure. In this study, the vitamin D level status among Iraqi Patients in Al Hillah City and the relation of these dependent and independent variable were assessed in 300 patents the most of sample are females 67%. The low mean of serum vitamin D deficiency in this study is higher in women than in men. Overall, we found that vitamin D deficiency was very common the study group, the prevalence of Vitamin D Deficiency (VDD) in the current study is about one fifth, this high prevalence health problem is similar to that reported by a study conducted by Kara A and Datta S in India who found that Vitamin D deficiency is significantly prevalent in otherwise healthy old aged population.

The Korea National Health and Nutrition Examination Survey reported prevalence of vitamin D deficiency (≤20 ng/mL) of 47.3% in males and 64.5% in females, but in a nationwide population-based study conducted in Thailand, only 5.7% of the population had a 25(OH)-D level <20 ng/mL. The prevalence of VDD in our study is higher than that found in local Iraqi study conducted in Baghdad on 20 Parkinsonism Iraqi patients with mean age 59 years (62.5%) the same study reported that the proportion of VDD was much lower in the control group (27.5%) 21. Studies found that there is an increasing prevalence of vitamin D deficiency with age. In general, elder people are more liable to VDD due to many reasons, not only due to decrease skin production of Vitamin D but also due to decreased sunlight exposure, decreased dietary intake, impaired intestinal absorption, and diminished hydroxylation in the liver and kidney. Our study depicts a strong association between low serum consecration of vitamin D and increasing both systolic and diastolic blood pressure, this finding goes in line with the findings of other studies that evaluated the association between the level of vitamin D and the blood pressure, the risk of hypertension diminished following elevation of plasma concentrations of 25(OH)D. Another study found an inverse association between 25(OH)D and cardiovascular disease (including arterial hypertension) mortality in old adults with serum 25(OH)D levels of ≤21 ng/mL. Other studies have reported contradictory results regarding the association between vitamin D level and hypertension in elderly men and women, there is evidence that VDD causes multiple diseases including hypertension and complications. Various mechanisms supposed to play role in the effect of vitamin D on blood pressure, one of which is the renin-angiotensin system which the important contributor to systolic blood pressure. Studies in animals have shown that 1,25-dihydroxyvitamin D reduces renin gene expression by a mechanism that is bound to the vitamin D receptor and thus reduces blood pressure. Vitamin D can also exert antihypertensive effects through different molecular mechanisms. A recent study recommends that Vitamin D can be used as an adjuvant drug to control the blood pressure on hypertension patients with vitamin D deficiency.

Conclusion

The results of the current study show a widespread, severe Vitamin D deficiency among participants of both gender in Iraqi elderly people there is a strong association between VDD in elder men and women and hypertension, we suggest starting public educational campaigns to raise public awareness about the relationship between low level of vitamin D and high blood pressure. We recommend further large scale studies are needed to confirm our findings. The health care providers (physicians and nurses) should keep a check on the Vitamin D levels of elderly people in order to curb the ever-increasing incidence of hypertension.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Babylon and all experiments were carried out in accordance with approved guidelines.

References

Attitudes of Secondary School Students toward Health Promotion Behaviors in Al- Hila City

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Abstract

Objectives To identify the school students sociodemographic characteristics . To assess the attitude of participants toward health promotion .

Methodology: A cross-sectional descriptive study consisting of (177) students , to Attitudes of Secondary School Students toward Health Promotion Behaviors of secondary school student in Al- Hilla City

Result: Analysis of data reveals that there is a (67.8%) of adolescent have a normal body mass index, and (15.8) have underweight, (12.4%) overweight, while (4%) only have obesity.

Conclusion: Most of the students maintained normal weight status according to their BMI. Most of students aged at middle adolescence period, males more than females, majority of students were un married, at fourth grade, most of them were urban residence and ordered as 2nd member in the family, majority of them were not smoking and live with their parents.

Keywords: Attitudes of Secondary School Students toward Health Promotion.

Introduction

A huge proportion of the world’s population more than 1.75 billion young, aged between 10 and 24 years. Adolescents (aged 10 to 19 years) have specific health and development needs, and many face challenges that hinder their wellbeing, including poverty, a lack of access to health information and services, and unsafe environments. Interventions that address their needs can save lives and foster a new generation of productive adults who can help their communities’ progress. Many boys and girls in developing countries enter adolescence undernourished, making them more vulnerable to disease and early death. Adolescents are neither children nor adults; their needs can be easily overlooked in policies. Health interventions for adolescents cannot be effectively implemented without the appropriate policy and legal environment and its effective application.

According to scientists healthy and routine physical activities not only prevent and cure diseases, they are cheap and useful instruments in controlling stress, depression and...
aggression of present life

Methodology

Study Design: A cross-sectional descriptive study of Attitudes of Secondary School Students toward Health Promotion Behaviors in Al-Hilla City. Randomly sample of (177) students from secondary schools were selected. All of these adolescent measured by their weight, height, body mass index. The content credibility of the instrument was estimated through a panel of (14) experts, the stability of the items was based on the internal consistency of the questionnaire was evaluated by calculating Alpha Cronbach’ which $\alpha = 0.79$. Data analysis: Through the used descriptive statistical (SPSS) version 24 analysis approach that includes, frequencies, percentages, mean of scores, standard deviation.

Result of the Study

Table (1). Distribution of Adolescents by their Body Mass Index

<table>
<thead>
<tr>
<th>BMI</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under weight</td>
<td>28</td>
<td>15.8</td>
</tr>
<tr>
<td>Normal weight</td>
<td>120</td>
<td>67.8</td>
</tr>
<tr>
<td>Overweight</td>
<td>22</td>
<td>12.4</td>
</tr>
<tr>
<td>Obese</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>177</td>
<td>100</td>
</tr>
</tbody>
</table>

This table describe the weight status according the body mass index categories. (67.8%) of adolescents have normal weight status, (15.8) of them have underweight, (12.4%) of them have overweight and only (4%) of them were obese. The adolescents have a positive attitude when response to the items of the nutritional domains and the total mean was (2.34) at positive attitude of assessment. According to the social support domain, they have a positive attitude and the total mean was (2.37). According to the health responsibility domain, they have a positive attitude and the total mean was (2.36). According to the Life appreciation domain, they have a positive attitude and the total mean was (2.68). According to the exercise domain, they have a neutral attitude and the total mean was (2.22). According to the Stress management domain, they have a positive attitude and the total mean was (2.44). Finally the grand mean of all the domains was (2.4) and that indicate the adolescents had a positive attitude toward health promotion behaviors according to the level of assessment.

Discussion of the Study Results

Distribution of the Students by their Body Mass Index

In respect to the Body Mass Index results indicated that mostly participants have normal weight status, and only few of them reported as obese. The body built and weight abnormalities either low or high is considered nowadays the subject of concern because of its seriousness and this documented by so many agencies especially when it affect this age group due to the future effects and outcomes. This result disagreed with the findings of $^1$ they found that the prevalence of obesity was 21.3% and 22.3% respectively among adolescents’ students.

Part-3-Adolescent’s Attitudes toward Health Promotion Behaviors: Concerning the nutritional behaviors of the students, a positive nutritional attitudes were found. Most of students agree about eating three meals daily and snacks, choosing foods without too much oil, include dietary fiber (e.g. Fruits or vegetables), Drink at least 1500 cc of water daily (or 6-8 cups), Each meal includes five food groups (bread, meat, milk, fruit and vegetable) and eat breakfast daily. Kollatage et al., (2011) supported our findings, they found 83.2% of the respondents eating regular breakfast, and 62.6% have regular light lunch.

In regard to the social support behavior domain of the students, they believe in the social support behavior positively according to the mean (2.37). Most of students agree about speaking up and sharing feelings with others, caring about other people, talking about concerns with others, make an effort to smile or laugh every day, enjoy keeping in touch with relatives, make an effort to have good friendships and disagree with talking about troubles to others. $^3$ clarified that students reported a high scores when response to social support scale.

According to the present study, the health responsibility behavior of the students, and according to their answers shows positive healthy responsibility behavior at the mean (2.36). Most of students agree
about read food labels when shopping, watching weight, discuss health concerns with a doctor or nurse, observe body at least monthly, brushing teeth and using dental floss after meals, wash hands before meals, read health information and make an effort to choose foods without preservatives. Those vital results are supported by 4 who identified that high percentage of students gained high scores at healthy responsibility behaviors. 

The same table demonstrated the attitude regarding the life appreciation behavior of the students, results show a positive attitude mean (2.68). Most of students agree about make an effort to like myself, make an effort to feel happy and content, usually think positively, make an effort to understand strengths weaknesses and accept them, make an attempt to correct the defects, make an effort to know what’s important for the human, make an effort to feel interesting and challenged every day and make an effort to believe that life has purpose. The present results supported by 6 when they revealed that students had high total scores when response to life appreciation scale. Concerning the exercise behavior of the students, they have neutral attitude toward exercise behavior. Most of students partially agree about perform stretching exercise daily, also they are agree about exercising rigorously 30 minutes at least 3 times per week, participating in physical fitness class at school weekly, warm up before rigorous exercise and make an effort to stand or sit up straight. Keskin et al., (2017) supported the findings of the present study, they found that a large number of the students (63.9%) had a habit of doing sports regularly and the number of students who practice sports in a sports club is considerably high (43.8%). 

The stress management behavior of the students is another crucial domain, the present study findings revealed that mean of scores of attitudes show positive result. This may be due to social and cultural relationships, students agree about most of the items. Such as make an effort to spend time daily for relaxation, make an effort to determine the source of stress, make an effort to watch mood changes, sleep for 6–8 hours each night, make schedules and set priorities and try not to lose control when things happen that are unfair. The results came along with 4 who agreed that students had good stress management behavior.

**Conclusion**

1. Most of students aged at middle adolescence period, males more than females, majority of students were un married, at fourth grade, most of them were urban residence and ordered as 2nd member in the family, majority of them were not smoking and live with their parents.

2. Mostly their family’s income was insufficient, high percentage of student’s fathers education was bachelor degree and mothers had secondary school graduated, most of fathers were employer occupation and mothers were housewives.

3. Most of the students maintained normal weight status according to their BMI.

4. The students scored positive and neutral attitudes in most of the domains and sub-domains of the health promotion scale.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Faculty of Nursing, Iraq and all experiments were carried out in accordance with approved guidelines.

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Investigation of mec A and (tst-1) Genes Among Staphylococcus aureus Isolated from Skin Infection in Al-Diwaniyah Iraq

Rasool kadam-alheyawey, Ibtisam Habeeb Al-Azawi

1 M.Sc. Student, 2 Assit. Prof. Dr., Department of Microbiology, College of Medicine University of Al-Qadisiyah, in Al-Diwaniyah Iraq

Abstract

In this study one handed and five samples were collected from skin infection in hospital Diwaniyah Dermatology Consultancy in Al-Diwaniyah governorate from December 2018 to April 2019. All samples were cultured and identified by using phenotyping tests. The results revealed that 41 isolates were Staph. spp. and 30 isolates out of them diagnosed Staphylococcus aureus by using (API staph). Virulence factors were explicated by using polymerase chain reaction (PCR) methicillin-resistant Staphylococcus aureus (MRSA), were identified by detecting (mec A gene), which revealed that all skin infections were MRSA (100%). Also, toxic shock syndrome toxin (TSST) were identified by using PCR to detect (tst-1 gene 326 bp.), which revealed that 23 isolate were positive out of 30 isolate (76.33%).

Keywords: Investigation, mec A and (tst-1) Genes, Staphylococcus aureus

Introduction

Many patients who are hospital reviewers suffer from skin lesions and considered an important health problem. S. aureus is one of the most important pathogens found in most places and also found naturally on human skin and is associated with a wide range of skin diseases. The threat of this S. aureus is its morbidity, which is the factor of virulence produced. The skin invasion of S. aureus either an essential internal source or external source. The emergence of strains of S. aureus resistant to antibiotics such as MRSA is a global problem in clinical medicine. Staphylococcal resistance to penicillin is mediated by producing penicillinase. Staphylococcal cassetes chromosome mec (SCCmec) is a family of mobile genetic elements of S. aureus. Resistance is given by the mecA gene by a protein associated with penicillin (PB2a or PB2), which has less affinity for act with β-lactams; allowing resistance to all β-lactam antibiotics, this mobile gene component has been acquired by different strains in separate gene transfer events, indicating that there is no common ancestor for the different MRSA strains. Toxic shock syndrome is a condition caused by this bacterial toxins, the primary mechanism involves the production of high-contrast antigens during topical Staphylococcal infection. The progression of the disease arises from superantigen toxin that activating multicellular T cells.

Material and Method

The study was conducted on patients with skin lesion caused by Staphylococcus aureus in Al-Diwaniyah city / Iraq / 2019 and collected 105 samples included male and female. Patients (children, young and adults) range in age from 1 to 60 years in AL-Diwaniyah Teaching Hospital.

Isolation and Identification:

One handed and five samples were collected through a questionnaire (name, sex, age) from skin lesion by transport media swab, then cultured on conventional media (blood agar, mannitol salt agar). This dishes were incubated at 37°C for 18-24 and 48 h respectively, and diagnosed by biochemical testing. The diagnosis were isolates basis on phenotypic, catalase, oxidase, and coagulase. These isolates were recognized based on common biochemical tests. (API Staph) that differentiate between species belonging to staphylococcal.
antimicrobial susceptibility:

To perform the antimicrobial susceptibility testing, the agar discs diffusion method as that described by 9.

Bacterial DNA Extraction:

The extraction DNA has been done according to the manufacturer instructions.

Table (1) Primers used for meca and tst-1 genes amplification

<table>
<thead>
<tr>
<th>Primer</th>
<th>Primer Oligonucleotide sequence, 5’ to 3’</th>
<th>(bp)</th>
</tr>
</thead>
</table>
| meca   | F 5’- TGAGTTGAACCTGGTGAAGTT - 3’
       | R 5’-TGGTATGTTGGAAGTTAGATTGG- 3’       | 855 bp|
| tst-1  | F 5’-ACCCCTGTTCCTTTATCATC- 3’
       | R 5’-TTTTCCAGTATTTGAACGCC- 3’         | 326 bp|

Table (2) Polymerase Chain Reaction:

<table>
<thead>
<tr>
<th>Step</th>
<th>Temperature</th>
<th>Time</th>
<th>Cycle</th>
</tr>
</thead>
<tbody>
<tr>
<td>meca</td>
<td>Initial denaturation</td>
<td>94.0C0</td>
<td>5 min</td>
</tr>
<tr>
<td></td>
<td>Denaturation</td>
<td>94.0C0</td>
<td>1 min</td>
</tr>
<tr>
<td></td>
<td>Annealing</td>
<td>57.0C0</td>
<td>2 min</td>
</tr>
<tr>
<td></td>
<td>Extension</td>
<td>72.0C0</td>
<td>1 min</td>
</tr>
<tr>
<td></td>
<td>Final Extension</td>
<td>72.0C0</td>
<td>5 min</td>
</tr>
<tr>
<td></td>
<td>Hold</td>
<td>4 0C</td>
<td>Forever</td>
</tr>
</tbody>
</table>

| Tst-1         | Initial denaturation | 94.0C0 | 5 min | 1 |
|               | Denaturation  | 94.0C0 | 45 Sec |
|               | Annealing    | 50.0C0 | 45 Sec |
|               | Extension    | 72.0C0 | 45 Sec |
|               | Final Extension | 72.0C0 | 10 min |
|               | Hold         | 4 0C  | Forever |

Table (3) Polymerase chain Reaction mastermix components

<table>
<thead>
<tr>
<th>PCR Master mix</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>DNA template</td>
<td>5µL</td>
</tr>
<tr>
<td>Forward primer (10pmol/µL)</td>
<td>1.5µL</td>
</tr>
<tr>
<td>Reverse primer (10pmol/µL)</td>
<td>1.5µL</td>
</tr>
<tr>
<td>PCR water</td>
<td>4.5µL</td>
</tr>
<tr>
<td>Master mix</td>
<td>12.5 µL</td>
</tr>
<tr>
<td>Total volume</td>
<td>25 µL</td>
</tr>
</tbody>
</table>
To determine the presence of the desirable amplicon, electrophoresis that in 1.5% gel agarose stained with adding ethidium bromide, and the products that visualized using a UV transil-luminator.

**Statistical analyses:** the used, Chi square, were performed. A p-value less than 0.05 was considered statistically significant.

**Results:** In this study 30 isolates of *S. aureus* out of 105 isolates, were isolated from skin lesion such as abscesses, boils, pimples and folliculitis at Al-Diwaniyah Teaching Hospital, which was determined by phenotypic characteristics and via biochemical testing then confirmed. Ten different antibacterial were used against *S. aureus*. Resistance showed against some antibiotic, (30 isolates 100%) resistant to each Ampicillin, pencillin, cefoxatin, azithromycin, and trimethoprim, resistance was moderate to levofloxacin, chloramphenicol (12 isolates 40%), clindamycin (15 isolates 50%) While lowest resistance to Amikcin (2 isolates 6.66). But they are wholly active vancomycin (30 isolates 100%). Polymerase chain reaction (PCR) used for amplification of *mecA* and *tst-1* genes. All the isolates from *Staphylococcus aureus* appeared to be carriers of *mecA* gene, which were 100% by using specific primer 855 bp as figure (1). While were results *tst* that shown 23 (76.66%) samples from the out of 30 isolates was positive by using specific primer 326 bp as figure (2).

**Figure (1)** Ethidium bromide Gel electrophoresis (1.5%) of PCR of *MecA* amplicon product. (1-30) all positive for this *mecA* gene with amplicon size (855bp) in skin lesion isolates of *Staphylococcus aureus* for 1 hr. at 80 volts.

**Figure (2)** Ethidium bromide Gel electrophoresis (1.5%) of PCR of *tst-1* amplicon product (1,2,3,5,6,7,13,14,15,16,17,18,19,20,21,22,23,25,26,27,28,29,30) were positive for this gene, (4,8,9,10,11,12,24) were negative for *tst-1* gene with amplicon size (326bp) in skin lesion isolates of *Staphylococcus aureus* for 1 hr. at 80 volts.
Discussion

The most commonly utilized antimicrobial substances in present clinical treatment procedures are β-lactams with intervention that includes inhibition of the last phase of the synthesis of bacterial cell-wall. These medicines have a smooth bactericidal with time-relied activities. They usually have excellent via-blood dissemination and little toxicity. Changes in the initial molecule resulted to the introduction of new substances with a wider antimicrobial action profile; however, in certain clinical environments, the use and effectiveness of beta-lactams are restricted because of increased bacterial resistance against those drugs.

Resistance to β-lactams can be induced by various genes; however, the most well-known worldwide distributed gene is mecA. The staphylococcal cassette chromosome has a gene called mecA which codes for PBP that is responsible of resistance against β-lactam antibiotics.

The action of the PBPs is manifested by their enzymatic activities due to inhibition-binding to β-lactams which results in destruction in the β-lactam chemical action properties. The PBP binding to β-lactams is occurred via the similarity present between the chemical structure of β-lactams and the chemical structure of the backbone of the sugar-amino acid that is an important part of the peptidoglycan.

Resistance via the presence of mecA can be induced due to random use of antibiotics in various clinical conditions; however, resistance to certain antibiotics due to this gene were found to occur even with no previously exposure to those antibiotics suggesting different means by which bacterial species can acquire such genetic resistance. One of the most important tools that bacteria employ to receive resistance is horizontal genetic transm (HGT). Bitrus et al., have recognized that mecA gene can be transmitted from methicillin resistant S. aureus to susceptible strains via HGT, and this confirms that resistance can be present even with no previous history use of certain antibiotics. S. aureus can generate pathogenicity by employing various bacterial techniques; however, it can enhance potential damages to human body via harboring important genes such as toxic shock syndrome toxin (tst-1) gene. The work of this gene is recognized by its coding for an extracellular toxin that induce toxic shock syndrome. The health condition is characterized by the presence of severe symptoms such as fever, hypotension, rash, and malfunctioning of some body organs. In infants, TSS can generate Kawasaki syndrome, TSS-like exanthematous disease, and sudden infant death syndrome. The nowadays-reports refer to increasing the worldwide distribution of the tst-1 gene to even higher levels than the already known elevated spreading. It has been found that this gene has genetic variations which might suggest different virulence levels.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Microbiology, Iraq and all experiments were carried out in accordance with approved guideline.

References


Electroencephalogram and Visual Evoked Potential Changes in Patients with Primary Headaches

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Abstract

This study was a case/control study in which a total of (450) subjects, into (150) with primary headache ( male and female) and this was included in this study, 128 with migraine headache, 22 with non-migraine headache and 300 were normal, as control group. The electrophysiological tests were done at the neurophysiology unit of Mirjan Teaching hospital in Babylon City, during the period from 28 / October/ 2014 until 22 / May/2015. This study reveals that involvement of the migraine are more than that of the non-migraine in headache patients when compared with control group and when compared between the migraine and non-migraine headache patients. The most common EEG changes in headaches patients were diffuse slowing and spike wave of back ground activity, in such a way that 54 (42.2%) migraine patients had abnormal EEG changes, in comparison to 4 (18.2%) of non-migraine patients. Visual evoked potential (VEP) was dependable marker for central nervous system affection in primary headache (migraine and non-migraine ) and the most common abnormalities were prolonged latency and amplitude is stay in normal ranged (5-10) µ.volt.

Keywords: EEG, VEP, migraine headache, non-migraine headache.

Introduction

Headache is defined as a pain arising from the head or upper neck of the body. The pain originates from the tissues and structures that surround the brain because the brain itself has no nerves that give rise to the sensation of pain (pain fibers) 1. Headaches can radiate across the head from a central point or have a pincering vise-like quality. They can be sharp, throbbing or dull, appear gradually or suddenly and last for multiple days or less than an hour 2.

All headaches are considered primary headaches or secondary headaches. Primary headaches are not associated with other diseases. Examples of primary headaches are migraine headaches Typically the headache affects one half of the head, is pulsating in nature, and lasts from 2 to 72 hours. Associated symptoms may include nausea, vomiting, and sensitivity to light, sound, or smell. The pain is generally made worse by physical activity 3.

Migraines are believed to be due to a mixture of environmental and genetic factors. About two-thirds of cases run in families. Changing hormone levels may also play a role, as migraines affect slightly more boys than girls before puberty, but about two to three times more women than men 4,5. The risk of migraines usually decreases during pregnancy.

Subjects and Method

This study was carried out through the period from October 2014 to May 2015, In the brain alone planning and optic nerve, as well as in consultation nervous in Mirjan Hospital in the city of Babylon. By using the history, as a cross section observational study, we select (150) patients with primary headache, in addition to (300) healthy control subjects, underwent EEG and VEP...
study with age and sex matched healthy control group should be selected for this study. All of them met the criteria of episodic headache (migraine with, without aura & non migraine) according to the international classification of headache disorder.

Subjects:

Two groups of subjects were studied:

The control group:

This group comprised thirty hundred healthy volunteers, (135 males and 165 females) ranging in age from (9 to 67) years, with a mean age of (30.40±7.38) years.

The patients group:

One hundred and fifty headache patients were selected all types of primary headache in Mirjan Teaching Hospital, they were (43 males and 107 females) ranging in age from (7 to 69) years with a mean age of (31.23±12.38) year.

Methods:

All the subjects were approved for:

- Electrophysiological tests:

- Visual evoked potential (VEP).

- Electroencephalography (EEG).

Visual Evoked Potentials (VEPs) Study:

Visual Evoked Potential test was carried out in a dark, quite room, with the subjects sitting comfortably on a chair and advised not to move or blink continuously during the test in order to decrease muscle contraction artifacts from eyes and skeletal muscles which blur the evoked potential waves, thus it is of paramount importance to avoid such artifact.

Instrumentation:

Using in this study Evoked Potential machine, serial no.GH 17 H9NW315431B, model 171S, (Italy) was used for electrophysiological analysis of the VEP using the VEP program. The VEP system include four channel preamplifiers which are connected to plasma screen as a photo-stimulator source.

Procedure:

Recording Visual Evoked Potentials:

The subject is call him to sit on the chair while made recording and told him to see in same level of the red point sited in the center of the screen, and the space between his state and the screen is fixed at rate equal to 100 cm.

The patient should asked him to cleaning and lesser his hair then asked him to sleep on the bed then begin applying gel on the surface of electrodes (to make skin impedance slighter) on the subsequent positions: on the right side from the beside of the head and about five centimeters from frontal side placed the three electrodes (F7,T3,T5), in the anther side (left side) placed the three other electrodes (F8,T4,T6), and then placed the five electrodes from the right side also, in frontal side (Fp1,F3,C3,P3,O1), and then placed the five electrodes from left frontal side (Fp2,F4,C4,P4,O2). At the end all of these electrodes were connected to the referential inputs by electrode cables.

Stimulation:

The full-field checkerboard pattern reversal (black and white checkerboard pattern), displaying at a rate of 3.5 reversals/ second (Hz). Mean luminance of the screen was fixed at 60-cd/m and contrast level of 100%. With visual angle of 16 (degrees) subtended by the stimulus field. The checkerboard size was selected according to the visual acuity of the subject between 60-90 (minutes). Each eye was stimulated separately by covering the other eye with a gauze patch (Monocular testing). VEP tests were filtered and amplified by the VEP computer program, and averaged of 200 runs according to response clearance. The amplifier band width was 0.1 – 100 Hz, with amplifier sensitivity of 2 µV and sweep speed of 500 msec/Div. Two series of examination of each eye were done to ensure reproducibility of the traces and results of VEP. During the test, the fixation point of the eye was kept on a target on the center of the screen (red dot), the subjects eye lids were fully opened to allow maximum amount of face and neck muscles, avoiding swallowing, moving tongue, speaking and frequent blinking, in order to minimize the artifacts during the recording procedure.
**Electroencephalography (EEG) study:**

Electroneurodiagnostics is the study and recording of electrical activity in the brain and nervous system. Tests are performed by technologists who record information on paper or computer, and the results are then interpreted by a specially trained physician.

Brain cells continually send messages to each other that can be picked up as small electrical impulses on the scalp. The process of picking up and recording the impulses is known as an EEG.

The billions of nerve cells in your brain produce very small electrical signals that form patterns called brain waves. During an EEG, small electrodes and wires are attached to your head. The electrodes detect your brain waves and the EEG machine amplifies the signals and records them in a wave pattern on graph paper or a computer screen. A normal EEG means that you have a normal pattern of brain wave activity. An abnormal reading means that abnormal patterns of brain activity are being produced and picked up.

**EEG Procedure:**

Electrical impulses in the brain are evaluated using an EEG. The test measures this electrical activity through several electrodes placed on your scalp. An electrode is a conductor through which an electric current can pass safely. The electrodes transfer information from your brain through wires to an amplifier and a machine that measures and records the data. The test is administered at a hospital, at your healthcare provider’s office, or at a laboratory by a specialized technician. The test usually involves the following steps:

You will be asked to lie down on your back in a reclining chair or on a bed. The technician will measure your head and use a pencil to mark where electrodes will be attached to your scalp. These spots are then scrubbed with a special cream that helps the electrodes get a high-quality reading.

**Results**

In this study is show the overall mean age of patients with headache and control were (31.23±12.38) and (30.40±7.38) years old, respectively, the distribution of patients and control by sex, (28.7%) and (47.3%) of patients and control were males, as show in the Figure (4).

In this study is show the differences between patients with headache and control by EEG Changes there was significant difference between patients and control by EEG, Patients with headache were 30 times more likely to have abnormal EEG, in the (Table 1).

In this study is shows the differences of patients with headache types and control during hyperventilation and photic stimulation of EEG. 24%, 14.66%, 1%, 1%, as show in the figure 5).

Table (2) shows the Mean Differences of VEP amplitude Parameter by Patients with Headache and Control Groups. There were significant mean differences of VEP Amplitude RT and LT by study groups. Table (3) shows the Differences of Patients with Headache and Control Groups by VEP latency and waves morphology. There were significant differences of Patients with Headache and Control Groups by RT Latency Positive1, RT Latency Negative1, LT Latency Positive1, LT Latency Negative1, RT Latency Positive2, and wave Morphology. Case group were 6, 2, 19, 3, 13 and 24 times to have abnormal right latency 1 positive and negative and left latency 1 positive and negative, right latency 2 positive and abnormal wave morphology, respectively.

In this study is shows distribution of patients by types of headache. (71.30%), (13.3%), (10.0%), (2.7%), (2.0%) and (0.7%) of the patients had migraine without aura, migraine with aura, tension headache, cluster headache, chronic headache and TAC headache, respectively, as show in the figure (1).

In this study is shows The distribution of different EEG abnormalities in different types of migraine. Spike 25.96%, poly spike 12.96%, sharp 12.96%, slow 48.14%, as show in the figure (2). In this study show the distribution of different EEG abnormalities in different types of Non-migraine. Spike 0.0%, poly spike 0.0%, sharp 4.54%, slow 13.63%, as show in the figure (3).
Table 1: Differences of Patients with Headache and Control by EEG Findings.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Study Groups</th>
<th>( \chi^2 )</th>
<th>P Values</th>
<th>Odds Ratio (95% C.I.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Patients with headache (%)</td>
<td>Control (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EEG Normal</td>
<td>92 (61.3)</td>
<td>294 (98.0)</td>
<td>110.20</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>EEG Abnormal</td>
<td>58 (38.7)</td>
<td>6 (2.0)</td>
<td></td>
<td>30.89 (12.91-73.92)</td>
</tr>
</tbody>
</table>

*p value ≤ 0.05 is significant

EEG = Electroencephalography
\( \chi^2 = \) Chi-Square, C.I. = Confidence Interval

Table 2: Mean Differences of VEP amplitude by Patients with Headache and Control Groups.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Study Groups</th>
<th>Mean</th>
<th>S.D</th>
<th>t-test</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>VEP Amplitude RT (µ volt)</td>
<td>Case</td>
<td>7.47</td>
<td>2.25</td>
<td>8.622</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>6.22</td>
<td>0.80</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VEP Amplitude LT (µ volt)</td>
<td>Case</td>
<td>6.75</td>
<td>1.60</td>
<td>2.876</td>
<td>0.004*</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>6.37</td>
<td>1.15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p value ≤ 0.05 is significant

VEP = Visual Evoked Potential
RT = Right, LT = Left
S.D = Standard deviation

Table 3: Differences of Patients with Headache and Control Groups by VEP latency and Waves Morphology.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Study Groups</th>
<th>( \chi^2 )</th>
<th>P values</th>
<th>Odds Ratio (C.I. 95%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Case</td>
<td>Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT Latency Positive1</td>
<td>103 (68.7)</td>
<td>281 (93.7)</td>
<td>49.938</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Normal &lt; 75 (m.sec)</td>
<td>47 (31.3)</td>
<td>19 (6.3)</td>
<td></td>
<td>6.749 (3.783-12.037)</td>
</tr>
<tr>
<td>Abnormal ≥ 75 (m.sec)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT Latency Negative1</td>
<td>107 (71.3)</td>
<td>262 (87.3)</td>
<td>17.344</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Normal &lt; 110 (m.sec)</td>
<td>43 (28.7)</td>
<td>38 (12.7)</td>
<td></td>
<td>2.771 (1.696-4.527)</td>
</tr>
<tr>
<td>Abnormal ≥ 110 (m.sec)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 3: Differences of Patients with Headache and Control Groups by VEP latency and Waves Morphology.

<table>
<thead>
<tr>
<th></th>
<th>Latency Positive1</th>
<th>Latency Negative1</th>
<th>Latency Positive2</th>
<th>Latency Negative2</th>
<th>Wave Morphology</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal &lt; 75 (m.sec)</td>
<td>Abnormal ≥ 75 (m.sec)</td>
<td>Normal &lt; 110 (m.sec)</td>
<td>Abnormal ≥ 110 (m.sec)</td>
<td>Normal</td>
</tr>
<tr>
<td>LT Latency Positive1</td>
<td>79 (52.7)</td>
<td>71 (47.3)</td>
<td>102 (68.0)</td>
<td>48 (32.0)</td>
<td>120 (80.0)</td>
</tr>
<tr>
<td>Abnormal ≥ 75 (m.sec)</td>
<td>287 (95.7)</td>
<td>13 (4.2)</td>
<td>261 (87.0)</td>
<td>39 (13.0)</td>
<td>297 (99.0)</td>
</tr>
<tr>
<td></td>
<td>121.79</td>
<td>&lt;0.001*</td>
<td>23.148</td>
<td>&lt;0.001*</td>
<td>53.123</td>
</tr>
<tr>
<td></td>
<td>19.841 (10.45-37.69)</td>
<td></td>
<td>3.149 (1.948-5.092)</td>
<td></td>
<td>24.75 (7.413-82.635)</td>
</tr>
<tr>
<td>LT Latency Negative1</td>
<td>102 (68.0)</td>
<td>48 (32.0)</td>
<td>130 (86.7)</td>
<td>20 (13.3)</td>
<td>127 (84.7)</td>
</tr>
<tr>
<td>Abnormal ≥ 110 (m.sec)</td>
<td>261 (87.0)</td>
<td>39 (13.0)</td>
<td>99 (33.0)</td>
<td>201 (67.0)</td>
<td>265 (88.3)</td>
</tr>
<tr>
<td></td>
<td>23.148</td>
<td>&lt;0.001*</td>
<td>115.24</td>
<td>&lt;0.001*</td>
<td>1.197</td>
</tr>
<tr>
<td></td>
<td>3.149 (1.948-5.092)</td>
<td></td>
<td>13.19 (7.78-22.39)</td>
<td></td>
<td>0.729 (0.414-1.286)</td>
</tr>
<tr>
<td>RT Latency Positive2</td>
<td>130 (86.7)</td>
<td>20 (13.3)</td>
<td>127 (84.7)</td>
<td>23 (15.3)</td>
<td></td>
</tr>
<tr>
<td>Normal &lt; 145 (m.sec)</td>
<td>99 (33.0)</td>
<td>201 (67.0)</td>
<td>265 (88.3)</td>
<td>35 (11.7)</td>
<td></td>
</tr>
<tr>
<td>Abnormal ≥ 145 (m.sec)</td>
<td>201 (67.0)</td>
<td>35 (11.7)</td>
<td>265 (88.3)</td>
<td>35 (11.7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>115.24</td>
<td>&lt;0.001*</td>
<td>1.197</td>
<td>0.274</td>
<td></td>
</tr>
<tr>
<td></td>
<td>13.19 (7.78-22.39)</td>
<td></td>
<td>0.729 (0.414-1.286)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LT Latency Positive2</td>
<td>127 (84.7)</td>
<td>23 (15.3)</td>
<td>127 (84.7)</td>
<td>23 (15.3)</td>
<td></td>
</tr>
<tr>
<td>Normal &lt; 145 (m.sec)</td>
<td>265 (88.3)</td>
<td>35 (11.7)</td>
<td>265 (88.3)</td>
<td>35 (11.7)</td>
<td></td>
</tr>
<tr>
<td>Abnormal ≥ 145 (m.sec)</td>
<td>35 (11.7)</td>
<td>35 (11.7)</td>
<td>35 (11.7)</td>
<td>35 (11.7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.197</td>
<td>0.274</td>
<td>1.197</td>
<td>0.274</td>
<td></td>
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<tr>
<td></td>
<td>0.729 (0.414-1.286)</td>
<td></td>
<td>0.729 (0.414-1.286)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p value ≤ 0.05 is significant, **reference group RT = Right, LT = Left

χ² = Chi-Square  C.I. = Confidence Interval
Discussion

Concerning the gender distribution, we have found that migraine is more common in females than males in different age groups at ratio of about 2.3:1. We found in figure (4) that female (47.30%) was susceptible to infected headache more than male (28.70%) in compared to control group. These findings are agreed with 20 who found females 2:1 for headache, as well as with other studies of 21 and also agreed with 22 who found that female to male ratio is about 3:1, but 23 found female to male ratio 3:2, so that there is a significant preponderance in females over males, this may be attributed to hormonal changes that occur in females mainly estrogen 24. We found higher incidence of migraine without aura, then followed by migraine with aura, tension headache, cluster headache, chronic daily headache, trigeminal autonomic cephalgia (TAC), (66.0%), (13.3%), (10.0%), (2.7%), (2.0%) and (0.7%). This agreement with (Stephen L. Hauser, MD, 2006) who found Migraine without aura is more common than migraine with aura in our study group with ratio of 2:1.
Conclusion

This study stated that EEG, the significant abnormal findings in patients with migraine headaches are more than patients with non-migraine headaches. The abnormal EEG findings in migraine patients were found mainly during hyperventilation and photic stimulation. Epileptic discharge were found in about of the whole migraine patients represented by spike and wave, polyspike and sharp waves respectively, 25.69%, 12.69%, 12.69%. In VEP, regarding the latency of P75, N100 and P 145 there were significantly higher in patients with headache in compared to the control group, while there were significant changes related to the amplitude, but stay in normal range.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Hilla Teaching Hospital Neurosurgical department, Iraq and all experiments were carried out in accordance with approved guidelines.

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Pulmonary Thromboembolism in Organophosphorus Poisoning – A Rare Complication

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Abstract
Organophosphate based insecticides constitute the cause of a large number of mortality and morbidity cases in the developing world. The reasons include easy availability, being inexpensive, and lack of regulations regarding their sale and storage. Another factor that has made organophosphate insecticides a major source of suicidal ingestion is the perceived fatality associated with them. Though the muscarinic, nicotinic and central nervous system complications of organophosphate poisoning are well known, the organophosphate toxidrome can sometimes present with unusual presentations and unexpected complications. In the scenario that exists wherein there are substantial number of cases, there arises the possibility that these presentations and complications will only increase in number. In this context it becomes important to know the possible mechanisms that cause unusual presentations and take adequate safeguards. In the case examined herein, a geriatric patient consumed organophosphorus insecticide. Treatment included an initial stomach wash, standard atropine therapy and supportive management. The patient experienced multiple diverse presentations related to the poisoning before eventually succumbing after 1 month. On autopsy the immediate cause of death was found to be pulmonary thromboembolism. The increased susceptibility of thromboembolism could have multiple reasons such as increased immobilization, myopathy resulting in inefficient venous return and deep vein thrombosis, or vessel damage due to inflammatory mediators. This case illustrates the need to consider pulmonary thromboembolism as a potential lethal complication of organophosphorus poisoning.

Keywords: Organophosphorus poisoning, Pulmonary thromboembolism, heparin prophylaxis, inflammatory response

Introduction
Among the group of chemicals used as insecticides in agriculture, organophosphates (Ops) are among the most widely used. Easy availability, being inexpensive, and lack of regulations regarding their sale and storage are some of the reasons due to which OPs are regularly used as suicidal poisons in additions to accidental, occupational and bystander exposures. The most common routes of poisoning are ingestion, absorption through the skin or by inhalation. Organophosphate poisoning mostly affects the nervous system. (1) Organophosphates bind irreversibly as well as covalently at the activity region of acetylcholinesterase (AChE).(1) Hence clinical presentation of acute organophosphorus poisoning includes symptoms of the nicotinic, muscarinic and central nervous systems. To counteract these symptoms, the treatment protocol consists of atropine, oximes (AChE reactivators) and diazepam. It has been stated that prior studies on the poisonous effects of organophosphates in non-target tissues have been limited. (2) The studies that were conducted however, indicate that organophosphate poisoning may induce
Oxidative stress, increase lipid peroxidation and reduce glutathione levels. Due to this high oxidative stress, tissues may show a persistent inflammatory response and sustain damage leading to cellular necrosis. This chronic inflammatory response due to OP poisoning can lead to endothelial injury or dysfunction which in turn can cause coagulation abnormalities and an increased risk of pulmonary thromboembolism and deep vein thrombosis. This paper presents a case of pulmonary thrombosis (PT) in a patient of suicidal OP ingestion, and will list out various possible mechanisms for the same.

Case Description

A sixty-two-year-old male geriatric patient had consumed approximately two hundred millilitres of an organophosphate insecticide compound. He was taken to a primary care centre where initial first aid and stomach wash was performed. He was then transferred to a tertiary care centre where atropine infusion was started immediately. The patient then developed breathlessness, muscle weakness and hypotension. He also had an episode of a cardiac arrest but was brought back to sinus rhythm. In addition, the patient started having myoclonic movements and was treated for the same. At this juncture a diagnosis of intermediate syndrome was made as a result of organophosphorus poisoning. The patient initially succumbed one month later. Due to unremittent breathlessness and respiratory failure, the patient had to undergo a tracheostomy procedure. At the time of death, the patient was also diagnosed to have sepsis with septic shock along with broncho-pneumonia as a complication of organophosphorus poisoning. The autopsy showed atypical findings of basal ganglia haemorrhage in the brain. On histopathological examination, both lungs showed findings of pulmonary thromboembolism with the lobar pneumonia. There were however no thromboemboli present in the heart or the veins of the lower limbs. The stomach wash that was collected at the time of primary treatment tested positive for organophosphate insecticide compound whereas the other viscera and blood sent from the autopsy tested negative. The final cause of death was opined as due to pulmonary thromboembolism as a complication of organophosphorus poisoning.

Discussion

To our knowledge, this is the first documented case of pulmonary thromboembolism in a case of organophosphorus poisoning with no associated deep vein thrombosis or heart involvement. The clinical presentations of OP poisoning are classically shown as one of the following three stages: (i) Initial acute cholinergic crisis due to accumulation of acetylcholine at nicotinic and muscarinic sites and accumulation within the central nervous system resulting in altered sensorium and seizures, which present within 24-72 hours; (ii) intermediate syndrome, wherein weakness of ocular, neck, respiratory muscles and proximal limbs is seen after 24-96 hours; and (iii) delayed peripheral neuropathy that is often permanent. As per Virchow’s triad, the three major risk factors that primarily contribute to thrombosis are (i) hypercoagulability; (ii) turbulence or stasis (haemodynamic instability); and (iii) dysfunction of the endothelium or its injury. In general, organophosphate poisoning may not be a risk factor for pulmonary thromboembolism or deep vein thrombosis per se, but chronic inflammatory conditions are associated with coagulation abnormalities and increased risk of deep vein thrombi, and pulmonary thromboembolism. A recent study however showed that lipid peroxidation and increased reactive oxygen species (ROS) may be associated with OP poisoning. One of the outcomes of thus high oxidative stress is an intense inflammatory response. This inflammatory response may cause thrombotic tendencies leading to microvascular thrombosis as a result of inhibiting natural anticoagulant pathways and increasing procoagulant factors. The properties of the endothelium may also become affected leading to loss of anticoagulant, vasodilatory and anti-aggregation properties. These mechanisms may explain the causation of pulmonary thromboembolism in our patient. In addition, prolonged immobility due to hospitalization which lasted almost a month may have been an additional factor. However, lack of deep vein thrombosis points to additional factors and mechanisms. We would also like to hypothesise that muscle weakness and myopathy as a result of OP poisoning are additional risk factors for the formation of deep vein thrombi and pulmonary thromboembolism.
A Taiwanese study, which was a population-based longitudinal cohort study done nationwide on the danger of development of deep vein thrombi and pulmonary thromboembolism on patients with organophosphate poisoning, found that these patients had a 1.55-fold increased risk of deep vein thrombi when equated with the general population. A recent report has also been published of pulmonary thrombosis in acute organophosphate poisoning.\(^{(11)}\) Another case of OP poisoning presenting with clinical features of coronary thrombosis and pulmonary thromboembolism has been reported that occurred during the delayed phase.\(^{(12)}\) A rare case of upper extremity deep vein thrombosis in OP poisoning has also been published.\(^{(13)}\)

**Conclusion and Implications for Clinical Practice**

With more studies now showing a clearer association between a chronic inflammatory state and organophosphorus poisoning, deep vein thrombosis and pulmonary thromboembolism must be considered significant complications that may arise. This is especially true in those cases that require prolonged hospitalization. In view of this, we recommend prophylactic heparin therapy for those patients that progress to the delayed phase of organophosphorus poisoning. We also suggest that in cases of OP poisoning with a presentation or development of breathless and hypoxaemia, pulmonary thromboembolism as a complication of organophosphate poisoning should be considered a differential diagnosis.

**Conflict of Interest:** None declared

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**Ethical Clearance:** Article submitted to the Institutional Ethics Committee

**References**


An Analysis of Autopsied Maternal Deaths in Dakshina Karnataka District Over A 10-Year Period

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1Undergraduate, 2Associate Professor, 3Professor, Department of Forensic Medicine and Toxicology, Kasturba Medical College, Mangalore, Manipal Academy of Higher Education (MAHE), Karnataka

Abstract

Introduction: Though all deaths are accompanied by profound sorrow and anguish, maternal deaths are perhaps more so. Unfortunately, when these deaths are reported as medico-legal cases, the agony is then prolonged. Anguish from the family members is understandable, but opportunities to conduct autopsies on these deaths present an opportunity to examine in detail the pathophysiology of these deaths. This study is an attempt to find the cause of death in autopsied maternal death cases that have been filed as medico-legal cases and to compare the trends of autopsied maternal deaths with other regions.

Objectives: To find the cause of death in autopsied maternal death cases that have been filed as medico-legal cases and to compare the trends of autopsied maternal deaths with other regions.

Methods: A record-based study was conducted consisting of maternal deaths in the past 10 years based on the medico-legal autopsied reports from Government Wenlock Hospital mortuary.

Results: Among the causes of death attributed, the most common cause of death was embolism related with 4 deaths. This included deaths due to amniotic fluid embolism, trophoblast embolism and their complications such as DIC. Haemorrhage was the cause of death in 2 cases. In 2 cases, the cause of death was acute liver failure. However, one of these cases also had features of gestational acute respiratory distress syndrome. In one case, the cause of death was attributed to coronary artery disease complicated by pregnancy. One case was of ruptured ectopic pregnancy. In another case, the cause of death was a surgical complication of a dilatation and curettage procedure. In the remaining 3 cases, the cause of death could not be ascertained even after histopathological examination, chemical analysis, and a complete autopsy.

Key words: Autopsied maternal deaths, embolism, haemorrhage, maternal mortality

Introduction and Background

Three hundred thousand women die every year because of the various complications and obstacles of giving birth (1). Unfortunately, even as recently as 2008, more than fifty percent of all recorded pregnancy-related deaths were in 6 countries namely India, Afghanistan Ethiopia, Pakistan, Nigeria, and the Democratic Republic of Congo (2). Valid and reliable epidemiological data can lead to more effective and efficient health and social policies that will improve overall maternal health (3). It is said that the difficulties in reporting maternal deaths arise because of “the lack of information about deaths among women in the reproductive age group, their pregnancy status at or near the time of death and the medically certified cause of death. These components can be difficult to measure accurately, especially in regions where deaths are not comprehensively or accurately reported” (4). In addition, in developing countries, data

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on the cause of pregnancy-related deaths are still mainly from verbal analyses and clinical histories which do not give the complete picture.

The reasons causing women to die in pregnancy and childbirth are multi-layered. The major complications that are said to account for nearly seventy-five percent of all pregnancy-related deaths are said to be “haemorrhage, infection-related, blood pressure disorders of pregnancy, complications related to delivery, and unsafe abortion”. However, many maternal deaths are still not identified due to various reasons (5).

Our study is an attempt at finding the cause of death in autopsied pregnancy-related deaths that have been filed as medico-legal cases and to compare the trends of autopsied maternal deaths with other regions.

Aim and Objectives

The study aimed to find out the causes of deaths of autopsied maternal deaths. We also hoped to analyse the trends in numbers of medico-legal autopsied maternal deaths as an indirect indicator of maternal health services and provide information that could lead to the better delivery of health services.

Materials and Methods

This was an organized longitudinal retrospective record-based study of 14 maternal autopsies performed at a government tertiary care mortuary (Government District Wenlock hospital) by the Forensic medicine and toxicology department of the attached medical college (Kasturba Medical College Mangalore). This hospital serves the health requirements of the population of Dakshina Kannada and neighbouring districts.

Inclusion criteria: All cases of maternal deaths classified as medico-legal cases which had been brought to District Government Wenlock hospital mortuary and cases that had been filed as closed by the police.

Exclusion criteria: Non-medico-legal cases of maternal deaths; sub-judice cases of maternal deaths.

This study protocol was presented for approval from the Institutional Ethics Committee (IEC) of Kasturba Medical College, Mangalore. After the authorization was obtained from the ethics committee, authorization was then obtained from the Head of the institution, after which permission was taken from the respective medical officer for analysis of their post-mortem reports. In total, 14 pregnancy-related deaths were autopsied during the 10-year period from 1st January 2009 to December 31st, 2018. The autopsy was done as the maternal deaths were registered as medico-legal cases either on behest of the treating doctor to find out the exact cause of death; when requested by the relatives of the deceased; or where the cause of death was uncertain. Clinical details, where ever available, were reviewed, either prior to or after conducting the autopsy. Complete autopsies were conducted in each case, with tissue specimens preserved in 10% formalin for further histopathological examination. Blood and viscera were also preserved, sealed, packed, and sent for toxicological analysis to the Forensic Science Laboratory located at Mangalore. The cause of death was opined based on perusal of hospital records (where available), chemical analysis report, histopathological examination report and the autopsy report.

Results

There were 8465 autopsies conducted at the Government Wenlock district hospital mortuary by the Forensic Medicine and Toxicology department, Kasturba Medical College Mangalore, during the study period. Of these 14 autopsies were related to maternal deaths, i.e. 0.16%. Among the autopsied maternal deaths, the minimum age of the deceased was 21 years and maximum age was 38. Table No.1 shows the frequency of deaths on a year-wise basis. There were no autopsied maternal deaths in three years, i.e. 2009, 2010 and 2016. The highest number of cases were in 2015 and 2014 with 3 deaths each. Deaths in the other years ranged from 1 to 2.

Among the causes of death attributed (Table No.2), the most frequent cause of death was embolism related with 4 deaths. This included deaths due to amniotic fluid embolism, trophoblast embolism and their complications such as DIC. Haemorrhage was the reason of death in two cases. In 2 cases, the reason of death was acute liver failure. However, one of these cases also had characteristics of gestational acute respiratory distress syndrome. In one case, the reason for death was assigned to coronary artery disease complicated by pregnancy. One case was of ruptured ectopic pregnancy. In another
case, the cause of death was a surgical complication of a dilatation and curettage procedure. In the remaining 3 cases, the underlying triggering reason for death could not be determined even after histopathological examination, chemical analysis, and a complete autopsy.

Table No.1 : Year-wise distribution of maternal deaths (n=14)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total number of deaths</th>
<th>Maternal deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>712</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>2010</td>
<td>836</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>2011</td>
<td>782</td>
<td>1 (0.12%)</td>
</tr>
<tr>
<td>2012</td>
<td>837</td>
<td>1 (0.11%)</td>
</tr>
<tr>
<td>2013</td>
<td>873</td>
<td>2 (0.22%)</td>
</tr>
<tr>
<td>2014</td>
<td>969</td>
<td>3 (0.30%)</td>
</tr>
<tr>
<td>2015</td>
<td>929</td>
<td>3 (0.32%)</td>
</tr>
<tr>
<td>2016</td>
<td>885</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>2017</td>
<td>836</td>
<td>2 (0.23%)</td>
</tr>
<tr>
<td>2018</td>
<td>806</td>
<td>2 (0.24%)</td>
</tr>
</tbody>
</table>

Table No.2 : Causes of autopsied maternal deaths

<table>
<thead>
<tr>
<th>Cause of death</th>
<th>Number of deaths (n=14)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Embolism or its complications</td>
<td>4 (28.57%)</td>
</tr>
<tr>
<td>Haemorrhage</td>
<td>2 (14.28%)</td>
</tr>
<tr>
<td>Pregnancy related liver disorders</td>
<td>2 (14.28%)</td>
</tr>
<tr>
<td>Coronary artery disease complicated by pregnancy</td>
<td>1 (7.14%)</td>
</tr>
<tr>
<td>Post-surgical complication</td>
<td>1 (7.14%)</td>
</tr>
<tr>
<td>Rupture of ectopic pregnancy</td>
<td>1 (7.14%)</td>
</tr>
<tr>
<td>Unascertained</td>
<td>3 (21.42%)</td>
</tr>
</tbody>
</table>

**Discussion**

The process of first obtaining the record of deaths and then designating a cause is not a simple one, and this, in itself, makes demonstrating trends – an increase or decrease – difficult (6). “Up to two-thirds of the world’s population reside where regular registration of deaths is missing, and for the other third, misclassification or wrong classification of causes or circumstances may lead to false trends and conclusions about progress” (7). Without an appropriate analysis of the causes of pregnancy-related mortality, there will not be present a proportional allocation of resources to reduce its incidence. “In many developing countries only deaths occurring in a health facility are assigned a medical cause of death, as certification of deaths at home is rare and relatives’ version of signs and symptoms might not be adequately accurate or dependable to draw conclusions. Also, for deaths at home, verbal autopsy techniques are often
used to determine the likely cause of death” (8). Thus, the leading source of data on pregnancy-related deaths can be said to be clinical records and verbal autopsies in developing countries. Both of these sources have considerable constraints as a result of inconsistencies between the clinically assumed and the definite cause of death (9). It has also been noted that verbal autopsies have little validity in attributing maternal deaths to a single specific medical cause and that there are intrinsic limitations in obtaining medical event records from non-medical informants who may not be literate and lack a medical background (10). Another finding seen is that “Misclassification of medical cause of death is common for many categories of death, including in developed countries with sophisticated statistical systems (11) as well as in developing countries”. (12)

It has been made repeatedly apparent that “Evidence provided by medical autopsies has played an important role in improving the accuracy of cause-of-death reports and improving clinical practice in the developed world” (9,13). A trustworthy ascertainment of the causes of pregnancy-related mortality thus requires an autopsy (14). The value of an autopsy in establishing the cause of death was revealed in the study of Sonderegger-Iseli et al. (9) with clinical differences in up to thirty percent of cases. Evidence from autopsies has been shown to invaluable for obtaining information that will prevent maternal deaths (15,16). It is also apparent that “In the absence of a routine autopsy, many deaths in developing countries remain recorded as ‘unknown’.”

Time of death around pregnancy: Studies have “shown that maternal deaths cluster around labour, delivery and the twenty-four hours immediately postpartum” (17). This is similar to the findings in our study which showed that the majority of deaths were in the third trimester and within 24 hours post-partum.

Cause of death: The major causes of maternal mortality in India have been identified as “anaemia (64.4%), pre-eclamptic toxaemia (PET) & eclampsia (25.5%), sepsis (20.6%) and haemorrhage (19.8%)” (18). This contrasts with our study wherein the majority of deaths were related to embolism and its complications. Haemorrhage only accounted for two deaths in our study and showed an equal incidence to acute liver disease of pregnancy. The reasons for the cause of death being unascertained in three cases can be attributed to incomplete medical information furnished, a lack of hospital records, or natural causes of death that are difficult to diagnose at autopsy. Our study also shows different findings when compared to the study done by Bardale et al., where “haemorrhage was the leading cause of death (38.09%) followed by indirect causes (23.80%), undetermined (19.04%), sepsis (9.52%) and postpartum pre-eclamptic shock (9.52%)” (19).

**Conclusion**

Maternal mortality autopsies have perhaps more importance than autopsies of other deaths because these reports are then used to make suggestions for improving clinical obstetric practice and defining the cause of death (20). In conclusion, maternal autopsy investigation offers an exact cause of death in most cases and is still an important tool for identifying the cause of maternal mortality (20). The information gathered from maternal autopsies deliver feedback to clinicians which will help to improve clinical practice (15).

**Funding & Conflict of Interest:** None to declare

**References**


Morphometric Measurements of Cervical Spine using Computed Tomography

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Abstract

The cervical spine anatomy exhibits wide variations. For cervical spine pathologies which require surgical treatment, the prior knowledge of these anatomic variations would reduce the surgical complications. The aim of the study is to perform CT based measurements of cervical transverse foramen and spinal canal in Indian population which would be useful in providing road map and guidance for surgical interventions of cervical spine. This is a retrospective study. A total of 73 patients (49 males, 24 females, age range: 18-75 years) indicated for CT cervical spine from June 2018 to June 2019 were included. The sagittal spinal canal Diameter (dSSC), sagittal (TFs) and transverse diameters (TFt) of transverse foramen, distance between transverse foramen and spinal canal (dTF-SC) were measured at C1-C7 levels. We found that significant difference in sagittal spinal canal diameters at all the levels of cervical spine (C1-C7) between males and females (p<0.01). Our study also found significant difference in sagittal (TFs) and transverse (TFt) diameters of transverse foramen at all cervical levels in males and females between right and left side (p<0.01). Significant difference were noted for distance between transverse foramen and spinal canal (dTF-SC) at all the levels of cervical spine in males and females between right and left side (p<0.01). From our study we conclude that a thorough comprehension of cervical anatomy with CT-based measurements help in preoperative planning and reduce the complications in surgical interventions. Our study noticed significant reduction in distance between transverse foramen and spinal canal (dTF-SC) in both males and females on left side. Hence, care must be taken while performing surgical procedures of cervical spine on the left side in males and females at all cervical levels.

Keywords: Cervical Spondylosis, Spinal canal, transverse foramen, cervical myelopathy

Introduction

The cervical vertebral structure is complex and has wide variations in anatomy. Cervical spondylosis is age related chronic degenerative disease of the spine with a prevalence of 13.76% 1. Spinal canal stenosis is commonest factor leading to Cervical myelopathy and cord injury2-5. Cervical spine instrumentation procedures such as posterior and anterior stabilization for spondylosis and fractures requires prior knowledge of variations for reducing the surgical complications. Due to presence of vertebral artery the precise placement of screws is major requirement in most of the cervical spine interventions 6-9. The literature also suggest wide variation in pedicle and lamina measurements, hence prior knowledge is required for selection of screws for fixation10-12. CT plays important role in diagnosis of pathologies of cervical spine. In addition, it also provides accurate information regarding the measurements such as spinal canal diameter and vertebral body measurements13-14. There are many cadveric studies described cervical

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The literature also reported ethnic differences in cervical spinal canal, vertebral measurements\(^{15-19}\). There are only few studies done on CT cervical spine measurements which are relevant for surgical procedures\(^{20-21}\). Hence, the purpose of the study is to perform CT based measurements of cervical transverse foramen and spinal canal in Indian population which would be useful in providing road map and guidance for surgical interventions of cervical spine.

**Materials and Method**

The approval for study was obtained from Institutional Research Committee, School of Allied Health Sciences and Institutional Ethics Committee, Kasturba Hospital, Manipal. This is a retrospective study which included 73 patients indicated for CT cervical spine. Out of 73 patients, 49 were males and 24 were females. The age range of the study was 18-75 years (mean age 33.5±5.3 years) The CT cervical scans with fracture, neoplasm, infection, congenital anomalies were excluded.

The CT cervical spine imaging was performed using 128 slice CT scanner (Philips Incisive 128 slice CT, Netherlands). Axial sections were obtained with 1 mm slice thickness.

**CT Measurements**

Figure 1: Mid-Sagittal image of CT Cervical spine showing Sagittal Spinal Canal Diameter (dSSC)

Spinal canal diameter (dSSC) was measured on mid sagittal section as antero posterior diameter from the back of each vertebral body to the nearest spinolaminar line (Figure 1).

Figure 2: Axial image of CT Cervical spine showing Sagittal diameter of Transverse foramen (TFs), transverse diameter of Transverse foramen (TFT) and Distance between transverse foramen and spinal canal (dTF-SC)

Sagittal (TFs) and transversr diameters of transverse foramen (TFT) were measured on axial section as antero posterior and cranio caudal diameters of transverse foramen respectively. Distance between transverse foramen and spinal canal (dTF-SC) was measured on axial image as antero posterior distance between them (Figure 2).

All the measurements were done using measuring tools in DICOM Imaging software of Mediff technology and were noted in millimeter (mm). The data were measured by two readers A and B to check for variability.

**Statistical Analysis**

The data analysis was done using statistical package for social sciences (SPSS) version 20.0. The Students paired t-test was performed for the three measurements to find significant difference between right and left side.

**Findings**

Seventy-three patients (49 were males and 24 were females) 511 vertebrae from C1-C7 were evaluated in this study. The measurements were done on right and left sides of vertebrae.

**Sagittal Spinal Canal Diameter (dSSC)**

The Canal diameter was noted wider at C1 level for both males and females. The CDs measured were narrower at C6 level in the males and at the level C4 in females. Significant differences in canal diameters were noted at all the levels of cervical spine (C1-C7) between
males and females (Table 1).

Table 1: Showing the mean and standard deviation of Sagittal spinal canal diameter (dSSC) in males and females

<table>
<thead>
<tr>
<th>Level</th>
<th>Males</th>
<th>Females</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>22.5±1.38</td>
<td>20.7±1.33</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>C2</td>
<td>16.8±1.17</td>
<td>15.3±1.19</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>C3</td>
<td>14.2±1.19</td>
<td>12.9±1.16</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>C4</td>
<td>13.9±1.18</td>
<td>12.2±1.17</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>C5</td>
<td>13.6±1.19</td>
<td>12.4±1.13</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>C6</td>
<td>13.5±1.20</td>
<td>12.9±1.17</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>C7</td>
<td>13.7±1.21</td>
<td>13.0±1.17</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>

Sagittal (TFs) and transverse diameter (TFt) of transverse foramen

The sagittal diameter of transverse foramen (TFs) was noted narrower at C6, C7 level for males and females, on both sides. The diameter was widest at the C1 level for males and females on both sides. Significant differences were noted for sagittal diameter of transverse foramen (TFs) at all cervical levels in males and females between right and left side (p<0.01) (Table 2).

Table 2: Showing the mean and standard deviation of sagittal diameter (TFs) of transverse foramen in males and females for right and left side

<table>
<thead>
<tr>
<th>Level</th>
<th>Males</th>
<th>Females</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>6.6±1.11</td>
<td>6.5±0.90</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>C2</td>
<td>6.2±1.11</td>
<td>6.0±0.90</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>C3</td>
<td>5.8±0.70</td>
<td>5.6±0.70</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>C4</td>
<td>5.5±0.60</td>
<td>5.5±0.70</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>C5</td>
<td>5.7±0.60</td>
<td>5.9±0.60</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>C6</td>
<td>5.3±1.00</td>
<td>5.3±1.00</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>C7</td>
<td>5.0±0.90</td>
<td>5.2±0.90</td>
<td>&lt;0.01</td>
</tr>
</tbody>
</table>
The transverse diameter of transverse foramen (TFt) was noted narrower at C6, C7 level for males and females, on both sides. The diameter was widest at the C1 level for males and females on both sides. Significant differences were noted for transverse diameter of transverse foramen (TFt) at all cervical levels in males and females between right and left side (p<0.01) (Table 3).

**Table 3: Showing the mean and standard deviation of transverse diameter (TFt) of transverse foramen in males and females for right and left side**

<table>
<thead>
<tr>
<th>Transverse diameter of Transverse foramen in Males and Females (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level</strong></td>
</tr>
<tr>
<td>****</td>
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<tr>
<td>---</td>
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<tr>
<td>C1</td>
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<tr>
<td>C2</td>
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<tr>
<td>C3</td>
</tr>
<tr>
<td>C4</td>
</tr>
<tr>
<td>C5</td>
</tr>
<tr>
<td>C6</td>
</tr>
<tr>
<td>C7</td>
</tr>
</tbody>
</table>

**Distance between transverse foramen and spinal canal (dTF-SC)**

The distance between transverse foramen and spinal canal (dTF-SC) was noted narrower at C3, C4,C5 level for males and at C4 level for females, on both sides. The distance was widest at the C1 level for males and females on both sides. Significant differences were noted for distance between transverse foramen and spinal canal (dTF-SC) at all the levels of cervical spine in males and females between right and left side (p<0.01) (Table 4).

**Table 4: Showing the mean and standard deviation of distance between transverse foramen and spinal canal (dTF-SC) in males and females for right and left side**

<table>
<thead>
<tr>
<th>Distance between transverse foramen and spinal canal in males and females (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Level</strong></td>
</tr>
<tr>
<td>****</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>C1</td>
</tr>
<tr>
<td>C2</td>
</tr>
<tr>
<td>C3</td>
</tr>
<tr>
<td>C4</td>
</tr>
<tr>
<td>C5</td>
</tr>
<tr>
<td>C6</td>
</tr>
<tr>
<td>C7</td>
</tr>
</tbody>
</table>
Discussion

The literature states wide variations in anatomy of cervical vertebrae\textsuperscript{10-12}. There also ethnic differences in spinal canal and vertebral measurements \textsuperscript{20-21}. Due to necessity of surgery in cervical spine pathologies such as trauma, degenerative and inflammatory conditions, the prior preoperative knowledge of anatomical variations is utmost important for the surgeon. The diameter of the cervical spinal canal is vital and any reduction in the measurement might lead to myelomalacia secondary to spondylosis\textsuperscript{2-5}. There are limited studies performed using CT, which is gold standard and provide road map for preoperative planning\textsuperscript{15-19}.

In our study, the spinal canal diameter (dSSC) was noted wider at C1 level for both males and females. The spinal canal diameter declined gradually from C1-C6 and increased at C7 level. The findings of our study are partially contrary to the studies conducted by Binit Sureka et al., Evangelopoulos et al.\textsuperscript{25-26}. Study done by Ambuj Kumar et al\textsuperscript{27} have also observed decline in cervical spinal canal diameter from C1-C4, inaddition our study has shown decline in dSSC till C6 Level and increased at C7 level.

The literature suggests that the diameters of the vertebral arteries are of unequal size and the left side vertebral artery is often larger compared with right sided vertebral artery\textsuperscript{28}. Significant differences were noted for sagittal diameter of transverse foramen (TFs) at all cervical levels in males and females between right and left side (p<0.01). Significant differences were noted for transverse diameter of transverse foramen (TFt) at all cervical levels in males between right and left side (p<0.01). Significant difference were noted for (TFs) at C3 level in females between right and left side (p<0.01). We also significantly noticed the diameters of transverse foramen larger on left side in males and females which supports the literature that left sided vertebral is larger than right. These measurements would provide the surgeon to choose appropriate side for placement of screws and also the knowledge about the various screw sizes to be used for fixation procedures. The findings of our study are slightly different to the results of recent studies done by Binit Sureka et al., Evangelopoulos et al.\textsuperscript{25-26}. They have stated increase in diameter of transverse foramen on left side only in females compared to males. However, our study noticed increased diameter of transverse foramen in both males and females on left side.

In our study, significant differences were noted for distance between transverse foramen and spinal canal (dTF-SC) at all the levels of cervical spine in males and females between right and left side (p<0.01). The findings of our study are slightly different to the results of studies done by Binit Sureka et al., Evangelopoulos et al.\textsuperscript{25-26}. They have stated decrease in distance between transverse foramen and spinal canal (dTF-SC) on left side only in females compared to males. However, our study noticed decreased distance between transverse foramen and spinal canal in both males and females on left side.

Our study would add new contribution to the literature that the diameter of transverse foramen is larger on left side in both males and females at all the cervical levels. Hence care must be taken will doing fixation of screws in males and females especially in left side.

There are few pitfalls in our study. Firstly the sample size opted for the study is substantial. Secondly, we have not included the pediatric age group who are more prone for anatomical variations. Thirdly, we did not compare the transverse foramen and distance between the foramen and spinal canal between the genders.

Conclusion

Multidetector CT examination would provide precise measurements of anatomical structure of cervical spine and helps in identifying the variations. The CT preoperative measurements would be helpful in providing road map and mitigate the possible damage to vertebral artery and neural structures while performing surgery. The measurements from our study recommends adequate care to be given while performing surgeries on left side of cervical vertebrae for males and females.

Conflicts of Interests: No potential conflicts of interest

Funding Source: This research did not receive any specific grant from funding agencies

Ethical Clearance: The approval for study was obtained from Institutional Ethics Committee, Kasturba
References:


Determination Reference of Concentration (RfC) Xylen Exposure Based on Xylen NOAEL in White Rats and Workers’ Body Weight and Height in Surabaya Car Painting Area, Indonesia

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Abstract

This study aims to calculate the value of RfC from xylen exposure around the car painting area of Surabaya, Indonesia. This is an observational cross-sectional study with quantitative data analysis methods conducted manually. The population in this study was groups of car painting workers and groups of car repairer on Jalan Pengenal Kota Surabaya. The sampling technique was proportionate stratified random sampling to take 51 people. The measurement of xylen concentration around the car painting area was 635.98 mg/m³ (146.47 ppm). This value is above the threshold value according to Minister of Manpower and Transmigration Regulation Number 13 of 2011 and Minister of Manpower Regulation Number. 5 of 2018 is 434 mg/m³ (100 ppm). RfC of car painting workers with NOAEL 50 mg/kg was 7.76 mg/kg.

Keywords: Xylen, RfC, car painting worker

Introduction

Xylen is an aromatic hydrocarbon which is often used as a solvent namely cleaning agents, diluents for paints, and varnishes. Xylene is colorless, flammable, and volatile. It is often used in the printing, rubber and leather industries. The chemical industry produces xylene from petroleum (ATSDR, 2007)¹.

In the process of painting the car by spraying, workers are constantly exposed to xylen when the paint is sprayed. Workers are exposed not only to the vapor, but also from a collection of fine particles (mist). This form is easily absorbed by workers or into the skin, especially if workers do not wear proper personal protective equipment (WWAC, 2009)². The main exposure pathway occurs through inhalation, yet dermal exposure (through skin contact) and oral can also occur (IPCS, 2004)³. Individuals who routinely work on conditions that are periodically exposed to high levels of solvent vapors can be acutely affected such as intoxication, fatigue, poor endurance, headache, nausea, tremor, balance complaints to mild depression (Spurgeon et al., 1994)⁴.

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Kurnianto (2016) stated that the results of measuring xylene concentrations in the car painting area of Surabaya at 5 painting locations showed an average yield of 146.47 ppm which was above the threshold according to Minister of Manpower and Transmigration Regulation No. 13 of 20116 and Minister of Manpower Regulation Number. 5 of 20187. The set threshold value is not much different, namely 434 mg/m$^3$ (100 ppm). While it does not cause a carcinogenic effect, it has an impact on health if one is continuously exposed.

Research conducted by Ilhan in 2004 on workers in Turkey showed that as many as 131 workers exposed to organic solvents with a noise of 85 dB in the workplace experienced increased hearing damage in the paint-making industry and painting workers with higher xylene organic solvents than workers who were only exposed to noise with the same level (Ilhan et al., 2014)$^8$. Exposure to 10,000 ppm xylene inhaled shows complaints of kidney function characterized by increased levels of β-glucoronidase and albumin and the excretion of red blood cells and white blood cells in the urine (Malathi, 2014)$^9$.

Based on the previous research, calculations of xylene Reference of Concentration (RfC) on workers around the car painting area of Surabaya by using anthropometric data of Indonesian people has not been made. RfC as a safe concentration of xylene which is recommended for car painting workers in Indonesia still uses research references from America and Europe so that it is not accurately used as a reference in determining risk for Indonesian people. The xylene response dose was obtained from IRIS (2003) in US EPA10 which stated an inhalation reference dose (RfC) for non-xylene carcinogen exposure in the air by 0.1 mg/m$^3$. The RfC number is multiplied by the default value of the adult inhalation rate by 20 m$^3$/day (Kolluru, 1996) 11 and divided by the default value of adult body weight 70 kg (EPA, 1991) 12 resulting in 0.03 mg/kg.

In this study, the calculation of RfC was derived from experimental doses of NOAEL (No Observed Adverse Effect Level) using the characteristics of the experimental animals of white rats (Rattus norvegicus) from Indonesia and anthropometric factors (Wb, tE, fE, and Dt) car painting workers. The value of NOAEL xylene average body weight, the average height of Indonesian people is then obtained. The purpose of this article is to determine the xylene RfC for workers around the car painting area of Surabaya, Indonesia so that the results can be used as a reference to estimate the amount of exposure each day that workers can receive without causing harmful effects during their lifetime.

**Material and Method**

This is an analytic observational study conducted in a cross sectional manner. The study population consisted of 2 strata of groups of workers namely car painting workers on Jalan Pengenal Kota Surabaya and group of car wreckers. The sampling technique was proportionate stratified random sampling which produced 51 samples consisting of 36 painters and 15 repairer.

The research design starts from secondary data collection related to the general description of the location, number of workers, and work schedule obtained from the chairman of the Welding and Painting Employers Association (PPLDC) Surabaya. Literature studies are carried out by studying scientific books, research reports, research journals related to xylene toxicology. Furthermore, primary data collection related to xylene content in the air was carried out by collaborating with the Prodia laboratory and UPT K3 East Java Province.

The research variables were xylene concentration, body weight, height, respiratory rate, exposure time in a day, body surface area of workers, weight of white rats, body surface of white rats, highest dose of toxin without effect on experimental animals (NOAEL), Km factor in animals (Animal Km), factor Km in society (Human Km), RfC. Data analysis in this study was carried out by using quantitative data analysis manually to determine the xylene RfC.

**Findings**

A. Characteristics and Body Surface Area of Experimental Animal

The experimental animals used in this study were white rats (Rattus norvegicus). The properties of white rats are perfectly known, easy to maintain, and are relatively healthy and suitable for various studies. In general, human response to toxicity is qualitatively similar to that of animals. This fact is the basis of extrapolation of animal data to humans.
Table 1. Distribution of Characteristics of Experimental Animals (White Rats)

<table>
<thead>
<tr>
<th>Research Object (White Rats)</th>
<th>W (kg)</th>
<th>BSA (m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.1405</td>
<td>0.024165</td>
</tr>
<tr>
<td>2</td>
<td>0.1405</td>
<td>0.024165</td>
</tr>
<tr>
<td>3</td>
<td>0.141</td>
<td>0.024223</td>
</tr>
<tr>
<td>4</td>
<td>0.141</td>
<td>0.024223</td>
</tr>
<tr>
<td>5</td>
<td>0.1395</td>
<td>0.02405</td>
</tr>
<tr>
<td>6</td>
<td>0.1415</td>
<td>0.024165</td>
</tr>
<tr>
<td>Total</td>
<td>0.844</td>
<td>0.144991</td>
</tr>
<tr>
<td>Average</td>
<td>0.140666667</td>
<td>0.024165167</td>
</tr>
</tbody>
</table>

Based on data from Table 1, body surface area of white rats is calculated using the following formula.

\[
BSA = 0.09 W^{0.67} H^{0.67}
\]

Where

- \( BSA \): Body Surface Area (m²)
- \( W \): Weight (kg)

B. Characteristics, Worker’s Body Surface Area and Worker’s Respiratory Rate

The characteristics of workers in this study included weight and exposure time of 51 respondents who settled around the fertilizer industry. The average body weight is 62.14 kg and the average exposure time is 6.67 hours. Community height uses the average value of Indonesian adult height of 159 cm.

Based on data on body weight and height, people’s body surface area and respiratory rate were calculated using the following formula.

Worker’s body Surface Area

\[
BSA = \sqrt{W \cdot h^{3600}/W \cdot h^{3600}}
\]

WHERE

- \( BSA \): Body Surface Area (m²)
- \( W \): Weight (kg)

<table>
<thead>
<tr>
<th>Workers</th>
<th>Wb (Kg)</th>
<th>h (Cm)</th>
<th>BSA (m²)</th>
<th>t (hour/day)</th>
<th>BR (m(^3)/hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>50.1</td>
<td>159</td>
<td>1.48</td>
<td>6</td>
<td>0.57</td>
</tr>
<tr>
<td>2</td>
<td>50.1</td>
<td>159</td>
<td>1.48</td>
<td>6</td>
<td>0.57</td>
</tr>
<tr>
<td>3</td>
<td>50.1</td>
<td>159</td>
<td>1.48</td>
<td>6</td>
<td>0.57</td>
</tr>
<tr>
<td>4</td>
<td>50.1</td>
<td>159</td>
<td>1.48</td>
<td>6</td>
<td>0.57</td>
</tr>
<tr>
<td>5</td>
<td>50.1</td>
<td>159</td>
<td>1.48</td>
<td>6.5</td>
<td>0.57</td>
</tr>
<tr>
<td>6</td>
<td>50.1</td>
<td>159</td>
<td>1.48</td>
<td>6.5</td>
<td>0.57</td>
</tr>
<tr>
<td>7</td>
<td>50.1</td>
<td>159</td>
<td>1.48</td>
<td>6.5</td>
<td>0.57</td>
</tr>
<tr>
<td>8</td>
<td>50.1</td>
<td>159</td>
<td>1.48</td>
<td>6.5</td>
<td>0.57</td>
</tr>
<tr>
<td>9</td>
<td>50.1</td>
<td>159</td>
<td>1.48</td>
<td>6.5</td>
<td>0.57</td>
</tr>
<tr>
<td>10</td>
<td>50.1</td>
<td>159</td>
<td>1.48</td>
<td>6.5</td>
<td>0.57</td>
</tr>
<tr>
<td>11</td>
<td>50.1</td>
<td>159</td>
<td>1.48</td>
<td>6.5</td>
<td>0.57</td>
</tr>
<tr>
<td>12</td>
<td>50.1</td>
<td>159</td>
<td>1.48</td>
<td>6.5</td>
<td>0.57</td>
</tr>
<tr>
<td>13</td>
<td>58.7</td>
<td>159</td>
<td>1.61</td>
<td>6.5</td>
<td>0.61</td>
</tr>
<tr>
<td>14</td>
<td>58.7</td>
<td>159</td>
<td>1.61</td>
<td>6.5</td>
<td>0.61</td>
</tr>
<tr>
<td>15</td>
<td>58.7</td>
<td>159</td>
<td>1.61</td>
<td>6.5</td>
<td>0.61</td>
</tr>
<tr>
<td>And so on</td>
<td>73.64</td>
<td>159</td>
<td>1.8034504</td>
<td>7</td>
<td>0.66</td>
</tr>
<tr>
<td>Average</td>
<td>62.14</td>
<td>159</td>
<td>1.65</td>
<td>6.67</td>
<td>0.62</td>
</tr>
</tbody>
</table>

Based on the calculation results of the average body surface area of the worker is 1.65 m² and the average respiratory rate is 0.62 m³/hour.
B. Xylene Concentration

The results of xylene concentration measurements in the car painting area showed different results at 5 workshop locations. The workshops at this location consist of open and semi-closed workshops.

<p>| Table 3. Distribution of Xylene Concentrations around Surabaya Car Painting Area |</p>
<table>
<thead>
<tr>
<th>Radius</th>
<th>Xylene Concentration (mg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workshop A (Open)</td>
<td>137.64</td>
</tr>
<tr>
<td>Workshop B (Open)</td>
<td>263.46</td>
</tr>
<tr>
<td>Workshop C (Open)</td>
<td>286.26</td>
</tr>
<tr>
<td>Workshop D (Semi Closed)</td>
<td>1176.66</td>
</tr>
<tr>
<td>Workshop E (Semi Closed)</td>
<td>1480.59</td>
</tr>
<tr>
<td>Average</td>
<td>635.98</td>
</tr>
</tbody>
</table>

Based on the results of measurements, the xylene concentration around the car painting area was 635.98 mg/m³ (146.47 ppm) with the highest concentration of 1480.59 mg/m³ (341 ppm) and the lowest concentration of 137.64 mg/m³ (31.7 ppm).

C. Animal Km and Human Km

Determination of safe dosage of toxin for the community begins with the calculation of Animal Km and Human Km.

1. Animal Km

\[
Animal\ Km = \frac{W_{\text{animal}}}{BSA_{\text{animal}}}
\]

Where:

Animal Km : Km factor on human
W : Wight of Experimental Animal (white rats)
BSA : Body Surface Area of Experimental Animal (white rats)

The results of the Animal Km calculation are shown in table 4 with an average Animal Km in experimental white rats of 5.81.

<p>| Table 4. Results of Calculation of Animal Km in White Rice |</p>
<table>
<thead>
<tr>
<th>Experimental Animal (White rats)</th>
<th>Animal Km</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.814209516</td>
</tr>
<tr>
<td>2</td>
<td>5.814209516</td>
</tr>
<tr>
<td>3</td>
<td>5.821029467</td>
</tr>
<tr>
<td>4</td>
<td>5.821029467</td>
</tr>
<tr>
<td>5</td>
<td>5.800520675</td>
</tr>
<tr>
<td>6</td>
<td>5.827833234</td>
</tr>
<tr>
<td>Averages</td>
<td>5.816471979</td>
</tr>
</tbody>
</table>

2. Human Km

\[
Human\ Km = \frac{W_{human}}{BSA_{human}}
\]

Where:

Human Km : Km factor on human
W : Workers’ weight
BSA : Workers’ Body Surface Area

The results of the Human Km calculation are shown in table 5 with Human Km average for workers of 37.41.
**Table 5. Results of Human Km Calculation for Workers around the Surabaya Car Painting Area**

<table>
<thead>
<tr>
<th>Citizen</th>
<th>Human Km</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>33.67</td>
</tr>
<tr>
<td>2</td>
<td>33.67</td>
</tr>
<tr>
<td>3</td>
<td>33.67</td>
</tr>
<tr>
<td>4</td>
<td>33.67</td>
</tr>
<tr>
<td>5</td>
<td>33.67</td>
</tr>
<tr>
<td>6</td>
<td>33.67</td>
</tr>
<tr>
<td>7</td>
<td>33.67</td>
</tr>
<tr>
<td>8</td>
<td>33.67</td>
</tr>
<tr>
<td>9</td>
<td>33.67</td>
</tr>
<tr>
<td>10</td>
<td>33.67</td>
</tr>
<tr>
<td>11</td>
<td>33.67</td>
</tr>
<tr>
<td>12</td>
<td>33.67</td>
</tr>
<tr>
<td>13</td>
<td>36.45</td>
</tr>
<tr>
<td>14</td>
<td>36.45</td>
</tr>
<tr>
<td>15</td>
<td>36.45</td>
</tr>
<tr>
<td>dst</td>
<td>51</td>
</tr>
<tr>
<td>Average</td>
<td>37.41</td>
</tr>
</tbody>
</table>

**D. No Observed Adverse Effect Level (NOAEL)**

One of the objectives of research activities in the field of toxicology is to evaluate the safety of a substance. The safe limit of the concentration of a chemical begins with the toxicity test for determining the highest dose without causing effects on experimental animals or No Observed Adverse Effect Level (NOAEL). Korsak et al. (1994) in U.S. The 2003 Environmental Protection Agency10 stated that NOAEL xylene is 50 ppm (mg / kg: ppm is 1: 1).

**E. Reference of Concentration (RfC)**


\[
RfC = \frac{\text{NOAEL}}{\frac{\text{Animal Km}}{\text{Human Km}}} 
\]

where:

- \( RfC \): Reference of Concentration
- Animal Km: Km factor on animal
- Human Km: Km faktor on human

Results of Calculation of Reference of Concentration (RfC) obtained from NOAEL, Animal Km averages, and Human Km averages are as follows.

\[
RfC = \frac{50 \times \frac{5.81}{5.81}}{37,4137,4135.96} = 7.76 \text{ mg/kg}
\]

Based on the results of calculations, the inhalation Reference Concentration (Rfc) for workers around car painting area of Surabaya is 7.76 mg/kg.

**Discussion**

Based on the measurement results, the average xylene concentration around the car painting area of Surabaya was 635.98 mg / m\(^3\) (146.47 ppm) with the highest concentration of 1480.59 mg/m\(^3\) (341 ppm) and the lowest concentration of 137.64 mg/ m\(^3\) (31.7 ppm). The value of xylene concentration is higher than the results of a study conducted by Irawati (2010)\(^{17}\) on shoe shop workers in the small industrial area of Jakarta with an average value of 0.05 mg / m\(^3\) with the highest concentration in the section 0.18 mg/m\(^3\). This is in line with the research conducted by Cahyana et al (2015)\(^{18}\) in informal car painting workers in Bandung with xylene values between 0.042 and 4.447 ppm. The significant difference in concentration between this study and other studies was caused by differences in sources of xylene exposure. For research conducted in the car painting area in Bandung, there are 3 types of workshops of open, semi-open, and closed that the results are smaller. In this study there were only 2 types of open and semi-closed workshops.

RfC in the present study is 7.76 mg/kg. Calculation of RfC xylene in this study is greater than that of RfC according to IRIS (2003) in US EPA 1991 of 0.03 mg/ kg. There were significant differences in RfC results because the calculations were carried out using relatively...
different data on Indonesian body weight and height. In addition, the concentration of xylene in the air of the car painting area of Surabaya, Indonesia is also high. The greater the RfC, the greater the safe concentration so that it becomes less stringent and less safe for workers. Thus, control measures are still needed to reduce xylen exposure.

Control measures that can be taken are the provision of air vents (local exhaust) especially for semi-closed workshops, the use of paint containing safer organic solvents, the use of appropriate personal protective equipment in the form of half mask respirators with organic vapor cartridges to minimize xylen vapor exposure (ATSDR, 2007)\(^1\).

**Conclusion**

The average xylen concentration around the car painting area of Surabaya, Indonesia is 635.98 mg/m\(^3\) (146.47 ppm). This level of concentration is above the threshold value according to Minister of Manpower and Transmigration Regulation Number 13 of 2011 and Minister of Manpower Regulation Number. 5 of 2018 is 434 mg/m\(^3\) (100 ppm). The average body weight is 62.14 kg and the average exposure time is 6.67 hours. For community height data, the researchers used the average value of Indonesian adult height of 159 cm.

The results of RfC car painting workers with NOAEL 50 mg/kg is 7.76 mg/kg.

**Conflict of Interest:** All authors have no conflicts of interest to declare.

**Source of Funding:** This is an article “Determination of Reference of Concentration (RfC) Xylen Exposure Based on Xylen NOAEL in White Rats and Workers’ Body Weight and Height in Surabaya Car Painting Area, Indonesia” of Occupational Health and Safety Department that was supported by Faculty of Public Health, Airlangga University.

**Ethical Clearance:** The study was approved by the institutional Ethical Board of the Public Health, Airlangga University

**References**


Therapeutic Health Benefits of Religion Among Elderly—A Population based Representative Survey from Iran

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Abstract

Background: We determined whether practice of religious beliefs influence health-related lifestyle among general elderly population.

Methods: We recruited elderly (60+years) subjects from among the general population who were invited to answer practice of religious belief and healthy lifestyle in Iranian elderly questionnaires.

Results: A total of 218 elderly subjects participated (51.3% males, mean age: 68.3 years, SD 9.2, range 60-92). The mean religious belief was 73.0 (SD 11.5) without male-to-female difference (p=0.9). The mean lifestyle was 100.9 (SD 14.7, range 61-138) with a 9.3% male-to-female difference, p=0.0001. The odds of better lifestyle with religion was 5.5 (p=0.001, effect-size=0.18, variance=29.5%). The most benefit was in prevention (effect-size 0.18), nutrition (effect-size 0.15), and social relationship (effect-size 0.12).

Conclusions: Based on a representative un-selected validated sample, and by using a systematic questionnaire, and after controlling for various possible confounders, and within current evaluation limits, we may conclude that religion may mitigate health-related lifestyle.

Keywords: Epidemiology, religion, mental health, transcultural, social, health,

Introduction

Since the beginning of human history, religion has always had a strong association with the practice of medicine and healthcare in general [1, 2]. For instance, early community health and medical facilities up to French revolution had mostly been initiated by the religious institutions and clergies-cum-physicians [1, 3].

Thus, religion has not had a strong association with the early practice of medicine but still has a valid clinical context[4]; for instance 1/4th of all mental illness cases can be explained through religion [5].

Despite considerable public and clinical significance, the research on this topic is often avoided [1] [6], and religious aspects are never or rarely enquired about in a day-to-day clinical practice[4]. Thus, by avoiding such topics, we may unintentionally devoid others, especially elders, of possible benefits from practicing religion. This is because elders have a different frequency of practicing religion [7], they have different spiritual [8] and health [1, 5] needs, and they are far more inclined to seek health and welfare benefits from religion [9]. The prevalence of aging is increasing [10]. Thus, continuing with our vision of establishing a reliable mental health (and neurological) profile and an international positive participation of scientifically-silent countries, and with an objective to examine an association between practice of religion and health-related lifestyle among general

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elderly population, we performed this work in Ali Abad Katool (Iran).

Methods

Iran is one of the most prominent countries of the MENA region, and a country of our major interest. For many reasons, our choice of Iran was appropriate, figure 1. For instance, in principal, Iran is religiously unitary which is not the case in many countries. For instance, in UK, there are likely to be about 170 distinct religions [11]. Another reason was that, although other religions are allowed, Iran principally follows Islam, which was again advantageous in this context. For instance, in Hinduism, there are said to be 33 million god-bodies. In Christianity, although there is no exact number, but the sects and denominations are likely to be in 1000s. Thus, belief system is likely to change with each sect or denomination. The choice was further appropriate since Islam is already dose-defined (including the time, nature, and quantity) which is not likely to be in other religions. For instance, in Christianity, The Bible says “to pray without ceasing” (Romans New Testament 12:12).

Besides, all this, today, Islam is the fastest growing religion in the world and may sooner or later become the most prevalent. For instance, Islam grew 15.0% in the last five years in Australia; the Christians are reduced to 70.0% in Sweden; in 2008, 61.0% of those who annually migrated to France belonged to Meghreb [12]; by 2040 the Islam would become the 2nd largest religion in USA; in UK about 100,000 convert to Islam every year which showed a 12.0% growth in the last three years. It is also important to note that for MENA countries, like Algeria and Tunisia, having the nationality of their colonial country (i.e. France) is almost a right (Personal data, D Bhalla). Thus, a greater understanding through Islam populations is not a privilege anymore but a full necessity.

The project was conducted in Ali Abad Katool (Iran). Ali Abad Katool is a mountaneous area covered with Alborz mountains with a general population of about 46000. A participation was invited from among the residents through three population-based sources (i.e. elder leisure center, main mosque, main park). The participants were required to meet our inclusion criteria as below. Those who didn’t meet these criteria were not invited. The inclusion criteria were:

- Muslim, age 60 years and above, any gender,
- Ability and interest to participate,
- Being cognitively intact, as defined through primary assessment and interview,
- No substance abuse or other conditions that may preclude participation

To determine practice of religion and health-related lifestyle, we used 25-item practice of religious belief (PRBQ) and 46-item healthy lifestyle among Iranian elderly (HLEQ) questionnaires. Both have earlier been demonstrated to be valid in our cultural context, and have a cronbach alpha of 0.91 [13] and 0.76 [14], respectively. For this work, PRBQ scores were categorized as <50, 51-74, and >74, while HLEQ scores were categorized as undesirable lifestyle (upto 98), medium desirable lifestyle (99-155), and fully desirable lifestyle (>155).

The required sample size was estimating by using a simple formulae after assuming a type1 error as 0.05, type2 error as 0.2 and correlation factor of 0.2 [15]. This required a sample of 194 subjects however we aimed to recruit additional 10.0% to this. All data was entered into MS-Excel. The statistical approach was according to the type of variable and purpose. The data was described in number, range, frequency, standard deviation (SD), mean, median, 95% confidence interval (CI). The statistical significance testing of a group proportion (eg. gender) and means was done for parameters we deemed suitable. By using an ordinal regression, religion was regressed with lifestyle to determine respective odd ratios (OR) and respective statistical significance. A Tukey’s posthoc test was thereafter performed to determine value of contrast and significance between different religion score categories. Similarly, five lifestyle domains (prevention, physical activity, nutrition, social relationship, stress management) were regressed with religion to identify which domains are likely to be affected by religion. By using an independent t-test, the means of both religion practice and health-related lifestyle were seperately examined for all possible sociodemographic indicators (including number of children (categorised as <5 children or >5 children), literacy (illiterate or literate), marital status (married or unmarried), employment (employed or unemployed), age (<75 years or >75 years)). Those factors which were found to be statistically significant above were later controlled-for in the regression while determining relationship between religion and lifestyle. The proportion of variance ($r^2$) in the dependent variable
that can be explained by our independent variable was also determined. The effect size (ES) was also calculated by using means, SD, 95% CI, and population size. The ES is more intuitive since it is independent of the sample size. Lastly, we had taken informed consent prior to allowing participation along with an ethic permission from the institutional review board of the Islamic Azad University. The funding agency had no undesirable role during this project.

**Results**

Overall, a total of 218 elderly subjects participated, and they had an overall mean age of 68.3 years (SD 9.2, range 60-92, 95% CI 63.8-66.2). Of them, 112 (51.3%) were males. A comparison of two proportions (male-female) was not statistically significant, \( p=0.9 \). The remaining details are provided in Table 1 below.

The mean religious score among overall population was 73.0 (SD 11.5, range 35-95, 95% CI 71.5-74.5). Among males and females, the religious score was 73.0 (SD 11.5, range 43-95) and 72.9 (SD 11.5, range 35-92), \( p=0.9 \), respectively. Similarly, the mean lifestyle score among overall population was 100.9 (SD 14.7, range 61-138). Among males and females, this score was 110.9 (SD 14.7, range 61-138) and 101.0 (SD 14.7, range 61-129), \( p=0.0001 \), respectively. To simplify, both religious and lifestyle scores were medium, and, religious score was nearly identical for males and females (\( p=0.9 \)), while, lifestyle score was significantly better among males than females by about 9.3% (\( p=0.0001 \)).

**Lifestyle domains:**

The mean lifestyle score across individual domains was: prevention (39.2, SD 6.1, range 24-53), nutrition (25.6, SD 4.9, range 15-39), physical activity (10.5, SD 2.6, range 6-19), stress management (8.8, SD 3.0, range 4-18) and social relationships (16.5, SD 3.7, range 7-26). By gender, only social relationship domain (17.0±3.4 vs 16.0±4.0, \( p=0.04 \), ES= 0.01, respectively) was statistically different between males and females.

Associators and predictors (sociodemographic factors) of lifestyle and religious belief:

By using an independent t-test, the mean religious score was both numerically and statistically higher among those with <5 children (75.1, 95% CI 72.7-77.4 vs. 71.2, 95% CI 69.3-73.2, \( p=0.007 \), and the literate ones (76.7, 95% CI 74.4-79.0 vs. 70.2, 95% CI 68.2-72.1, \( p=0.0001 \). By using an independent
t-test, the mean lifestyle score was higher for those with <5 children (103.0, 95% CI 100.5-105.4 vs. 98.5, 95% CI 95.3-101.6, \( p=0.01 \), ES=0.02), and the unmarried ones (108.2, 95% CI 105.1-111.3 vs. 99.2, 95% CI 96.9-101.4, \( p=0.0002 \), ES=0.10).

Interaction between religious beliefs and lifestyle, and role of moderators:

Based on an ordinal regression, for a one unit increase in religion category, the odds of having a high lifestyle was estimated to be 5.5 (95% CI 3.1-9.7, \( p=0.001 \), ES=0.18, \( r^2=29.5\% \)), given that all of the other variables in the model are held constant. Based on a Tukey post-hoc test, all three religion categories were statistically different as follows: between <50 and >75 (contrast 24.4, 95% CI 12.8-35.9, \( p=0.001 \)), between <50 and 51-74 (contrast 12.8, 95% CI 1.4-24.3, \( p=0.02 \), and between 51-74 and >75 (contrast 11.5, 95% CI 7.1-15.8, \( p=0.001 \)). After controlling for above three moderator factors (marital status, number of children, and employment), for a one unit increase in religion category, the odd of having a high lifestyle was estimated to be 5.8 (95% CI 3.1-10.5, \( p=0.001 \), ES=0.19).

According to five lifestyle domains, by using an ordinal regression, the religion practice successfully predicted the domains of prevention (OR=0.18, 95% CI 0.11-0.28, \( p=0.001 \), ES=0.18), nutrition (OR=0.21, 95% CI 0.13-0.34, \( p=0.001 \), ES=0.15), social relationship (OR=0.25, 95% CI 0.16-0.40, \( p=0.001 \), ES=0.12). The other two domains did not have any significant prediction.

**Discussion**

Aging is a period of life in which the elderly may face many psychological problems[18].

We performed an important work to determine any health-related association with regards to the practice of religion. For this, we used structured detailed questionnaires. Moreover, our sample was from various population-based sources and no particular gender was overly-present in our sample (\( p=0.9 \)).

Our work provides new knowledge and dissipate myths as well. For instance, hyper-religiosity is popularly perceived for Iran, Muslims, and the MENA region[16]. However, our religion score was fairly moderate, both for males and females, without any gender-based difference (\( p=0.9 \)). Despite popular beliefs, this should not be unexpected because Islam is a dose-defined religion
(including the time, nature, and quantity of prayers one has to do), for both males and females, which is visibly not in other religions. For instance, in Christianity, The Bible says “to pray without ceasing” (Romans New Testament 12:12). Moreover, based on a United Nations survey, the most violent region in the world is Latin America, followed by Africa, and not the MENA region [17], as popular perceptions might indicate.

Conclusions

Based on a representative un-selected validated sample, and by using a systematic questionnaire, and after controlling for various possible confounders, and within current evaluation limits, we may conclude that religion may mitigate health-related lifestyle.

Acknowledgment: We acknowledge all, named or unnamed, that might be. Funding was procured from the Islamic Azad University, Iran. The funding agency had no undesirable role during either planning or the implementation of this survey.

Conflict of Interests: There is no conflicting interest.

Source of Funding: This study was approved by Islamic Azad University of Aliabad Katoul.

Ethical Clearance: IR.GOMUS.REC1395.18 approved by Golestan University of Medical Sciences

References


The Effect of Storage and Time of Blood Specimen Examination of Plasma Prothrombin Time and Activated Partial Thromboplastin Time Stabilities

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Abstract
This was an analytical study with cross sectional design. Collection of blood specimens was carried out by consecutive sampling during March-June 2019. Blood specimens in this study were healthy adults aged ≥21 years who underwent general medical check-up or blood donors who met the inclusion criteria and signed informed consent. A total of 71 samples were stored at room temperature and temperature 4-8 °C, then PT (prothrombin time) and aPTT (activated partial thromboplastin time) checks were carried out at 0, 4, 12, and 24 hours. Data were analyzed by using Kolmogorov-Smirnov Test, paired t test and Wilcoxon Signed Rank Test. There were differences in the results of PT in the room temperature specimens and 4-8 °C at 4 hours, 12 hours, and 24 hours with p value <0.001. This was also found in the aPTT parameter, but for specimens at 4-8 °C at the 24th hour examination the results of changes in aPTT were not statistically significant with p values 0.062. Different PT and aPTT tests at the two storage areas and at different examination times obtained different and statistically significant results with p value <0.001. Examination of hemostasis physiology requires special attention, where pre-analytic plays an important role which can influence the overall test results. The aspects of time and storage on the stability of PT and aPTT specimens are illustrated in this study where significant differences were obtained with p values <0.001. Examination and storage of coagulation study specimens in accordance with CLSI recommendations will provide accurate results and accurately describe the state of the specimen according to the patient’s clinical condition.

Keywords: activated partial thromboplastin time, examination time, preanalytic coagulation study, prothrombin time, hematology

Introduction
Coagulation is a physiological routine test requested at a clinical laboratory to identify the occurrence of coagulation disorders and monitor anticoagulant therapy. In the last few decades, various ways have been developed to improve the quality of preanalytic, analytic and standardized coagulation tests. However, poor control and standardization of the preanalytic phase still needs to be improved as it disrupts the reliability of the results. Therefore, continuous efforts to identify and prevent preanalytic errors are needed[1,2].

Although the integrity of specimens is important for each laboratory test, coagulation testing that requires plasma specimens seems to be very sensitive to even small deviations from standard practice regarding anticoagulant concentrations, container materials, collection techniques, centrifugation, examination time and blood specimen storage. Coagulation physiological testing is a routine test carried out in laboratories in general, and in Dr. Soetomo Hospital, Surabaya, Indonesia[1,2].

Similar to reagents, specimens also decline over time, which leads to a number of false test result points.
In most cases, laboratories can safely use manufacturer’s or published study information to determine the stability of the specimen, but in some conditions the stability of the specimen is not available yet\(^\text{[3,4,5,6]}\). Because of this reason, research related to recommendations of storage and examination time on the stability of PPT and aPTT blood specimens in the testing of coagulation physiology in Dr. Soetomo Hospital laboratory is very important, considering that the results of an accurate, fast, and precise testing is closely related to the financing and quality of blood testing services at Dr. Soetomo Hospital, Surabaya, Indonesia.

### Materials and Method

The study used analytical study with cross sectional design. Blood specimens in this study were obtained from healthy adults aged \(\geq 21\) years old who underwent general medical check-up or blood donor that met the inclusion criteria and was willing to take part in the study. The collection of blood specimens was carried out by consecutive sampling during March-June 2019.

Blood specimens were calculated using equation:

\[
\alpha = 0.05, 1-\beta = 0.90, \sigma = 5.8, \sigma_0^2 = 33.64, \mu_0 = 28.3, \mu_a = 30.7 \\
n = \frac{\sigma^2(Z_{1-\beta/2} + Z_{1-\alpha})^2}{(\mu_0 - \mu_a)^2}
\]

So that the value of blood specimen is 62. Blood specimen value was calculated using the hypothesis tests for a population mean (two-sided test). Patients were excluded from the analysis if they did not meet the inclusion criteria and did not sign informed consent.

Statistical tests were done using SPSS version 17.0. A total of 71 specimens were collected, then divided and stored at room temperature and 4 - 8 ° C. Afterwards, PT and aPTT at 0 hours, 4 hours, 12 hours, and 24 hours were assessed. Prior to the statistical test, normality test was performed using the Kolmogorov-Smirnov test. Normally distributed data was analyzed using paired t test while not normally distributed data was analyzed using the Wilcoxon Signed Rank test. Data was displayed as mean±standard deviation with \(p <0.05\) significantly.

### Results

A total of 71 specimens that met the inclusion criteria and signed the informed consent were obtained for this study.

#### Table 1. Difference Test of PT of Room Temperature and 4-8 °C Specimen Groups at 0 hour, 4 hour, 12 hour, and 24 hour.

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Storage Time</th>
<th>n</th>
<th>Mean ± Standard Deviation</th>
<th>Median (min-max)</th>
<th>Difference with 0 hour</th>
<th>Mean ± Standard Deviation</th>
<th>p Value</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Room Temperature</td>
<td>0 hours</td>
<td>71</td>
<td>10.05 ± 0.361</td>
<td>10 (95-11.2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 hours</td>
<td>71</td>
<td>9.85 ± 0.445</td>
<td>9.8 (9-11.6)</td>
<td>-0.199 ± 0.266</td>
<td>&lt; 0.001</td>
<td>Significant</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12 hours</td>
<td>71</td>
<td>9.95 ± 0.351</td>
<td>9.9 (9.3-11)</td>
<td>-0.094 ± 0.150</td>
<td>&lt; 0.001</td>
<td>Significant</td>
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<tr>
<td></td>
<td>24 hours</td>
<td>71</td>
<td>10.22 ± 0.588</td>
<td>10.1 (9.3-12.5)</td>
<td>0.175 ± 0.572</td>
<td>0.045</td>
<td>Significant</td>
<td></td>
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<tr>
<td>4-8 °C</td>
<td>4 hours</td>
<td>71</td>
<td>10.10 ± 0.364</td>
<td>10.1 (9.5-11.3)</td>
<td>0.056 ± 0.198</td>
<td>0.001</td>
<td>Significant</td>
<td></td>
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<tr>
<td></td>
<td>12 hours</td>
<td>71</td>
<td>10.13 ± 0.457</td>
<td>10.1 (9.2-11.4)</td>
<td>0.086 ± 0.259</td>
<td>0.007</td>
<td>Significant</td>
<td></td>
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<tr>
<td></td>
<td>24 hours</td>
<td>71</td>
<td>10.41 ± 0.900</td>
<td>10.3 (7.9-15.8)</td>
<td>0.369 ± 0.897</td>
<td>&lt; 0.001</td>
<td>Significant</td>
<td></td>
</tr>
</tbody>
</table>
Table 2. Difference Test of aPTT of Room Temperature and Specimen Group at 0 hour, 4 hour, 12 hour, and 24 hour.

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Storage Time</th>
<th>n</th>
<th>Mean ± Standard Deviation</th>
<th>Median (min–max)</th>
<th>Difference with 0 hour</th>
<th>Mean ± Standard Deviation</th>
<th>p Value</th>
<th>Details</th>
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<tbody>
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<td></td>
</tr>
<tr>
<td>Room Temperature</td>
<td>0 hour</td>
<td>71</td>
<td>29.01±2.160</td>
<td>29.1 (23.6-35.6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 hours</td>
<td>71</td>
<td>28.26±2.568</td>
<td>28.4 (23.5-35.0)</td>
<td>-0.75±2.054</td>
<td>0.090</td>
<td>Significant</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12 hours</td>
<td>71</td>
<td>30.60±2.120</td>
<td>30.2 (27.1-37.0)</td>
<td>1.587±1.222</td>
<td>&lt; 0.001</td>
<td>Significant</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24 hours</td>
<td>71</td>
<td>31.48±2.417</td>
<td>31.3 (26.6-37.2)</td>
<td>2.475±2.089</td>
<td>&lt; 0.001</td>
<td>Significant</td>
<td></td>
</tr>
<tr>
<td>4-8 °C</td>
<td>4 hours</td>
<td>71</td>
<td>29.38±1.956</td>
<td>29.2 (25.4-35.0)</td>
<td>0.370±0.872</td>
<td>&lt; 0.001</td>
<td>Significant</td>
<td></td>
</tr>
<tr>
<td></td>
<td>12 hours</td>
<td>71</td>
<td>29.61±2.645</td>
<td>29.4 (23.7-37.1)</td>
<td>0.597±2.067</td>
<td>0.008</td>
<td>Significant</td>
<td></td>
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<tr>
<td></td>
<td>24 hours</td>
<td>71</td>
<td>29.53±2.141</td>
<td>29.6 (23.1-34.6)</td>
<td>0.518±2.304</td>
<td>0.062</td>
<td>Not Significant</td>
<td></td>
</tr>
</tbody>
</table>

Table 3. Difference Test Results of PT at 4th Hour, 12th Hour and 24th Hour at Room Temperature and at 4-8 °C.

<table>
<thead>
<tr>
<th>Storage Time</th>
<th>Temperature</th>
<th>n</th>
<th>Mean ± Standard Deviation</th>
<th>Median (min – max)</th>
<th>Difference</th>
<th>Mean ± Standard Deviation</th>
<th>p Value</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Room Temperature</td>
<td>71</td>
<td>9.85±0.445</td>
<td>9.8 (9-11.6)</td>
<td>0.255±0.347</td>
<td>&lt; 0.001</td>
<td>Significant</td>
<td></td>
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<tr>
<td></td>
<td>4-8 °C</td>
<td>71</td>
<td>10.10±0.364</td>
<td>10.1 (9.5-11.3)</td>
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</tr>
<tr>
<td>12 hours</td>
<td>Room Temperature</td>
<td>71</td>
<td>9.95±0.351</td>
<td>9.9 (9.3-11)</td>
<td>0.180±0.262</td>
<td>&lt; 0.001</td>
<td>Significant</td>
<td></td>
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<tr>
<td></td>
<td>4-8 °C</td>
<td>71</td>
<td>10.13±0.457</td>
<td>10.1 (9.2-11.4)</td>
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<tr>
<td>24 hours</td>
<td>Room Temperature</td>
<td>71</td>
<td>10.22±0.588</td>
<td>10.1 (9.3-12.5)</td>
<td>0.194±0.817</td>
<td>0.001</td>
<td>Significant</td>
<td></td>
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<tr>
<td></td>
<td>4-8 °C</td>
<td>71</td>
<td>10.41±0.900</td>
<td>10.3 (7.9-15.8)</td>
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</tbody>
</table>
Table 4. Difference Test Results of aPTT at 4 Hours, 12 Hours and 24 Hours at Room Temperature and at 4-8 °C.

<table>
<thead>
<tr>
<th>Storage Time</th>
<th>Temperature</th>
<th>n</th>
<th>Mean ± Standard Deviation</th>
<th>Median (min-max)</th>
<th>Difference</th>
<th>Mean ± Standard Deviation</th>
<th>p Value</th>
<th>Details</th>
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</thead>
<tbody>
<tr>
<td>4 hours</td>
<td>Room Temperature</td>
<td>71</td>
<td>28.26±2.568</td>
<td>28.4 (23.5-35.0)</td>
<td>1.121±1.688</td>
<td>&lt; 0.001</td>
<td>Significant</td>
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<tr>
<td></td>
<td>4-8 °C</td>
<td>71</td>
<td>29.38 ± 1.956</td>
<td>29.2 (25.4-35.0)</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>12 hours</td>
<td>Room Temperature</td>
<td>71</td>
<td>30.60 ± 2.120</td>
<td>30.2 (27.1-37.0)</td>
<td>-0.990±1.756</td>
<td>&lt; 0.001</td>
<td>Significant</td>
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<tr>
<td></td>
<td>4-8 °C</td>
<td>71</td>
<td>29.61 ± 2.645</td>
<td>29.4 (23.7-37.1)</td>
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</tr>
<tr>
<td>24 hours</td>
<td>Room Temperature</td>
<td>71</td>
<td>31.48 ± 2.417</td>
<td>31.3 (26.6-37.2)</td>
<td>-1.956±1.967</td>
<td>&lt; 0.001</td>
<td>Significant</td>
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<tr>
<td></td>
<td>4-8 °C</td>
<td>71</td>
<td>29.53 ± 2.141</td>
<td>29.6 (23.1-34.6)</td>
<td></td>
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</tbody>
</table>

Discussion

Preanalytic conditions that can potentially cause errors in hemostasis testing include improper sampling or improper handling of specimens. In these circumstances, the test results do not accurately reflect the state of the specimen according to the clinical condition of the patient[7]. In this study, as many as 71 specimens that met the inclusion criteria were collected, then PT and aPTT examinations were carried out at two different storage locations, namely at room temperature and at 4-8 °C, each at 0 hours, 4 hours, 12 hours and 24 hours. Clinical and Laboratory Standards Institute (CLSI) recommends storing specimens for the testing of physiological hemostasis at room temperature or non-refrigerated temperature and examined in the shortest time possible, preferably 1 (one) hour after collection[8]. At the Clinical Pathology Laboratory of Dr. Soetomo Hospital, Surabaya, the testing of physiological hemostasis is a routine test. Several conditions that occur in the field after the collection of specimens, either from the inpatient room or from the outpatient specimen collection room, may cause a variety of time delays between the collection and examination of the specimen. This can certainly affect the results of the examination and it is feared that results cannot describe the condition of the specimen according to the clinical condition of the patient accurately. Therefore, the time between specimen collection and specimen examination needs to be considered.

Prior to the testing of physiological hemostasis, the specimen must be stored at room temperature to prevent deterioration of unstable clotting factors such as factor V and factor VIII, and specimens do not need to be delivered in refrigeration, but at temperature of 15-22 °C. Extreme temperatures must be avoided and delays in transportation can affect unstable factors (factor V, factor VIII), which may cause prolongation of freezing time due to loss of activity of these factors[9,10]. In accordance with CLSI guidelines, specimens must be assessed as soon as possible (ideally within 1 hour after collection) to maintain specimen integrity.

According to the 71 specimens in this study, it can be generally said that there was a difference in the results of PT and aPTT on specimens examined at room temperature and at 4-8 °C. The mean±standard deviation of PT obtained at room temperature showed values of (10.05±0.361) seconds at 0 hours, (9.85±0.445) seconds at 4 hours, (9.95±0.351) seconds at 12 hours and (10.22±0.588) seconds at 24 hours. The data obtained
revealed information on the tendency of prolonged PT from the examination of 4 hours until the examination of 24 hours. However, the median variation did not show great differences with PT minimum value (9.0 seconds) and maximum value (12.5 seconds), where numbers were still in the range of PT reference values, namely (9-12) seconds.

The mean±standard deviation of PT at temperature of 4-8 °C revealed results of (10.10 ± 0.364) seconds at 4 hours, (10.13 ± 0.457) seconds at 12 hours and (10.41 ± 0.900) seconds at 24 hours. According to this data, there was a tendency of prolonged PT from the time of specimen collection to the 24-hour examination. It is important to pay attention to the storage of specimens at 4-8 °C, where examination at 24 hours showed a wide range of minimum - maximum values of PT parameter, namely (7.9-15.8) seconds. This shows that the storage of specimens at temperature of 4-8 °C can affect factor VII, thus prolong PT value beyond the reference value.

Difference test results of aPTT parameter on the room temperature specimen group at 4 hours, 12 hours and 24 hours showed p value of p <0.05. It can be concluded that there were statistically significant differences between specimens assessed at 0 hours with specimens assessed at 4 hours, 12 hours and 24 hours. The mean±standard deviation obtained at room temperature showed values of (29.01±2.160) seconds at 0 hours, (28.26±2.568) seconds at 4 hours, (30.60±2.120) seconds at 12 hours and (31.48±2.417) seconds at 24 hours. According to the data it can be informed that there was a prolonging of results, however the median of aPTT was in a range that was not much different (28.4-31.3) seconds. In this study, difference test was done on the results of specimens that were immediately assessed (0 hours), with the results of specimens assessed at 4 hours, 12 hours and 24 hours. Mean±standard deviation was obtained with variations that were still in the range of the standard reference value or slightly prolonged. So, although results are statistically reported to be significantly different with p value of p <0.001, results need to be further clinically studied to know the patient’s clinical condition and disease history.

Difference test results of aPTT at temperatures of 4-8 °C showed p value of p <0.001 at 4 and 12 hours, while at 24 hours, results showed p value of p = 0.0062. It can be concluded that statistically there was no significant difference in the results of aPTT at 24 hours. An interesting finding in the examination of aPTT at 4-8 °C and at 24 hours is that results showed very small differences, which were 0.23 seconds and 0.07 seconds, thus it can be concluded that there was no significant difference. This study is in accordance with the study conducted by Magnette et al. who concluded that physiological coagulation specimens are recommended to be stored at room temperature (15-25 °C) and the examination of specimens should be carried out <4 hours for whole blood specimens that are not centrifuged and <1 hour for centrifuged samples. Further research with a wide variety of storage time and larger quantity of specimens may provide data or results with higher accuracy in the form of cut off time and optimum storage temperature for PT and aPTT examination[5].

**Conclusion**

Is sum, the examination of hemostasis physiology requires special attention, where pre-analytic processes play an important role and can influence the overall test results. The aspects of time and storage on the stability of PT and aPTT specimens are illustrated in this study where a significant difference with p value of p <0.001 was obtained. Testing and storage of physiologic hemostasis specimens in accordance with CLSI recommendations will provide accurate results and accurately describe the state of the specimen according to the clinical condition of the patient.

**Conflict of Interest** : The authors declare that they have no conflict of interest.

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**Ethical Approval**: This study was approved by the Health Research Ethics Commission (KEPK), Dr. Soetomo Hospital, Surabaya, Indonesia (Number: 1049/KEPK/III/2019).

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Correlation of Urine Leukocytes and Urine Bacteria Using Current Sitometry Using Urine in Patients of Children Channel Infection

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Abstract

Background: Urinary tract infection (UTI) in children is a common illness. The gold standard for UTI diagnosis is urine culture, but it takes a long time and often gives negative results. Currently developed a method of flow cytometry for checking urine sediments. This tool is able to detect leukocytes urine and urine bacteria in quick time. The purpose of this study is to analyze the relationship of urine leukocyte count and the number of urine bacteria using flow cytometry with urine culture in patients with UTI.

Method: Eighty-four patients were enrolled in this study that consisting of 43 patients with suspected UTI and 43 patients with non-ISK treated at Inpatient Installation, Emergency Installation Department of Health Sciences at Dr.Soetomo General Hospital, Surabaya for 4 months. The examination of urine leukocytes and urine bacteria was using current cytometry method (UF-500i, Sysmex, Japan). While, examination of urine culture using blood agar plate and Mac. Conkey.

Results: There was a significant relationship between the number of leukocytes and the number of colonies. The relationship between leukocytes and the number of colonies was weak, this was indicated by Spearman correlation coefficient (rho) value of 0.376. There was a significant relationship between bacteria and the number of colonies. p <0.05. The relationship between the number of urine bacteria and the number of colonies was quite strong indicated by rho = 0.729.

Conclusion: There was a relationship between urine leukocyte count and the number of urine bacteria using flow cytometry with a urine culture.

Keywords: Urine leukocytes, Urine bacteria, Urine culture, Urinary tract infections.

Introduction

Urinary tract infection (UTI) in children is a common illness that found in addition to upper respiratory tract infections and diarrhea and the second most common cause of fever after upper respiratory tract infection 1. Urine culture examination takes a long time and can give false negative results. It may delay the diagnosis of UTI, which in the end the management of UTI is also delayed, which may lead to poor UTI prognosis. The incidence of UTI in children at Indonesia ranges from 0.1% to 1.9% of all cases that children treated within 5 years (1984-1989) 2.

The high incidence of UTI causes many requests for urine culture examination3,4. Positive urine culture when bacterial growth of more than 100.000 colony forming units (CFU)/mL from one pathogen5. 60 - 80% urine culture examination did not contain any infectious bacteria or just contaminants that can be solved by filter test 4,6,7. Examination of bacteria with Gram staining (sensitivity 96%, specificity 93%), examination using 10 cell/μL hemositometer (83% sensitivity and specificity) 8. Microscopic examination can give results faster than culture, more simple and inexpensive. But
the results of the examination require skilled, trained, and interpretation among interrogators can be different. In addition to microscopically, examination of urine and urine leukocyte bacteria can use the method of flow cytometry. Current cytometry methods can distinguish particles in urine and quantitatively calculate them, including leukocytes, erythrocytes, epithelium, bacteria, fungi, cylinders, and crystals. Sysmex UF-500i is one example of urine sediment examination tool using current cytometry method. This tool is able to check large quantities of samples with fast time.

The sensitivity and specificity of the examination using flow cytometry to confirm the diagnosis of UTI is non-existent. Previous studies have suggested that the 65-bit bacteria/mL and 100 leukocyte/mL cutoff points gave 98% sensitivity, specificity 62.1%, negative predictive value 98.7%, positive predictive value 53.7%. Other studies also stated that at the point of cutting of 230 bacteria/μL, urine culture <105 CFU/mL obtained 95% sensitivity and 80% specificity and able to reduce the number of urine culture examination by 52%. Research using flow cytometry in Indonesia is still rare. In this research will be examined using flow cytometry to assess the relationship of urine and urine leukocytes with urine culture results.

Method

This research was an observational analytic research with the cross-sectional design. The research started from the literature search, research proposal preparation, sample collection and workmanship, data management, and research report preparation conducted from March until June 2013. The research was conducted at Inpatient Installation, Outpatient Installation and Emergency Installation of Department Child Health Science Dr.Soetomo General Hospital/Faculty of Medicine Universitas Airlangga Surabaya, as the place of sampling. Sample examination was performed at the Clinical Pathology Installation of Dr.Soetomo/Faculty of Medicine Universitas Airlangga, Surabaya. The sample of the study was the pediatric patient and divided into two groups: groups of patients with UTI and Non-UTI that meet the inclusion criteria.

The inclusion criteria for samples meeting the criteria in this study included patients with suspected UTI aged 2 to 18 years, patients receiving antibiotics, doing urinalysis examination and obtaining positive esterase leukocyte, positive nitrite, uric microstatic leukocyte>5/Lpb or found urine bacteria microscopic, and willing to sign informed consent. Urinalysis results obtained negative nitrite, leukocyte esterase negative, leukocyte urine microscopic <5Lpb or not found microscopic urine bacteria.

This study was started by selecting the sample according to the inclusion criteria, then the urine sampling was performed by catheterization in children less than 6 years old and the way of urine transmit clean in children more than 6 years old. After the urine sample is directly sent to the Installation of Clinical Pathology Dr.Soetomo General Hospital for urine examination using flow cytometry (UF 500i) (Sysmex Corporation, Japan) and urine culture was done within ≤ 1 hour.

All collected data collected in the data collection sheet was presented in tabular form, the diagram was processed statistically in the form of descriptive analysis. To calculate sensitivity, specificity, positive predictive value, negative and ROC curve, and to know the relation of urine leukocyte count and urine bacteria, statistic analysis test using Pearson correlation test if the data was normally distributed if the data not normally distributed using Spearman correlation test.

Results

Table 1. The suitability between the tilt image on the flow cytometry and the bacterial form of the urine culture

<table>
<thead>
<tr>
<th>Tilt Picture</th>
<th>n</th>
<th>Right</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tilt 1</td>
<td>3</td>
<td>2</td>
<td>66.7</td>
</tr>
<tr>
<td>Tilt 2</td>
<td>15</td>
<td>14</td>
<td>93.3</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>16</td>
<td>88.9</td>
</tr>
</tbody>
</table>
Table. 2 Table 2 x x2 examination of urine leukocyte count and amount of urine bacteria using flow cytometry

<table>
<thead>
<tr>
<th></th>
<th>Urine Culture</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≥ 5 x 10^4 CFU/mL</td>
<td>UTI</td>
<td>Non-UTI</td>
</tr>
<tr>
<td>Urine Leukocytes ≥ 40/µL</td>
<td>17</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Urine bacteria ≥ 125/µL</td>
<td>18</td>
<td>8</td>
<td>3</td>
</tr>
</tbody>
</table>

Table. 3 The diagnostic value of urine leukocyte examination using urine flow cytometry

<table>
<thead>
<tr>
<th></th>
<th>Urine Leukocytes</th>
<th>Urine Bacteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagnostic value</td>
<td>CI (95%)</td>
<td>CI (95%)</td>
</tr>
<tr>
<td>Diagnostic sensitivity (%)</td>
<td>65.4%</td>
<td>44.4 – 82.1</td>
</tr>
<tr>
<td>Diagnostic specificity (%)</td>
<td>81.7%</td>
<td>69.1 – 90.1</td>
</tr>
<tr>
<td>Positive predictive value (%)</td>
<td>60.7%</td>
<td>40.7 – 77.9</td>
</tr>
<tr>
<td>Negative predictive value (%)</td>
<td>84.5%</td>
<td>72.1 – 92.2</td>
</tr>
<tr>
<td>Possibly positive ratio</td>
<td>3.6</td>
<td>1.9 – 6.5</td>
</tr>
<tr>
<td>Possibly negative ratio</td>
<td>0.4</td>
<td>0.2 – 0.7</td>
</tr>
</tbody>
</table>

The results of the examination of the number of urine bacteria obtained the lowest value of 0.0/µL and the highest 58017.8/µL. Median examination results of urinary bacterial counts in the UTI group of 671.85/µL with a range of 19.4/µL to 58017.8/µL. Median examination results of urinary bacterial counts in the non-UTI group were 7.2/µL with a range of 0.0/µL to 832/µL. There was a significant difference in the number of urine bacteria between group UTI groups rather than UTI, p <0.05 (Figure.4B). Current cytometric examination can also display a scattergram image that can be viewed on scattergram B1 (Figure.3BA). Urine bacteria is represented by a purple (purple) color. There are two typical features of the slope of the bacterial scattergram namely the inclination 1 (Figure.3BB) and the slope 2 (Figure.3BC). 26 samples were tested to match the results of identification of urine cultures with current isometric illustrations. There were 18 samples that can be tested suitability and 18 samples cannot be analyzed because it does not give a typical picture. The 18 samples had bacterial counts <105 CFU/mL. The slope of 1 was 66.7% according to the culture of urine, whereas on the slope 2 there was 93.3% according to the culture of the urine (Table 1). The results of the examination of leukocyte counts with 40/µL cutoff points were 28 (32.56%) of the samples, and 58 (67.44%) of
the samples were not-UTI (Table 2). The sensitivity of leukocyte examination with cutting point 40/μL to the culture of urine was 65.4%, with specificity 81.7%. The positive predictive value and negative predictive value was 60.7% and 84.5% respectively. The diagnostic value of urine leukocyte examination using flow cytometry (Table 3).

The ROC curve formed for examination of urine leukocyte counts using flow cytometry at the cutting point ≥40/μL against urine culture results ≥ 5x10^4 CFU/mL (Figure.5A). The under the curve (AUC) area was 0.793 (medium). p <0.05. (95% CI 0.69 - 0.89). When using the cutoff point 30/μL then obtained the sensitivity of 69.2% and specificity 71.7%. The results of the examination of the number of bacteria with 125/μL intake point were 21 samples (24.4%) and 65 samples (75.6%) samples instead of UTI (Table 2). The sensitivity of examination of urine bacteria with the 125/μL cutting point for urine culture was 69.2%, with specificity 95.0%. Positive predictive values and negative predictive values were 85.7% and 87.7% (Table.3) respectively. The ROC curve formed for examination of the number of urine bacteria using flow cytometry at the point of ≥ 125/μL against the urine culture result ≥ 5x10^4 CFU/mL (Figure.5B). The under the curve (AUC) area was 0.946 (very good). p <0.05. (95% CI 0.902-0.989). AUC obtained on bacterial examination is wider than in urine leukocyte examination.

Discussion

Based on the results obtained, there was the growth of 3 kinds of colonies of germs or more without dominant species that considered as contaminants. If there were 3 or more different organisms in urine culture then a strong allegation of shelter errors and handling of urine samples. But it can also be found in patients who use permanent urinary catheters 12.

There is a growth of fungi in urine culture results, these results were consistent with earlier studies, in which UTI may also be caused by pathogens (fungi, parasites, and viruses) colonizing the urinary tract. Mushroom (Candida spp) is one of the causes of UTI 13-15. The presence of fungi in urine culture is an indicator of pyelonephritis that derived from hematogenous spread (descending path). Haematogenous spread is usually as a result of bacteremia or in patients with immune system disorders 6.

The result of urine culture obtained significant growth. These results were different from previous studies, the difference may be due to the screening of patients suspected of strict UTI. When more rigorous screening was performed then the possibility of a positive urine culture percentage will be even more. However, it is also known that the main problem of urine culture examination lies in the collection of samples, the length of urine in the bladder, the density of the urine, if the low urine weight may be due to increased urinary frequency, the number of colonies obtained is also low. Sampling and transportation of samples, culture techniques and interpretation of results also greatly influence urine culture test results 12.

The incidence of UTI depends on age and sex 2,5. In this study, girls with UTI were more likely to be in the age group 0-1 years and over 5 years, while the 1-5-year-olds were more likely to suffer from boys. Girls are more at risk of developing UTI by the first year of life than boys because of different anatomical features. Moisture of the periurethral and vaginal areas stimulates the growth of uropathogenic. A shorter urethral size increases the chances of ascending infection to the urinary tract. Besides, women are more likely to receive UTI because the uropathogenic, which is part of the normal flora of the stool, can colonize in the perianal which can then rise to the vaginal introitus. The spread of uropathogenic into the periurethral, urethra and bladder can be inhibited by the normal vaginal flora (Lactobacillus sp) causing the acidic vaginal pH. If the vaginal flora is also impaired it can cause uropathogenic to stick to the urinary tract and multiply and the incidence rate of UTI will increase in estrogen deficiency 6,15.

The most common pathogenic bacteria causing UTI were Escherichia coli (E. coli). E. coli was associated with childhood UTI in developing countries. Bacteria can survive and replicate because they have virulence factors such as expression of fimbriae, synthesis of aerobactin and enterobactin (iron-binding protein), which is very high affinity to iron, useful for bacterial replication, producing hemolysin, glycolalylx-mediated adherence, somatic Ag expression, producing urease, may move and be resistant to serum bactericidal activity 15. There was a significant number of urine bacteria between group UTIs rather than UTIs. p <0.05, so the number of bacteria with current cytometric examination can be used for screening examination of suspected UTI patients, thus reducing the number of urine culture requests. However, it is known that direct bacterial
examination cannot distinguish between uropathogenic or contaminants 15

There were two images of the slope of the scattergram bacteria (scattergram B1), which a slope of 1 that formed from densely dispersed points and extends along a diagonal line. This describes was suspected of the bacteria in the form of coccus. Tilt 2 was the slope formed from the points collected/concentrated in the narrow zone. This picture of the possibility of urine bacteria in the form of stems 16. The compatibility between the slope 2 and the shape of the stem bacteria was 93.3%, while for slope 1 only 66.7%. The same result was obtained in the previous research which got 2 slope suitability of 100% while the slope of 1% was 75% from 47 samples under study 16. The formation of a typical slope image is caused by the working principle of bacterial examination using a red (semiconductor) laser that concerns the bacterial distribution of B_FSC (describes particle size) and B_FLM (describes the intensity of the nucleic acid color of the particles) 14

The result of the analysis shows that there was a significant correlation between urinary leukocyte count and the number of colonies, but the relationship was weak, it indicated by the correlation coefficient (Spearman) only 0.376. The flow of urine can usually clear the urinary tract of pathogens. Urine itself also has specific antimicrobial properties, including low urine pH, high urea content, high organic acid content, polymorphonuclear cells, and Tamm-Horsfall glycoprotein, which can inhibit bacterial adherence in the bladder mucosal wall 6,15. The relationship between urine bacteria and the number of colonies was quite strong, this indicated by the value of the correlation coefficient (Spearman) that quite large by 0.729. Urine bacteria found in current cytometric examination was associated with positive urine culture results but direct bacterial examination cannot distinguish between uropathogenic or contaminants 15.

**Conclusion**

Based on the results of research and discussion can be concluded that there was a weak relationship between urine leukocytes and the number of bacterial colonies, but a strong relationship between urine bacteria with the number of bacterial colonies.

**Conflict of Interest** : There is no conflict interest

**Source of Funding**: This study is self-funded

**Ethical of Clearance**: This study was approved by Ethical Comission of Health Research Faculty of Medicine University of Airlangga

**References**


Ecological Analysis of Stunted Toddler in Indonesia

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Abstract

The results of the Indonesia Basic Health Survey (Riskesdas) in 2007, 2013 and 2018 showed the stunted rate for toddlers was still above 30%. While proven poverty often comes with stunted on toddlers. The study aimed to answer whether poverty factors and the availability of health services are related to the prevalence of stunted toddlers in provinces in Indonesia. This study was a secondary data analysis “Data and Information: Indonesian Health Profile in 2017”. The results showed that the high percentage of the poor population (>14.43%) was dominated by the high prevalence of stunted toddlers (22.51%-30.0%). In the category of health center ratio per 100 thousand high population (≥4) seen dominated by the prevalence of stunted toddlers in the high category (22.51%-0.0%). In the category of nutritionist ratio per 100 thousand high population (>12), it appears to be dominated by the prevalence of stunted toddler in the high category (22.51%-30.0%). In the category of midwife ratio per 100 thousand high population (>97) was dominated by the prevalence of stunted toddler (22.51%-30.0%). It was concluded that the percentage of the poor population was positively related to the prevalence of stunted toddler. While health service input factors (health center, nutritionists, and midwives) were not related to the prevalence of stunted toddlers.

Keywords: ecological analysis, stunted toddlers, health profile, poverty.

Background

The quality of growth in the first 1000 days of life is one of the focuses in health development. The importance of meeting nutritional needs at this time will also determine the quality of growth and development be optimal. Because this period is called a critical period because the failure of growth that occurs in this period will affect the quality of health in the future¹, including the quality of education².

One indicator of non-optimal growth quality is the high prevalence of stunted toddler. Stunted is a condition of malnutrition which is marked by the z score of height according to age under -2 elementary school. The high prevalence of stunting in toddlers shows the disruption of the quality of growth in the golden period. The 1000 day life period starts from the baby in the womb until the first two years of life³,⁴.

According to the results of the Riskesdas in 2007, 2013 and 2018, in Indonesia still showed stunted rates in toddlers above 30%. This means that there are 3 stunted toddlers out of 10 toddlers born in Indonesia⁵. The high prevalence of stunted certainly requires serious treatment. The serious impact will threaten the quality of human resources in the continuous life chain. Stunted toddlers will grow into a stunted adult with various impacts that will be caused⁶,⁷. Besides giving birth to babies with the same nutritional problems, for example, the birth of stunting babies or babies with low birth weight, growth failure is also closely related to the long-term impact of increasing the prevalence of non-communicable diseases in the future⁷.

Adequate nutrition during pregnancy and supervision of the health of pregnant women through antenatal care services is one of the sensitive efforts in stunted...
Poverty is proven to often occur together with the occurrence of stunted in toddlers. Poverty is not only present and contributing individually to one family, but macro poverty in an area is also allegedly closely related to the high prevalence of stunting in a colony or community group. Poverty is closely related to the availability of food to the family\textsuperscript{10,11}.

The study aimed to answer whether poverty factors and the availability of health services are related to the prevalence of stunting under five in provinces in Indonesia. This research is important to do because existing studies always focus on toddlers individually. No studies have been found that ecologically analyze aggregate data at the provincial level. The results of this study are important for health policymakers at the provincial and national levels for efforts to improve the nutritional status of children under five, especially the category of height indicators per age.

**Materials and Method**

This research was an ecological analysis using secondary data. Secondary data sourced from “Data and Information: Indonesian Health Profile in 2017” issued by the Indonesian Ministry of Health\textsuperscript{12}. Data were available at the link www.pusdatin.kemkes.go.id. The unit of analysis in this study was the provinces of Indonesia. In total (total sampling) 34 provinces were analyzed in this study.

The main variable to be predicted was “Prevalence of stunted toddlers”, ie the percentage of children aged 0-59 months with indicators of height per age included in the very short and short categories. Predictor variables consisted of the percentage of poor population, the ratio of health center per 30 thousand population, ratio of nutritionist per 100,000 population, and the ratio of midwives per 100,000 population. The variable prevalence of stunted toddlers was categorized into 4 strata based on WHO criteria that the prevalence of 30\% and above was a serious public health problem\textsuperscript{5}. While other variables will be categorized into 4 strata with statistically the same cut of points. Data were analyzed descriptively by cross-tabulation. Because the data processed was a total sample of the entire province, it was not necessary to see the level of significance.

**FINDINGS**

Figure 1 showed the distribution of stunted toddler prevalence per province in Indonesia. Only 1 province (Central Kalimantan) has a prevalence rate of stunted toddlers more than 30\%. Based on WHO criteria, the prevalence of stunted toddlers in Central Kalimantan falls into the category of serious public health problems\textsuperscript{5}.

![Figure 1. Stunted Toddlers Prevalence Distribution by Province in Indonesia](image-url)
Table 1. Descriptive Statistics of Stunted Toddlers Prevalence and Related Factors

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stunted Toddlers Prevalence</td>
<td>34</td>
<td>13.60%</td>
<td>30.40%</td>
<td>21.55%</td>
<td>4.40%</td>
</tr>
<tr>
<td>Percentage of Poor Population</td>
<td>34</td>
<td>4.00%</td>
<td>28.00%</td>
<td>10.95%</td>
<td>5.79%</td>
</tr>
<tr>
<td>Ratio of Health Centers/100 thousand Population</td>
<td>34</td>
<td>1</td>
<td>5</td>
<td>1.82</td>
<td>0.968</td>
</tr>
<tr>
<td>Ratio of Nutritionists/100 thousand Population</td>
<td>34</td>
<td>1</td>
<td>26</td>
<td>9.65</td>
<td>7.515</td>
</tr>
<tr>
<td>Ratio of Midwives/100 thousand Population</td>
<td>34</td>
<td>18</td>
<td>175</td>
<td>74.65</td>
<td>34.972</td>
</tr>
</tbody>
</table>

Table 1 is a statistically descriptive of the 5 variables analyzed in this study. There is a very high gap in all variables. The lowest prevalence of stunted toddlers is Bali Province (13.60%), and the highest is in Central Kalimantan Province at 30.40%. The variation in the percentage of the poor population is also quite high. The lowest of 4.00% is Jakarta Province, and the highest proportion of the poor is Papua Province at 28%. While the health service input variable also shows a high gap.

Table 2. Crosstabulation of Percentage of Poor Population and Prevalence of Stunted Toddlers in Indonesia in 2017

<table>
<thead>
<tr>
<th>Percentage of Poor Population</th>
<th>Prevalence of Stunted Toddlers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low (&lt;15.0%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Middle (15.00%-22.5%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High (22.51%-30.0%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very High (&gt;30.0%)</td>
<td></td>
</tr>
<tr>
<td>&lt;6.36%</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>12.5%</td>
<td>50.0%</td>
</tr>
<tr>
<td>6.36%-9.38%</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>0.0%</td>
<td>66.7%</td>
</tr>
<tr>
<td>9.39%-14.43%</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>22.2%</td>
<td>44.4%</td>
</tr>
<tr>
<td>&gt;14.43%</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>0.0%</td>
<td>25.0%</td>
</tr>
</tbody>
</table>

Percentage of Poor Population and Prevalence of Stunted Toddlers

Table 2 is a crosstabulation between the prevalence of stunted toddlers and the percentage of the poor population. In the low percentage of the poor population category (<6.36%), it is seen that it is dominated by the prevalence of toddlers with moderately stunted toddlers (15.00%-22.5%). While in the category of the high percentage of the poor population (>14.43%) it appears to be dominated by a high prevalence of stunted toddlers (22.51%-30.0%). This means that the higher the percentage of the poor population in a province, the prevalence of stunted toddlers is also higher.
The ratio of Health Center and Prevalence of Stunted Toddler

Table 3 is a crosstabulation between the prevalence of stunted toddlers and the Health Centers ratio per 100,000 population. In the category of low health center per population ratio (1), it appears to be dominated by the prevalence of stunted toddlers in the medium category (15.00%-22.5%). While the Health Centers ratio per 100 thousand high population (≥4) was seen to be dominated by the prevalence of stunted toddlers in the high category (22.51%-30.0%). This means that the ratio of Health Centers in a province has no effect on the prevalence of stunted toddlers.

Table 3. Crosstabulation of Health Centers Ratio and Prevalence of Toddler Stunting in Indonesia in 2017

<table>
<thead>
<tr>
<th>The ratio of Health Centers per 30 thousand population</th>
<th>Prevalence of Stunted Toddlers N=34</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low (&lt;15.0%)</td>
<td>Middle (15.00%-22.5%)</td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>20.0%</td>
<td>60.0%</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>0.0%</td>
<td>30.8%</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>0.0%</td>
<td>75.0%</td>
</tr>
<tr>
<td>≥4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

The ratio of Nutritionists and Prevalence of Stunted Toddler

Table 4 is a crosstabulation between the prevalence of stunted toddlers and the ratio of nutritionists per 100,000 population. In the category of nutritionists ratio per 100 thousand low population (<4) seen dominated by the prevalence of stunted toddlers in the moderate category (15.00%-22.5%). While the ratio of nutritionists per 100,000 population is high (>12) it seems to be dominated by the prevalence of stunted toddlers in the high category (22.51%-30.0%). This means that the ratio of nutritionists in a province has no effect on the prevalence of stunted toddlers.

Table 4. Crosstabulation of Nutritionists Ratio and Prevalence of Toddler Stunting in Indonesia in 2017

<table>
<thead>
<tr>
<th>The ratio of Nutritionists per 100 thousand population</th>
<th>Prevalence of Stunted Toddlers N=34</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low (&lt;15.0%)</td>
<td>Middle (15.00%-22.5%)</td>
</tr>
<tr>
<td>&lt;4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>16.7%</td>
<td>83.3%</td>
</tr>
<tr>
<td>4-7</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>8.3%</td>
<td>50.0%</td>
</tr>
<tr>
<td>8-12</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>11.1%</td>
<td>22.2%</td>
</tr>
<tr>
<td>&gt;12</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>0.0%</td>
<td>42.9%</td>
</tr>
</tbody>
</table>
The ratio of Midwives and Prevalence of Stunted Toddler

Table 5 is a crosstabulation between the prevalence of stunted toddlers and the ratio of midwives per 100,000 population. In the category of midwives ratio per 100 thousand low population (<53) seen dominated by the prevalence of stunted toddlers in the moderate category (15.00%-22.5%). While in the category of midwives ratio per 100 thousand high population (>97) it appears to be dominated by the prevalence of stunted toddlers in the high category (22.51%-30.0%). This means that the ratio of midwives in a province has no effect on the prevalence of stunted toddlers.

Table 5. Crosstabulation of Midwives Ratio and Prevalence of Toddler Stunting in Indonesia in 2017

<table>
<thead>
<tr>
<th>The ratio of Midwives per 100 thousand population</th>
<th>Prevalence of Stunted Toddlers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Prevalence of Stunted Toddlers</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low (&lt;=15.0%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Middle (15.00%-22.5%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High (22.51%-30.0%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very High (&gt;30.0%)</td>
<td></td>
</tr>
<tr>
<td>N=34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;53</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>12.5%</td>
<td>75.0%</td>
</tr>
<tr>
<td></td>
<td>12.5%</td>
<td>12.5%</td>
</tr>
<tr>
<td></td>
<td>0.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>53-67</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>11.1%</td>
<td>33.3%</td>
</tr>
<tr>
<td></td>
<td>55.6%</td>
<td>.0%</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>68-97</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>0.0%</td>
<td>44.4%</td>
</tr>
<tr>
<td></td>
<td>44.4%</td>
<td>11.1%</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td></td>
</tr>
<tr>
<td>&gt;97</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>12.5%</td>
<td>37.5%</td>
</tr>
<tr>
<td></td>
<td>50.0%</td>
<td>0.0%</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td></td>
</tr>
</tbody>
</table>

The results of this study indicate that poverty is a factor that has a major contribution to the high prevalence of stunted toddlers in Indonesia. This is in line with the basic concept of growth and development which states that socio-economic factors are variables that have an influence on the quality of growth and development\textsuperscript{13,14}. The poverty factor is considered to be closely related to family characteristics such as education level, purchasing power so that it will affect family access in the search for health services, providing quality food and also providing a clean and healthy environment\textsuperscript{15,16}.

This study is in line with the results of an analysis of the causes of stunted between other low and high socioeconomic factors. A Guatemalan study in 2010 found a high prevalence of stunting in families with low socioeconomic status\textsuperscript{17}. In another study, it was also mentioned that large disparities between groups with low and high socioeconomic factors were associated with meeting nutritional needs during pregnancy and alcohol use\textsuperscript{18}.

The results of studies in four states in India multivariate found that food security, toilet use, and low body mass index status of mothers were the main predictors of stunted and underweight in children. While acute respiratory infections are a major predictor of weight loss and diarrhea is a major predictor of stunted\textsuperscript{19}. All predictors show the inherent poverty characteristics of a family.

A case study in Mexico distinguishes rural and urban factors in identifying the cause of stunted toddlers. In urban areas, stunted is mostly found in toddlers with the type of work parents are farmers and with a low level of attendance to child health services. While in rural areas, parents do not work as a contributing factor to stunted, although it is also related to other factors,
namely duration of breastfeeding and attendance in child health services. A multilevel analysis of factors causing stunted in Indonesia states that the variance of stunted at the provincial level by 51.9% can be reduced to 44.1% if the provincial economic level is improved.

The results of this study are considered limited in terms of useful macro policy because the data processed is aggregate data at the provincial level. Further research is needed at the individual level as a basis for more detailed policy decisions at the micro-level, with more involvement in target families.

Conclusions

Based on the results of the study it could be concluded that the percentage of the poor population was positively related to the prevalence of stunted toddlers. Or the less the percentage of the poor population, the less the prevalence of stunted toddlers. While health service input factors (health centers, nutritionists, and midwives) were not related to the prevalence of stunted toddlers.

Source of Funding: Self-funding

Conflict of Interests: Nil

Ethical Clearance: This study utilized secondary data as analytical material. No ethical license was needed in its implementation.

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The Use of Touch DNA Analysis in Forensic Identification
Focusing on STR CODIS LOCI THO1, CSF1PO and TPOX

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Abstract

Introduction: Identification through DNA analysis is an accurate diagnostic tool. DNA analysis is via Variable Number of Tandem Repeat (VNTR) and Restriction Fragment Length Polymorphisms (RFLP). Up to date, blood spots/blood, sperm spots, vaginal swabs, buccal swabs and bones are specimens that are widely used in the field of forensics for DNA analysis. At the crime scene, the perpetrator’s skin may accidentally be in contact with surrounding objects thereby transferring trace evidence to the objects.

Method and Materials: Laboratory observation to demonstrate identification through DNA isolation from the objects that are touched (touch DNA), using the STR CODIS locus, with a momentary research design. DNA was isolated from buccal swabs and swab properties (watches and mobile phones) from volunteers who have signed the consent form. A total of ten samples were used in this study.

Results and Discussion: Mean levels of DNA [UV-Visible Spectrophotometer] buccal swab: 167.89 ± 85.71 µg / ml, watch swab: 59.19 ± 5.58 µg / ml, mobile swab: 38.09 ± 2.12 µg / ml and the purity of the buccal swab DNA: 1.79 ± 0.71, the watch swab: 1.69 ± 0.76, the mobile swab:1.53 ± 0.56. Visualization of PCR products on Polyacrylamide Agarose Composite Gel Electrophoresis [PAGE] stained with Silver and amplified using the standard primers THO1, TPOX and CSF1PO for STR CODIS showed a 100% detection of amplicons. Allele profiles on all samples of STR CODIS were a match or identical to the positive control K562.

Conclusion: Property (handphone and watch) swabs can be used as alternative materials in forensic identification using Touch DNA analysis. It was able to be isolated and amplified by using Polymerase Chain Reaction on the STR CODIS loci THO1, CSF1PO and TPOX

Keywords: Touch DNA, STR CODIS, Identification

Introduction

Identification is a way of identifying individuals with characteristics and features to distinguish them from others. Currently the identification method has evolved towards molecular forensic DNA (Deoxyribonucleic acid). DNA is the smallest unit and is present in all living things from microorganisms to higher organisms such as humans, animals and plants.

Identification through DNA analysis is an accurate diagnostic tool. DNA analysis includes analysis of Variable Number of Tandem Repeat (VNTR) and Restriction Fragment Length Polymorphisms (RFLP). DNA analysis through VNTR is a DNA examination method that is based on certain repeated base sequences (core sequences). DNA repeated sequence areas with base size less than 1 kb (kilo base pair), are known as ‘microsatellite’ or Short Tandem Repeat (STR).1
The Federal Bureau of Investigation [FBI] designed 13 STR locus as a synergistic forensic identification system with the Combined DNA Index System (CODIS) database. The STR locus used by FBI includes TH01, TP0X, CSF1PO, vWA, FGA, D3S1358, D5S818, D7S820, D13S317, D16S539, D8S1179, D18S51, and D21S11, plus amelogenin markers used to determine the sex of the victim.2,3

At the crime scene the perpetrator’s skin surface or part of his body is often accidentally exposed to the surrounding objects, resulting in the transfer of trace evidence to the objects. In this case one of the technologies namely touch DNA / contact trace DNA can be used, through DNA that is transferred through skin cells when objects are held or touched. Up to date, personal identification through touch DNA testing is not widely known.4

**Materials and Methods**

The type of research was experimental laboratory. Research sample: the watch and handphone used by the respondent and the buccal swab. All respondents used in this study signed the consent form after they freely agreed to participate as subjects of the research. The sample size used was 12.

Research Materials: DNAzol Reagent, 100% & 70 % ethanol solution. PCR Mix [ATP,CTP,TTP GTP, MgCl2,TaqPolymerase], Nuclease Free water, STR CODIS primers of locus:

- TH01: CTGGGCACGTGAGGGCAGCGTCT/-TGCCGGAAGTCCATCCTCACAGTC
- TP0X: ACTGGCACAGAACAGGCTAGG-/- GAGGAAGTGGGAACCACACAGGT
- CSF1PO: AACCTGAGTCTGCCAAGGACTAGC/- TCCACACACCACCTGGCCATCTTC

**Results**

<table>
<thead>
<tr>
<th>Sample</th>
<th>Average amount of DNA (x ± SD) (mg/ml)</th>
<th>Average purity of DNA (λ260 nm/λ280 nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buccal Swab</td>
<td>167.89 ± 85.71</td>
<td>1.79 ± 0.71</td>
</tr>
<tr>
<td>Watch Swab</td>
<td>59.19 ± 5.58</td>
<td>1.69 ± 0.76</td>
</tr>
<tr>
<td>Handphone Swab</td>
<td>38.09 ± 2.12</td>
<td>1.53 ± 0.56</td>
</tr>
</tbody>
</table>

Key, x: mean and SD: Standard Deviation

PCR products were visualised using Polyacrylamide Agarose Composite Gel Electrophoresis [PAGE] and the gel was stained with silver. To amplify the STR CODIS locus, the standard primers [THO1, TP0X and CSF1PO] were used and all buccal swab and property [watch and handphone] swab samples showed positive results signifying a 100% detection. Allele profiles in all samples were a match with the positive control, K562, as shown in both Figure 1 and their purity profiles were also shown on table 1.

![Figure 1. Visualization of STR CODIS PCR product using at locus TH01 [156 – 195 bp]](image-url)
The figure 2 below shows the visualization of PCR products with PAGE stained with Silver. The samples were amplified using the primer CSF1PO [amplicon product 321–357 bp] and all the results were positive as shown by the matching bands with the positive control [K562]: 9 : 10.

**Figure 2. Visualization of STR CODIS PCR product using at locus CSF1PO [321 – 357 bp]**

**Discussion**

The results were obtained by measuring the average amount of DNA using a UV-Visible Spectrophotometer. The average DNA level of all samples was at a minimum amount of 0.25 ng with a purity of 1.8-2.3

The above Figure shows the visualization of PCR products on Polyacrylamide Agarose Composite Gel Electrophoresis [PAGE] stained with silver. Repeat - Combined DNA Index System [STR- CODIS] locus THO1 [amplicon product 156 – 195 bp] showing that all samples were detected as compared to the positive control [K562]: 9,3;9,3.5,6

**Figure 3. Visualization of STR CODIS PCR product using at locus TPOX [262 – 290 bp]**

Figure 3 above, shows the visualization of PCR products with PAGE stained with silver and the amplicons were amplified using the CODIS STR TPOX locus [amplicon product 262 - 290 bp] and all samples were detected as positive [detection +] when compared with the positive control [K562]: 9: 10. For adequate visualization of the results, sufficient levels and purity of the DNA is needed in order for the DNA to be used
as an examination material, including in this case of identification and paternity test.\(^7\)

Failed PCR amplification is characterized by the absence of bands on agarose gel. Incomplete PCR cycles were minimized by PCR optimization for all the respective primers used.\(^8\)

In this study, 3 STR CODIS loci were used, showing that all the samples for buccal swab and property swab (watch and handphone) were detected positive, as well as the allele profile of each locus in each sample showing matched results. Matched results have the understanding that the allele profile on the buccal swab is identical to the allele profile on the swab property. Only one sample showed a different allele, the sample is A\(^2\) (handphone) [ allele 8 : 9,3]. This could be due to contamination during DNA analysis checking process, starting from the process of sample collection.\(^9\)

### Table 2. Allele STR CODIS’s profile

<table>
<thead>
<tr>
<th>LOCUS</th>
<th>SAMPLE</th>
<th>A</th>
<th>A1</th>
<th>A2</th>
<th>B</th>
<th>B1</th>
<th>B2</th>
<th>C</th>
<th>C1</th>
<th>C2</th>
<th>D</th>
<th>D1</th>
<th>D2</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSF1PO</td>
<td></td>
<td>9;9.3</td>
<td>9;9.3</td>
<td>8;9.3</td>
<td>9;9.3</td>
<td>9;9.3</td>
<td>9;9.3</td>
<td>9;9.3</td>
<td>9;9.3</td>
<td>9;9.3</td>
<td>9;9.3</td>
<td>9;9.3</td>
<td>9;9.3</td>
</tr>
<tr>
<td>THO1</td>
<td></td>
<td>9;10</td>
<td>9;10</td>
<td>9;10</td>
<td>9;10</td>
<td>9;10</td>
<td>9;10</td>
<td>9;9</td>
<td>9;9</td>
<td>9;9</td>
<td>9;9</td>
<td>9;9</td>
<td>9;9</td>
</tr>
<tr>
<td>TPOX</td>
<td></td>
<td>8;9</td>
<td>8;9</td>
<td>8;9</td>
<td>8;9</td>
<td>8;9</td>
<td>8;9</td>
<td>8;9</td>
<td>8;9</td>
<td>8;9</td>
<td>8;9</td>
<td>8;9</td>
<td>8;9</td>
</tr>
</tbody>
</table>

**key:** A, B, C, D : buccal swab sample  
A\(^1\), B\(^1\), C\(^1\), D\(^1\) : watch swab  
A\(^2\), B\(^2\), C\(^2\), D\(^2\) : handphone swab

As a positive control, that is K562 which is a positive control in the examination of DNA analysis with STR CODIS and 100 bp ladder markers. DNA analysis tests have a 100% accurate value, when done correctly. This DNA analysis test gave a results probability of 100%.\(^9\)

The following is a profile table of STR CODIS allele detection results [THO1, CSF1PO, TPOX] on DNA samples [watch swabs, handphone swabs and buccal swabs].\(^10\)

Research on STR CODIS as a whole has not yet been reported, only a few primers. Some studies have been conducted from several STR CODIS focus areas. The accuracy of research at the loci THO1, TPOX, CSF1PO, and has been reported in several studies including: chromosome populations and allele sequences at the THO1 locus, population in Thailand with 8 STR loci included THO1, TPOX, CSF1PO and vWA. Research on Chinese population in Taiwan with STR research on genetic variation in Caucasia revealed that genetic variation in the population of Filipinos and Thais living in Taiwan using 9 STR loci. Whereas in Indonesia, a research on the THO1 allele pattern in the Batak population in Surabaya and locus D1S80 and D17S5 populations in Surabaya. STR loci typing method especially the THO1 locus is a reasonable, strong and efficient method making it a useful method in forensic cases. 5 to 6 STR loci has a ratio of 1: 100 billion so that in principle regarding the number of loci examined, the more loci used the better the accuracy value.\(^11\)

**Conclusion**

Property (handphone and watch) swabs can be used as alternative materials in forensic identification using Touch DNA analysis with an average DNA yield of: 59.19 ± 5.58 mg/ml and: 38.09 ± 2.12 mg/ml for watch and handphone swabs respectively. Both the buccal swab, watch swab and handphone swabs had trace amount of DNA that was able to be isolated and amplified by using Polymerase Chain Reaction on the Short Tandem Repeat locus - Combined DNA Index System [STR-CODIS] loci THO1, CSF1PO and TPOX.

**Conflict of Interests:** The authors declare that they have no conflict of interest in publishing this article.
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Ethics Approval and Consent to Participate

This study has been agreed by Faculty of Dentistry Universitas Airlangga which number of ethical clearance is 033/HRECC.FODM/IV/2018.

List of Abbreviations

CODIS : Combined DNA Index System
DNA : Deoxyribonucleic acid
FBI : Federal Bureau of Investigation
PAGE : Polyacrylamide Agarose Composite Gel Electrophoresis
PCR : Polymerase Chain Reaction
RFLP : Restriction Fragment Length Polymorphisms
STR : Short Tandem Repeat
VNTR : Variable Number of Tandem Repeat

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Topological Data Analysis for Image Forgery Detection

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Abstract

The manipulation of digital images has become easy due to powerful computers, advanced photo-editing software packages and high-resolution image-capturing devices. The identification of image authenticity has received much attention because of the increasing power of image editing methods. Object removal is an image forgery technique, which is usually achieved by the Exemplar-Based Inpainting (EBI) method without any noticeable traces. Some legal issues may arise when a tampered image cannot be distinguished from a real one by visual examination. Therefore the manipulation of digital images has become a huge challenge to passive image forensics. There are a lot of forgery techniques that use to detect on these images after removing the object, but these techniques have limitations when used some post-processing operations such as super-resolution processing, noise addition, blurring and compression processes. To address this issue, this paper proposes a novel forgery detection technique to recognize tampered inpainting images, using topological data analysis (TDA) approach. TDA is a mathematical approach concern studying shapes or objects to gain information about connectivity and closeness property of those objects. This proposed technique is applied for a large number of natural images with getting a good results.

Keywords: Image forgery. Image inpainting. Topological Data Analysis. Local Binary patterns. kNN classifier.

Introduction

In recent years, the field of digital image forgery detection has remained active and has received significant interest from the scientific community. A wide-ranging study about image forgery detection have been introduced in (1).

A copy-move and object removal are a famous forgeries processes at this time. There are a lot of techniques for detecting the copy-move regions in images in the literature, also there are a lot of techniques for detecting the forgery regions in images. However, we will focus on techniques for the detection of object removals in an image, which is usually completed by EBI method in an unnoticeable way. Up to now, there are few works which report about the blind detection of image inpainting (2), (3), (4), (5), (6).

As the first attempt, the authors in (2) introduced a forgery detection method for EBI based on zero-connectivity features, and fuzzy membership is proposed to detect specific image doctoring to yield the degree of matching of blocks in suspicious regions and identified forged regions by the fuzzy membership. However, this method failed to detect the forged regions in the compressed and JPEG images.

Later, the authors in (3) presented an automatic forgery detection method for EBI process. The proposed method contains two major processes: suspicious region detection and forged region identification. The proposed method performs well with regard to both accuracy and speed while detecting forged regions. However, this method still incapable to locate the forged regions of small sizes.

Therefore, Bacchuwar et al. in (4) proposed a novel method to detect inpainting forgery and copy-move regions using a jump patch-block matching, which makes this method robust and faster than the already existing methods. This method reduces computational costs.

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In recent work, the authors in (5) presented an efficient forgery detection technique for object removal by EBI method. This proposed technique combines central pixel mapping, greatest zero-connectivity component labelling and fragment splicing detection. The proposed technique has succeeded in detecting the tampered regions in images and reduction of computational complexity; but this method fail to when those inpainted images are further subjected to some post-processing operations such as super-resolution process, noise addition, blurring, and compression.

Therefore, the authors in (6) proposed a hybrid forensic technique to detect object removal in the images. First, the technique in (5) is used to detect whether the image is forged or not. Second, the DCT is computed for the undetectable images, then the joint probability density matrix is computed for each difference array to model the correlations among adjacent DCT coefficients. This technique has succeeded in detecting the object removal either with or without post-processing but this work still has some limitations, because it is only working if a candidate image is forged. So to detect the forged image either with or without post-processing, we propose a new technique based on the TDA approach.

The rest of the paper organized as follows. The topological data (image) analysis is clarified. After that Local binary patterns are introduced as an image texture descriptor to build Rips complexes. Then TDA approach is proposed to detect which of these images has had an object removed from it. Next the experimental results of the proposed technique are illustrated. Finally, conclusion and future work will be presented.

**Topological Data/Image Analysis**

The topology has used to study the shapes of data (objects) (7), (8), (9). Once the shape of the data (e.g. images) constructed, then topology has rich tools to study the connectivity and closeness properties of that shape/object, using a finite combinatorial process known as Simplicial Complex (SC). Roughly speaking simplicial complexes are made up of zero-dimensional simplices (i.e. vertices), then building one-dimensional simplices (i.e. edges between the vertices) from them, then 2nd dimensional simplices (i.e. triangles) from zero and one-dimensional simplices and then higher dimensional simplices are constructed similarly. Finally, one gets a SC by gluing these simplices ‘nicely’ together along their edges and faces. There are many types of SCs, but here we are using what is known Vietoris-Rips (Rips) SCs as it is easy to construct and compute in comparison with other types of SCs. Traditional construction of Rips SCs are based on selecting a single distance threshold and calculating corresponding topological invariants such as betti numbers ($\beta_n$ for $n = 0,1,2$), Euler characteristics, cliques and other topological invariants.

The popular mathematical theory used to characterise topological features is known as homology theory. More precisely, the rank of the $n$-th homology group equals to what is known as betti numbers $\beta_n$, where $\beta_0$ is equal to the number of connected components (CCs), $\beta_1$ is the number of holes and $\beta_2$ is the number of cavities in the constructed Rips SC. Instead of computing aforementioned topological invariants at a single distance threshold, TDA depends on calculating the persistency of these invariants across an increasing series of distance thresholds using what is known as persistent homology (9), (10).

The first step in building a SC is to consider landmark points (i.e. zero-dimensional simplices) in order to be able to build on them higher dimensional simplices such as edges, triangles and tetrahedrons. For this task, the approach suggested in (11) is followed which is the use of uniform Local Binary Patterns as a tool to systematically choose landmark points from images of interest to build topological objects.

**Local Binary Patterns (LBP)**

Ojala et al. in (12) first introduced LBP as an image texture descriptor. In this paper, the original idea proposed in (12) is followed. Given any image, LBP replaces each pixel of the image with an 8-bit binary code, which encapsulates texture and local structure, determined by its 8 neighbouring pixels in a $3 \times 3$ window surrounding it in clockwise order, see Figure 1. The process works as follow: starting from the top-left corner of the window; subtract central pixel from its 8 neighbouring pixels, assign 0 if the result is negative, and 1 otherwise. Mathematically this process can be written as follow:
Uniform LBP (ULBP) refers to 8-bit circular bytes that have no more than 2 circular transitions. For the sake of clarity, examples of ULBPs are 11110000 (2 transitions), 11111111 (0-transitions) and examples of non-uniform LBP are 10101010 (8-transitions), 11001110 (4 transitions). This means that ULBP of any monochrome image consists of 58 unique uniform geometries, see Figure 2. It has been shown that ULBP codes constitute 90% of LBP codes in natural images \(^{(13)}\). There are seven groups (of 8 binary codes) of ULBP according to the number of 0’s and 1’s in their binary codes, excluding the cases 00000000 and 11111111. Each of these groups is related to certain types of image textures. The ULBP codes have \(t\) consecutive 1’s as geometry-\(t\). Our experimental investigation contains the set of pixels in all geometries as potential landmark candidates to build SC.

Regarding uniform LBP patterns classifications based on the number of ones included in the pattern in the natural images database which described in \(^{(14)}\); the patterns in G0, G8, (G2 and G4), (G3 and G5), and G6 describe the flat area, spot area, edges, corners, and line ends in the image, respectively.

**Construction of Rips Simplicial Complexes**

For each class of geometry-\(t\) in ULBP, its corresponding positions are extracted in the forged and original images of the given data. As a result, we end up with a set of image pixel positions of the 8 sets of \(t\)-ones ULBP codes. First, the known Euclidean distance is calculated between all pairs of points in the set, and then an increasing 8 sequence of \(T\)-dependent Rips complexes is constructed, one for each rotation of the geometry-\(t\) codes. For \(T = 0\), only 0-dimensional complexes are constructed.
simplices are obtained, i.e, the points. Then $T$ is gradually increased and computed $\beta_0$ at each $T$.

Robert Ghrist in (10) illustrated that there is no optimal method to select the best threshold that best captures the topology of data sets. A fixed number of distance thresholds are used, as follows:

$$T_1 = 0, T_2 = 3, T_3 = 5, T_4 = 7, T_5 = 10, T_6 = 12, T_7 = 15, T_8 = 17, T_9 = 20.$$ .

This approach is motivated by the work of A. Asaad and S. Jassim in (11), as they used the TDA approach to assess the quality of degraded images. In particular, they focused on discriminating face images degraded by shadows and blurring. The topological invariant which is used across this paper is the zero homology groups, which correspond to the number of CCs, as shown in Figure 3.

More specifically, the Rips complex graph for forged images and the original image are identical, except the forged region which we highlighted by red box in Figure 3. The TDA approach is used to detect forged images by counting the number of CCs in the images, where the CCs is computed in 8 rotations in each one of these 7 geometries at different thresholdings.

Forgery detection-based TDA approach

A new forensic technique is proposed to detect the forged images using the TDA approach. The steps of the proposed technique are as follows:

1) Image pre-processing: Before the features extraction process, converting these RGB images into a grayscale images, then transforming them into the LBP domain.

2) Feature extraction: Applying the TDA approach to the LBP image domain, the number of CCs will be counted in each geometry (i.e. G1, G2,..., G7) at different thresholds (i.e. T=0, T=3, T=5, T=7, ...) until the number of the CCs be 1 in each rotation.

3) Classification: The purpose of a classifier is to discriminate the given images and classify them into two
categories which are original and forged images based on the number of CCs in each geometry at different thresholds. The kNN classifier method is used to classify the images into two groups which are original and forged groups (i.e. decision stage)\(^\text{(15), (16)}\).

**Testing Experiments**

The forgery proposed method is applied to detect forged images from the yokoya natural database in\(^\text{(17)}\), which consists of 100 original and 100 forged (inpainted) images of size 200x200, as see in Figure 4.

![Figure 4: Example of six out of 100 training natural images.](image_url)

To detect the inpainted images, the TDA approach is used by selecting landmarks from the whole image to build SCs and then computed their corresponding homological features (i.e. the number of CCs). The number of CCs is computed from different increasing distance thresholds and the pattern of change in the components while we increase the threshold is stored. We stop when the number of CCs becomes one for both classes (original and inpainted images). Finally, we train kNN classifier when \(k=1\) (i.e. Nearest Neighbour) on those 200 images with 3 different classification protocol as follow:

- Protocol One: 30% of the data used for Training
- Protocol Two: 50% of the data used for Training
- Protocol Three: 70% of the data used for training.

Each protocol is repeated 100 times, across seven ULBP groups and 10 different increasing distance thresholds. Experimental results showed the number of CC is sensitive to the degradation present in the inpainted images. Furthermore, among the 7 geometries we used as landmarks to build the topology G1, G5 and G7 geometries more sensitively detect the changes in the edges and corners in the inpainted images\(^\text{(18)}\), as see in the Tables 1.

![Table 1: kNN classifier on CCs features from natural images.](table_url)

Examining the whole distribution of accuracies from \(T=0\) to \(T=20\), the accuracy is starting in a low rate around 52% then gradually increasing until reach the peak at \(T=10\) and then gradually decreasing. The highest obtained accuracy is 90% for detecting the inpainted images at \(T=10\). Also, the number of images in the training does not affect the accuracy of the image classification, that means the classification features are strong.
The values of accuracy for classifying the natural images into original and inpainted images are not absolutely correct. There are two kinds of error which are False Positive (FP) and False Negative (FN). The FP represents the original images that classify as forged images, while FN represents the forged images that classify as original images (19). Tables 2 show the average of FP and FN values for each geometry at different thresholds in above three protocols, respectively.

Table 2: False Positive and False Negative values from natural images.

Tables 2 showed the average values of FP and FN in G1, G5, and G7 at threshold $T=10$ are less than in other geometries and in other thresholds. This clearly shows that TDA can be used as an effective technique for inpainting detection.

Summary and Conclusion

A novel forgery detection technique has been proposed to recognise tampered inpainting images (i.e. by the EBI method). TDA has been used to detect the forged images (i.e. to detect which of these images has had an object removed from it). The number of CCs has been used as a component in the feature vector in the classifier methods. The kNN classifier has been used to classify the images into original and forged images. The proposed method has been applied to natural database images. The experimental results showed that the proposed method performs well in detecting inpainted images with promising results. Also, the FP and FN error are calculated for all geometries at different thresholds for natural database images. In the future, we will extend our investigation to detect the suspicious regions in the forged image by applying TDA approach.

Ethical Clearance: Taken from applied computing school, buckingham university committee.

Source of Funding: Self.

Conflict of Interest: It is nil.

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17. yokoya. 100 images used in the restoration experiments. restoration images Data set.
Moringa Leaf (*Moringa oleifera* Lam) Nanoparticle Supplementation on Zygote Cleavage in Goat Embryo Culture In Vitro

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Abstract

One of the causes of failure of zygote development is oxidative stress in the culture medium. Where oxidative stress can damage the structure and function of zygotes due to free radicals Reactive Oxygen Species (ROS). *Moringa oleifera* Lam contains antioxidant polyphenol compounds, flavonoid flavonols namely quercetin which is the most antioxidant content in *Moringa* leaves which is expected to fight excess ROS. The purpose of this study was to prove that the supplementation of *Moringa oleifera* Lam leaf nanoparticles to increase zygote cleavage in goat embryo culture in vitro. The research subjects used goat oocytes which were divided into 4 groups consisting of 1 control group and 3 treatment groups. Each group consisted of 31 samples. Control group K1 without Moringa leaf nanoparticle supplementation, treatment group I P1 Moringa leaf nanoparticle supplementation with a dose of 0.5 µM, treatment group II P2 supplementation of Moringa leaf nanoparticles with a dose of 1.0 µM, Treatment group III P3 supplementation with Moringa leaf nanoparticles with a dose of 2.0 µM. Embryo culture was carried out in a 5% CO₂ incubator, temperature 38.5°C for 48 hours, then observed under an inverted microscope. The results show that there are significant differences with the value of p = 0.041 which means p <0.05. Supplementation of moringa leaf nanoparticles (*Moringa oleifera* Lam) can significantly increase zygote cleavage at embryo culture stage in vitro.

**Key Words:** *Moringa oleifera* Lam, Reactive Oxygen Species (ROS), Zygote Cleavage

Introduction

Infertility has an impact on population decline leading to zero population growth (without changes in mortality and migration)¹. An estimated 4-6 million couples need infertility treatment to get offspring such as hormonal treatment, In vitro Fertilization (FIV)². The success of In Vitro Fertilization (FIV) is not only influenced by oocytes, but also by spermatozoa which are used to fertilize and physiological conditions of the culture medium used³.

The success of In Vitro Fertilization in couples of childbearing ages is 32.2% (Ramalingam et al., 2016). Based on the ability of zygotes to overcome cell block (developmental barriers) in the development of zygotes into phase two cells in the M16 medium at 85.09% and on the HTF medium at 83.36%. The zygote obtained from FIV in the culture medium can develop into a two-cell stage, but there are also zygotes that cannot develop and the cells undergo apoptosis, picnosis, and fragmentation³.

One of the causes of zygote failure to overcome cell block is due to oxidative stress in the culture medium due to free radicals Reactive Oxygen Species (ROS). Endogenous antioxidant defenses in zygotes are not enough to fight the oxidative stress encountered during in vitro culture so that it can cause membrane lipid peroxidation, DNA, and protein in zygotes⁴.

Modifying the condition of in vitro culture medium is one technique to increase the number of fertilization and viability of zygotes to blastocysts⁵. Modifying the condition of the culture medium by the addition of exogenous antioxidants has been carried out by Gaviria et al.⁶ about the addition of the antioxidant resveratrol which is present in many plant foods, especially red wine...
in in vitro culture media in enhancing the development of bovine embryos from the stages of cleavage, morula and blastocyst. In addition to red wine, there are also exogenous antioxidants from plants, namely Moringa oleifera Lam leaves made in the form of nanoparticles to overcome oxidative stress\(^7\).

Moringa oleifera Lam contains antioxidant polyphenol compounds, flavonoid flavanols namely quercetin which is the most antioxidant content in Moringa leaves. Quercetin will bind free radical species in the presence of hydroxyl groups (OH-) at C to 3, 5, 7, 3’, and 4’ and catechol ring β\(^8\). With the presence of natural antioxidants from moringa leaves, it is expected to reduce oxidative stress in the culture medium thereby increasing zygote cleavage in stage 2 cells\(^7\).

**Material and Method**

The process of making Moringa leaf nanoparticles is carried out in Nanobox Jl. Raya Serpong KM.2 Setu, Tangerang. All protocols were approved by the Animal Care and Use Committee (ACUC), Faculty of Veterinary Medicine, Airlangga University No. 2.KE.136.07.2019.

**Experimental design and sampling**

This study uses a research design that is a pure experiment using a completely randomized design (CRD) with the Randomize Posttest-only Control Group Design approach carried out 5 times. The study was conducted in the in vitro laboratory of the Faculty of Veterinary Medicine of Airlangga University in July - October 2019. The research subjects used goat oocytes which were divided into 4 groups consisting of 1 control group and 3 treatment groups. Each group consisted of 31 samples. All data are first tested for normality using the Shapiro-Wilk test and Homogeneity test using the Levene test. Then proceed with the Kruskal Wallis test, obtained significantly different results (p <0.05) then proceed with the Mann Whitney test between 2 treatments each.

**Findings**

**Zygote Cleavage**

Table 1: The result of Zygote Cleavage

<table>
<thead>
<tr>
<th>Group</th>
<th>Average ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>K(_1) (Control)</td>
<td>6.6680 ± 9.13054</td>
</tr>
<tr>
<td>P(_1) (0.5 µM)</td>
<td>3.3340 ± 7.45505</td>
</tr>
<tr>
<td>P(_2) (1.0 µM)</td>
<td>3.3340 ± 7.45505</td>
</tr>
<tr>
<td>P(_3) (2.0 µM)</td>
<td>16.6700 ± 0.00000</td>
</tr>
</tbody>
</table>

Table 1 shows that administering a 2.0 µM dose of Moringa leaf nanoparticles in embryo culture in vitro can increase zygote cleavage.

Table 2: p value of Zygote Cleavage

<table>
<thead>
<tr>
<th>Variable</th>
<th>p value</th>
<th>explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zygote cleavage</td>
<td>.041</td>
<td>There is a significant difference</td>
</tr>
</tbody>
</table>

Kruskal Wallis test results showed a value of p <0.05 meaning that there were significant differences in the cleavage of zygotes at the stage of embryo culture in vitro between groups K\(_1\) P\(_1\) P\(_2\) P\(_3\).

Table 3: The differences between groups of zygote cleavage variables

<table>
<thead>
<tr>
<th>Group</th>
<th>P(_3)</th>
<th>P(_2)</th>
<th>P(_1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>K(_1)</td>
<td>.050</td>
<td>.513</td>
<td>.513</td>
</tr>
<tr>
<td>P(_1)</td>
<td>.014</td>
<td>1.000</td>
<td>.513</td>
</tr>
<tr>
<td>P(_2)</td>
<td>.014</td>
<td>.513</td>
<td>.513</td>
</tr>
</tbody>
</table>

Based on the table above, the most different groups are in the P\(_3\) group against K\(_1\), P\(_1\), and P\(_2\), namely .050, .014, .014. These results indicate that the supplementation of Moringa oleifera Lam Moringa leaf nanoparticles at a dose of 2.0 µM can significantly increase zygote cleavage.

Figure 1: Mean graph of zygote cleavage at embryo culture
In Figure 1, the results of the study showed that the highest zygote clavage (16.66) was found in group P3 (Treatment III Nano dose 2.0 μM).

**Figure 2: Results of the cleavage of zygote 2-cell using an inverted microscope**

**Figure 3: The results of the cleavage of zygote 4 cells and 8 cells using an inverted microscope**

**Discussion**

At the time of embryo culture in vitro can trigger the occurrence of Reactive Oxygen Species (ROS) due to external conditions or in vitro culture medium. ROS can come directly from gametes and embryos, or from their environment. Although ROS can regulate cell function and activate key signaling pathways, increased ROS can cause the formation of highly radial hydroxyl which can increase lipid peroxidation, increase DNA oxidation and damage DNA nuclei, increase protein oxidation.

In the female reproductive system such as the ovary there are endogenous antioxidants which naturally protect the embryo from oxidative damage, but in the production of embryos in vitro, the embryo lacks endogenous antioxidants because it continues to be exposed to stressors that are too high. To determine the ability of the zygote through the observation of developmental barriers (cell block), which is based on the ability of the developing embryo to reach the stage of two cells. In addition, ROS levels exceed basal levels, nuclear factor-kappa B subunit 1 (NFkB) is induced. NFkB is activated by ROS during embryo development, so that it can result in cell death in the embryo.

Moringa oleifera Lam leaves contain a source of vitamin A, C, B calcium, protein, and potassium. In addition, it contains special plant pigments with strong antioxidants. The most antioxidant in moringa leaves is quercetin, where the system works by binding to free radical species in the presence of hydroxyl groups (OH-) at C to 3, 5, 7, 3’, and 4’ and catechol ring. Quercetin is a powerful antioxidant whose strength is 4-5 times higher compared to vitamin C and vitamin E which are known as potential vitamins. Quercetin as an antioxidant can prevent oxidation through hydrogenation and complex formation and prevent auto-oxidation.

This is consistent with Uswatun’s research that Antioxidants are needed to fight excess ROS in zygote cells so as to prevent zygote cell death and can develop to the next stage. The right concentration of antioxidants can contribute to the generation of high-quality embryos.

In this research, Moringa oleifera Lam
containing exogenous antioxidants is made in the form of nanoparticles to more quickly penetrate the space between the intended cells and to specific cells\textsuperscript{18}. Exogenous antioxidants can be added to a culture medium to protect the embryo from oxidative stress (OS) during in vitro culture (IVC) via the lipophilic cation conjugation pathway by penetrating the zygote cell membrane lipid bilayer\textsuperscript{19}.

There is research conducted by Barakat et al.\textsuperscript{14} about Moringa oleifera found that with a dose of Moringa oleifera extract 100 µg/ml effectively increases the level of maturation of sheep oocytes and can act as a promoter to induce mRNA gene expression (Cyclin B and CDK2 for cell cleavage control), and synthesis of essential proteins, eg. MPF (Maturation Promoting Factor). MPF is a complex protein consisting of two subunits including a catalytic subunit (P34 CDK2 kinase) and a regulator subunit (Cyclin B). While MAPK (Mitogen Activated Protein Kinase) activates cyclin (cell cycle protein). The abundance of specific transcripts in mRNA pools is important for the first embryonic cell cleavage\textsuperscript{14}.

Where MAPK (Mitogen Activated Protein Kinase) namely Cyclin B (cell cycle protein) is activated by serine protein and MPF (Maturation Promoting Factor) namely CDK2 is activated by threonine protein. The binding between Cyclin and CDK triggers mitosis by activating cyclin binding CDK to Cyclin CDK Complex so that it triggers cells to pass the G2 check point to the M phase (Mitosis) in the cell cycle\textsuperscript{20}.

Determination of the 0.5 µM and 1.0 µM doses of the researchers refers to the study of Gaviria et al.\textsuperscript{6} Supplementation of medium culture with low levels of resveratrol improves embryo quality\textsuperscript{21}. Low doses cause a significant decrease in cleavage age and blastocyst rate, which does not produce a fast-developing blastocyst percentage.

In pharmacodynamic tests, it is only fitting that the greater the dose used, the greater the effect will be on the dose-response effect. The therapeutic effect is a function of dose and time, such charts illustrate the dose-response relationship that is not time-dependent. In this situation the maximum effect intensity (ceiling effect) can be caused\textsuperscript{22}. In this condition, it can also be concluded that the dose of moringa leaf nanoparticles which can cause an effect that is an increase in zygote cleavage is at a dose of> 2.0 µM while the doses of 0.5 µM and 1.0 µM do not have pharmacological effects in this case do not support embryonic cell cleavage.

Osman et al (2015) reported that the dose of Moringa leaves was given incorrectly and could cause toxicity to the cells themselves\textsuperscript{23}. These effects can be mutually supportive but can also be contradictory. The variety of active chemicals found in plants will work in synergy to produce the expected therapeutic effects and these effects can be lost or can cause adverse effects when the chemicals are not in accordance with the target cell needs\textsuperscript{24}.

The form of the reproductive system of living things for each species is different so that the ability to reproduce is also different. The lust cycle will affect the time for holding in vitro fertilization and affect the success of fertilization. The process of fertilization in goats is around 20-24 hours while in cattle it is 36 hours. So that the positive effect of antioxidants on embryonic development in vitro is shown in cows on embryonic development to blastocysts because cow embryos can tolerate low antioxidant concentrations in order to produce beneficial effects\textsuperscript{23}. In addition, goat spermatozoa have phospholipase A2 in plasma causing early acrosome reactions and result in spermatozoa cells being damaged more quickly than cattle spermatozoa. As a result, the failure of in vitro embryo production among goats is higher than cattle\textsuperscript{25}.

So, resveratol with a dose of 0.5 µM and 1.0 µM has been able to increase the development of cow embryos due to the adequacy of energy and antioxidants while a dose of 0.5 µM and 1.0 µM in moringa oleifera produces energy and antioxidants needed are still lacking so that it can trigger embryonic cell damage.

Antioxidants can cause prooxidant activity under certain conditions, such as at high doses or when there are metal ions. Prooxidant activity is highly dependent on its concentration at high doses (> 50 µM) can potentiate superoxide radicals (O2-) in isolated mitochondria and cells that are cultured, reduce cell survival and cause damage to DNA, proteins, lipids while too low doses can induce cytotoxicity, DNA strand breaks and apoptosis\textsuperscript{26}.

\textbf{Conclusion}

In the number of doses between Moringa leaf extract and nanoparticles is not much different in increasing zygote cleavage in vitro because there has been no research on organic nanoparticles against zygote cleavage in vitro so in this study the amount of Moringa
leaf nanoparticles dose is based on previous research journals on natural antioxidant extracts in plant.

**Conflict of Interest:** The authors declare that there is no conflict of interest.

**Source of Funding:** This research is financed by independent financial from the researchers.

**Ethical Clearance:** Taken from Animal Care and Use Committee (ACUC), Airlangga University, NO:2.KE.136.07.2019.

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Study of Tuberculosis Related Topics in Baghdad, Iraq 2012-2016 Tuberculosis Related Topics

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Abstract

Objective(s): The present study designed to explore topics related to Tuberculosis, such as new smear positive cases, causes, treatment and new pulmonary positive cases in Baghdad City, Iraq for 2012-2016.

Methods: A descriptive “retrospective” design was performed throughout the present study from the period of November 12th 2017 to February 13th 2018. All registered tuberculosis patients in Baghdad, Iraq for the period of 2012-2016. An instrument was constructed for the purpose of the study. Data were collected from the health records at the National Tuberculosis Center, State TB center, and district TB center for the period of 2012 to 2016 with the use of the study instrument. Data were analyzed through the application of descriptive statistical data analysis approach of frequency, percent, incidence rate and ratio.

Results: The study findings depicted that most of the new smear positive cases are accounted for the age group of (15-24) year old during the years of 2012-2016. Causes of Tuberculosis in the rural area were accounted for poverty (39.95%), smoking (22.39%), untreated cases (12.4%), alcoholism (11.32%), malnutrition (10.30%) and overcrowded (3.57%) respectively, and accounted for alcoholism (27.77%), overcrowded (27.16%), malnutrition (24.69%), smoking (11.93%), poverty (7.62%) and untreated cases of Tuberculosis (0.80%) respectively in the urban area.

Conclusion: The study concluded that Most of the new smear positive cases are accounted for the age group of (15-24) year old during the years of 2012-2016. Patients, in 2014, had benefited out of the Tuberculosis Program more than others based on the success rate.

Key Word: Study, Topics, Tuberculosis, Baghdad City, Iraq

Introduction

Roughly one-third of the world’s population has been infected with M. tuberculosis, and new infections occur at a rate of one per second (¹). However, not all infections with M. tuberculosis cause tuberculosis disease and many infections are asymptomatic (²). In 2007 there were an estimated 13.7 million chronic active cases, and in 2010 there were 8.8 million new cases, and 1.45 million deaths, mostly in developing countries (³,⁴). 0.35 million of these deaths occur in those co-infected with HIV. In 2015, across the world 1.8 million out of 10.4 million people affected by the disease died (⁵,⁶).

Any person who coughs and who was in contact with smear positive index case (smear positive pulmonary TB patient) should have three sputum examinations. Children aged less than 5 years: any contact aged less than 5 years who has a positive tuberculin that not previously vaccinated with BCG with signs or symptoms of TB should be treated as suffering from active TB. Those without signs or symptoms of disease should be given preventive chemotherapy (INH for 6 months). Children under one year of age with mothers who are
being treated for smear positive pulmonary TB should be given Isoniazid if the tuberculin test is negative at the end of three months, INH may be stopped and BCG may be given \(^{(7,8,9)}\).

Drug Resistance Tuberculosis is a man-made disease (due to non-compliance, improper drug regimen, etc.). Primary resistance is prevented by giving the patient combination of drugs. Secondary (acquired) TB resistance is expected to be developed \(^{(10-12)}\).

1. A large bacillary population such as patient with cavitations.

2. Inadequate drug regimens (inappropriate drugs, insufficient dosage), drug side effects and complications.

3. Treatment of DR TB should be done by or in close consultation with an expert in the management of these cases and on hospitalization bases.

4. A single new drug should never be added to a failing regimen.

5. Treatment duration for DR TB patient may last 18-24 months by using 4-6 drugs (capreomycin, cyclocerin, ethionamide, levofloxacine, and PAS).

6. Second line regimens often represent the patient’s last hope for being cured inappropriate management can thus have life threatening sequences.

Based on the early stated facts, the present study ought to carry out a retrospective study to investigate related issues to detected cases of tuberculosis in Baghdad, Iraq for 2012-2016.

**Method**

A descriptive “retrospective” design was employed throughout the present study from the period of November 12th 2017 to February 13th 2018 in order to investigate related topics to Tuberculosis, such as new smear positive cases, causes, treatment and new pulmonary positive cases in Baghdad City, Iraq for 2012-2016. A convenient sample of (11680) registered patients with tuberculosis in Baghdad, Iraq for the period of 2012-2016. These patients were males and females and they were one year to over than 65 year of age.

An instrument was constructed for the purpose of the study. It was comprised of items that focused on patients’ characteristics of age, gender and type of Tuberculosis. A pilot study was conducted for the determination of the study instrument’s content validity, internal consistency reliability and adequacy. The study was carried out for the period of December 10th -20th 2017. Content validity of the instrument was determined through panel of (15) experts. These experts were (5) faculty members at the College of Nursing University of Baghdad, (5) Faculty members at the College of Medicine University of Baghdad and (5) epidemiologists at the Ministry of Health and Environment. They were presented with copy of the study instrument and asked to review it and provide comments for its modification to be more appropriate measure of the study. They had reviewed the instrument and presented their comments with an agreement that the instrument is content valid. Internal consistency reliability was determined for the study instrument through the use of split-half technique and measurement of Cronbach alpha correlation coefficient. The results indicated that Cronbach alpha correlation coefficient was \(r=0.85\) which adequately reliable measure for the problem underlying the present study.

Data were collected from the health records at the National Tuberculosis Center, State TB center, and district TB center for the period of 2012 to 2016 with the use of the study instrument. Data were analyzed through the application of descriptive statistical data analysis approach of frequency, percent, incidence rate and ratio.

**Results**

Results out of table (1) indicate that most of the new smear positive cases are accounted for the age group of (15-24) year old during the years of 2012-2016.

Table (2) depicts that causes of Tuberculosis in the rural area are accounted for poverty (39.95%), smoking (22.39%), untreated cases (12.4%), alcoholism (11.32%), malnutrition (10.30%) and overcrowded (3.57%) respectively, and accounted for alcoholism (27.77%), overcrowded (27.16%), malnutrition (24.69%), smoking (11.93%), poverty (7.62%) and untreated cases of Tuberculosis (0.80%) respectively in the urban area. So, poverty and smoking are considered the most effective causes for patients in the rural area. In contrast, alcoholism, overcrowded and malnutrition are considered as the most effective causes for patients in the urban area.
Results of treatment out of table (3) reveal that success rate are (69%) in 2014, (61%) in 2013 and (51%) in 2012 respectively. Such rate can present evidence that patients in 2014 have benefited out of the program more than others.

Table (4) shows that age specific incidence numbers, percentage and incidence rate by gender. The percentage and the numbers in age group 15-24 years old was the highest and declined thereafter while age was increasing for both male and female. But the incidence cases in age group 0-14 in both male and female were almost the same.

Though the incidence rate of both male and female cases the same in the age group 0-14 years old and difference was much higher as age groups increased from 15-24, 25-34, 35-44, and the highest was found among the age group 55-64 years old while the rapid decreasing was found in the age group 65 + years old.

### Table (1). Percentage of New Smear Positive Cases in Different Age Groups (2012-2016)

<table>
<thead>
<tr>
<th>Age Group (years)</th>
<th>Number of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-14</td>
<td>102</td>
<td>2.5</td>
</tr>
<tr>
<td>15-24</td>
<td>1025</td>
<td>24.9</td>
</tr>
<tr>
<td>25-34</td>
<td>815</td>
<td>19.8</td>
</tr>
<tr>
<td>35-44</td>
<td>676</td>
<td>16.5</td>
</tr>
<tr>
<td>45-54</td>
<td>642</td>
<td>15.6</td>
</tr>
<tr>
<td>55-64</td>
<td>479</td>
<td>11.6</td>
</tr>
<tr>
<td>65+</td>
<td>366</td>
<td>8.9</td>
</tr>
</tbody>
</table>

### Table (2). Causes of Tuberculosis in Urban and Rural Areas

<table>
<thead>
<tr>
<th>Causes</th>
<th>Rural</th>
<th></th>
<th>Urban</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
<td>Frequency</td>
<td>Percentage</td>
</tr>
<tr>
<td>Poverty</td>
<td>380</td>
<td>39.95%</td>
<td>818</td>
<td>7.62%</td>
</tr>
<tr>
<td>Alcoholism</td>
<td>108</td>
<td>11.35%</td>
<td>2980</td>
<td>27.77%</td>
</tr>
<tr>
<td>Malnutrition</td>
<td>98</td>
<td>10.30%</td>
<td>2650</td>
<td>24.69%</td>
</tr>
<tr>
<td>Smoking</td>
<td>213</td>
<td>22.39%</td>
<td>1280</td>
<td>11.93%</td>
</tr>
<tr>
<td>Overcrowded</td>
<td>34</td>
<td>3.57%</td>
<td>2915</td>
<td>27.16%</td>
</tr>
<tr>
<td>Untreated cases of Tuberculosis</td>
<td>118</td>
<td>12.40%</td>
<td>86</td>
<td>0.80%</td>
</tr>
<tr>
<td>Total</td>
<td>951</td>
<td></td>
<td>10729</td>
<td></td>
</tr>
</tbody>
</table>
Table (3). Results of Treatment of Drug Resistance Cases Detected among Tuberculosis Patients during (2012-2016)

<table>
<thead>
<tr>
<th>Years</th>
<th>Total Enrolled</th>
<th>Cure</th>
<th>Completed Treatment</th>
<th>Defaulted</th>
<th>Died</th>
<th>Failure</th>
<th>Treatment Extended</th>
<th>NA</th>
<th>Success Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>114</td>
<td>47</td>
<td>11</td>
<td>26</td>
<td>20</td>
<td>10</td>
<td>0</td>
<td>0</td>
<td>51%</td>
</tr>
<tr>
<td>2013</td>
<td>79</td>
<td>38</td>
<td>10</td>
<td>21</td>
<td>8</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>61%</td>
</tr>
<tr>
<td>2014</td>
<td>55</td>
<td>12</td>
<td>3</td>
<td>16</td>
<td>8</td>
<td>0</td>
<td>1</td>
<td>15</td>
<td>69%</td>
</tr>
<tr>
<td>2015</td>
<td>58</td>
<td>2</td>
<td>0</td>
<td>2</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>47</td>
<td>……</td>
</tr>
<tr>
<td>2016</td>
<td>63</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>56</td>
<td>……</td>
</tr>
</tbody>
</table>

Table (4). New Pulmonary Positive Cases by Age Groups and Gender in Baghdad during (2012-2016)

<table>
<thead>
<tr>
<th>Age groups (Year)</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-14</td>
<td>29</td>
<td>73</td>
<td>102</td>
</tr>
<tr>
<td>15-24</td>
<td>392</td>
<td>633</td>
<td>1025</td>
</tr>
<tr>
<td>25-34</td>
<td>478</td>
<td>336</td>
<td>814</td>
</tr>
<tr>
<td>35-44</td>
<td>479</td>
<td>197</td>
<td>676</td>
</tr>
<tr>
<td>45-54</td>
<td>385</td>
<td>257</td>
<td>642</td>
</tr>
<tr>
<td>55-64</td>
<td>278</td>
<td>201</td>
<td>479</td>
</tr>
<tr>
<td>65+</td>
<td>190</td>
<td>176</td>
<td>366</td>
</tr>
<tr>
<td>Total</td>
<td>2231</td>
<td>1873</td>
<td>4104</td>
</tr>
</tbody>
</table>

Conclusion

The study concluded that Most of the new smear positive cases are accounted for the age group of (15-24) year old during the years of 2012-2016. The urban zone’s incidence rate was greater than that of the rural zone. Poverty and smoking were considered the most effective causes for patients in the rural area. In contrast, alcoholism, overcrowded and malnutrition were considered as the most effective causes for patients in the urban area. Patients in 2014 had benefited out of the Tuberculosis Program more than others based on the success rate. The incidence rate of both male and female cases the same in the age group of (0-14) years old and difference was much higher as age groups increased from (15-24), (25-34), (35-44), and the highest was found among the age group (55-64) years old while the rapid decreasing was found in the age group 65 + years old.
**Recommendations:**

Based on the early stated conclusion, the present study recommended that:

1. An educational program can be designed, constructed and implemented public-wide to increase individuals and patients’ awareness toward tuberculosis as public health problem and the benefits of its treatment.

2. The Ministry of Health and Environment in Iraq can present appropriate and effective attention to people who were at risk of Tuberculosis.

3. Further research with a large sample size and wide range of variables can be conducted.

**Disclosure:**

- Ethical approval N/A
- Informed consent N/A
- Registry and the Registration No. of the study/Trial N/A
- Animal Studies N/A
- Conflict of Interest N/A

**References:**


Analysis of Factors Related to Pesticide Poisoning in Rice Farmers in Teweh Selatan Subdistrict, Barito Utara District

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Abstract

The results of monitoring and examination of farmers in Barito Utara District by examining the cholinesterase enzyme by the Regional Health Laboratory and the District Health Office of Barito Utara in the blood of farmers found 71.19% experienced organopathic pesticide poisoning. This study aims to analyze the risk factors associated with the level of pesticide poisoning in rice farmers in Teweh Selatan Subdistrict, Barito Utara District, namely mixing dosage, spraying time, spraying frequency, spraying duration, working period, wind direction, and use of personal protective equipment. The research design used was observational with cross sectional approach. The number of samples is 55 people taken by simple random sampling. Rice farmers who experienced pesticide poisoning by 56.4%. Chi-Square Test showed four variables had a significant relationship with the incidence of pesticide poisoning and were a risk factor for the occurrence of pesticide poisoning namely mixing dose (p=0.003 OR=6.909; 95% CI=2.020-23.627), frequency of spraying (p=0.004; OR=6.300; 95% CI=1.913-20.749), working period (p=0.020; OR=4.416; 95% CI=1.402-13.906) and wind direction (p=0.007; OR=5.714; 95% CI=1.756-18.591). Multiple logistic regression test showed that the most dominant factor related to the incidence of pesticide poisoning was the frequency of spraying. Risk factors associated with the incidence of pesticide poisoning are mixing dosage, frequency of spraying, working period and wind direction.

Keywords: farmer, mixing dose, frequency of spraying, working period, wind direction, poisoning, pesticides

Introduction

An increase in farmer groups that cause a lot of use of pesticides which can ultimately increase the risk of poisoning due to pesticides in Central Kalimantan. The cases of pesticide poisoning in Central Kalimantan in 2016 amounted to 48 cases, while in 2017 there were 56 cases. An increase in poisoning cases due to pesticides is in line with the increase in farmer groups in Central Kalimantan.1

Factors that can influence the occurrence of pesticide poisoning on farmers are the characteristics of farmers, namely age, sex, nutritional status, level of education, length of work, behavior of farmers in using pesticides, among others, the number of pesticides used, mixing pesticide doses, frequency of spraying, duration spraying, the use of personal protective equipment (PPE).2 Farmers can be contaminated with pesticides when storing and moving pesticides, preparing pesticide solutions, applying pesticides and washing application tools. Applying pesticides when spraying often results in pesticide contamination.3

There was a significant relationship between variable spraying frequency (p=0.001) and spraying time (p=0.000) with pesticide poisoning in Jati Village, Sawangan Subdistrict, Magelang District.4 There is a significant relationship between the frequency of spraying (p=0.020), duration of spraying (p=0.002), wind direction (p=0.020) and the use of personal protective equipment (p=0.002) with cholinesterae activity blood in farmers in Naman Teran Subdistrict Karo District, as

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well as according to Suparti S, et al. (2016) which states that there is a significant relationship between frequency of spraying ($p=0.002$), pesticide dose ($p=0.001$), duration of spraying ($p=0.001$), spraying time ($p=0.016$) and wind direction ($p=0.039$) with pesticide poisoning to farmers.5

Based on data from the Barito Utara District Health Laboratory it is known that in 2018 from the results of the examination of 21 farmers, 76.19% of farmers experienced pesticide poisoning. The recapitulation of the District Health Office of Bairto Utara states that the average age of farmers is 54 years with an average working period of 23 years, 57.1% of farmers mixing pesticide doses do not match the label stated, 52.4% of farmers used to spray pesticides during the day days and with a frequency of spraying more than twice a week as much as 47.6%. 28.6% of farmers sprayed for more than 3 hours in one spraying and 33.3% of farmers in the technique of spraying downwind, and the average farmer did not use a complete PPE of 61.9%.6 Thus, farmers are a group that is vulnerable to exposure to pesticides that have an impact on pesticide poisoning. However, not many studies have revealed the factors that cause pesticide poisoning, especially in lowland rice farmers in Teweh Selatan Subdistrict, Barito Utara District.

**Materials and Method**

The research design used was a cross sectional approach. The study was conducted in Teweh Selatan Subdistrict, Barito Utara District, considering that the rice rice farmers group in Teweh Selatan Subdistrict was the farmer group that used the most pesticides assisted by the Agriculture Office Program of Barito Utara District and had never done any research on the factors related to pesticide poisoning in rice farmers. The study was conducted in March - June 2019. The population in this study were all rice farmers who sprayed with pesticides in Teweh Selatan District as many as 240 people. The number of samples was 55 respondents. The dependent variable in this study was pesticide poisoning of rice farmers (measured by the cholinesterase enzyme level <75%).

**Findings and Discussion**

Table 1. Bivariate Analysis Relationship between Mixing Doses, Spraying Time, Spraying Frequency, Spraying Duration, Working Period, Wind Direction, and PPE Usage with the Occurrence of Pesticide Poisoning in Rice Farmers

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pesticide poisoning</th>
<th>p value</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Poisoning Normal total</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>n %</td>
<td>n %</td>
<td>n %</td>
</tr>
<tr>
<td>Mixing dose</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not suitable</td>
<td>20 80.0 5 20.0 25 100</td>
<td>0.003</td>
<td>6.909 (2.020-23.627)</td>
</tr>
<tr>
<td>Suitable</td>
<td>11 44.1 19 55.9 34 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spraying time</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bad</td>
<td>22 59.5 15 40.5 37 100</td>
<td>0.708</td>
<td>(0.472-4.555)</td>
</tr>
<tr>
<td>Well</td>
<td>9 50.0 9 50.0 18 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spraying frequency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Often</td>
<td>21 77.8 6 22.2 27 100</td>
<td>0.004</td>
<td>6.300 (1.913-20.749)</td>
</tr>
<tr>
<td>Rarely</td>
<td>10 35.7 18 64.3 28 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spraying duration</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 3 hours a day</td>
<td>17 60.7 11 39.3 28 100</td>
<td>.696</td>
<td>(0.492-4.184)</td>
</tr>
<tr>
<td>≤ 3 hours a day</td>
<td>14 51.9 13 48.1 27 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Working period</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; 5 years</td>
<td>20 74.1 7 25 27 100</td>
<td>0.020</td>
<td>4.416 (1.402-13.906)</td>
</tr>
<tr>
<td>≤ 5 years</td>
<td>11 39.3 17 60.7 28 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wind direction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not in same direction</td>
<td>24 72.7 9 27.3 33 100</td>
<td>0.007</td>
<td>5.714 (1.756-18.591)</td>
</tr>
<tr>
<td>In same direction</td>
<td>7 31.8 15 68.2 22 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PPE usage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not eligible</td>
<td>22 55 18 45 40 100</td>
<td>.978</td>
<td>(0.244-2.722)</td>
</tr>
<tr>
<td>Eligible</td>
<td>9 60 6 40 15 100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Relationship between Mixing Doses and Pesticide Poisoning on Rice Farmers

The results of the analysis stated that there was a relationship between mixing dose with pesticide poisoning on rice farmers in Teweh Selatan Subdistrict, Barito Utara District with p-value 0.003 <α (0.05). The OR score of 6.909 means that farmers who mix the dosage incorrectly on the label are 6.9 times at risk of experiencing pesticide poisoning compared to rice farmers who mix pesticides according to the dosage on the label.

The rice farmers mix the dosage with pesticide insecticides mixed with three different brands of pesticides namely Winder, Selden and Spontan. The pesticide when it enters the body of rice farmers can inhibit and reduce the production of the enzyme kholineterase in the body. This situation will cause nervous system disorders in the form of cholinergic activity continuously due to achethilcholine (AchE) not hydrolyzed. This disorder is known as signs or symptoms of poisoning such as dizziness, headaches, and nausea.7

The Relationship between Spraying Time and Pesticide Poisoning on Rice Farmers

Based on the results of the analysis showed that there was no significant relationship between the time of spraying with pesticide poisoning on rice farmers in Teweh Selatan Subdistrict, Barito Utara District with p-value (0.708)> α(0.05). The rice farmers spend more time during the day and poisoning ie at 11:00 to 13:00 at 31.82%. As for farmers who work at noon. 11.00-15.00 pm but the blood cholineterase level is classified as normal at 46.67%. Normal levels of cholineterase in the blood due to the spraying time range between 2:00 pm to 3:00 pm there is a decrease in air temperature so that the rate of expansion is also reduced. In addition, it is supported by an infrequent spraying frequency of ≤ 2 times a week by 80%.

The Relationship between Frequency of Spraying and Pesticide Poisoning on Rice Farmers

The results showed that the frequency of spraying carried out by rice farmers was >2 times a week and experienced pesticide poisoning by 77.8%. The average frequency of farmers spraying pesticides 3 times a week is 100%. The more often farmers spray using pesticides, the greater the possibility of poisoning. Exposure to pesticides with frequent frequency and with short time intervals causes pesticide residues in the human body to be higher.

Statistical analysis showed that there was a significant relationship between the frequency of spraying with pesticide poisoning on rice farmers in Teweh Selatan Subdistrict, Barito Utara District with a p-value (0.004) <α (0.05). OR results of 6.300, meaning that farmers who do frequent spraying frequency >2 times a week have a risk of 6.3 times experiencing pesticide poisoning compared to farmers who spray pesticides as much as ≤ 2 times a week.

The Relationship between Spraying Duration and Pesticide Poisoning on Rice Farmers

Chi-square test results with a 95% confidence level to see the relationship between spraying duration and the incidence of pesticide poisoning in rice farmers obtained p-value 0.696 (p> 0.05) which states that there is no relationship between spraying duration and the incidence of pesticide poisoning. In lowland rice farmers in Teweh Subdistrict.

The results of the analysis showed that the rice farmers who did the spraying duration >3 hours but the normal blood cholineterase level was 20%. Spraying duration depends on wide area of land worked by farmers. The area of rice fields that farmers have influenced the incidence of pesticide poisoning. The longer time the spraying is, the more pesticides are exposed. This can affect the body’s exposure or entry...
of pesticides so that it can cause poisoning. However, the normal level of cholinesterase in the blood occurs because the farmer mixes the dosage according to the label and the working period of the new rice farmers is ≤ 5 years as much as 63.6%.\(^9\)

**The Relationship between Working Period and Pesticide Poisoning on Rice Farmers**

Based on the results of the analysis showed that farmers who worked more than 5 years more experienced pesticide poisoning which was 74.1% compared to respondents who worked ≤ 5 years ie 39.2%. In addition, the age of rice farmers who have worked for more than 5 years is classified as at risk by 92.6%. Naturally, human endurance will decrease with age, while the emergence of pesticide poisoning is strongly influenced by human endurance factors. There is a tendency for older farmers to have lower blood cholinesterase activity.\(^10\)

The number of farmers who have a long working period allows farmers to experience longer exposure to pesticides so that the levels of pesticides in their blood are higher and bioaccumulation will occur in the body. This has the potential to cause chronic poisoning to pesticide spraying farmers. If the longer the farmer works and spraying, the longer the contact with pesticides so the risk of exposure to pesticides is higher.\(^11\)

**The Relationship between Wind Direction and Pesticide Poisoning on Rice Farmers**

Based on the results of the analysis states there is a relationship between the direction of the wind with pesticide poisoning on rice farmers in Teweh Selatan Subdistrict, Barito Utara District with p-value (0.007) <\(\alpha\) (0.05). The OR results of 5.714 means that farmers who spray not in the direction of the wind are 5.7 times at risk of experiencing pesticide poisoning compared to rice farmers who spray in the direction of the wind.

Rice rice farmers who did the spraying technique were not unidirectional and experienced 72.7% poisoning. The observations showed that farmers sprayed without regard to the wind direction, but with alternating directions according to the rows of plants. Actually farmers know that a good spraying direction is in accordance with the direction of the wind but they consider spraying with attention to the direction of the wind more troublesome and time-consuming. Farmers who do not follow the direction of the wind will risk being exposed to pesticides such as being splashed or exposed directly to body parts and clothing due to gusts of wind that turn towards the body of the sprayer. More risky if pesticides are sprayed directly on the eye that is not protected with protective glasses.

**The Relationship between The Use of PPE and Pesticide Poisoning on Rice Farmers**

Based on the results of statistical analysis, there was no significant relationship between the use of PPE and pesticide poisoning on rice farmers in Teweh Selatan Subdistrict, Barito Utara District with a p-value of 0.978 (> 0.05). The results of the analysis stated that the majority of rice farmers did not use PPE as much as 72.7% greater than those using PPE that met the requirements. Only 27.3% of rice farmers who use PPE are eligible. This causes the use of PPE that there is no meaningful relationship. There is no relationship between the completeness of personal protective equipment (PPE) with the pesticide poisoning in farmers with p-value = 0.355.12

PPE is used to protect farmers from exposure to pesticides ranging from headgear/hats, masks, long sleeve clothes, gloves, glasses and shoes. Based on field research, it was found that the type of PPE that farmers usually use when spraying is 45.5%, boots 49.1%, long sleeves 29.1% and gloves 27.3%. The interview results showed that the awareness of farmers to wear a head cover in the form of a hat by 70% on the grounds not because of the dangers of pesticides but farmers to protect their heads from the sun’s heat.

**Table 2. Multivariate Relationship Analysis**

<table>
<thead>
<tr>
<th>Variable</th>
<th>p-value</th>
<th>OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Lower</td>
<td>Upper</td>
</tr>
<tr>
<td>Mixing dose</td>
<td>0.007</td>
<td>8,472</td>
<td>1,801</td>
</tr>
<tr>
<td>Spraying frequency</td>
<td>0.003</td>
<td>11,081</td>
<td>2,326</td>
</tr>
<tr>
<td>Working period</td>
<td>0.053</td>
<td>4,195</td>
<td>0.985</td>
</tr>
</tbody>
</table>
Based on the results of multiple logistic regression analysis of four independent variables that are significantly related to pesticide poisoning on rice farmers there are two variables that are most related to pesticide poisoning, namely the frequency of spraying and mixing dose. Based on p-value <0.05 in the second stage of multiple logistic regression analysis, from the two variables it was concluded that the most dominant variable was related to pesticide poisoning on rice farmers, namely the frequency of spraying because it had the highest OR (OR = 11.081) and a p-value of 0.007 states that there is a significant relationship on rice farmers who spray more than 2 times a week having a risk of 11.08 times experiencing pesticide poisoning compared with paddy farmers who spray ≤2 times a week.

The frequency of spraying more than 2 times a week can increase the risk of poisoning because it allows an increased risk of exposure to insecticides and the risk of poisoning. The more often farmers spray, the higher the risk of poisoning. Spraying should be done in accordance with the provisions. The time needed to be in contact with pesticides is a maximum of 5 hours per day.13

The exposure to pesticides on the human body with frequent frequency and with short time intervals causes pesticide residues in the human body to be higher, indirectly the activities of farmers who reduce the frequency of spraying can reduce the exposure of these farmers by pesticides.7

**Conclusion**

Risk factors associated with the incidence of pesticide poisoning are mixing the dose, frequency of spraying, working period and wind direction. The dominant factor associated with the incidence of pesticide poisoning in lowland rice farmers is the frequency of spraying.

**Ethical Clearance:** This research has gone ethical feasibility testing by the Ethical Research from Faculty of Medicine, Lambung Mangkurat University.

**Source Funding:** This study was done by self-funding from the authors.

**Conflict of Interest:** The authors declare that they have no conflict interests.

**References**


[12] Runia YA. Factors Associated with


Title page
The Effect of Zinc Supplementation on Improving Cognitive and Nutrition Status among Preschool Children Coming to Family Medicine Center Clinic in Nikla Village at Giza

Amany Nassef Tawfik Elshemy1, Hanna Mohamed Aboulghar2, Maha Abd El Rahman Mowafy3, Maha Emad Eldin Ahmed4, Marwa Sayed Mohamed5

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Abstract

Objectives:

• Prevalence of zinc deficiency among preschool children in the study.
• Impact of zinc supplementation on cognitive function and the nutritional status among preschool children.
• Health education for healthy food and their requirement from the food regard the age and sex.

Study design:

This is a pre-post intervention study included 50 preschool child.

Method: The children randomly assigned to receive zinc supplementation daily for 6 months according to the level of plasma zinc. They were A self- administered questionnaire was used included (socio-demographic data, food frequency questionnaire and 24 hr. recall), anthropometric and cognition were assessed at the beginning and the end of the supplementation period. In addition to health education about healthy food throughout the follow up 6 months.

Results:-The study included males (46%) and females (54%);

-There was a significant difference in weight for age and height for age between the group before and after zinc supplementation.

- A significant difference in cognitive function, which the full-scale IQ, verbal IQ and nonverbal IQ between the group before and after zinc supplementation

- The health education effect positively on increasing the consumption of healthy food as protein, CHO, fruits, and vegetables to the normal proportions also effect on decrease consumption of unhealthy food as manufactured potatoes, fizzy drinks, and sweats.

Conclusions: zinc supplementation has an effect on cognitive and nutrition status on preschool age.-

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Health education about healthy food have good feedback on the study.

Keywords: Prevalence, Zinc, Cognitive, Nutrition, IQ
Introduction

Zinc is an important vital micronutrient for humans, and zinc deficiency among children is deleterious to growth and development, and cognitive function.1

The main sources of zinc are beef, pork, poultry, fish and shellfish. Vegetables represent a good plant source of zinc.2

Adequate nutrition is a cornerstone of health and essential in early childhood to ensure healthy growth, proper organ formation and function, a strong immune system, and neurological and cognitive development.3

Method

Study design and settings:

This is a pre-post intervention study carried out on pre-school age children attending the Family Medicine center clinic of Nikla village at Giza.

Inclusion criteria:

Apparent healthy children randomly chosen aged 2-5 years who came to the clinic starting from January 2018.

Exclusion criteria:

Any child had a chronic disease, any child with congenital anomalies, any child with chronic diarrhea and IQ test below 80

Sample size & sampling

A total sample size of (45). Based on the previous data, the expected difference in IQ results over time is 6.4±13.4 Using power 85% and 5% significance level. 39 children needed to be studied to be able to reject the null hypothesis that this response difference is zero. This number increased to 60 children to compensate for possible losses during follow up. The sample size was calculated by the PS program.

Data collection by different tools:

1) A structured interviewing questionnaire:

- Socio-demographic Characteristics adopted from Gelani questionnaire.

- Food frequency questionnaire and 24-hour recall for full dietary assessment. The FFQ was derived from a validated FFQ and was adjusted specifically for the National Institute of Nutrition in Egypt (NIN).

2) General examination:

Anthropometric assessments done to every child while wearing light clothing and barefoot. The anthropometric measures recorded according to the WHO Child Growth Standards charts for boys and girls (from birth to 5 years / Z-scores).

3) Laboratory investigation: to assess the level of zinc in plasma.


5) Written models of healthy food, the amount of food calculated for each child regard to child sex, age, and writing models for unhealthy food to avoid.

Zinc dose supplementation plan:

According to zinc level, in normal children, they supplied according to RDA of zinc for age 2-5 years (3-5 mg zinc sulfate oral / day), but deficient children received therapeutic dose (0.5-1 mg zinc sulfate oral / kg/day) divided 2 times/day in the form of zinc sulfate. Then calculated the dose of zinc to each child in the form of syrup.

Study time

The study carried out from 1st January 2017 to the end of March 2019.

Statistical Design:

The collected data were computerized and statistically analyzed using the Statistical Package for Social Science (SPSS) program version 17. Using descriptive and analytical statistics

Results

- Table (1) the study group included 50 children distributed 54% females and 46% male also shows that zinc deficiency in females and males represented (24% and 22%) respectively so prevalence of zinc deficiency 46% of the studied group.

- Noticed that increase in weight, height, and serum zinc measure and showing highly significant differences before and after zinc supplementation in table (2).
- As regards the anthropometric measures improved after intervention regarding growth curves in table (3).

- This table illustrated improving of all factors of IQ scores and their subtypes according to age by months and shows statistical significant differences intervention with p-value (0.000) in all illustrated in table (4).

- The table (5) shows high significant differences in mean values of total energy for all food components after health educations for 6 months.

- Notice in table (6) that enhancement increase of daily food-frequency of egg, milk products, potatoes, fruits and vegetables and also weekly food-frequency of, milk, rice, and pasta but decrease consumption of junk food.

Table (1) Distribution of children group according to the zinc level and its relation to sociodemographic characteristics:

<table>
<thead>
<tr>
<th>sociodemographic</th>
<th>Normal zinc</th>
<th>Zinc deficiency</th>
<th>Total (50)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>1- Sex:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Male</td>
<td>12</td>
<td>24</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>- Female</td>
<td>15</td>
<td>30</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>- Total</td>
<td>27</td>
<td>54</td>
<td>23</td>
<td>46</td>
</tr>
<tr>
<td>2- Socioeconomic status:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Low</td>
<td>16</td>
<td>32</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>- Moderate</td>
<td>11</td>
<td>22</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>- High</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>3- Mother education:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Low</td>
<td>6</td>
<td>12</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>- Moderate</td>
<td>17</td>
<td>34</td>
<td>13</td>
<td>26</td>
</tr>
<tr>
<td>- High</td>
<td>4</td>
<td>8</td>
<td>5</td>
<td>10</td>
</tr>
</tbody>
</table>

* Pearson chi-square

Table (2) Anthropometric measures before and after zinc supplementation

<table>
<thead>
<tr>
<th>Anthropometric measure</th>
<th>Before</th>
<th>After</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean± SD</td>
<td>Median (min-max)</td>
<td>Mean± SD</td>
</tr>
<tr>
<td>1- Weight (by Kg)</td>
<td>15 ± 2</td>
<td>15(11-21)</td>
<td>17 ± 2</td>
</tr>
<tr>
<td>2- Height (by cm)</td>
<td>98 ± 6</td>
<td>99(86-113)</td>
<td>103 ± 6</td>
</tr>
<tr>
<td>3- Serum zinc measure (109-167 mg/dl)</td>
<td>109 ± 24</td>
<td>111(55-153)</td>
<td>140 ± 14</td>
</tr>
</tbody>
</table>

*P-value is considered significant if < 0.05
Table (3): Comparing anthropometric measure using the standard WHO Z-Score curves before and after zinc supplementation

<table>
<thead>
<tr>
<th>Anthropometric measure</th>
<th>Before zinc supplementation</th>
<th>After zinc supplementation</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No (50)</td>
<td>%</td>
<td>No (50)</td>
</tr>
<tr>
<td>1- Wt/age:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>‧ -3 to -2</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>‧ -2 to 0</td>
<td>32</td>
<td>64</td>
<td>27</td>
</tr>
<tr>
<td>‧ 0 to +2</td>
<td>15</td>
<td>30</td>
<td>21</td>
</tr>
<tr>
<td>‧ +2 to +3</td>
<td>2</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>2- Ht/age:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>‧ -3 to -2</td>
<td>12</td>
<td>24</td>
<td>3</td>
</tr>
<tr>
<td>‧ -2 to 0</td>
<td>32</td>
<td>64</td>
<td>30</td>
</tr>
<tr>
<td>‧ 0 to +2</td>
<td>5</td>
<td>110</td>
<td>15</td>
</tr>
<tr>
<td>‧ +2 to +3</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>3- Wt/ht:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>‧ -2 to -1</td>
<td>1</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>‧ -1 to 0</td>
<td>12</td>
<td>24</td>
<td>9</td>
</tr>
<tr>
<td>‧ 0 to +1</td>
<td>22</td>
<td>44</td>
<td>26</td>
</tr>
<tr>
<td>‧ +1 to +2</td>
<td>14</td>
<td>28</td>
<td>13</td>
</tr>
<tr>
<td>‧ +2 to +3</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

*P value is considered significant if < 0.05

** Test used chi-square

Table (4): Comparing cognitive function before and after zinc supplementation

<table>
<thead>
<tr>
<th>IQ score</th>
<th>Before</th>
<th></th>
<th>After</th>
<th></th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± SD</td>
<td>Median (min-max)</td>
<td>Mean ± SD</td>
<td>Median (min-max)</td>
<td></td>
</tr>
<tr>
<td>1- Full-scale IQ</td>
<td>99 ± 10</td>
<td>99 (81-120)</td>
<td>109 ± 8</td>
<td>110 (94-126)</td>
<td>0.000</td>
</tr>
<tr>
<td>2- Factors index score</td>
<td>96 ± 13</td>
<td>91 (74-129)</td>
<td>105 ± 12</td>
<td>105 (87-147)</td>
<td></td>
</tr>
<tr>
<td>FR</td>
<td>106 ±10</td>
<td>106 (84-126)</td>
<td>111 ± 16</td>
<td>113 (91-137)</td>
<td></td>
</tr>
<tr>
<td>KN</td>
<td>96 ± 11</td>
<td>96 (69-113)</td>
<td>103 ± 10</td>
<td>107 (81-120)</td>
<td></td>
</tr>
<tr>
<td>QR</td>
<td>99 ± 8</td>
<td>100 (78-124)</td>
<td>107 ± 6</td>
<td>107 (90-124)</td>
<td></td>
</tr>
<tr>
<td>VS</td>
<td>95 ± 12</td>
<td>97 (58-119)</td>
<td>104 ± 6</td>
<td>104 (91-127)</td>
<td></td>
</tr>
<tr>
<td>WM</td>
<td>98 ± 14</td>
<td>96 (66-124)</td>
<td>110 ± 11</td>
<td>111 (87-134)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>9±4</td>
<td>7 (4-19)</td>
<td>12±3</td>
<td>12 (6-18)</td>
<td></td>
</tr>
<tr>
<td>3- Verbal IQ</td>
<td>13±3</td>
<td>14 (6-17)</td>
<td>15±3</td>
<td>15 (7-21)</td>
<td>0.000</td>
</tr>
<tr>
<td>4- Verbal subtypes</td>
<td>8±3</td>
<td>8 (2-14)</td>
<td>10±3</td>
<td>11 (2-16)</td>
<td></td>
</tr>
<tr>
<td>FR</td>
<td>10±2</td>
<td>10 (2-15)</td>
<td>12±2</td>
<td>11 (7-17)</td>
<td></td>
</tr>
<tr>
<td>KN</td>
<td>10±3</td>
<td>10 (2-14)</td>
<td>12±2</td>
<td>12 (6-18)</td>
<td></td>
</tr>
<tr>
<td>QR</td>
<td>10±2</td>
<td>10 (2-15)</td>
<td>12±2</td>
<td>12 (6-18)</td>
<td></td>
</tr>
<tr>
<td>VS</td>
<td>10±3</td>
<td>10 (2-14)</td>
<td>12±2</td>
<td>12 (6-18)</td>
<td></td>
</tr>
<tr>
<td>WM</td>
<td>9±4</td>
<td>7 (4-19)</td>
<td>12±3</td>
<td>12 (6-18)</td>
<td></td>
</tr>
</tbody>
</table>
Cont.. Table (4): Comparing cognitive function before and after zinc supplementation

<table>
<thead>
<tr>
<th>5- Non-verbal IQ</th>
<th>6- NV subtypes</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>5- Non-verbal IQ</td>
<td>97 ± 7</td>
<td>97 (83-112)</td>
<td>104 ± 6</td>
</tr>
<tr>
<td>6- NV subtypes</td>
<td>9 ± 2</td>
<td>9 (6-12)</td>
<td>10 ± 2</td>
</tr>
<tr>
<td>- FR</td>
<td>10 ± 2</td>
<td>10 (7-14)</td>
<td>12 ± 2</td>
</tr>
<tr>
<td>- KN</td>
<td>10 ± 2</td>
<td>11 (3-14)</td>
<td>11 ± 2</td>
</tr>
<tr>
<td>- QR</td>
<td>10 ± 2</td>
<td>10 (5-15)</td>
<td>12 ± 2</td>
</tr>
<tr>
<td>- VS</td>
<td>10 ± 3</td>
<td>9 (3-17)</td>
<td>11 ± 2</td>
</tr>
<tr>
<td>- WM</td>
<td>97 (83-112)</td>
<td>104 ± 6</td>
<td>105 (91-122)</td>
</tr>
</tbody>
</table>

*P-value is considered significant if < 0.05

Table (5): Comparing approximately contents of food components before and after zinc supplementation

<table>
<thead>
<tr>
<th>Food components</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± SD</td>
<td>Median (min-max)</td>
</tr>
<tr>
<td>Total energy</td>
<td>1210 ± 284</td>
<td>1158 (643-2016)</td>
</tr>
<tr>
<td>CHO (by gm)</td>
<td>178 ± 47</td>
<td>173 (67-297)</td>
</tr>
<tr>
<td>Protein (by gm)</td>
<td>41 ± 13</td>
<td>39 (20-83)</td>
</tr>
<tr>
<td>Fat (by gm)</td>
<td>35 ± 15</td>
<td>32 (14-87)</td>
</tr>
<tr>
<td>Zinc (by mg)</td>
<td>5.5 ± 1.9</td>
<td>6.5 (2-11)</td>
</tr>
<tr>
<td>Ca (by mg)</td>
<td>418 ± 234</td>
<td>366 (105-1084)</td>
</tr>
<tr>
<td>Iron (by mg)</td>
<td>7.76 ± 2.4</td>
<td>8.5 (2-15)</td>
</tr>
</tbody>
</table>

*P-value is considered significant if < 0.05 Test used Wilcoxon Signed Ranks
Table (6): comparing food category by FFQ before and after follow up 6 months among the studied group:

<table>
<thead>
<tr>
<th>food category</th>
<th>Before</th>
<th></th>
<th></th>
<th>After</th>
<th></th>
<th></th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>daily</td>
<td>weekly &lt; 3 times</td>
<td>weekly &gt; 3 times</td>
<td>monthly</td>
<td>weekly &lt; 3 times</td>
<td>weekly &gt; 3 times</td>
<td></td>
</tr>
<tr>
<td>meat</td>
<td>2</td>
<td>40</td>
<td>4</td>
<td>2</td>
<td>38</td>
<td>5</td>
<td>0.000</td>
</tr>
<tr>
<td>egg</td>
<td>8</td>
<td>23</td>
<td>7</td>
<td>11</td>
<td>20</td>
<td>9</td>
<td>0.000</td>
</tr>
<tr>
<td>bean</td>
<td>18</td>
<td>12</td>
<td>4</td>
<td>17</td>
<td>11</td>
<td>5</td>
<td>0.000</td>
</tr>
<tr>
<td>milk</td>
<td>14</td>
<td>18</td>
<td>14</td>
<td>13</td>
<td>16</td>
<td>15</td>
<td>0.000</td>
</tr>
<tr>
<td>milk product</td>
<td>28</td>
<td>13</td>
<td>9</td>
<td>31</td>
<td>9</td>
<td>0</td>
<td>0.000</td>
</tr>
<tr>
<td>rice</td>
<td>9</td>
<td>27</td>
<td>14</td>
<td>4</td>
<td>30</td>
<td>16</td>
<td>0.000</td>
</tr>
<tr>
<td>pasta</td>
<td>3</td>
<td>32</td>
<td>12</td>
<td>1</td>
<td>33</td>
<td>13</td>
<td>0.000</td>
</tr>
<tr>
<td>potatoes</td>
<td>8</td>
<td>25</td>
<td>15</td>
<td>21</td>
<td>18</td>
<td>11</td>
<td>0.000</td>
</tr>
<tr>
<td>fruits</td>
<td>34</td>
<td>11</td>
<td>4</td>
<td>37</td>
<td>8</td>
<td>4</td>
<td>0.000</td>
</tr>
<tr>
<td>vegetables</td>
<td>24</td>
<td>23</td>
<td>3</td>
<td>32</td>
<td>13</td>
<td>5</td>
<td>0.000</td>
</tr>
<tr>
<td>processed potatoes</td>
<td>31</td>
<td>9</td>
<td>8</td>
<td>25</td>
<td>10</td>
<td>10</td>
<td>0.000</td>
</tr>
<tr>
<td>fizzy drinks</td>
<td>6</td>
<td>27</td>
<td>10</td>
<td>5</td>
<td>21</td>
<td>11</td>
<td>0.000</td>
</tr>
<tr>
<td>sweets</td>
<td>13</td>
<td>21</td>
<td>7</td>
<td>6</td>
<td>16</td>
<td>7</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Discussion

The prevalence of zinc deficiency in the current study represent 46%. Male to female represent (22%, 24%) respectively. Regarding World Bank Nutrition-Related Activities in Egypt, Vitamin and Mineral Deficiencies Cause Hidden Hunger although they may not be visible to the naked eye and 9% of the population at risk for insufficient zinc intake. But Rabeh 2010 showed that the prevalence of zinc deficiency in their study about 70%, male to female represent (38%, 32%) respectively. This variation finding due to the variation of community and habits.

Concerning the mean weight and height of this study group before and after zinc supplementation showed a highly significant difference as the mean of weight before and after represented (15 ± 2 and 17 ± 2 kg) respectively and the mean of height represented (98 ± 6 and 103 ± 6 cm) respectively. While Garremo in NOPLAS project in United Arab Emirates (UAE) founded the mean of weight and height in children 2-3 years (13.9 ± 2 kg and 92.6 ± 4.8 cm) and the children more than 3 years (15.5 ± 2 kg and 99.7 ± 6 cm). Although our observations show that zinc supplementation stimulated growth, the mechanisms for this effect are unknown. The effect of zinc may result from increased appetite and improved ingestion of protein.

Results of the current work illustrated that weight gain and linear growth improved more after zinc supplementation, as before zinc supplementation the underweight and wasting represented (2%) and the stunting represented (24%), whereas after zinc supplementations only (6%) represented the stunting. This agrees with Islam et al., done in India, El-Farghali et al., done in Ain shams university and Bhutta and Das, who prove that preventive zinc supplementation in populations at risk of zinc deficiency increases linear growth and weight gain among infants and young children. In contrast, a meta-analysis by Ramakrishnan, based on 43 studies found no significant effect of zinc supplementation on linear growth in
children < 5 years of age.\textsuperscript{11} this is against another meta-analysis done by Liu et al., based on 78 trials included 54 in infancy/childhood (target age of our study) which found improved specific growth outcomes including height, weight, and WAZ. They also identified evidence for potentially stronger effects on height and HAZ by child age, with greater effects when supplements were given to children aged ≥2 years, rather than infants.\textsuperscript{12}

We found that zinc supplementation significantly increased FSIQ, NVIQ, VIQ, and also subtypes which indicated that preschool children increased their abilities in reasoning, solving problems, and adapting to the cognitive demands of the environment. more recently studied as de Moura et al., which founded that children supplemented with zinc alone presented better particularly in reasoning, orientation– engagement and hand and eye coordination.\textsuperscript{5}

The results of the present study showed highly significant differences after health education regarding the contribution of approximately total energy and energy intake from dietary carbohydrate, protein, and fat in daily diets. This study agreement with the recommended RDA of total energy and macronutrients by FAO\textsuperscript{13,14}.

The current results approximately illustrating improve in the frequency of food rich in protein (meat, liver, poultry, egg, fish, bean, legumes, milk and milk products), vegetables, fruits, CHO (rice, pasta, and potatoes) and fat among studied group by FFQ and showed highest significant difference between before and after 6 months follow up to nearly meeting their needs recommended by FAO and WHO and UNICEF.\textsuperscript{13,14} This improvement is due to teaching the mother about the balanced diet to meet the needs of children should be distributed, regarding energy/caloric intake, according to the rules of healthy nutrition, i.e. the diet should be varied and include foods which provide the necessary nutrients in terms of proportion and quantity.

**Ethical Clearance:** The study protocol was discussed by selected staff members of the Family Medicine Department, Faculty of Medicine, Cairo University, and was approved by its council held in Juan 2017. and taken from center direct for Research and Health Development from Ministry Of Health and Population (Com.No/Dec. No:1-2018/7). An informed consent was obtained from every child-parent before filling the questionnaires.

**Source of Funding:** self

**Conflict of Interest:** Authors declare there is no conflict of interest regarding the publication of this paper.

**References**


6. Rabeh ZZ, Safi JM, Ramadan MA., The relation between stunting and zinc deficiency among toddlers aged 1-3 years in the GAZA strip. Master’s degree, Al Azhar university- GAZA, clinical nutrition program- faculty of pharmacy, 2010.


Antibiotic Sensitivity of *Streptococcus Pneumoniae* that Isolated from Different Pneumococcal Infections

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Abstract

During the period from June of 2018 to February 2019 (150) isolates of *Streptococcus pneumoniae* were isolated from 600 patients with clinical symptoms of Lower respiratory tract infections (LRTI) (pneumonia), otitis media and meningitis obtained from Baqubah Hospitals. The results showed that not only *S. pneumoniae* causes pneumonia and it can causes diseases other than pneumonia such as otitis media and meningitis but with less frequency. *S. pneumoniae* showed different susceptibilities towards antibiotics used in this study. The total susceptibility was (65.8%) and the total resistance was (34.2%). The highest pneumococcal susceptibility was showed to the cell wall inhibitors (44.4%) followed by protein synthesis inhibitors (28%) and quinolones (17.3%), and the lowest susceptibility was to folate antagonists with 0%. The highest rates of susceptibility was to penicillin (100%), chloramphenicol (86%), vancomycin (80%) and moderate rates of susceptibility to levofloxacin (90) 60%, linezolid (42.7) %, cefotaxime (40%), ofloxacin (40%) whereas there was a relatively lower susceptibility rate towards other antibiotics such as ampicillin, imipenem, amoxicillin, trimethoprim/sulfamethoxazole. Therefore, it should be avoided in the treatment in addition to tazobactam, amikacin, gentamicin, which had lowest rates susceptibility against *S. pneumoniae*. As a result, it required more research to identify new antibiotic or vaccine to reduce the risk of pneumococcal infection.

Keywords: *Streptococcus pneumoniae*, pneumonia, otitis media, antibiotic sensitivity.

Introduction

*Streptococcus pneumoniae* is an important respiratory pathogen responsible for high rate of morbidity and mortality around the world. This bacterium causes many infections, which lead to die especially in children according to the World Health Organization (1). The pneumococcus causes many different types of infections such as otitis media, sinusitis and conjunctivitis, and pneumonia. *S. pneumoniae* can invade the bloodstream to cause sepsis or septicemia and spread to other human sites to cause meningitis, collectively called invasive pneumococcal disease (IPD) (2), which most infect children less than 2 years old, adults over 65 years old and immunocompromised individuals (3). The human nasopharynx is the only reservoir of pneumococci which spread by droplet between individuals (3). This bacterium produces different virulence factors that assist its spread from the nasopharynx to other human sites such as the lungs, blood and brain (4). Antibiotics are the drug of choice for pneumococcal infection. In the last twenty years, the antibiotic resistance among pneumococci has become a big problem and is affected by the types of antibiotic use and population density (3). However, vaccination can give protection against most of pneumococcal serotypes. On the other hand, there are different problems with current vaccination strategies, and horizontal gene transfer, which can reduce the efficacy of vaccines and antibiotics (5).

Antibiotics are one class of antimicrobials, which produced through chemically derived substances from different organisms, such as bacteria and fungi (6). The antibiotic treatment relays on the infection human site and the age of patient (7). Effectiveness and allergic of potential antibiotic will detect a sole or combined administration of such prophylactic drug agents. However, pneumococcal diseases still connected with significant morbidity and mortality around the world. A growing proportion of *S. pneumoniae* in the aetiology of
morbidity and mortality is highly correlated with a high incidence of individual (especially to penicillin) and multiple antibiotic resistance. Antimicrobial resistance of *S. pneumoniae* is not only local but also a global problem. Resistance of pneumococci leads to changes in the clinical presentation of diseases which in turn leads to more difficult diagnosis and treatment. The resistance may result from several different mechanisms, such as the inactivation of the antibiotic by bacterial enzymes, low permeability to antibiotics bacteria, changes in the target protein, leading to reduced binding of the antibiotic, or overproduction of the target protein structure and by passing the metabolic pathways of the target (8). Therefore, the aim of this study was to detect the prevalence of sensitivity and resistance of *S. pneumoniae* to antibiotics that act on the cell wall synthesis, protein synthesis, folate antagonists and quinolones, in order to achieve proper treatment of pneumococcal disease and reduce morbidity and mortality.

### Materials and Method

#### Study design

This study is of prospective-retrospective and analytical nature was conducted in the Bacteriology Unit of Baqubah teaching hospital. Invasive and non-invasive *pneumococcal* samples were collected from adult patient (>16 years) suspected to have pneumonia and otitis media and meningitis, a total of 600 of samples were collected between June of 2018 to February 2019 From the hospital, non-invasive isolates such as sputum and ear swab.

#### Bacterial Strains and Growth Conditions

All the infectious samples were cultured on blood agar base (BAB) (Oxoid, UK) supplemented with 5% (v/v) defibrinated horse blood, Chocolate agar, and MacConkey agar (Oxoid, UK) and incubated at 37°C for 24 hr. Blood agar plates and Chocolate agar Plates were incubated in the presence of 5-10% CO2 at 37°C for 34 hr. Sputum samples were homogenized and mixed with an equal volume of normal saline by a vortex. Then, it was take 0.1 ml of homogenized sputum samples and cultured on the plates. The cultures were made for all the infectious samples (9).

### Identification of Bacteria

The diagnosis of *S. pneumoniae* was done according to colony morphology, sensitivity to optochin test and biochemical reactions as described in (10). A blood agar plate was cultured with a pure isolate colony of the bacteria that need to be tested. Then, optochin disc was placed in the center of the plate and incubated at 37°C with CO2 for 24 hr. The showing of a zone of inhibition growth around the disc more than 14 mm was considered the bacteria as sensitive (11).

### Antibiotic Susceptibility Testing

Disk diffusion method was used according to the instructions of the Clinical Laboratory Standards Institute (12). A pure isolated colonies of identified bacteria was used for culture on 5 ml of tryptic soy broth and then incubated for 2 hr to produce a turbidity that was the same with the turbidity of 0.5 McFarland standard tube. Inoculum from the standardized bacterial suspension was cultured by a sterile swab on a Muller–Hinton agar plate supplemented with 5% horse blood. The antibiotic discs were put on the surface of this plate and incubated at 37°C for 24 hrs. The inhibition zones around the antibiotic discs were measured and compared with standard zones to detect the sensitivity of the bacteria to each antibiotic (12).

### Statistical analysis

Graphpad Prism software (Graphpad, California, USA) was used for statistical analysis. The results were expressed as means ± standard error of the mean (SEM), significance was defined as (* p<0.05, ** p<0.01, *** p<0.001 and **** p<0.0001).

### Results

The samples for pneumococcal isolated were obtained from sputum (300) and (100) from ear swab, and the remaining was from CSF (100) and blood (100). As can be seen in Figure 1, most of *S. pneumoniae* was found in sputum (100) and ear swab (50) while a limited number of the microorganism isolated from CSF and blood (<25).
In Figure 1 shows that of 300 sputum samples, 100 samples of sputum culture appeared \textit{S. pneumoniae} and 150 of them produced no growth, the remaining results of sputum culture was another microorganisms such as \textit{K. pneumonia}, \textit{P. aerugenosa}, and \textit{Acinetobacter}.

In Figure 2 shows that of 300 sputum samples, 100 samples of sputum culture appeared \textit{S. pneumoniae} and 150 of them produced no growth, the remaining results of sputum culture was another microorganisms such as \textit{K. pneumonia}, \textit{P. aerugenosa}, and \textit{Acinetobacter}.

In 65.8\% of \textit{Streptococcus pneumoniae} that isolated appeared sensitivity against antibiotics, while they were shown resistance in 34.2\%.

The representation of the susceptibility of cell wall inhibitors as penicillin 14.7\%, vancomycin 11.8\%, cefotaxime 5.9\%, meropenem 4\%, piperacillin 3\%, amoxi-clav 2\%, amoxicillin 1.4\%, cefepime 1.5\%, ceftriaxone 1.2\%, ampicillin 0.5\%, imipenem 0.2\%, tazobactam 0.2\%. While susceptibility of protein synthesis inhibitors as chloramphenicol 12.8\%, linezolid 6.4\%, tetracycline 3\%, erythromycin 2\%, azithromycin 1.6\%, doxycycline 1.5\%, amikacin 0.8\%, gentamycin 0.6. Susceptibility of quinolones as levofloxacin 8.9\%, ofloxacin 5.9\%, ciprofloxacin 1.6\%, gatifloxacin 0.8\%, trimethoprim/sulfamethoxazole 0.2\%.

The results of this study showed the susceptibility of each group antibiotics according to the number of susceptible \textit{S. pneumoniae} (150). We will find that the susceptibility of cell wall inhibitors: penicillin (150) 100\%, vancomycin (120) 80\%, cefotaxime (60) 40\%, meropenem (42) 28\%, piperacillin (26) 17.3\%, amoxi-clav (20) 13.3\%, cefepime (14) 9.3\%, ceftriaxone (12) 8\%, amoxicillin (10) 6.7\%, ampicillin (4) 2.7\%, imipenem (2) 1.3\%, tazobactam (2) 1.3\% Figure 3.
Protein synthesis inhibitors were shown sensitivity as chloramphenicol (130) 86%, tetracycline (30) 20%, erythromycin (20) 13.3%, azithromycin (16) 10.7%, doxycycline (14) 9.3%, amikacin (8) 5.3%, gentamycin (6) 4%, nitrofurantoin 1.3% Figure 3. Quinolones were appeared sensitivity as levofloxacin (90) 60%, ofloxacin (60) 40%, ciprofloxacin (16) 10.7%, gatifloxacin (8) 5.3%, trimethoprim/sulfamethoxazole (2) 1.3% Figure 4. However, folate antagonists were shown full resistance against pneumococcus and the sensitivity was 0% Figure 3.

**Discussion**  
Annually, invasive pneumococcal diseases (IPD)
cause an estimated 1.6 million deaths, including 1 million children less than 5 years old (3). The available population-based surveillance shows significant differences in the incidence and mortality rates of IPD worldwide between industrialized and developing countries. Pneumonia cause death more in children under five years of old than other infection around the world. It was reported that the estimated 9 million child deaths were through pneumonia. The results of this study shows that most of S. pneumoniae infection presented as pneumonia and otitis media less commonly with meningitis (Figure 1). In addition, it can be seen that not only S. pneumoniae causes pneumonia, it can caused by other microorganisms such as K. pneumoniae, S. aerugenosa, and Acinetobacter (Figure 2). Not very low representation of resistance (34.2%) that was observed in this study may be due to inadequate prescription and consumption of medicines, predisposed specific serotypes of S. pneumoniae in the development of resistance to antibiotics and their different geographical distribution.

For many years penicillin has been the mainstay of therapy for pneumococcal diseases. Clinical resistance to penicillin was first reported in 1960’s. Since this early reported, penicillin resistance has been encountered with increasing frequency in strains of Streptococcus pneumoniae from around the world. Our results showed that penicillin sensitivity is 100%, comparing our results in which 86% of chloramphenicol and very low sensitivity of erythromycin 13.3% (15). The new fluoroquinolones are widely performed to treat respiratory tract infections. It was showed that a high rate 96.5% of ciprofloxacin susceptibility in S. pneumoniae, it was higher than rates found in a recent study. The high consumption of quinolones could explain the lower susceptibility rate (16).

The differences showed in the rates of sensitivity to ciprofloxacin and levofloxacin are within 16 samples with first-step mutations in the quinolone resistance-determining regions. These isolates (ciprofloxacin susceptible and levofloxacin resistant) may become highly resistant under selective fluoroquinolone pressure and are associated with treatment failure when quinolones are used (17).

The emergence of high-level resistance to antimicrobials is an increasing threat to global health (18), and even a small increase in antibiotic-refractory bacterial subpopulations or MIC could herald the emergence of higher-level resistance (19). Therefore, any factor leads to rise the antibiotic resistance is essential.

The most important result of this study is the sensitivity level of Ceftriaxone (from 32.4 % to 8%), Meropenem (from 83.8% to 28%), Imipenem ( from 100% to 1.3%), cefepime (from 86.9% to 9.3%),While there is an increase in the results of erythromycin from 0% to 13.3% and chloramphenicol from 32.4% to 86% and penicillin from 18.9% to 100%. Therefore, this study showed that these antibiotics are the most common used in the Iraqi hospitals, and this is still a good antibiotic choice for the treatment of pneumococcal pneumonia, otitis media, and meningitis.

**Conclusion**

The lowest frequency in isolated pneumococci is recorded with imipenem 1.3%, trimethoprim/sulfamethoxazole 1.3% and gentamicin 4%, while the higher incidence of isolated sensitive pneumococci is recorded at penicillin 100%, chloramphenicol 86% and vancomycin 80%. Defining representation of antibiotics groups in the overall susceptibility make it easy to suspect their representation in the total resistance which show therapeutic adequacy of the same. This point was of great importance, because it approximately can serve as a guide in the selection of a therapeutic agent in the case of impossibility of making susceptibility testing or therapeutic coverage waiting period. For example,
quinolones and folate antagonists have significantly lower representation in the overall susceptibility make them to have the greater representation in the overall resistance and are therapeutically inadequate. It is evident that the presence of inhibitors of the cell wall in the overall susceptibility is very high, but that also has a much significant share in the overall resistance.

The results obtained in this study indicate the existence of a great need for rational use of antibiotics and establishing adequate monitoring patterns of pneumococcal resistance. We should determine the serotypes and the spread of resistant strains. Physicians should keep local and regional patterns of resistance at the consideration during the selection of empirical therapy for diseases caused by this agent. For further control of the resistance development necessary is a multidisciplinary approach that includes the clinicians, epidemiologists, microbiologists and pharmacists.

**Ethical Clearance:** The project of this study was taken from the ethical committee of College of Medicine/University of Diyala.

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**Conflict of Interest:** Nil

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Abstract

Background: Trauma is a serious health problem especially when an individual is poor. They cannot reach hospital timeously, and also could not afford to get a quality of care in hospital. Transkei is the poorest region in South Africa with poor infrastructure like transport and health care.

Objective: To study the incidence of blunt force trauma deaths in the Transkei sub-region of South Africa.


Results: There were 26 855 autopsies were conducted over the period of 23 years. Of this, 2960 (11 %) deaths are related with blunt force trauma. Majority were males 2477 (9.2%). The male to female ratio is 6:1. About one-fourth 720 (30.21%) are between 21 and 30 years of age group. The average blunt force trauma fatalities is 20.2 per 100 000 per year. The highest rate of deaths, 25 per 100 000 has recorded in the year 1993.

Conclusion: There has been an increasing trend of deaths as a result of blunt force trauma in the Transkei sub-region of South Africa. Poverty is probably a major underlying factor in these deaths.

Keywords: blunt, trauma, assault, unnatural, death

Introduction

Blunt force trauma is one of the most common injuries encountered by forensic pathologists in different scenarios such as motor vehicle accident, jumping of falling from heights, blast injuries and struck by firm objects. Injuries result in 5.8 million deaths per year and the projections for year 2020 show that 8.4 million deaths per year are expected in the world. As a consequence of this, injury in particular blunt force injury will be the second most common cause of disability adjusted years of life lost within the next 13 years (second to HIV/AIDS). More than 90% global deaths from injuries occur in low-and middle-income countries. Males in Africa and the low-and middle-income countries of Europe, and females in Africa and India, have the highest injury-related mortality rates worldwide.

South Africa, a country not at war, faces an unprecedented burden of morbidity and mortality arising from violence and injury. South Africa had 59935 deaths due to injury in 2000, which is an overall death rate of 157.8 per 100 000 population. The rate is higher than the African continental average of 139.5 per 100 000, and is nearly twice the global average of 86.9 per 100 000 population. The blunt –force trauma to the body noted in most cases in a study carried out by Herbst et al in 2015 at Cape Town mortuary. The sticks, metal bars and sjamboks are the common objects, used for causing death by blunt force trauma. These objects were ordinary items that were incidentally found at the scene and easily accessible to the perpetrators of the presumably spontaneous assaults. A mortuary based audit conducted at provincial capital in Kwa-Zulu Natal has shown that trauma trends do seem to be changing. Blunt trauma contributed to 55.7% of all deaths. This is in contrast of 90% of trauma mortality being secondary to penetrating trauma in Durban in the 1990. Males account for 82% of all homicide victims, and the highest
among them between 15 and 29 years of age group, followed by aged 30-44 years. Blunt force trauma contributed 27% of all homicide deaths in South Africa. Nearly half of the violent and/or traumatic deaths occurred in the 21-to 40-year age groups according to this study.

A detailed analysis of the relation between socioeconomic inequalities and violence, based on survey data from 63 countries, shows that income inequality, low economic development, and high gender inequality are strong positive predictors of rates of violence. The health and social cost of alcohol misuse are estimated to be R9 billion per year, which is roughly twice the amount received in excise duties in alcohol in South Africa. The purpose of this study is to highlight the problem of blunt force trauma related deaths in the Transkei sub-region of South Africa.

Patients and Method

This is a retrospective descriptive study from the autopsy register of Mthatha Forensic Pathology Laboratory. The Mthatha Forensic Pathology Laboratory is the only laboratory in this region catering for more than half a million of the population in the region of Mthatha. A total number of 27036 autopsies were conducted between 1993 and 2015 (Photograph 1). It is difficult to determine the cause of death in cases of advanced putrefied human remains, and therefore also excluded from study. The terms ‘blunt trauma’ and ‘assault’ are used interchangeably and mean the same. All the cases of assault (blunt force trauma) are recoded in the post mortem register year wise. Data were collected on a sheet of paper designed to record the post-mortem number, year, gender and cause of death. These data were transferred to the Excel computer program and analysed by using the SPSS computer program.

Results

There were 26 855 medico-legal autopsies performed between 1993 and 2015 on the victims of unnatural deaths (Table 1). Of this, 2960 (11%) were died as a result of traumatic violent deaths by a blunt objects (Table 1). The average annual rate of blunt force trauma deaths was 20.2 per 100 000 (Table 2). It was the highest (25/100 000 population) in the year 1993, and lowest (16/100 000) in the year 2002 (Table 2 and Figure 1). Among males the average deaths rate as a result of blunt force trauma was 16.2 per 100 000, and among females, it is 3.4/100 000 (Table 2 and Figure 1). It was highest 21.5/100 000 in the year 1993 among males, and 5.6/100 000 in 2003 in females (Table 2 and Figure 1). Males’ subjects were outnumbered than females with ratio of 6:1 (Table 1, 2 and Figure 1).

The highest (30.21%) victims were between the age group of 21 and 30 years of age, followed by 23.66% between 11 and 20 years of age in this study (Table 3 and Figure 2). Surprisingly, there are victims of deaths from blunt force trauma 2.72% under the age of 10 years, and 1.29% above the age 80 years in this study (Table 3 and Figure 2). Blunt force trauma deaths were taking over to the gunshot injury deaths in the Transkei sub-region of South Africa (Figure 3).

Discussion

Seventy-three percent of the rural people in the Eastern Cape were living on less than R300 per month in 2005/2006., and more than half of them on less than R220 per month. There were 26 855 non-natural deaths recorded in the post mortem register over a period of 23 years (1993-2015) in the Transkei sub-region of South Africa. Out of this, 2960 (11%) deaths as a result of blunt force trauma, which ranks 3rd in homicide, and 4th in traumatic deaths in this sub-region (Table 1). Assault also ranked the 4th cause of death among males, and 5th among females (Table 1). The average annual rate of blunt force trauma deaths was 20.2 per 100 000 population in this study (Table 2 and Figure 1), which is little less than an earlier study (1993-1999) carried out by the author (24/100 000) in the same region. There was one third fall (33%) in rate of murder by blunt objects between 1993 and 2002. i.e. from 25/100 000(1993) to 16/100 000 (2002) in this region (Table 2 and Figure 1). This fall could not sustained any more, and it started climbing up from the 2003, and reached almost at the same level in year 2015 i.e. 24.7/100 000 (Table 2 and Figure 1). This dipping in murder rate by blunt objects is an interesting finding in this study (Table 2 and Figure 1). It is difficult to understand the pattern of fall and rise of murder rate by blunt force trauma (Table 2 and Figure 1). The benefit of ‘gun control act of 2002’ was nullified by the excessive use of blunt object in committing deaths (Figure 3) Deaths as a result of gunshot has almost come down to more than half over a period of 23 years (1993-2015), but the deaths due to blunt force trauma has reached the same high level, as it was in 1993 (Table 2 and Figure 3). The trauma burden consisted predominantly of
blunt trauma (69.6%) followed by penetrating trauma (30.4%). This is not the case in Transkei sub-region. The average murder rate as a result of penetrating injuries were increased to three times (62 per 100 000) than that of blunt force trauma (20.2/100 000) (Table 2 and Figure 1). Of the 615 deaths related to blunt trauma, 153 (24.87%) were secondary to assault. There is 9580 case of blunt trauma deaths were admitted in mortuary between 1993 and 2015 (Table 1). Of this, 2960 (30.89%) were related with assault (Table 1). It indicated that the total number of deaths as a result of assault were more common in this region than Pietermaritzburg area.9 This difference is because of the level of poverty, which is more profound in Transkei region than Pietermaritzburg area.15

It is a well-known fact that South Africa is unique country in the world with a high number of traumatic deaths, and it is also true that Transkei region is unique in South Africa with excessive number of deaths.16 An Average (16.8/100 000) blunt force trauma related deaths were recorded among males (Table 2 and Figure 1). It is complimentary and congruent to total number of murders by blunt force trauma (Figure 1). Xhosa women are more resilient and have more survival skills than their male counterpart. An average deaths were accounted in this study is only 4 deaths /100 000 population, which one sixth of male’s deaths (Table 2 and Figure 1).

The victims of blunt force traumatic deaths were young adult (41%) males between the age of 21 and 40 years (Table 3 and Figure 2). This is the age where they takes maximum risk to the life and also consume a lot of alcohol. South Africa is a hard drinking country. It is reckoned that we consume in excess of 5 billion litres of alcohol annually.17 A study carried out by the author has shown that about half (49.5%) of traumatic deaths were related with alcohol in Transkei region.18 More than one-fifth (22.11%) victims were teenager and young- young adults,’ school boys between the age of 11 and 20 years in this study (Table 3 and Figure 2). A study carried out in schools of six African countries showed that risky drinking and illicit drug use were common in the school children.19 It is surprising that 2.72% children of the age of ten, and under ten were also get murdered by blunt objects (Table 3 and Figure 2). Of this, it is difficult to understand that male’s child is almost 3 times (2.01/100 000) more vulnerable to death by blunt object than a female child (0.71/100 000) in this study (Table 3 and Figure 2). Traditional custom of lobola, also known as “bride-price” or “bride-worth”, may sometimes be misunderstood by western eyes but in African culture, it is a ritual that helps to bring two families closer together.20 Dowry system was the root cause of female foeticide in India, thus it should be treated first.21 A victim of blunt force trauma has fair chances of survival than the victim of penetrating injury, provided one will get an early emergency care. A study carried out by the author in the Transkei region showed that about 12% pre-hospital deaths are preventable.22

Both trauma and HIV are competing and complimenting each other, and have cause and effect relationship. The 2013 Mortality and Causes of Death release shows that HIV disease has moved from being ranked sixth in 2012 to being ranked third in 2013.23 Traumatic deaths (homicide) are also ranked high in the Transkei sub-region (Figure 2). A published study by Chiumia et al in 2014, showed that a third of South African suffering from mental health disorder. More than 17-million people in South Africa are dealing with depression, substance abuse, anxiety, bipolar disorder and schizophrenia.24 During his first address to Parliament in 1994, former President Mandela specifically singled out alcohol abuse as a major cause of crime, poverty, reduced productivity, unemployment, dysfunctional family life, political instability, the escalation of chronic diseases such as AIDS and TB, injury and premature death.25

Limitations

The annual growth in population is accepted as 3%, which may not be strictly accurate in view of the lack of precise death and birth ratios. However, the author has tried to estimate as accurately as possible.

Conclusion

There is an increasing trend of blunt force traumatic deaths in the Transkei sub-region of South Africa over a 23 years study period (1993-2015). Murder as a result of blunt force trauma is neutralising the beneficial effect of Gun Control Act of 2002. It is a frightening finding in this study, as a little less than a quarter (23.66%) of school age children (11 and 20) were murdered by blunt objects. Female child were having some protective effect than males. Poverty alleviation is an important steps to curb these premature deaths in this region along with improvement in pre-hospital and hospital care to avoid these preventable deaths. Community education, and deterrent law enforcement could be helpful in reduction of crime.
Ethical Issue: The author has ethical permission for collecting data and publication (approved project No. 4114/1999) from Ethical committee of University of Transkei, South Africa.

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Conflict of Interest: None

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The Relationship of General Health Condition with Safety Attitudes and Demographical Specifications in Workers of Car after-Sale Services Workshops Iran 2019

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Abstract

Background: Health condition of workers affects their productivity. The relationship between general health and safety attitudes is not quite clear.

Objective: The present paper is an attempt to examine the relationship of general health condition with safety attitude and demographical specifications of workers at car after-sale services workshops in Ardabil-Iran.

Materials and Method: The study was carried out as a descriptive-analytical cross-sectional study. The sample group consisted of 650 workers in small car after-sale services workshops located in Ardabil City. Three questionnaires including a demographical form, the General Health questionnaire (GHQ-28), and the safety attitude inventory were used for data gathering. The collected data was analyzed in SPSS19.

Results: The mean score of safety attitude was 71.05±2.3 and the mean score of general health was 24.96±3.35. The score of general health had a significant relationship with age group, work experience, marital status, education level, and history of work incident. The mean scores of safety attitude was significantly different depending on age group, work experience, workshop ownership status, marital status, education level, income, and history of work accident.

Conclusion: The subjects had a low safety attitudes score and high probability of general health disorders. General health condition was directly related to safety attitude of the participants. Therefore, providing applied educations based on the workers’ needs to increase awareness and improve safety attitudes of workers can lead to a decrease in the rate of work accidents and a higher general health in the workers.

Keywords: General Health, Safety Attitude, worker, Small Workshops

Introduction

Attitudes is a preset collection of answers that people develop throughout experiencing similar situations. In addition, attitude can be defined as one’s tendency to a specific behavior in specific situation and positive (accepting) or negative (rejecting) response...
to others, things, and situations (1). Observing safety
codes has to do with the attitudes that affect safety
behaviors and might decrease the risk of accidents (2-
3). Studies have shown that work environments with
workers who have a positive attitude to safety have a
lower rate of job accidents and that there is a significant
relationship between safety attitudes and the risk of
accidents and injuries at work. An increase in safety
attitude at work leads to a decrease in work accidents
(4). Some safety experts even believe that all accidents
are rooted in negative attitudes to safety in workers (5).
Some studies have shown that demographical variations
are effective in the safety attitudes in workers so that
it grows with age and work experience (6). Normally,
small workshops (less than 10 workers) fail to provide
adequate and quality safety and health services and jobs
are done in poor work conditions. In contrast however,
small workshops play the key role in the development
of national economy, creating job, and self-employment
(7). Small workshops are one of the pillars of economy
in all countries (8). The work force at small industries
constitute 40% and 60% of total workforce in the
industrial and developing countries respectively (9).
As the statistics by the Ministry of Health, Treatment,
and Medical Education in Iran show, small workshops
constitute 98% of workshops and more than 80% of job
opportunities in the country. Depending on the economy
and the level of development, different definitions are
available for small workshops. According to instruction
by the Ministry of Industries in Iran, workshops with
10 or fewer workers are considered as small workshops
(10). These workshops are a growing source of creating
job opportunities and supported by economic and
development policies of the county; still, safety and
health in them are at an undesirable level (11). Several
studies have been conducted on the general health of
workers and among many a study on general health and
the factors in a power board factory is notable (12).
In (13), the effect of job stress on general health and performance
of flight safety personnel was examined. Lack of safety
control and safety knowledge in workers have increased
the rate of debilitating accidents and diseases at
workshops (14-15). Workers’ attitude about safety is affect
by several variables; although, the relationship between
these variables and safety attitude are not quite clear.
Therefore, examining safety attitudes and the factors
and actual role of each factor in the attitude, mainly in
small workshops that host the majority of workforce in
Iran, can be a large step towards attenuating the risk of
damages caused by accidents and diseases (16). While
there have been several studies about safety attitudes in
large industries, there is a paucity of studies on safety
attitude in small industries. Given the importance of
general health and safety attitudes in workers, the
present study is an attempt to survey the relationship of
general health with safety attitudes and demographical
specifications of workers in small car after-sale services
workshops in Iran (2019).

Material and Method

Participants

A descriptive-analytical cross-sectional study was
carried out in 2019. Study population was comprised
of the workers in 550 small workshops (less than
10 employees) of car after-sale services in Ardabil.
Inclusion criteria were desire to participate and working
in a small workshop of car services (engine, paint, body
repair, services, and electrician technicians) in Ardabil.
Exclusion criterion was reluctance to participate.

The data was collected using a demographic form,
the General Health Questionnaire (GHQ-28), and the
safety attitude inventory. The participants were selected
from 550 small workshops in Ardabil in June 2019.
The questionnaires were distributed among the workers
by two researchers (n=1134) and collected after three
weeks by revisiting the workshops. Totally, 650 workers
took part in the study.

The demographics form included age, work record,
workshop ownership status, marital status, education,
income, history of accident at work, and severity of
accidents.

To determine safety attitudes, a standard safety
attitude questionnaire was used. With 25 questions, the
questionnaire measures safety attitudes in the workers.
The questions are designed based on Likert’s five-
point scale . Total score range is 25-125 so that scores
≥75 indicate a positive safety attitude and scores<75
represent a negative safety attitude. The higher the score
the more positive the safety attitudes (17).

To measure general health of the participants
GHQ-28 was used, which is a questionnaire with 28 items
designed by Goldberg and Hiller (1979). Validity
and reliability of the Farsi version were supported by
Noorhala et al. (26). The questions are designed based
on Likert’s four-point score. Total score ranges from 0
to 84 and scores ≥23 indicate probable health disorders
and scores <23 indicate an acceptable general health condition (18).

Data analyses were done in SPSS19 so that the mean score of quantitative variables were compared using independent-sample T-test and one-way ANOVA. To examine the relationship between quantitative variables, Pearson’s correlation was used and the relationship among qualitative variables were examined using chi-square (p=0.05).

Results

The mean age of the participants was 36.48±10.3 and the youngest and oldest workers were 15 and 75 years old respectively. The mean work experience was 15.3±9.6 and the shortest and longest work experiences were 1 and 53 years respectively. The mean score of general health was 24.96±3.35 -i.e. probable general health problems. The mean scores of general health were significantly different in terms of age, work experience, marital status, education level, and history of work accident. Workers older than 50 years old and those with more than 20 years of work experience had the highest score of GHQ-28. In addition, the unmarried, and those with low education level also had high GHQ-28 scores. High GHQ-28 score indicates the high probability of general health problems. There was a significant difference in safety attitude scores in terms of age group, work experience, ownership status of the workshop, education level, income, and a history of work accident. The workers younger than 30 years old and those with a work experience of less than 10 years had the lowest score of safety attitudes. The illiterate workers and those with low income levels had a lower safety attitude. Those who had rented the workplace and married individuals had a lower safety attitudes. The workers who had experienced a work accident had a lower safety attitude.

The correlation test showed that there was a significant relationship among general health, safety attitudes, age, and work experience. The general health score had an inverse and significant relationship with safety attitudes and since the lower general health score means a better health condition, the higher the safety attitude the better the general health condition. Workers with strong safety attitudes had a better general health condition (Table 1). Moreover, there was a direct relationship between general health condition and safety attitudes.

<table>
<thead>
<tr>
<th>Correlate</th>
<th>Safety Attitude</th>
<th>Age</th>
<th>Job Experience</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Health</td>
<td>-0.191**</td>
<td>0.267**</td>
<td>0.247**</td>
</tr>
</tbody>
</table>

** : Correlation is significant at the 0.01 level (2-tailed)

Discussion

Workers who had experienced a work accident had a higher general health score and for this the experience of accident must be taken into account. Gholami et al. (2014) studied general health condition and the factors in workers of a power board manufacturer in Kerman. They showed that factors like education level can be effective in general health condition of the workers, which is consistent with our results. It is possible to improve general health condition by studying and focusing on the controls of accidents and education (12). Demographical variables like age and work experience had an inverse relationship with general health so that an increase in age and work experience decreased general health condition. The reason form this can be the aging phenomenon that increases health problems including general health problems. Sanaie Nasab et al. (2016) examined the effect of stress at work on general health and productivity in personnel of flight control services. They argued that stress had a negative effect on productivity and that general health was a mediatory variable between work stress and productivity of flight control personnel (19). The safety attitudes score was significantly different in terms of the severity of work accident. Loosemore et al. (2019) conducted a study titled “safety education and creating positive safety attitude in Australian
manufacturing industry” and found that age, gender, and education were potential mediators in the process of development of positive safety attitudes. Studies have recommended paying more attention to using new technologies in developing safety education programs (21). A study by Sanaie Nasab et al. showed that the mean score of awareness was significantly related to education level (19). Yin et al., on the other hand, showed that there was no relationship between education level and safety attitude (22). Williamson et al. maintained that a mere reliance on engineering approaches without improving safety attitudes of the workers or creating an effective safety system surely fails. Their results highlighted the importance of improving safety attitudes (16).

**Conclusions**

The results showed that the safety attitudes were negative and the general health condition of workers was low. The effective variables in safety attitudes were age, education level, and experience of accident. An improvement of safety attitudes can lead to a better general health condition. Therefore, holding face-to-face and virtual education workshops designed based on the workers’ needs by the state supervising bodies are recommended to improve awareness and attitudes of workers. Such measures, hopefully, lead to a lower rate of accidents and a better general health in the workers.

**Conflicts of Interest:** The authors declare no conflict of interest.

**Ethical Clearance:** Taken from Department of Health committee, University of Medical Sciences, Ardabil. IR.ARUMS.REC.1398.338

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**References**

15. Pouya AB, Jame RN, Abedi P, Azimi Z. Identification and Assessment of Occupational
Personal Hygiene and its Effect on the Treatment of After Cesarean Section Debridement in NTB General Hospital

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Abstract

Personal hygiene is important for after cesarean patients because personal hygiene will affect one’s health and psychological well-being. Patients with after cesarean wounds should be given immediate wound care by cleaning to prevent infection during the wound care. This will affect the wound healing process in cesarean surgery patients. This study aims to determine the relationship between personal hygiene and healing of after cesarean wounds in the NTB General Hospital. An accidental sampling technique of 52 patients with after cesarean section who experienced personal hygiene during wound care in the NTB General Hospital was used in this study using a prospective cohort study design. By using data analysis based on the chi-square test, the results showed that personal hygiene in after cesarean patients was mostly good category of 40 respondents (76.9%), cesarean section wound healing in after cesarean patients most of the categories were cured as much as 46 respondents (88.5%) and obtained a p-value of 0.002 <0.05. The results of the study confirmed the relationship between personal hygiene and healing of after cesarean wounds in the NTB General Hospital. This study recommends that nurses and other health teams develop theories and guidelines for the implementation of personal hygiene that are more effective and efficient in order to reduce infection after cesarean section.

Keywords: personal hygiene, debridement, cesarean section, chi-square, cohort.

Introduction

Personal hygiene is important for patients after cesarean section.¹ Personal hygiene will affect one’s health and psychological well-being. The purpose of personal hygiene is to provide comfort, relaxation and prevent infection. Personal hygiene also affects the wound healing process because germs can enter through the wound at any time.² In the treatment of wounds caused by surgery on the abdominal wall and uterus, the physiological process of wound healing goes through four stages: the stage of acute inflammatory response to injury, the destructive stage, the proliferative stage, and the stage of maturation.³ Patients with after cesarean wounds should immediately be given debridement treatment by cleaning to prevent infection during treatment of the wound. This will affect the wound healing process in cesarean surgery patients. Cesarean section is surgery on the wall in the abdomen and uterus because surgery is easier and can be done faster.⁴ Based on data from the NTB General Hospital received 320 patients in 2014 after cesarean section (Table 1).

Table 1. Details of the number of after cesarean patients in the NTB General Hospital in 2014

<table>
<thead>
<tr>
<th>Month</th>
<th>C-section</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>79</td>
</tr>
<tr>
<td>February</td>
<td>105</td>
</tr>
<tr>
<td>March</td>
<td>84</td>
</tr>
<tr>
<td>April</td>
<td>52</td>
</tr>
<tr>
<td>Total</td>
<td>320</td>
</tr>
</tbody>
</table>

Table 1 shows that the number of patients undergoing cesarean delivery is still quite high and the highest data occurred in February 2014. This is due to the lack of
knowledge of patients about the risk of cesarean delivery. The large number of patients delivering by cesarean section is a challenge for nurses as professionals who have more time compared to other health care workers in the order of service required to improve quality nursing care. Meanwhile, in cesarean section patients, personal hygiene occurs due to an abdominal surgery. This will affect the wound healing process because germs can enter through the wound at any time if personal hygiene is lacking. This study examines the effect of personal hygiene on after cesarean wound healing, and the relationship of after cesarean wound healing related to personal hygiene

Method

Research methodology is a scientific way to obtain data with specific objectives and meanings based on rational, empirical and systematic. This type of research is quantitative research. This study aims to look for the relationship of personal hygiene with wound healing after cesarean section. This research method will describe the research subject, population, data collection techniques, identification of variables, frameworks and data analysis.

The subjects in this study were patients with after cesarean section who experienced personal hygiene during wound care in the NTB General Hospital. In this study, the sample was determined by sample criteria, namely patients who received after cesarean wound care, patients who experienced personal hygiene after cesarean section, and patients who were willing to become respondents. The number of samples in this study were 52 people.

This study was designed in the form of a prospective study (cohort) ie research observing the independent variable of risk factors. The subjects were followed until a certain time to see the effect on the dependent variable.

For data collection and data processing techniques, observations were made by direct observation of research subjects to determine personal hygiene with wound healing. In addition, interviews and documentation were also conducted to analyze the relationship between personal hygiene and wound healing in the NTB General Hospital.

To determine the relationship of personal hygiene with after cesarean wound healing using the chi-square test with the SPSS program, it is said to have a relationship between personal hygiene with after cesarean wound healing indicated by p-value <0.05.

Results

This section presents the results of research and discussion on personal hygiene with after cesarean wound healing in the NTB General Hospital. The findings identified post cesarean wound healing by performing personal hygiene after being given wound care treatment and analyzed the relationship of personal hygiene with post cesarean wound healing in the NTB General Hospital. Specific data presents results that illustrate the relationship of personal hygiene with wound healing after cesarean section in the NTB General Hospital. Test results regarding the identification of patients’ personal hygiene after a cesarean section in the NTB General Hospital, showed that patients who experienced good personal hygiene were 40 (76.9%), personal hygiene was as much as 9 (17.3%), personal hygiene less as much as 3 (5.8%). This happens due to lack of knowledge about after cesarean wound care.

<table>
<thead>
<tr>
<th>Personal Hygiene</th>
<th>Freq.</th>
<th>Percentage (%)</th>
<th>Wound healing</th>
<th>Freq.</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good</td>
<td>40</td>
<td>76.9</td>
<td>Get well</td>
<td>46</td>
<td>88.5</td>
</tr>
<tr>
<td>Enough</td>
<td>9</td>
<td>17.3</td>
<td>Not cured</td>
<td>6</td>
<td>11.5</td>
</tr>
<tr>
<td>Less</td>
<td>3</td>
<td>5.8</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>52</td>
<td>100</td>
<td>52</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
Furthermore, to identify wound healing in after cesarean patients in the NTB General Hospital, the results showed that 46 patients (88.5%) healed wound healing and 6 respondents who did not heal wound healing (11.5%). This happens because there are other diseases suffered by respondents such as nutritional status and consumption, personal hygiene, lack of mobilization, anemia, and DM (Diabetes Mellitus). 8,9,10,11

The results of the analysis of the relationship of personal hygiene with after cesarean wound healing, showed the relationship of personal hygiene with after cesarean wound healing based on the compilation of documentary studies, observation sheets and interviews conducted on respondents. The results showed that 40% of respondents experienced good personal hygiene (76.9%). Of the 40 respondents who experienced healing wounds healed as many as 39 (75%) patients and healing wounds not healed as many as 1 (1.9%) patients. Of the 9 respondents who experienced healing wounds healed as many as 6 (11.5%) patients, and wound healing did not heal as many as 3 (5.8%) patients. For respondents who experienced less personal hygiene, there were 3 (5.8%) patients. Of the 3 respondents who experienced healing wounds healed as many as 1 (1.9%) patients and healing wounds that did not heal as many as 2 (3.8%) patients. Statistical analysis using the chi-square test with the help of SPSS showed a significance level of 5% obtained p value 0.002 <0.05. This means that there is a relationship between personal hygiene and wound healing after a cesarean section in the NTB General Hospital. This study also suggests that to prevent the complications of childbirth by cesarean section of surgical site infections, health workers must provide health education about personal hygiene so that cesarean patients can implement this. 12 Thus, the incidence of infection in the surgical wound does not occur.

Table 3. Analysis of the relationship of personal hygiene with wound healing of after cesarean section

<table>
<thead>
<tr>
<th>Personal Hygiene</th>
<th>Wound healing</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Get well</td>
<td>%</td>
</tr>
<tr>
<td>Good</td>
<td>39</td>
<td>75</td>
</tr>
<tr>
<td>Enough</td>
<td>6</td>
<td>11.5</td>
</tr>
<tr>
<td>Less</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>52</td>
<td>100</td>
</tr>
</tbody>
</table>

The results showed that the majority of post-operative personal hygiene in the good category were 40 respondents (76.9%), quite as many as 9 respondents (17.3%) and less as many as 3 respondents (5.8%). Before surgery, the client and the client’s family are given health education about the importance of personal hygiene as well as ways of performing personal hygiene after a cesarean section. Personal hygiene is self-care carried out to maintain health, both physically and psychologically. 13 Cleanliness can provide a sense of comfort, relaxation, and prevent infection. Personal hygiene also affects the wound healing process because germs can enter through the wound at any time.

After surgery personal hygiene cleanses the dirt contained in the wound using povidone iodine, 14 after that the wound is wrapped using gauze and bandages that aim to cover the wound so as not to be contaminated with the environment around the patient and to keep the wound from becoming infected. Every patient who will be given wound care certainly hopes that the wound heals quickly. Therefore, nurses are required to provide wound care, the main thing is also needed physical and psychological readiness. Wound healing occurs when the patients do not feel heat, pain, redness, swelling, and decreased lip function.

The results showed that the majority of after cesarean wound heal healing categories were as many as 46 respondents (88.5%), not recovering as many as 6 respondents (11.5%). Observation to assess wound healing after cesarean section was done on the fifth day
after cesarean section. Injury is the destruction of normal anatomical structures and functions due to pathological processes originating from internal or external and affecting certain organs. Injuries due to cesarean section are intentional injuries because there is a clear purpose and purpose. A good wound healing or healing category will appear dry sores and there are no signs of infection. This is supported because the majority of after cesarean patients perform personal hygiene well, while wound healing is not good because patients do lack personal hygiene.

In cesarean section, there are injuries to both the abdominal skin and abdominal muscles and the uterine wall. The existence of after cesarean wounds is one of the factors that prolong the patient’s after cesarean section care in the hospital. By doing personal hygiene, it is expected to affect the wound healing process because germs can enter through the wound at any time if personal hygiene is lacking. The opposite explanation, if the patient does not perform personal hygiene well after the cesarean section, the infection in the area of the surgical wound will hamper the process of wound healing. Poor healing of wounds or categories not healed will show symptoms of infection such as swelling around the wound, redness, pain, heat in the wound and the presence of pus or pus in the wound. Thus, the duration of treatment will increase and longer.

Conclusion

The results of the study showed that the personal hygiene of after cesarean patients was self-care carried out to maintain health, both physically and psychologically. Based on the results of the study it can be seen from the 52 patients who experienced good personal hygiene there were 40 (76.9%) patients, who experienced enough personal hygiene 9 (17.3%), and patients who experienced less personal hygiene and 3 (5.8 %). For wound healing in after cesarean patients, the results showed that after cesarean wound healing was mostly cured in the category of 46 respondents (88.5%), not recovering as many as 6 respondents (11.5%). Observation to assess wound healing after cesarean section was done on the fifth day after cesarean section.

Analysis of the relationship of personal hygiene with after cesarean wound healing showed the results of the chi-square statistical test on the relationship of personal hygiene with after cesarean wound healing in NTB General Hospital with a value of 16.18> 5.991. These results empirically prove that there is a relationship between personal hygiene and wound healing after a cesarean section in the NTB General Hospital. These results confirm that good personal hygiene can accelerate the healing process of cesarean section wounds so that complications such as infection can be prevented and shorten the length of patient care in the hospital.

Ethical Clearance- The ethical clearance for this manuscript was taken from NTB General Hospital committee and approved by College of Health Science (Stikes) Mataram, West Nusa Tenggara, Indonesia.

Source of Funding- This research was funded by private funding.

Conflict of Interest – There are no conflict of interests.

References


Factors Affecting the Incidences of Needle Stick Injury on The Nurses Emergency Department of Hospital East Java

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Abstract

Hospital with all the facilities and equipment that can be a source of health and safety hazards of potential, especially for health workers if no management following the standards of safety and health procedures. Needle stick and sharp object injuries is a significant challenge for health workers, and nurses are jobs are most often associated with the incidence of needle stick injury. The purpose of this study was to determine the factors that influence the prevalence of needle stick injury to nurses in the emergency department of hospital Eas Java. This study using 64 samples from a total of as many as 76. The ER nurse that most of the variables age category ≥ 29 years, ≥ five years of working life, has never participated in occupational safety and health training, and education level diploma 3 — workers who perform unsafe actions as much as 37.5%. The Bivariable analysis showed that age, work periode, education level, and training has a significant value above 0.05 was no meaningful relationship to the needle stick injury. Unsafe action was a value of 0.026, which means significance was a substantial relationship with a needle stick injury. The multivariable nurses who perform dangerous activities are at increased risk of needle stick injury 4x compared to nurses who work safely. Prevention of occupational accidents to human factors include labor regulations taking into account the limits of the abilities and skills of workers, nullify the things that reduce the concentration of workers, enforce work discipline, avoid actions that bring accidents and eliminate their physical and mental incompatibility.

Keyword- Nurses, Needle Stick Injury, Emergency Department

Introduction

Hospital with all the facilities and equipment that can be a source of health and safety hazards of potential, especially for health personnel, if it is not done according to the standard management of occupational health and safety procedures1. As is well known, hospital activity is closely associated with the use of equipment or sharp objects as a means of support. Nurses play a full part in a 24 hours service on the side of the patient. Therefore, nurses have the highest intensity to interact with patients when compared to others2.

According to the Center for Disease Control and Prevention (CDC) estimates that each year 385,000 incidences of stab wounds as a result of syringes and sharps to health care in American hospitals. Health workers at risk of occupational exposure to blood and body fluids of infected (bloodborne pathogens) can lead to infection with HBV (hepatitis B virus), HCV (Hepatitis C Virus) and HIV (Human Immunodeficiency Virus) that one of them through a stab wound syringe known as Needlestick Injury (NSI)3. A total of 66.1% of nurses in public hospitals Sarajevo Bosnia experienced something stick injury needle4.

Needlestick and sharp object injuries are a significant challenge for health workers, and nurses are the most frequent jobs associated with the incidence of needlestick injury5. Implementation of the continuing education program showed that training could improve the awareness of nurses in Indonesia and can reduce needlestick injury6. Behavioral prevention of needle
stick injury incidence is related to age, education, employment, knowledge, and training. This training can be used as a program to reduce or prevent the occurrence of an accidental needle stick. For that reason, this study aims to determine the factors that influence the incidence of needle stick injury to nurses in the emergency department of a hospital X Tulungagung.

**Materials and Method**

This study uses observational study design, with design crossectional was an observational study design. This research was conducted in the ED Hospital “X” Tulungagung. The population in this study were all nurses in the emergency department (ED) Hospital X Tulungagung with a total of 76 nurses and a sample of 64 nurses. Data obtained from observation and interview. The variables were divided into two dependent (needle stick injury) and independent (age, years of services, Education level, training, and unsafe action). The age factor was divided into two categories: <29 years and ≥ 29 years, a working period divided <5 years and ≥ five years, training was divided already training and not exercise, education divided bachelor and diploma, unsafe action is divided yes and no hazardous. The data analysis used was descriptive, relationship analysis by chi-square test, and influence analysis by logistic regression test.

**Results**

Results obtained from interviews and observations. Interviews to collect information on age, length of employment, training, and education. The representations were made to get unsafe data action. Rate dangerous activity judged by indirect discard disposable needles into safety box, do recapping, not uses gloves, not to wash your hands before and aftercare to patients. The research results are as follows:

**Table 1 Distribution of variable frequency**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>&lt; 29 age</td>
<td>25</td>
<td>39.06</td>
</tr>
<tr>
<td></td>
<td>≥ 29 age</td>
<td>39</td>
<td>60.94</td>
</tr>
<tr>
<td>Work Periods</td>
<td>&lt; 5 age</td>
<td>28</td>
<td>43.75</td>
</tr>
<tr>
<td></td>
<td>≥ 5 age</td>
<td>36</td>
<td>56.25</td>
</tr>
<tr>
<td>Training</td>
<td>Never</td>
<td>44</td>
<td>68.8</td>
</tr>
<tr>
<td></td>
<td>Ever</td>
<td>20</td>
<td>31.2</td>
</tr>
<tr>
<td>Level Education</td>
<td>D3</td>
<td>40</td>
<td>62.5</td>
</tr>
<tr>
<td></td>
<td>S1</td>
<td>24</td>
<td>37.5</td>
</tr>
<tr>
<td>Unsafe Action</td>
<td>Yes</td>
<td>24</td>
<td>37.5</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>40</td>
<td>62.5</td>
</tr>
</tbody>
</table>

Table 1 shows that most of the variables age category ≥ 29 years, ≥ five years of working life, has never participated in occupational safety and health training, and education level diploma 3. Workers who perform unsafe actions as much as 37.5%
Table 2 Distribution of needle stick injury frequency

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSI</td>
<td>Ever</td>
<td>20</td>
<td>31.3</td>
</tr>
<tr>
<td></td>
<td>Never</td>
<td>44</td>
<td>68.7</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>64</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2 shows that large Legian respondents had never experienced a needle stick injury in the amount of 68.8% and who have had needle stick injury was 31.3%.

Table 3 Relationship between variables with Needle Stick Injury

<table>
<thead>
<tr>
<th>Variables</th>
<th>Needle Stick Injury</th>
<th>Total</th>
<th>PR</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 29 years</td>
<td>10</td>
<td>15</td>
<td>25</td>
<td>100,0</td>
</tr>
<tr>
<td>≥ 29 years</td>
<td>10</td>
<td>29</td>
<td>39</td>
<td>100,0</td>
</tr>
<tr>
<td>Work Periods</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 5 years</td>
<td>9</td>
<td>19</td>
<td>28</td>
<td>100,0</td>
</tr>
<tr>
<td>≥ 5 years</td>
<td>11</td>
<td>25</td>
<td>36</td>
<td>100,0</td>
</tr>
<tr>
<td>Training</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>12</td>
<td>32,3</td>
<td>32</td>
<td>72,7</td>
</tr>
<tr>
<td>Yes</td>
<td>8</td>
<td>40,0</td>
<td>12</td>
<td>60,0</td>
</tr>
<tr>
<td>Study</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D3</td>
<td>12</td>
<td>30,0</td>
<td>28</td>
<td>70,0</td>
</tr>
<tr>
<td>S1</td>
<td>8</td>
<td>33,3</td>
<td>16</td>
<td>66,7</td>
</tr>
<tr>
<td>Unsafe Action</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>12</td>
<td>50,0</td>
<td>12</td>
<td>50,0</td>
</tr>
<tr>
<td>No</td>
<td>8</td>
<td>20,0</td>
<td>32</td>
<td>80,0</td>
</tr>
</tbody>
</table>
Table 3 shows the bivariable analysis showed that the variables of age, years of training, and education are not significantly associated with the incidence of needle stick injury with a significant value above 0.05. Variable unsafe action had no meaningful relationship with the prevalence of needle stick injury with a significance value of 0.026.

Table 4 The results of Logistic Regression

<table>
<thead>
<tr>
<th>Step 1a</th>
<th>B</th>
<th>S.E.</th>
<th>Wald</th>
<th>df</th>
<th>Sig.</th>
<th>Exp(B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unsafe_Action(1)</td>
<td>1.386</td>
<td>.568</td>
<td>5.951</td>
<td>1</td>
<td>.015</td>
<td>4.000</td>
</tr>
<tr>
<td>Constant</td>
<td>-1.386</td>
<td>.395</td>
<td>12.300</td>
<td>1</td>
<td>.000</td>
<td>.250</td>
</tr>
</tbody>
</table>

a. Variable(s) entered on step 1: Unsafe_Action.

Table 4 shows the multivariable analysis showed that the unsafe action influences the incidence of needle stick injury. Nurses who perform dangerous activities are at increased risk of needle stick injury 4x compared to nurses who work safely.

**Discussion And Conclusion**

The incidence of needle stick injury is one of the occupational accident’s occurrences mild but can cause a moderately severe impact. The results of this study showed as much as 31.3% of respondents had experienced these events. Needlestick injury can be prevented, among others, by administrative control. The application of this control can be made by giving some rules or policies such as the creation of SOPs, and if there have as been an exposure attempts to do is to minimize the impact.

The results of the analysis bivariable between age and incidence of needle stick injury is not a significant relationship between age and the prevalence of needle stick injury. International Labor Organization (ILO) states that the issue of age and years of service is a crucial cause of the accident problem, but it must be remembered that the high age does not necessarily have a long service life as well. The results of the analysis

bivariable between working period with the incidence of needle stick injury showed no significant correlation between working period with the frequency of needle stick injury. These results are in line with the results of studies that there is no meaningful relationship between the length of employment with stab wounds incident syringe. Work experience is not an indication that is linked to workplace accidents. This result is different from the standard AS / NZS 4360 that risk control is generically carried out with the approach one of them by providing training to workers on how to work safely, safety culture and safety procedures. Education is not a significant relationship with the incidence of needle stick injury. This result differs from the opinion stating the level of knowledge related to how quickly a person in making decisions. If a worker education levels low so often late or hesitant in making decisions that could lead to accidents.

The results showed that there were a significant relationship and the influence of variables unsafe act on the incidence of needle stick injury. The theory of the swiss cheese model describes the accident that the accident with the leading causes of accidents was caused by human error (human error). Accidents that arise within a specific time will be able to accumulate, which can then be combined into an active failure or consist of unsafe actions that ultimately lead to accidents. The principles to prevent workplace accidents are actually very simple, namely, to eliminate the causes of the so-called dangerous acts and unsafe Events.

Based on the discussion, it can be concluded that nurses who work with unsafe action can increase the
risk of needle stick injury by 4x compared to nurses who work safely\textsuperscript{15}. Prevention workplace accidents to human factors include labor regulations taking into account the limits of the abilities and skills of workers, nullify the things that reduce the concentration workers, enforce work discipline, avoid actions that bring accidents, and eliminate their physical and mental incompatibility\textsuperscript{16}.

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**Conflicts of Interest:** The authors declare no conflict of interest.

**Ethical Clearance:** The institutional Ethical Board approved the study of the Public Health, Airlangga University

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Post Mortem Organ Weight at Bhayangkara Pekanbaru Polda Riau Hospital, Indonesia

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¹Forensic Departement, ²Histology Departement, Faculty of Medicine, Andalas University, Padang 25163, Indonesia, ³Medical Faculty, Andalas University, Padang 25163, Indonesia

Abstract

Post mortem organ weight is one of indicator that serves as supporting evidence in determining the cause of death, because if there is a difference between the post mortem organ weight with normal organ weight indicates the occurrence of pathological conditions that may be related to the cause of death. The objective of this study was to determine post mortem organ weight in autopsy cases at Bhayangkara Pekanbaru Polda Riau Hospital in 2017-2018. This research is a retrospective descriptive study using secondary data. Data were obtained from autopsy data in the forensic section of Bhayangkara Pekanbaru Polda Riau Hospital in 2017-2018. Data were analyzed by using univariate analysis carried out on each variable of the research results. The results of this study were obtained from twenty one autopsy cases with a mean value of organ weight: the brain (1334.29 grams), liver (1130.90 grams), right lung (370.48 grams), left lung (311.24 grams), heart (275.33 grams), left kidney (114.52 grams), right kidney (114.00 grams), and spleen (113.43 grams). Organs in men are heavier than women, except the liver. Organ weight has decreased in old age. People with short bodies tend to have lighter organ weights than people with tall bodies. The conclusion of this study is the average value of post mortem organ weight in this study is different from the weight value of organs found in forensic textbooks.

Keywords: autopsy, post mortem, organ weight

Introduction

Autopsy is one of the important parts in medical science, because in addition to establish the final diagnosis, the function of autopsy also to find the relationship between the cause of death with abnormalities in the organs that cause death, and can explain the relationship between these. An autopsy is done in suspicious death case, death due to murder, and sudden death without apparent cause.¹

Autopsy consists of 2 types examination, external and internal examination. On internal examination, one of the examinations is weighing post mortem organ weight.² It plays an important role as supporting evidence in determining the cause of death, because if there is a difference between the weight of a post mortem organ with the average weight of the post organ mortem is normal, it indicates a change in the organ caused by a pathological state in the organ that is likely related to the cause of the death.³

Standard values of post mortem organ weights are needed to determine whether a person’s organs are normal or not, such as those found in forensic books and studies that have been conducted in other countries, like South Africa, India, Korea, Thailand, Iran. Research by Vadgama et al. in 2014 in Jamnagar region, India, stated that the standard weight of organs contained in forensic books written by authors from other countries is not appropriate if used in populations in India.⁴ It shows that the standard weight of organs using samples in other countries may not necessarily be used as a reference to determine Indonesian organs are normal or not.
The value of organ weight obtained using samples in other countries may not be appropriate if it is used as a standard for assessing the weight of Indonesian, because between one country and another country has different races and ethnicities and it is known that both of these are some factors that influence weight post mortem organ. These racial and ethnic differences affect organ weight due to differences in the type of food consumed, the amount of water consumed, climatic conditions, and genetic variations in various ethnicities in various countries in the world. In addition to race and ethnicity, there are other factors that may influence weight post mortem organs, namely sex, age, body weight, body length, and body mass index.

In addition to race and ethnicity, there are other factors that may influence weight post mortem organs, namely sex, age, body weight, body length, and body mass index. Based on that problems that have been described, the author wants to know the average value of post mortem organ weight in autopsy cases that performed at Bhayangkara Pekanbaru Polda Riau Hospital, Indonesia and the average value of post mortem organ weight based on age, gender, and body length.

**Method**

This research is a retrospective descriptive study using secondary data. This research was conducted in the forensic department of the Bhayangkara Pekanbaru Polda Riau Hospital from August 2018 to May 2019.

The population in this study were all of the autopsy data in the forensic section of Bhayangkara Pekanbaru Polda Riau Hospital in 2017-2018. The sample studied in this study was taken from autopsy data in the forensic section at the Bhayangkara Pekanbaru Polda Riau Hospital in 2017-2018. The sample is part of the population that meets the inclusion and exclusion criteria.

Data was collected from the results of postmortem examinations at Bhayangkara Pekanbaru Polda Riau Hospital in 2017-2018 which were included in the inclusion and exclusion criteria. Data that has been obtained from the data collection process will be changed in the form of tables, then the data is processed using computer software.

**Results**

<table>
<thead>
<tr>
<th>Table 1 Characteristics of Research Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>Men</td>
</tr>
<tr>
<td>Women</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>Age</td>
</tr>
<tr>
<td>21-28 year</td>
</tr>
<tr>
<td>29-36 year</td>
</tr>
<tr>
<td>37-44 year</td>
</tr>
<tr>
<td>45-52 year</td>
</tr>
<tr>
<td>&gt;52 year</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>Body Length</td>
</tr>
<tr>
<td>142-149 cm</td>
</tr>
<tr>
<td>150-157 cm</td>
</tr>
<tr>
<td>158-165 cm</td>
</tr>
<tr>
<td>166-173 cm</td>
</tr>
<tr>
<td>&gt;173 cm</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Based on the characteristics table of the research subjects it is known that there are more men subjects than women subjects, 76.2%. The highest number of cadavers is found in the 21-28 year age group, which is 33.3%. Meanwhile, the highest number of cadavers was found in the 158-165 cm body length group, which was 38.1%.
Based on table 2, it is known that the brain is an organ that has an average value of the heaviest organ weight (1334.29 grams), while the spleen is the lightest organ (113.43 grams) compared to other organs. Comparison of weight between the same organs with different position, such as the lungs and kidneys shows different results, namely the right lung is heavier (370.48 grams) compared to the left lung (311.24 grams), while the right kidney weight (114.00 grams) lighter than the left kidney weight (114.52 grams).

<table>
<thead>
<tr>
<th>Organ</th>
<th>Range</th>
<th>Mean</th>
<th>Deviation Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brain</td>
<td>1070-1783</td>
<td>1334.29</td>
<td>161.84</td>
</tr>
<tr>
<td>Heart</td>
<td>185-420</td>
<td>275.33</td>
<td>68.17</td>
</tr>
<tr>
<td>Right Lung</td>
<td>100-665</td>
<td>370.48</td>
<td>153.18</td>
</tr>
<tr>
<td>Left Lung</td>
<td>100-535</td>
<td>311.24</td>
<td>122.95</td>
</tr>
<tr>
<td>Liver</td>
<td>858-1670</td>
<td>1130.90</td>
<td>187.24</td>
</tr>
<tr>
<td>Spleen</td>
<td>40-421</td>
<td>113.43</td>
<td>90.46</td>
</tr>
<tr>
<td>Right Kidney</td>
<td>50-200</td>
<td>114.00</td>
<td>41.97</td>
</tr>
<tr>
<td>Left Kidney</td>
<td>40-200</td>
<td>114.52</td>
<td>40.15</td>
</tr>
</tbody>
</table>

Based on table 2, it is known that the brain is an organ that has an average value of the heaviest organ weight (1334.29 grams), while the spleen is the lightest organ (113.43 grams) compared to other organs. Comparison of weight between the same organs with different position, such as the lungs and kidneys shows different results, namely the right lung is heavier (370.48 grams) compared to the left lung (311.24 grams), while the right kidney weight (114.00 grams) lighter than the left kidney weight (114.52 grams).

<table>
<thead>
<tr>
<th>Organ</th>
<th>Range</th>
<th>Mean</th>
<th>S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brain</td>
<td>1070-1783</td>
<td>1350</td>
<td>175.9</td>
</tr>
<tr>
<td>Heart</td>
<td>185-420</td>
<td>284.1</td>
<td>66.33</td>
</tr>
<tr>
<td>Right Lung</td>
<td>160-665</td>
<td>385.6</td>
<td>152.3</td>
</tr>
<tr>
<td>Left Lung</td>
<td>120-535</td>
<td>320.9</td>
<td>127.3</td>
</tr>
<tr>
<td>Liver</td>
<td>656-1600</td>
<td>1130.8</td>
<td>180.9</td>
</tr>
<tr>
<td>Spleen</td>
<td>40-421</td>
<td>120.3</td>
<td>103.0</td>
</tr>
<tr>
<td>Right Kidney</td>
<td>50-200</td>
<td>116.5</td>
<td>42.7</td>
</tr>
<tr>
<td>Left Kidney</td>
<td>40-200</td>
<td>115.6</td>
<td>40.8</td>
</tr>
</tbody>
</table>
The post mortem organ weight table by sex shows that almost all men organs are heavier than women organs, except that the liver in men (1130.8 grams) has an average weight value that is almost equal to the weight of the liver in women (1131.0 grams).

**Table 4 Post Mortem Organ Weight (gram) depend on Age (year)**

<table>
<thead>
<tr>
<th>Organ</th>
<th>21-28</th>
<th>29-36</th>
<th>37-44</th>
<th>45-52</th>
<th>&gt;52</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± S.D</td>
<td>Mean ± S.D</td>
<td>Mean ± S.D</td>
<td>Mean ± S.D</td>
<td>Mean ± S.D</td>
</tr>
<tr>
<td>Brain</td>
<td>1297.8 ± 84.8</td>
<td>1456.4 ± 214.5</td>
<td>1195.6 ± 192.2</td>
<td>1367.00 ± 188.0</td>
<td>1333.0 ± 120.5</td>
</tr>
<tr>
<td>Heart</td>
<td>214.8 ± 31.4</td>
<td>265.2 ± 63.4</td>
<td>292.3 ± 13.0</td>
<td>362.5 ± 17.6</td>
<td>337.5 ± 64.8</td>
</tr>
<tr>
<td>Right Lung</td>
<td>342.1 ± 148.8</td>
<td>404.4 ± 179.0</td>
<td>230.0 ± 88.8</td>
<td>497.5 ± 215.6</td>
<td>419.5 ± 105.4</td>
</tr>
<tr>
<td>Left Lung</td>
<td>301.2 ± 137.2</td>
<td>388.8 ± 103.2</td>
<td>171.0 ± 67.8</td>
<td>430.0 ± 98.9</td>
<td>277.5 ± 41.7</td>
</tr>
<tr>
<td>Liver</td>
<td>1020.2 ± 118.5</td>
<td>1119.8 ± 250.8</td>
<td>1140.6 ± 53.2</td>
<td>1374.0 ± 319.6</td>
<td>1209.5 ± 96.3</td>
</tr>
<tr>
<td>Spleen</td>
<td>166.2 ± 126.1</td>
<td>102.8 ± 65.4</td>
<td>54.6 ± 11.5</td>
<td>139.5 ± 85.5</td>
<td>65.2 ± 27.6</td>
</tr>
<tr>
<td>Right Kidney</td>
<td>118.4 ± 49.5</td>
<td>100.6 ± 45.9</td>
<td>90.0 ± 0.0</td>
<td>155.5 ± 62.9</td>
<td>120.2 ± 24.0</td>
</tr>
<tr>
<td>Left Kidney</td>
<td>115.00 ± 45.78</td>
<td>100.60 ± 52.23</td>
<td>113.00 ± .000</td>
<td>135.0 ± 21.21</td>
<td>106.2 ± 48.8</td>
</tr>
</tbody>
</table>

Table 4 show that almost all organs in the 45-52 years age group have an average value of maximum organ weight when compared with other age groups, except the brain (1367.0 grams) and spleen (139.5 grams).

**Table 5 Post Mortem Organ Weight (gram) depend on Body Length (cm)**

<table>
<thead>
<tr>
<th>Organ</th>
<th>142-149</th>
<th>150-157</th>
<th>158-165</th>
<th>166-173</th>
<th>&gt;173</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± S.D</td>
<td>Mean ± S.D</td>
<td>Mean ± S.D</td>
<td>Mean ± S.D</td>
<td>Mean ± S.D</td>
</tr>
<tr>
<td>Brain</td>
<td>1180</td>
<td>1266.6 ± 57.7</td>
<td>1376.0 ± 144.3</td>
<td>1290.8 ± 122.9</td>
<td>1498.0 ± 403.0</td>
</tr>
<tr>
<td>Heart</td>
<td>185</td>
<td>250.0 ± 86.6</td>
<td>297.8 ± 62.0</td>
<td>257.1 ± 67.6</td>
<td>332.0 ± 25.4</td>
</tr>
<tr>
<td>Right Lung</td>
<td>210</td>
<td>300.0 ± 173.2</td>
<td>406.8 ± 156.8</td>
<td>352.8 ± 121.5</td>
<td>472.5 ± 272.2</td>
</tr>
<tr>
<td>Left Lung</td>
<td>251</td>
<td>250.0 ± 132.2</td>
<td>323.5 ± 116.8</td>
<td>312.4 ± 127.8</td>
<td>380.0 ± 219.2</td>
</tr>
<tr>
<td>Liver</td>
<td>875</td>
<td>1100.0 ± 100.0</td>
<td>1258.1 ± 180.8</td>
<td>1041.0 ± 126.9</td>
<td>1111.0 ± 316.7</td>
</tr>
<tr>
<td>Spleen</td>
<td>96</td>
<td>100.0 ± .00</td>
<td>87.1 ± 51.5</td>
<td>148.4 ± 138.8</td>
<td>125.0 ± 118.7</td>
</tr>
<tr>
<td>Right Kidney</td>
<td>69</td>
<td>120,0 ± 51.9</td>
<td>108.2 ± 42.6</td>
<td>115.7 ± 43.9</td>
<td>144.5 ± 34.6</td>
</tr>
<tr>
<td>Left Kidney</td>
<td>74</td>
<td>120.0 ± 51.9</td>
<td>99.5 ± 32.8</td>
<td>120.1 ± 36.4</td>
<td>167.0 ± 45.2</td>
</tr>
</tbody>
</table>
In this study, it was obtained that most organs increased according to a person’s height. In the 150-157 cm body length group, brain, heart, right lung, left lung, and liver are lighter than the 158-165 cm body length group. Organs in the body length group > 173 cm are heaviest compared to organs in other body length groups.

**Discussion**

In this study, the average value of post mortem organ weight obtained from 21 autopsy cases started from the organ with the heaviest to the lightest organ weight, namely the brain (1334.2 grams), liver (1130.9 grams), right lung (370.4 grams), left lung (311.2 grams), heart (275.3 grams), left kidney (114.5 grams), right kidney (114.0 grams), and spleen (113.4 grams). Research conducted by Yosiati et al. in 2012 obtained the results of the average weight value of organs, namely the brain (1218.9 grams), heart (312.2 grams), right lung (477.4 grams), left lung (417.0 grams), liver (1252.9 grams), spleen (162.8 grams), right kidney (150.6 grams), and left kidney (151.0 grams). The average value of organ weight obtained from research conducted by Yosiati et al. is not much different from the average weight of organs obtained from this study. The results of this study are also not much different from the research conducted by Govender et al. in the Mongoloid race and the Negroid race. The weight of post mortem organs in the colored skin in Mongoloid race obtained by Govender et al., heart (353.6 grams), right lung (613.0 grams), left lung (486.9 grams), liver (1384.3 grams), spleen (120.8 grams), right kidney (125.0 grams), and left kidney (136.3 grams). Meanwhile, the weight of organs in the Negroid race are the heart (319.7 grams), right lung (613.0 grams), left lung (477.4 grams), liver (1252.9 grams), spleen (162.8 grams), right kidney (150.6 grams), and left kidney (151.0 grams). The average value of organ weight obtained from research conducted by Grandmaison et al. in 2000 which showed differences in organ weight in each race. In the study conducted by Peddle and Kirk in 2017 with Negroid race samples also obtained results that are in line with this study, namely the average value of men organs is heavier than women organs. Similarly, research conducted by Yosiati et al who obtained the result of organ weight in men is heavier than organs in women.

Govender et al. in 2017 conducted research on three different races, namely the Negroid race, the Mongoloid race (colored and Indian skin), and the Caucasoid race showed differences in organ weight in each race. In the research of Govender et al. conducted on the Caucasoid race, there is a very clear difference in the value of organ weight when compared with the value of organ weight in this study which examined the Mongoloid race. The value of organ weight in the study of Govender et al. performed on the Caucasoid race that is the heart (433.4 grams), right lung (753.4 grams), left lung (628.7 grams), liver (1843.8 grams), spleen (233.0 grams), right kidney (164.9 grams), as well as the left kidney (179.3 grams). Based on the results of research by Govender et al. carried out in this Caucasian race, it seems clear that the Caucasian race has heavier organs than the Mongoloid race. This is due to differences in the type of food consumed, the amount of water consumed, climatic conditions, and genetic variation.

The average weight of post mortem organs by sex in this study differed between men and women. In men, the average weight of post mortem organs were obtained, namely the brain (1350.0 grams), the heart (284.1 grams), the right lung (385.6 grams), the left lung (320.9 grams), the liver (1130.8 grams), spleen (120.3 grams), right kidney (116.5 grams), and left kidney (115.6 grams). Meanwhile, the average weight of post mortem organs in women are the brain (1284.0 grams), heart (247.0 grams), right lung (322.0 grams), left lung (280.2 grams), liver (1131.0 grams), spleen (91.2 grams), right kidney (105.8 grams), and left kidney (110.8 grams). Based on these results, it is known that almost all men organs have an average weight value that is more compared to women, except that the liver in men has a weight that is almost equal to the weight of the liver in women. This is in line with the research of Kim et al. which shows that the liver has almost the same weight in both men and women. Men have organs heavier than women due to the influence of physical posture, ie men tend to be taller and heavier than women. This physical posture affects the weight of the organ.

In the study conducted by Peddle and Kirk in 2017 with Negroid race samples also obtained results that are in line with this study, namely the average value of men organs is heavier than women organs. Similarly, research conducted by Yosiati et al who obtained the result of organ weight in men is heavier than organs in women.

The results of this study are in line with research conducted by Grandmaison et al. in 2000 which showed that men had heavier organs than women. The weight of men organs are heart (365 grams), right lung (663 grams), left lung (583 grams), liver (1677 grams), spleen (156 grams), right kidney (162 grams), and left kidney (160 gram), while the weight of women organs are the heart (312 grams), right lung (546 grams), left lung (467 grams), liver (1475 grams), spleen (140 grams), right kidney (135 grams), and left kidney (136 grams). Nonetheless, the average value of post mortem organ weight obtained from this study was very different from
the study conducted by Grandmaison et al., because the average value of organ weight obtained from the study of Grandmaison et al. is heavier than the average value of organ weight in this study. This is likely due to the differences in the sample races studied.

In this study, the weight of the heart organ in the 21-28 year age group was not much different from the weight value of the heart organ in the 21-30 year age group obtained by Deepika et al., but there was a considerable difference in the value of the weight of the heart organ. Deepika et al. obtained 280 grams for heart weight and 1311.03 for liver weight, while this study obtained a weight value of 214.86 for the heart and 1020.29 grams for the liver weight. Meanwhile, the value of organ weight in the age group 37-44 years and 45-52 years in this study were not much different from the weight value of organs obtained from studies conducted by Sheikhzadai et al. in India in 2009.12

In this study, it is known that the value of organ weight has increased if the weight of organs in the age group 21-28 years compared with the age group 45-52 years, then experienced a decrease in organ weight in the age group > 52 years. The results of this study are in line with organ weight values contained in Knight’s Forensic Pathology, which shows that the weight of organs in the youngest age group is heavier than the oldest age.13 This is due to the reduced amount of potassium in the aging process. Potassium is a component that plays a role in the body’s metabolic function, so it is an indirect indicator of muscle mass. Reduced muscle mass causes reduced organ mass.14,15

In addition, almost all of the organs that studied had the heaviest organ weights in the age group of 45-52 years, except for the brains that had the maximum weight in the 29-36 year of age group. The results of this study are in line with the results of research conducted by Singh et al. in 2004. Research Singh et al. states that the brain and liver have a maximum weight in their 20s and 40s compared to other ages, while the lungs and spleen have a maximum weight at 45-50 years of age.16 Research conducted by Kim et al. also in line with the results of this study, where the weight of the kidneys and liver reaches a maximum weight in their 40s.10 The heart becomes heavier with age and most organs (spleen, liver, and kidneys) are heavier in individuals in their 40s.17 After reaching maximum weight, the weight of the organs will decrease due to the aging process which can cause the size of these organs to decrease. In the heart, when middle age, blood pressure will increase, so that the heart’s work increases and causes an increase in heart mass.14 Meanwhile, brain weight tends to increase until adulthood in line with the growth of neurons and glia cells as its supporters, then after through adulthood the brain’s weight has decreased.17

In this study, it was found that almost the entire weight of the organ increased in accordance with an increase in a person’s body length, except in the body length group of 166-173 cm. In the 150-157 cm body length group, the weight of the brain, heart, right lung, left lung and liver organs is lighter than the 158-165 cm body length group. In addition, in this study it appears that all the organs studied have maximum weight in the highest body length group, which is > 173 cm. Based on the results obtained from this study it can be interpreted that people with shorter bodies tend to have lighter organ weights than people with higher bodies. This is because the growth of body organs goes hand in hand with human physical growth.18 Body proportions will determine the body’s metabolism, so the size of the organs must adjust to body proportions.8

The results of this study are in line with research conducted by Sheikhzadai et al. in 2009, which found that the weight of organs in both men and women increased with increasing body length. Organs in the body length group 176-192 cm heavier than the body length group 166-175 cm and organs in the body length group 166-175 cm heavier than weight than organs in the body length group 151-165.12

Organ weight in this study in each group of body length has a weight value that is very different from research conducted by Grandmaison et al. 2001 in the Caucasian race. In this study, the organ weight of body length groups of 166-173 cm namely heart (257.1 grams), right lung (352.8 grams), left lung (312.4 grams), liver (1041.0 grams), spleen (148.4 grams), right kidney (115.7 grams), and left kidney (120.1 grams). The weight of organs at body length intervals of 165-175 cm, including the heart (360 grams), right lung (625 grams), left lung (551 grams), liver (1637 grams), spleen (150 grams), right kidney (157 grams), and the left kidney (175 grams) had very large differences in organ weight and organ weights of 166-173 cm in the length of the body in this study. This very large difference in organ weight values is likely due to differences in race in the sample studied, ie the race studied in this study is the Mongoloid race, while the race in the study of
Grandmaison et al. is a Caucasoid race, because racial differences cause differences in genetic variation. In addition, the Caucasian race also has a longer body length interval than the Mongoloid race.\textsuperscript{11}

**Conclusion**

Based on research that has been done at Bhayangkara Pekanbaru Polda Riau Hospital, the average value of post mortem organ weight, namely the brain (1334.29 grams), liver (1130.90 grams), right lung (370.48 grams), left lung (311.24 grams), heart (275.33 grams), left kidney (114.52 grams), right kidney (114.00 grams), and spleen (113.43 grams). The organs in men are heavier than in women, except the liver. Organ weight has decreased in old age. People with shorter bodies tend to have lighter organs than taller people.

**Conflict of Interest:** Not applicable

**Ethical Clearance:** The research approval was requested to the research ethics committee of faculty medicine Andalas University

**Funding:** This research was no funded

**References**

Awareness of Senior and Specialist Dental Student Toward the Importance of Cost Analysis and Business Practice Management: Cross Sectional Study from a Public University in Indonesia

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Abstract

Background: Dental students not only develop practical skills but also management skills. Dental students must be able to understand how to determine cost analysis, which is a measure of the relationship between costs and output. Objective: to determine the awareness of senior dental student toward the importance of cost analysis and business practice management. Materials and Method: A cross-sectional study was conducted using a questionnaire with closed-ended questions. The study sample included 119 participants in Airlangga Dental College, Surabaya. Statistical analysis was performed by descriptive statistical analysis and chi square tests. Results: One hundred nineteen questioners were returned and analyzed. BDS 95 students while the specialist was 24 students. It was seen that there are 79% of specialist students who have a good level of confidence while in BDS students only 51% have a good level of confidence. BDS students (42%) and specialist students (33%) indicated that their knowledge was sufficient about the costs of practice management or business management. Conclusion: students have confidence in clinical skills but are not quite sure about practice management knowledge. Students are also interested in increasing the range of knowledge about business and practice management.

Keywords: Dental students, awareness, practice management, private practice, cost analysis.

Introduction

Dental students are challenged in the rapid development of knowledge in their fields, this shows the importance of graduate students not only preparing practical knowledge and skills but also practical skills and management1. Houlberg2 in the study stated that there was inadequate training in practice management and suggested for the future dentistry curriculum to discuss practice management training as an important component in the curriculum. They also should be prepared to have competency in business of practice management to improve their readiness and confidence as a dentist3.

One of the important things that needs to be understood by dental student is how to determine cost analysis. In economics, the Cost Analysis refers to the measure of the cost – output relationship4,5. In other words, the cost analysis is concerned with determining money value of inputs (labor, raw material)6, called as the overall cost of production which helps in deciding the optimum level of production7–9. In the study that conducted by Manakil et al10, graduate students feel they do not have enough knowledge in business management/practice costs, including administration; advertisement; equipment costs; dental consumables; and maintenance of infrastructure11; equipment overhead; ingredient12;
staff\textsuperscript{13}, etc. So it is important to calculate the value of the dental health treatment cost and balancing the income and outcome according to the performance of dentist and in accordance with the patient to produce an effective cost that could benefit the dentist and still affordable to patient\textsuperscript{14}.

Awareness is the ability to directly know and perceive, to feel, or to be aware of events. More broadly, it is the state of being conscious of something. Another definition describes it as a state where a subject is aware of some information when that information is directly available to bring to bear in the direction of a wide range of behavioral processes\textsuperscript{15}. The states of awareness are also associated with the states of experience so that the structure represented in awareness is mirrored in the structure of experience\textsuperscript{16}. This study is conducted to determine the awareness of senior dental student toward the importance of cost analysis and business practice management.

**Material and Method**

This survey is a modification of work\textsuperscript{3} and is designed to study fiscal status; trust; learning preferences; career path; overall knowledge; and integration or management of dental practices among dentist graduates. The questionnaire used in this descriptive cross-sectional study was a closed-ended questionnaire. The subject of this study are the senior undergraduate dental students from fourth and fifth year and specialist students at Airlangga dental college, Surabaya. The total number of sample are 119 students. The survey will be conducted distributed and confidential through a third party, to maintain anonymity.

The questionnaire was divided into four sections: the first section collected personal data such as age, gender and student income support throughout the program; the second part evaluates the confidence in the skills gained during the dental education program and the confidence to maintain a general private practice. The responses are measured on a five-point Likert scale with “1” being high confidence and “5” is low confidence. This section looks at perceived trust in operating skills, integrating into a dental practice, patient management skills, and business practice management skills.

The third part of the survey is analyzing student demographic work preferences such as private or public sector work, rural or city-based practices, the area of specialization of choice for practice, and the preference for establishing an independent practice. The fourth part is assessing student awareness in cost analysis and managing an independent practice. Studies evaluate students perception about the importance of the determining unit cost for dental treatment.

**Result**

The survey was conducted on 140 students, among a total of 140 questionnaires were distributed of which 119 were obtained back. The details of participants are according to the age, gender, qualification and years of experience as shown in (Table 1). Out of the 119 students, (72.3%) were females and (27.3%) were male. It was seen that most of the individuals were undergoing their undergraduate in dental medicine (82.6%) while the specialist was (17.4%). Most of the subjects fell under the age group of 21-23 years (64.7%).

**Table 1 Distribusi of the study according, gender, qualification, years of experience**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>33</td>
<td>27.7</td>
</tr>
<tr>
<td>Female</td>
<td>86</td>
<td>72.3</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21-23</td>
<td>77</td>
<td>64.7</td>
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<td>24-26</td>
<td>17</td>
<td>14.2</td>
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<td>27-30</td>
<td>14</td>
<td>11.7</td>
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<tr>
<td>30-32</td>
<td>11</td>
<td>9.4</td>
</tr>
<tr>
<td>Qualification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BDS</td>
<td>95</td>
<td>82.6</td>
</tr>
<tr>
<td>SPDS</td>
<td>24</td>
<td>17.4</td>
</tr>
</tbody>
</table>

There are 79% of specialist students who have a good level of confidence while in BDS students only 51% have a good level of confidence. Significant P value (0.036) had observed in question about Major cost in running a private practice with gender in undergraduate student. Another significant P value (0.000) was observed in question about how to determine the rates for dental treatment with age.

In BDS students 55% of respondents chose to practice together, this result is different from specialist students whose 58% of respondents choose to open private practice. Almost all respondents, both specialist students and BDS students agree that calculating costs
first before setting rates is important. And almost most of the respondents (BDS students: 78% and specialist students: 75%) from both groups also agreed that the way to set the right dental treatment rates is to calculate the cost of materials and tools needed for each treatment. In BDS students, 42% of respondents felt that the knowledge provided was insufficient. For specialist students, the biggest answer is in the ordinary choice of 42%.

For specialist students, significant P value had observed in some question. The first between level of confidence and age (0.043), then the sort of practice that student visualize once graduate with age (0.050). Next is the strongest experience with gender (0.002) and how to determine rates for dental treatment with gender (0.050). The last one is confidence on practice management and finance with years of practice (0.024).

**Discussion**

This survey questionnaire has been modified from previous studies and broader topics such as student financial support, preferential career paths after graduation, awareness of cost analysis, and business practice management. Self-perceived confidence is used to assess students’ preparedness for practice. From the results of this questionnaire, it can be seen that specialist students have a greater level of confidence when compared to undergraduate students. High self-confidence can be influenced by the length of experience in practice. The longer the practice, the more cases that will be faced, thus increase the confidence in the dental practice.

Having personal practices is often projected as a symbol of social success in dentistry field. However, after graduating, many students from BDS want to be employed or practice together. There is a significant difference between the kinds of practice that specialist student visualizes once graduate with age (0.050). It is believed that with the increasing age of someone, the practice experience will increase with the more dental cases they are facing thus making more experienced dentist inclined to open their private practice.

For BDS students, mentoring following graduation was considered very important. Preference in geography practices shows city practices as the first choice without significant differences between genders, age or years of experience in their choice. Dental graduates are not only required to be proficient in the patient care but must also be competent in business management or practice.

It was also reported from previous research that students felt their integration into general dentistry could be facilitated by more time for the clinical environment and more knowledge in practice management. Houlberg, report that there is inadequate training in practice management and suggest that for future dental curriculum it should discuss practice management training as an important component in a curriculum.

In the study mentioned that BDS students (42%) and specialist students (33%) felt they did not have enough knowledge about the costs of business management or practice, such as administration; advertisement; dental consumables; infrastructure equipment and maintenance costs; overhead costs of equipment; ingredients; staffing; etc. However, students’ assumptions about high-cost staffing and management in practice are wrong, they prefer to choose equipment and infrastructure as the biggest costs in carrying out dental practices.

**Conclusion**

This study shows that students feel confident about clinical skills that are developed but are not quite sure about management practice knowledge. Students are also interested in increasing the scope of knowledge about business and practice management. Improving students’ work skills after graduation is a challenge in the increasingly competitive and competitive job market; the curriculum must consider the integration of clinical skills and knowledge of practice management skills.

**Acknowledgment:** The authors acknowledge and thank all senior undergraduate and specialist dental students for participating in the study.

**Conflicts of Interest:** There are no conflicts of interest.

**Source of Funding:** Self-Funding
Ethical Clearance: Approved

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1815


The Relationship of Self-Motivation in Diabetes Mellitus Management with Blood Sugar Levels of Diabetes Mellitus Type II Clients

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Abstract

The purpose of this study was to determine the relationship of self-motivation to diabetes mellitus (DM) management with blood sugar levels of DM type ii clients in Outpatient Polyclinic Installation in Dr. Doris Sylvanus Hospital Palangka Raya. The research uses descriptive correlational with cross sectional research design. The sampling technique uses purposive sampling. The respondents of this study were 40 people. Data collection using a questionnaire and recording the value of blood sugar from the results of laboratory tests in the client report status. Statistical tests use the Chi-Square test. The results of statistical analysis revealed that self-motivation on clients was in the unfavorable category of 32 people (80%), blood sugar levels were in the high category of 26 people (65%) with a p-value of 0.001 (p <0.05). There is a significant relationship between self-motivation to DM management with blood sugar levels of DM type II clients in the Outpatient Polyclinic Installation of Dr. Doris Sylvanus Hospital Palangka Raya.

Keywords: self-motivation, blood sugar level, diabetes mellitus

Introduction

Diabetes mellitus is a group of metabolic diseases with characteristic hyperglycemia that occurs due to abnormal insulin secretion, insulin action or both. Based on a preliminary study in the medical record section of Dr. Doris Sylvanus Hospital Palangka Raya which was conducted on January 24, 2018, obtained data on the number of patients with Type II DM in 2016 the number of DM cases was 4111 cases with an average monthly of 343 cases and increased to 4942 cases in 2017 with an average monthly to 412 cases. The increase in cases of Type II DM is accompanied by an increase in the occurrence of cases of Type II DM complications, based on the medical record of complications that often occur is hyperglycemia which is the forerunner to the growth of various other diseases to the point of death. If hyperglycemia in people with Type II diabetes can be controlled properly, then all these chronic complications can be prevented, at least inhibited.

The goal of diabetes mellitus management for the short term is to eliminate complaints/symptoms and maintain a sense of comfort and health, while in the long run to prevent complications, both macroangiopathy and neuropathy with the ultimate goal of reducing diabetes morbidity and mortality.

Management of diabetes mellitus with 5 main pillars, namely first, meal planning by making dietary arrangements based on the nutritional status of diabetes. Second, physical exercise so that muscle contraction when doing physical exercise will make the membrane permeability to glucose increase. Third, pharmacological therapy. Fourth, counseling. The fifth routine and independent monitoring of blood sugar with sugar control can reduce the number of complications in patients with diabetes mellitus.

DM management problems that often occur in Dr. Doris Sylvanus Hospital Palangka Raya based on the results of a survey on January 24, 2018 in people with DM is the lack of self-motivation related to carrying out the four pillars of DM. One of the factors that influence
a person’s behavior in improving and maintaining their health is motivation, including in managing DM regularly as an effort to prevent complications in diabetes mellitus patients. One of the DM management is regular blood sugar control, which is one of the treatments for diabetes mellitus patients to support stable blood sugar and prevent complications, therefore there is a need for self-motivation in carrying out the examination and management of diabetes mellitus.

**Materials and Method**

This type of research is quantitative in the form of descriptive correlation which is research that aims to reveal the correlative relationship between the independent variables and the dependent variable, with the cross-sectional approach which is a study to study the dynamics of the correlation between factors and risks with effects by approaching, observing or collecting data at once in one when.

The population in this study is type II diabetes mellitus clients who seek treatment at the Internal Medicine Outpatient Clinic of Dr. Doris Sylvanus Hospital Palangka Raya. The sample used in this study with a sampling technique using purposive sampling with a total sampling of 40 respondents. This research was conducted on April 20-May 12, 2018. The time was used to collect data through a questionnaire that was filled in completely and returned to the researcher.

**Findings and Discussion**

Table 1. Relationship between Self-Motivation and Other Confounding Variables with Blood Sugar Levels

<table>
<thead>
<tr>
<th>Variable</th>
<th>Blood Sugar Levels</th>
<th>OR (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normal</td>
<td>High</td>
<td></td>
</tr>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>f</td>
</tr>
<tr>
<td>Self-motivation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Good</td>
<td>7</td>
<td>87.5</td>
<td>1</td>
</tr>
<tr>
<td>Not good</td>
<td>7</td>
<td>21.9</td>
<td>25</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early adulthood</td>
<td>1</td>
<td>50</td>
<td>1</td>
</tr>
<tr>
<td>Late adulthood</td>
<td>3</td>
<td>75</td>
<td>1</td>
</tr>
<tr>
<td>Early elderly</td>
<td>7</td>
<td>38.9</td>
<td>11</td>
</tr>
<tr>
<td>Late elderly</td>
<td>3</td>
<td>35</td>
<td>13</td>
</tr>
<tr>
<td>Gender</td>
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<td></td>
<td></td>
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<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Ed.</td>
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</tr>
<tr>
<td></td>
<td>6</td>
<td>8</td>
<td>4</td>
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<tr>
<td></td>
<td>31.6</td>
<td>38.1</td>
<td></td>
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<tr>
<td></td>
<td>13</td>
<td>13</td>
<td>6</td>
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<tr>
<td></td>
<td>68.4</td>
<td>61.9</td>
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<td></td>
<td>Reff</td>
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<tr>
<td></td>
<td>0.75</td>
<td>0.75</td>
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<td>(0.203 - 2.77)</td>
<td>(0.23-5.06)</td>
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<tr>
<td></td>
<td>0.92</td>
<td>0.91</td>
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<td>4</td>
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<td>6</td>
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<td>38.1</td>
<td>13</td>
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<tr>
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<td>50</td>
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<tr>
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<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
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<td>0</td>
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</tr>
<tr>
<td></td>
<td>0.99</td>
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<tr>
<td></td>
<td>(0.49-0.80)</td>
<td>(0.50 - 0.81)</td>
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<td>14</td>
<td>24</td>
</tr>
<tr>
<td>Not married/widowed</td>
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<td>0</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>0.53</td>
<td>0.53</td>
<td></td>
</tr>
<tr>
<td>DM suffered</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-10 years</td>
<td>14</td>
<td>14</td>
<td>25</td>
</tr>
<tr>
<td>&gt; 10 years</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>35.9</td>
<td>35.9</td>
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<tr>
<td></td>
<td>Reff</td>
<td>Reff</td>
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<tr>
<td></td>
<td>0.64</td>
<td>0.64</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.50 - 0.81)</td>
<td>(0.50 - 0.81)</td>
<td></td>
</tr>
</tbody>
</table>

Chi-square correlation test results obtained p-value of 0.001 (p <0.005). The results showed that only 8 people (20%) were good in self-motivation and had blood sugar levels in the normal range of 7 people (87.5%) while respondents in the good self-motivation category with high blood sugar levels were 1 person (12.5%). While the remaining 32 people (80%) with poor self-motivation category, where most of the blood sugar levels in the high category are as many as 25 people (78.1%) and as many as 7 respondents (21.9%) with self-motivation not good to have a value of blood sugar levels within normal limits. The results of the analysis of the motivational questionnaire items found that the highest score on statement number 6 is the statement “I am happy if my blood sugar is in the normal range” with a score of 138 with 19 answer choices answered “agree” and 21 respondents answered “strongly agree”. This means that the majority of respondents actually feel happy and want their sugar levels within the normal range. While the analysis of motivation questionnaire items with the lowest score on statement number 2 is the
statement “I am challenged to undergo treatment” with a score of 99. It shows that most respondents feel less challenged in undergoing treatment so that is one of the factors that can affect client motivation.

Odd Ratio (OR) value is 25.00, that is OR> 1, this shows that a person with DM with low self-motivation has a 25.00-fold risk of having uncontrolled blood sugar levels, the lowest has a risk of 2,617 times and the greatest risk is 238,787 times that of having an uncontrolled blood sugar level compared to someone with good self-motivation. The results of this study indicate the less motivation of clients in managing DM the more uncontrolled or high blood sugar levels. From the results of the study the researchers concluded that the self-motivation of Type II DM clients in the Outpatient Clinic of the Internal Medicine Polyclinic of Dr. Doris Sylvanus Hospital Palangka Raya is in the unfavorable category. This is influenced by several factors such as age, gender, level of education, occupation, marital status, and length of time with DM.

The results showed that the majority of respondents were early elderly, aged between 46-55 years. As a person ages, changes in function and composition in the body can affect one’s ability to carry out activities including one’s motivation. The results showed that the majority of respondents who came to control the disease in poly disease in the female sex. Gender also influences a person’s motivation and behavior. This is because women tend to be more obedient to the rules than men.

Most of the respondents studied had a high school education level. The level of education is an indicator that someone has taken formal education in certain fields. The higher the level of education a person will usually have more knowledge including about health and the presence of this knowledge will affect someone to have awareness in maintaining their health.

People who work tend to have less time to visit health facilities so that there will be less time available and opportunities for treatment. Whereas in this study the results were obtained that the majority of respondents were housewives/not working which means that respondents had plenty of time to visit health facilities including managing DM.

The marital status of most respondents is married and has a spouse. This is one of the factors that can affect a person’s motivation, including respondents in managing DM, because respondents get support from their husband or wife. The length of time with DM is also one of the factors that influence a person’s willingness to manage DM. The longer a person with DM, the better the coping and self-efficacy of a person and the more experienced in managing the disease.

This study is in accordance with previous research conducted by Yusi Ariani (2011) about the Relationship between Motivation and Self-Efficacy of Type II DM Patients in the Context of Nursing Care at H. Adam Malik Hospital Medan, stated that with the results of 45 respondents had poor motivation in conducting self-efficacy. Motivation the majority of patients lack self-care so it is advisable for nurses and physicians to increase patient motivation in the context of DM by increasing patient autonomy intrinsically.

Social environment, family, and health workers influence in increasing motivation and changes in patient behavior. Someone who has the support of the family, and surrounding and support from health workers who are not pressing, controlling tight or authoritarian will increase motivation in checking blood sugar levels.

Conclusion

There is a significant relationship between self-motivation and blood sugar levels of DM Type II clients in the Outpatient Poly clinic Installation of Dr. Doris Sylvanus Hospital Palangka Raya

Ethical Clearance: This research has gone ethical feasibility testing by the Ethical Research Commission of the Poltechnic of Health, Ministry of Health, Palangka Raya.

SourceFunding: This study was done by self - funding from the authors.

Conflict of Interest

The authors declare that there are no conflicting interests.

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Morphological Changes in Ovaries in Rats with Experimental Polycystic Ovary

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Abstract

Polycystic ovary syndrome is one of the important causes of infertility, metabolic syndrome. Complications of PCOS are a serious health hazard. The relevance of the study of morphological changes in the ovaries in rats is justified by the need to improve the treatment of PCOS. The experiment consisted in the fact that rats from the experimental group received testosterone for 7 days and were in constant artificial daylight for 60 days. As a result of histological examination of the ovaries in this group, multiple cysts, foci of fibrosis were found. Vaginal smears in rats from the experimental and control groups were collected and compared. The extracted ovaries of rats of the experimental and control groups were compared, the differences in colour according to Van Gieson X 100, haematoxylin-eosin X 40, haematoxylin-eosin X 100, B-G X 100 were analysed. Studies indicated oestrous cycle disturbance, hormonal changes in rats with experimental polycystic. The work can serve as material for further studies aimed at identifying fast and easily accessible methods for the diagnosis of metabolic syndrome predictors.

Key words: morphology, endocrine infertility, experimental and control groups, fibrosis, cyst.
the syndrome has a polygenic nature.\textsuperscript{12}

Epi- and ontogenetic factors ("unwanted" genes are activated by the influence of the external environment, for example, folate deficiency), as previously mentioned, account for one fifth of all cases of the disease. Sometimes this happens even in utero (due to adverse environmental factors, micronutrient deficiency). Girls born to mothers with PCOS have more follicles (in diameter) from birth than their peers, and a detailed examination during the pre-pubertal period reveals moderate metabolic disturbances. The syndrome manifests during puberty, when the synthesis of androgens in the body increases.\textsuperscript{13}

The aim of our work was to study the morphological changes in female rats with experimental polycystic.

**Materials and Method**

For the experiment, sexually mature female Wistar rats were taken. Experimental animals were divided into the following groups: control (n = 20) – group I, experimental (n = 25) – group II with experimental polycystic. Rats from the experimental group received testosterone intramuscularly (400 mg) for 7 days and were kept for 60 days under constant artificial daylight. Vaginal swabs were taken daily for 30 days to study the oestrous cycle. Stained using Giemsa method. Rectal temperature was measured daily.

The cytological evaluation of rat vaginal smears was performed according to the classification of Geist, Salmon and 2 indices were determined: Maturation Index (MI) and the kariopycnotic index (KPI). MI is the percentage of three types of epithelial cells – basal/parabasal, intermediate and superficial. KPI is the percentage of surface cells with a pycnotic nucleus to all other cells. An increase in the number of surface cells with a pycnotic nucleus correlates with increased oestrogen stimulation. Blood was also taken at the end of the experiment (on day 60) to determine the lipid spectrum and the level of hormones.\textsuperscript{14,15} Testosterone, oestradiol, FSH and LH were determined, including the lipid spectrum (atherogenic index, low density lipoproteins, high density lipoproteins, triglycerides and total cholesterol) in the Express Plus laboratory in Bishkek.\textsuperscript{16,17}

Animals were taken out of the experiment with an overdose of diethyl ether and ovaries were extracted for further histological examination. Morphological research was conducted on the basis of Republican Anatomic-Pathological Bureau. The material was fixed in a solution of 10\% formalin, embedded in paraffin, histological sections were made and stained with haematoxylin and eosin, also according to Van Gieson. Statistical processing of the obtained data was performed using the Statist software package.

**Results and Discussion**

In the control group, the results of histological examination of the ovaries display the normal structures of the ovaries with a maturing egg, the absence of zones of haemorrhage, fibrosis and the formation of cysts (Figure 1A). In the group with experimental polycystic disease, multiple cysts and foci of fibrosis are found (Figure 1B).

![Figure 1. A – rat ovary from the control group, Van Gieson stain X 100; B – rat ovary from the experimental group, haematoxylin-eosin stain X 40](image-url)
Figure 2B and 2C display a dense protein coating, which is characteristic of PCOS when stained according to Van Gieson. This indicates the absence of ovulation and the formation of multiple cysts in both ovaries.

Table 1 reflects changes in hormone levels. In the group with experimental polycystic disease, there is an increase in the level of testosterone, oestradiol and LH (luteinizing hormone) compared with the control, a decrease in the level of FSH (follicle-stimulating hormone).

Table 1. Hormone level changes

<table>
<thead>
<tr>
<th></th>
<th>Testosterone (nmol/l)</th>
<th>Oestradiol (pg/ml)</th>
<th>FSH (IU/L)</th>
<th>LH (IU/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group n=25</td>
<td>1.66±0.04</td>
<td>639.59±22.97</td>
<td>0.2±0.01</td>
<td>0.1±0.03</td>
</tr>
<tr>
<td>Experimental group n=25</td>
<td>23±0.61*</td>
<td>1228.7±38.74*</td>
<td>0.1±0.02</td>
<td>0.4±0.02*</td>
</tr>
</tbody>
</table>

Note: *- P<0.05 significantly with respect to the control group

There are many squamous cells in the vaginal smear of rats from the control group, which indicates the presence of ovulation and good oestrogen saturation (Figure 3A). Parabasal cells and white blood cells appear in the stage of meta-oestrus, that is, the epithelium is renewed and their maturation begins (Figure 3B). A large number of leukocytes was found in the di-oestrous phase and epithelial cells in the pro-oestrous phase increase in size, the cytoplasm becomes more transparent, and the nucleus begins to decrease under the influence of oestrogens (Figure 3C and 3D).
Figures 3A, 3B, 3C show oestrus, meta-oestrus, and di-oestrus stages in rats with experimental polycystic disease wherein a large number of leukocytes, parabasal cells and only a small number of epithelial cells were detected. Cell maturation does not occur, which indicates reduced oestrogen stimulation and anovulation. Impaired epithelial cell maturation due to excess testosterone is a major feature of polycystic ovary. In vaginal smears in rats from the experimental group, no pycnotic nuclei and squamous cells were found.

Figure 4. A – vaginal smear in the meta-oestrus phase in the rats in the experimental group; B – vaginal smear in di-oestrus phase in rats in the experimental group; C – vaginal smear in the pro-oestrus phase in rats in the experimental group (Table 2).
Table 2. Lipid level changes

<table>
<thead>
<tr>
<th></th>
<th>Atherogenic index</th>
<th>LDL (mmol/l)</th>
<th>HDL (mmol/l)</th>
<th>Total cholesterol (mmol/l)</th>
<th>Triglycerides (mmol/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group n=25</td>
<td>1.52±0.5</td>
<td>0.17±0.08</td>
<td>1.43±0.89</td>
<td>1.04±0.13</td>
<td>0.52±0.15</td>
</tr>
<tr>
<td>Experimental group n=25</td>
<td>2.36±0.83</td>
<td>0.48±0.18*</td>
<td>0.40±0.9</td>
<td>1.68±0.14*</td>
<td>0.63±0.19</td>
</tr>
</tbody>
</table>

Note: * – P <0.05 significantly with respect to the control group

Conclusions

Despite intensive studies in the field of PCOS, the mechanisms underlying the formation of this pathology are still understudied and debatable, which indicates a multifactorial aetiology and the lack of a single opinion on this pathology, which is very difficult for diagnosis and treatment. In women with menstrual irregularities, metabolic disorders and an increase in low-density lipoproteins (LDL) are significantly more common. These lipid abnormalities, namely an increase in LDL, suggest that women with PCOS have a risk of developing cardiovascular disorders of up to 70%. Furthermore, PCOS is associated with increased sympathicotonia, which is associated with cardiovascular complications. Scientists at experimental PCOS have demonstrated that low-frequency electric acupuncture has a significant effect in rats with PCOS – it reduces heart rate and sympathetic activity.

However, according to other authors, obesity, insulin resistance, impaired glucose tolerance and dyslipidaemia are not pathognomonic signs of PCOS. Overweight is of primary importance in the formation of metabolic disorders, and against the background of endocrine changes characteristic of PCOS, disturbances in carbohydrate and lipid metabolism are aggravated. Violation of lipid and carbohydrate metabolism plays an important part in the pathogenesis of PCOS. A carbohydrate diet can activate lipogenesis in the liver and activate the enzymes involved in lipogenesis, while starvation works the opposite. Our studies indicated a violation of the oestrous cycle in animals with experimental polycystic disease, as evidenced by a change in vaginal epithelial cells.

Our studies demonstrated hormonal changes upon violation of the oestrous cycle in animals with experimental polycystosis, which is confirmed by the morphological change in the ovaries. Further studies aimed at identifying fast and readily available diagnostic methods for the predictors of metabolic syndrome underlying PCOS are necessary.

Acknowledgment: None.

Conflict of Interest: There is no conflict of interests.

Ethical Clearance: All procedures were performed in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. A study was approved by Animal Research Ethics Committee of the St. Petersburg State University, October 25, 2019, No 1947-IL.

Source of Funding: Self-funding.

References
Metabolism, 2003, 52: 908-915.


The Correlation between Myelulcepidase Levels and the Event of the Acute Coronary Syndrome

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Abstract

Background: Acute coronary syndrome (ACS) is a collection of symptoms due to cardiac blood flow disorders consisting of acute myocardial infarction (AMI) with increased ST segment (STEMI), AMI without increased ST segment (NSTEMI) and unstable angina pectoris (UA). Myeloperoxidase (MPO) is an enzyme that plays a role in the destabilization and rupture of plaque that rises earlier within 2 hours after AMI attack so it can be used as an early marker of ACS without depending on evidence of myocardial necrosis. So, the purpose of this study is to determine the relationship between MPO levels and ACS events.

Methods: This study is using quantitative method. Research sample was 40 patients serum with the main complaint of chest pain that fulfilled the inclusion criteria who came to the emergency unit of Dr.Soetomo General Hospital Surabaya. The blood samples were examined for MPO with MPO kit from Quanticine (R & D system) using ELISA method. The diagnostic value obtained from the calculation with the 2x2 table.

Results: Patients with chest pain were 27 persons (67.5%), while non-ACS patients were 13 persons (32.5%). There were significant differences in MPO levels between the STA (STEMI, NSTEMI, UA) groups of 986.48 ng/ml and non-ACS 381.08 ng/ml (p = 0.002). Diagnostic sensitivity was 88.88%, diagnostic specificity 69.23%, negative predictive value 75% and positive predictive value 85.71%. The correlation coefficient between MPO and ACS content is r = 0.45 with p = 0.003.

Conclusion: There was a correlation between MPO levels and the incidence of ACS. The higher the MPO level the higher the incidence of ACS.

Keywords: sindroma coroner, infark miokard akut, unstable angina, nekrosis miokard.

Introduction

Cardiovascular disease is the first cause of death in the world and in Europe. Acute Coronary Syndrome (ACS) is one of the manifestations of coronary artery disease that is still a major health problem in the world. The American Heart Association (AHA) Statistics Data, in 2005 the number of patients undergoing medical treatment in the United States due to ACS is nearly one point five million people with one point one million people (80%) indicate instances of unstable angina (UA) or infarction myocardial infarction without ST-segment elevation (NSTEMI), whereas 20% of cases recorded suffer from myocardial infarction with increasing ST segment (STEMI)1.

The results from the Jakarta cardiovascular study in 2008 recorded a prevalence of overall myocardial infarction reaching five-point twenty-five percent. This figure is far above the prevalence of myocardial infarction in 2000, i.e., only one point two percent. This supports the Ministry of Health’s survey results showing that the prevalence of Coronary Heart Disease (CHD) in Indonesia is increasing from every year2.
The American College Cardiology (ACC) in its 2009 consensus states that the diagnosis of ACS if it meets at least two of the three characteristics is the presence of typical clinical symptoms, increased or decreased cardiac markers (Creatinine Kinase – Myocardial Band (CKMB), troponin T or I serum) and typical Electrocardiogram (ECG) patterns\(^3,4\). Acute coronary syndrome (ACS) consists of acute myocardial infarction (AMI) with increased ST-segment (STEMI), IMA without increasing ST-segment (NSTEMI) and unstable angina pectoris (UA). Clinical presentation is different but has a pathophysiological similarity. If there is NSTEMI increase in cardiac marker but without an increase in ST-segment, if there is an increase STEMI in ST-segment accompanied by elevated cardiac markers and is called UA when no increase in ST segment or elevated cardiac marker \(^5,6\).

The long-lasting troponin-inducing pattern may make troponin a good marker in detecting myocardial necrosis, but the limitation of its sensitivity makes it difficult to diagnose ACS at an early stage so that there is a need for a marker that can increase rapidly after the onset of clinical symptoms can speed up diagnosis and appropriate therapy in patients with an alleged ACS\(^7\).

Oxidative stress and inflammation play an important role in the pathogenesis of destabilization of the coronary arteries which refers to the onset of ACS. Macrophage and neutrophil infiltration play a role in the transformation of stable coronary artery plaques into unstable lesions. Recently, there is an increasing interest from researchers to MPO which is a proinflammatory enzyme that plays a role in the occurrence of plaque rupture. This MPO can be measured by using peripheral blood\(^8\).

The relationship between MPO levels and the incidence of ACS has not been widely studied, especially in Indonesia, the commercial kit of MPO is not yet widely available in the market so based on some of the above descriptions it is necessary to conduct research in RSUD dr. Soetomo Surabaya which aims to determine the relationship between MPO levels and the incidence of ACS so that handling and prevention can be done earlier to prevent fatal complications.

**Method**

This research was used observational analytic with the cross-sectional design. The study was conducted for 6 months starting from May to October 2013. The location of the research was in the emergency room of Dr. Soetomo General Hospital for the selection and sampling of blood and Department or Installation of Clinical Pathology Faculty of Medicine, Universitas Airlangga R & D section for serum separation and MPO examination.

The samples used were patients with chest pain complaints less than six hours with an alleged ACS that meets the criteria of sample acceptance. Inclusion criteria include patients with chest pain with less than 6 hours of onset suspected ACS, aged \(\geq 30\) years. Laboratory procedures in the form of inspection of MPO content of enzyme-linked immunosorbent assay (ELISA) method from Quanticine.

MPO examination sample is serum. The patient’s blood is taken and inserted into a yellow vacutainer containing serum separator without anticoagulation. The blood is then allowed to freeze for one to two hours at room temperature (18-250C). The blood is then separated from the serum to avoid hemolysis by centrifugation 3000 rpm for 15 minutes in the vacutainer tube. The obtained serum is then transferred into the aliquot tube and stored at -200C.

**Results**

All data were statistically tested using descriptive and inferential statistical analysis. Descriptive statistics for the distribution and frequency of sample characteristics is needed. Inferential statistics using Pearson correlation test to determine the relationship between MPO levels with the incidence of ACS and Kruskal Wallis test for the analysis of MPO levels between groups that all use the computer program SPSS 17.0 (SPSS, Inc. Chicago IL) Diagnostic value of MPO concentration as an ACS marker in Dr. Soetomo General Hospital Surabaya obtained from the calculation formula using 2x2 table to calculate the sensitivity, specificity, positive predictive value and negative predictive value.

Patients suspected of heart disease were 60 people, while those who meet the criteria of acceptance of the sample amounted to 40 people. The mean age of the sample was 57 years with an age range of between 36 and 79 years. Most of the subjects were male sex by 65%, where most of ACS patients had male sex 74.07% while for female patients only 25.93%.

Non-ACS patients of male and female were almost comparable, 46.15% and 53.85%. ACS patients were
on average 56 years of age with a 50-59 year age range of 52.5%, while non-ACS patients were on average 59 years old. Male subjects had an age range of 39 to 79 years, while female subjects had an age range of 47 to 78 years. There was an age difference between ACS and non-ACS patients but the difference was not significant (p = 0.333). Patients with chest pain suffering from ACS in this study were 27 people (67.5%) while for non-ACS chest pain patients only 13 people (32.5%). The highest number of ACS patients were STEMI, NSTEMI, and UA, which was 62.96%, 25.92% and 11.11%.

**Distribution of ACS Risk Factors**

The highest risk factors for ACS in this study were dyslipidemia (indicated by elevated triglyceride levels of 19 patients), hypertension in 18 patients, diabetes mellitus in 15 patients and smoking of 12 patients. Non-ACS patients with dyslipidemia were also the highest (12 patients) of all non-ACS patients followed by hypertension, diabetes mellitus, and smoking. ACS and non-ACS patients of the female sex all had HDL cholesterol levels <50 mg/dl. HDL cholesterol levels <40 mg / dl in male patients found a difference between ACS and non-ACS patients 85% and 50%. The results of statistical analysis showed that the RR value of the four risk factors for ACS was not significant.

Fat profile data in this study showed a significant difference in mean total cholesterol and HDL cholesterol levels among ACS patients with non-ACS (p = 0.019 and p = 0.001). Levels of triglycerides and LDL cholesterol were found to differ between ACS and non-ACS patients but the difference was not significant (p = 0.871 and p = 0.613) The number of leukocytes between the two groups in this study was significantly different with the error rate of 5% obtained significance value of 0.001 (p = 0.001).

**The Inspection Results Standard Content of MPO Solution**

The absorbance data of the standard solution content of MPO with dilution of hundred times obtained by ELISA method after the reading then the absorbance value obtained is plotted in the form of points and drawn a straight line so that obtained linear line forming a standard curve.

**The Results of MPO Levels**

There was a significant difference of MPO levels between groups of ACS patients (STEMI, NSTEMI, UA) and non-ACS using Kruskal Wallis test with 5% error rate obtained significance value p = 0.002 (Table 1). In contrast, there was no significant difference between patients STEMI, NSTEMI and UA with 5% error rate obtained significance value of 0.698 (p = 0.698). The mean values of MPO levels between groups were between ACS and non-ACS patients of 986.48 ng/ml and 381.08 ng/ml.

Calculation results based on table 2x2 with cut off of MPO350 ng/ml obtained the diagnostic sensitivity of 88.88%, diagnostic specificity 69.23%, negative predictive value 75% and positive predictive value 85.71%

**Table 1. Risk Ratio (RR) risk factor for ACS and Number of ACS events based on ACS based on cut off of MPO**

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Positive ACS</th>
<th>Negative ACS</th>
<th>RR</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking</td>
<td>12</td>
<td>4</td>
<td>1.20</td>
<td>0.22</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>15</td>
<td>4</td>
<td>1.38</td>
<td>0.08</td>
</tr>
<tr>
<td>Hypertension</td>
<td>18</td>
<td>6</td>
<td>1.33</td>
<td>0.12</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>26</td>
<td>12</td>
<td>1.36</td>
<td>0.36</td>
</tr>
<tr>
<td>MPO Level</td>
<td>MPO positive</td>
<td>MPO negative</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPO positive</td>
<td>24</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MPO negative</td>
<td>3</td>
<td>9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Relationship between MPO Levels and ACS Levels

The result of data analysis by using correlation test of Pearson was got correlation that equal to 45% which included in medium correlation with error rate 5% got significance equal to 0.003 (p = 0.003).

Table 2. The Relation of MPO and ACS

<table>
<thead>
<tr>
<th></th>
<th>ACS Group</th>
<th>MPO Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACS Group</td>
<td>Pearson Correlation</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Significance of 2 Subjects</td>
<td>0.452</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.003</td>
</tr>
<tr>
<td>N</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>MPO Level</td>
<td>Pearson Correlation</td>
<td>0.452</td>
</tr>
<tr>
<td></td>
<td>Significance of 2 Subjects</td>
<td>0.003</td>
</tr>
<tr>
<td>N</td>
<td>40</td>
<td>40</td>
</tr>
</tbody>
</table>

Discussion

Based on the results of this study was in accordance with previous research which states that the highest number of ACS sufferers in male aged 37 to 66 years. The study also obtained that the age of female to suffer from ACS was nearly 10 years older than men. This was because of pre-menopausal women being protected by estrogen hormones that are thought to play a role in maintaining the integrity of vascular endothelium, increasing insulin sensitivity and contributing to maintaining an ideal fat profile through decreased LDL and increased HDL.

STEMI patients have typical clinical symptoms so that in this study the number of events was ranked highest. Researchers previously stated in STEMI there is a total thrombus clogged coronary arteries, so clinical symptoms look more striking compared with NSTEMI and UA that only clog the coronary artery in part so that the resulting clinical symptoms are also not too severe than STEMI. This was what drives patients to get to the hospital so that hospital events tend to be higher for STEMI than NSTEMI and UA.

High blood glucose levels in ACS patients are associated with high levels of free fatty acids, insulin resistance and impaired glucose use by cardiac muscle, thus increasing potential oxygen consumption in exacerbating the incidence of ischemia and cardiac infarction, leading to organ failure and death. This study shows that elevated cholesterol levels are directly proportional to an increase in the incidence of ACS. Any decrease of 4 mg% of HDL cholesterol, will increase the risk of AMI by 10%.

The results of leukocyte count analysis showed significant differences in the previous study which stated that there was a significant increase in leukocyte levels of ACS and non-ACS patients. Patients with elevated levels of leukocytes have a higher risk of death and recurrent AMI. Previous studies have suggested that ACS patients with negative troponin levels of 25% have positive MPO levels. MPO was also said to be more sensitive because of its increased levels in STEMI and NSTEMI patients with negative troponin levels in the first hour compared with UA patients. This supports the theory that MPO increases within two hours and reaches peak levels within 9-12 hours after symptoms in AMI patients.

Other researchers also stated the same thing that the MPO rises earlier between the hour of zero to the third hour in patients with chest pain compared with the new troponin increased between the fourth hour to the sixth hour after complaints of chest pain. MPO along with several other enzymes such as lipoxygenase will initiate lipid oxidation of the sub endothelial vessel wall. MPO and products of lipid oxidation are commonly found
in atherosclerotic lesions along with macrophages. Endothelial dysfunction in smokers is due to the presence of thiocyanate which is a substrate for increased MPO in smokers’ plasma, forming a carbonylated LDL that is easily captured by receptors on the surface of foam cells\textsuperscript{16}.

**Conclusion**

There was a relationship with the strength between the increase in MPO levels with the incidence of ACS. The MMO of this study had a diagnostic sensitivity score of 88.88\%, diagnostic specificity of 69.23\%, negative predictive value of 75\% and a positive predictive value of 85.71\% so that MPO could not be used as a single heart marker in diagnosing ACS and non ACS patients due to its low specificity.

**Ethical Clearance:** This study protocol was approved by ethical clearance Dr. Soetomo Surabaya, Indonesia teaching hospital research.

**Conflict of Interest:** This study protocol was approved by ethical clearance Dr. Soetomo Surabaya, Indonesia teaching hospital research.

**Source of Funding:** This study is done with individual funding.

**References**


Effect of Foot Strengthening Exercises in Osteoarthritis Knee

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Abstract

Background: Knee osteoarthritis is one of the leading cause of global disability. Patients with degenerative knee osteoarthritis clinically complain of pain, decreased muscle strength, joint instability, joint stiffness and proprioceptive deficits, all of which lead to a decrease in or loss of function. Foot pain is highly disabling, functional abilities and increases the risk of falls.

Method: This was an experimental study with total of 33 subjects who had knee osteoarthritis with foot disability. Subjects of both genders with age group of 40 – 65 years fulfilling the inclusion and exclusion criteria participated. The outcome measure used was womac scale, for pain Visual analogue scale (VAS).

Result: Statistical analysis of VAS, WOMAC and range of motion (ROM) were found to be extremely significant with a P value of <0.0001.

Conclusion: This study concluded that foot strengthening exercises were effective. It is proved from this study that foot strengthening exercises has significant effect on pain, range of motion and functional status of OA knee.

Keyword: Foot, strengthening exercises, knee, osteoarthritis, VAS, WOMAC and ROM.

Introduction

The human foot is a very complex structure, which allows it to serve many diverse functions. During standing, it provides our base of support. During gait, the foot must be stable at foot-strike and push-off.¹ The ankle pain was common in community-dwelling older adults, whereas moderate to severe symptomatic, radiographic ankle osteoarthritis(OA) occurred less frequently.²

Knee OA is a major public health problem that causes substantial pain, physical dysfunction and impaired quality of life.³

The effect of proprioceptive training on foot progression angle, weight bearing rational knee adduction moment(KAM) in patient with degenerative osteoarthritis of the knee.⁴ Quadriceps muscle weakness leads to a change in the biomechanics and axis of the knee joint,⁵ negatively affecting joint mobility, posture and gait.⁶ There was altered foot posture in people with OA knee. People with medial compartment OA showed more pronated foot type and lateral compartment OA showed more supinated foot type.⁷

A Pescavus or hollow foot or supinated foot is a foot posture in which the longitudinal arches are accentuated and the metatarsal heads are lower in relation to the hind foot so that there is a dropping of the forefoot on the hind foot at the transometatarsal joints.⁸ A Pesplanus or flatfoot or pronated foot is a foot posture in which the calcaneus goes in valgus position, whereas the metatarsal region is in pronation.⁹

Knee OA is a leading cause of joint pain and disability in middle and older aged individuals, and is one of the most commonly managed conditions in primary care.⁹ Knee OA is one of the leading causes of global disability.¹⁰

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The previous research has shown associations between planus foot morphology (flat feet), knee pain, and cartilage damage. Further, many people with knee OA experience foot pain and dysfunction. However, as incident disease is a different phenomenon to worsening OA and risk factors may not be consistent across both, it is necessary to separately establish the association of foot/ankle symptoms with worsening OA. In individuals at risk of knee OA, the presence of contralateral foot/ankle symptoms in particular increases risk of developing both knee symptoms and symptomatic radiographic knee OA.

Change in foot posture may cause increased mechanical rotational stress on the knee joint and the higher degree of knee OA may also affect foot motion during walking which may lead to a compensatory response to allow typical function of the foot during ambulation and accelerates the degenerative changes at the knee joint. The relationship between ankle and knee biomechanics that indicate a more everted foot posture is correlated with lower KAM magnitudes.

Osteoarthritis also known as degenerative arthritis or degenerative joint disease or osteoarthrosis, is group of mechanical abnormalities involving degradation of joints, including not only articular cartilage but also the synovium, capsule, bone and ligaments leading to subchondral bone attrition and remodeling, meniscal degeneration, ligamentous laxity, fat pad extrusion, and impairments of neuromuscular control.

Materials and Method

This was an experimental study of analytical type conducted among total of 33 subjects who had knee osteoarthritis. They were selected after approval from ethical committee. This study was conducted in Krishna institute of medical sciences, Karad. The duration of study was 6 months. The materials used were paper, resistance band, towel, wobbled board, textures. 33 subjects including both males and females with osteoarthritis knee age of 40 – 65 years were included according to inclusion and exclusion criteria. The exclusion criteria consisted of subjects with patients with operative procedure, Limb length discrepancy, Diabetic foot, Congenital foot deformities, deformities of hip. Written consent was taken from the subjects those willing to participate. The subjects were selected by simple random sampling. The outcome measures used were foot prints, visual analogue scale for pain.

Procedure:

After the protocol and ethical clearance the procedure was started. Subjects were selected with age group 40 – 65 years with osteoarthritis knee population according to the inclusion and exclusion criteria. The consent was taken from the selected subjects. The individuals selected were evaluated using visual analogue scale and womac scale and were instructed with all the details about the assessment they were going to undergo. Range of motion of knee was measured in the beginning of the sessions. Foot strengthening exercises were given and ergonomic advice as per protocol. Data was collected in the data collection sheet. Pre and post interventional values were noted down. With the help of pre and post result of VAS, WOMAC and ROM of knee this study will be concluded by statistical analysis.

Statistical Analysis and Result:

Statistical analysis was done manually and by using the statistics software INSTAT so as to verify the results derived. The statistical analysis between the intra group value of VAS, WOMAC and ROM was done by Paired ‘t’ test. The study has p value <0.0001 which is extremely significant.

1. Gender Distribution

A total of 40 subjects were taken for the study. Out of 35 subjects 19 were males and 16 were females.

<table>
<thead>
<tr>
<th>Gender</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>19</td>
</tr>
<tr>
<td>Female</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
</tr>
</tbody>
</table>

Table 1 – Gender Distribution

2. Age Distribution

Age group of all patients ranged between 40-65 years.

<table>
<thead>
<tr>
<th>Age</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 – 49</td>
<td>12</td>
</tr>
<tr>
<td>50 – 59</td>
<td>17</td>
</tr>
<tr>
<td>60 – 65</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 2 – Age Distribution
3. **VAS – PRE AND POST INTERVENTION COMPARISON USING PAIRED T-TEST.**

<table>
<thead>
<tr>
<th></th>
<th>Pre Intervention</th>
<th>Post Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean ± SD</strong></td>
<td>6.25 ± 1.418</td>
<td>4.79 ± 1.350</td>
</tr>
<tr>
<td><strong>P value</strong></td>
<td>&lt;0.0001</td>
<td></td>
</tr>
<tr>
<td><strong>Interference</strong></td>
<td>Extremely significant</td>
<td></td>
</tr>
</tbody>
</table>

Table 3 – VAS

4. **WOMAC – PRE AND POST INTERVENTION COMPARISON USING PAIRED T-TEST.**

<table>
<thead>
<tr>
<th></th>
<th>Pre Intervention</th>
<th>Post Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean ± SD</strong></td>
<td>54.14 ± 16.601</td>
<td>44.14 ± 16.432</td>
</tr>
<tr>
<td><strong>P value</strong></td>
<td>&lt;0.0001</td>
<td></td>
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<tr>
<td><strong>Interference</strong></td>
<td>Extremely significant</td>
<td></td>
</tr>
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</table>

Table 4 – WOMAC

5. **ROM – PRE AND POST INTERVENTION COMPARISON USING PAIRED T-TEST.**

<table>
<thead>
<tr>
<th></th>
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<th>Post Intervention</th>
</tr>
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<tbody>
<tr>
<td><strong>Mean ± SD</strong></td>
<td>136.14 ± 8.139</td>
<td>145.57 ± 9.236</td>
</tr>
<tr>
<td><strong>P value</strong></td>
<td>&lt;0.0001</td>
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<tr>
<td><strong>Interference</strong></td>
<td>Extremely significant</td>
<td></td>
</tr>
</tbody>
</table>

Table 5 – ROM of Knee

**Discussion**

Knee OA is a leading cause of joint pain and disability in middle and older aged individuals, and is one of the most commonly managed conditions in primary care. Patients with degenerative knee osteoarthritis clinically complain of pain, decreased muscle strength, joint instability, joint stiffness and proprioceptive deficits, all of which lead to a decrease in or loss of function. Foot pain is highly disabling, functional abilities and increases the risk of falls.

Change in foot posture may cause increased mechanical rotational stress on the knee joint and the higher degree of knee OA may also affect foot motion during walking which may lead to a compensatory response to allow typical function of the foot during ambulation and accelerates the degenerative changes at the knee joint.

The study was carried out and the result was drawn by using VAS, WOMAC and Joint ROM scores as the outcome measures. Study place was Krishna College of
Physiotherapy, OPD.

A pre-treatment outcome measure using VAS, WOMAC and ROM score was done. The specific treatment protocol was followed as per and the post treatment outcome using VAS, WOMAC and ROM scores were documented accordingly. An exercise program was designed and a proper ergonomic advice was given.

Comparison was analyzed statistically using paired t test for VAS, WOMAC and ROM Scores.

Foot strengthening exercises like toe curls, toe raise, toe splay, big toe stretch, sand walking, wobble board, resistance band exercises, golf ball roll, Achilles stretch was given for 4 weeks. Toe raise will help to strengthen all parts of the feet and toes. Toe splay was developed to improve control over the toe muscles. It can be done on both feet at once, or alternate feet, depending on comfort. Toe curls build up the flexor muscles of the toe and feet, improving overall strength. Rolling a golf ball under the feet can help to relieve discomfort in the arches and ease pain associated with plantar fasciitis. Achilles stretch tendon is a cord connecting the heel to the calf muscles. It can strain easily, and keeping it strong may help with foot, ankle, or leg pain.

In this study an attempt was made to analyze the effect of foot strengthening exercises in osteoarthritis knee. This study was done to investigate the reduction of symptoms after application of foot strengthening exercises in OA knee patients and its post treatment evaluation in a standardized manner using VAS, WOMAC and ROM scores. The result shows that there is significant difference in improvement of pain, functional performance, range of motion of knee.

Conclusion

Various conservative treatment methods are used in treating Osteoarthritis Knee but this study concluded that foot strengthening exercises were effective. It is proved from this study that foot strengthening exercises has significant effect on pain, range of motion and functional status of OA knee and thus Alternate Hypothesis that There is significant effect of foot strengthening exercises in osteoarthritis knee accepted.

Acknowledgement: Authors acknowledge the immense co-operation received by the subjects and the help received from the scholars whose articles are cited and included in references of this article. The authors are also grateful to authors/ editors/publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed.

Conflict of Interest: There is no conflict of interest concerning the content of the study.

Source of Funding: This study was funded by Krishna institute of medical sciences deemed to be university Karad.

Ethical Clearance: The study was approved by the institutional ethics committee of KIMSDU.

References

1. Patrick O McKeon, Jay Hertel, Dennis Bramble, Irene Davis. The foot core system: a new paradigm for understanding intrinsic foot muscle function. 27 Feb, 2014
7. Dr. Shalmali S. Surlakar , Dr. Bindu M. Sarfare, Dr. Snehal Ghodey, et, al. Prevalence of altered foot posture in osteoarthritis of knee. DOI: 10.21839/jaar.2017.v2i3.87; June 2017


Correlation between Eruption of Permanent Teeth and Anthropometric Measurements among School Children

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Abstract

Background: The assessment of nutritional status of a child is essential in the clinical practice. Several clinical and laboratory parameters are being used for this purpose, of which height and weight play a major role. This study was carried out to correlate the eruption of permanent teeth with anthropometric measurements among school children.

Method: This cross sectional study was carried out among 983 school children between the age group of 4-14 years. The height and weight were measured using standardized scales. Eruption of permanent teeth were examined clinically. The classification of stunting and underweight was carried out based on CDC standards.

Results: Stunting was present in around 10% of each age group upto 7 years, followed by 20-30% between 7-8.9 years. From 9-11 years, stunting was present in around 40% of the participants and beyond 10 year, it was present in around 50% of the participants.

Conclusion: Although this study has not demonstrated statistical significance, it has elucidated the increased prevalence of malnutrition with advances in age with respect to both stunting and underweight, warranting adequate addressing of the nutritional needs of the school children.

Key words: Anthropometry, eruption of permanent teeth, nutritional status, stunting, underweight

Introduction

The period of childhood is essentially important in terms of growth, development and maturation. The entire growth comprising of accumulating energy reserves, building the body’s musculature, strengthening of the growing bones, take place during this period. Therefore, nutrition plays a major role in childhood, although it is important throughout a man’s life. During the neonatal period and infancy, fat and protein are significantly lower, and therefore, there is a maximum requirement for adequate nutrition. As the age advances, in addition to building energy and proteins, the need for accumulating extra reserves to combat infections is higher. Further, the period of adolescence witnesses another growth spurt, accompanied by sexual maturation characterized by puberty and development of secondary sexual characteristics. There is an increased demand for adequate nutrition during this phase, in order to combat the body’s requirements of various micronutrients and minerals.

The assessment of nutritional status of a child is essential in the clinical practice. Several clinical and laboratory parameters are being used for this purpose, of which height and weight play a major role. In addition, the other anthropometric measurements include mid arm circumference, triceps fold, and eruption of permanent teeth. According to Centre for Disease Control (CDC) standards, the nutritional status of a child is evaluated...
based on weight for height, weight for age and height for age and based on these measurements, malnutrition is classified as, wasting, underweight and stunting respectively. In addition to these measurements, eruption of teeth is significantly linked to the growth and nutritional status of a child. In most living individuals the age of eruption of permanent teeth remains fairly constant, within a narrow range. However, the teeth eruption is influenced by several factors include nutritional, hormonal, hereditary or genetic factors. Socioeconomic and nutritional factors caries conditions and the secular trend have also been found to have some effect on the eruption of permanent teeth. Hence, nutritional deficiencies can delay the process of teeth eruption. Malnutrition and poor nutrition in early childhood affects tooth eruption and results in the delayed emergence of the teeth.

Although several studies have documented the age of tooth eruption, very few studies have explored the correlation between the eruption of permanent teeth and anthropometric measurements. Establishing a scientific and statistical correlation between the two would help in incorporating dental assessment as a valid tool for assessing the nutritional status.

Objectives

This study was carried out to evaluate the correlation between eruption of permanent teeth and anthropometric measurements.

Methodology

Study setting and participants

This study was carried out as a cross sectional study among the school children of the urban field practice area of our medical college in Chennai. This study was carried out for a period of three months between July to September 2019.

Sample size and sampling technique

This study was carried out among all the children aged between four and fourteen years studying in a government school in the urban field practice area of our tertiary teaching institution. A total of 963 children participated.

Ethical approval and informed consent

Approval was obtained from the institutional ethics committee prior to the commencement of the study. Written consent was obtained from the principals of both the schools. Each participant was explained in detail about the study. Informed consent was obtained from both the parents and the participants prior to the commencement of data collection.

Data collection

A structured clinical proforma was used to obtain information regarding demographic characteristics like age, sex, etc. Clinical examination was carried out to measure the height and weight. Oral examination was carried out by the principal investigator to evaluate the dentition pattern among the study participants. The classification of stunting and underweight was carried out based on CDC standards.

Data analysis

Data was entered and analyzed using SPSS ver. 20 software. The pattern of eruption of the permanent teeth was expressed in percentages. Independent sample t test was used to evaluate the association between eruption and background characteristics. A p value <0.05 was considered statistically significant.

Results

This study was carried out among 963 school students in the field practice area of our tertiary teaching institution. Majority of the participants were aged between 4-7.5 years (41.4%) and were males (64.4%). (Table 1)

It was observed that central incisor had erupted in 31.1% of the participants followed by first molar (29.6%). Lateral incisor and second molar had erupted in 22.2% of the participants. (Figure 1)

The gender-wise comparison of the mean height of the participants is given in table 2. Overall, there was a negligible difference in the mean height between males and females in any given age group. While the mean height range of the boys began with 98-103.4 cm in the age group of 4.0-4.5 years, the height range of the girls in the same age group was 97.1-102.4cm. As the age advanced, the mean height range was higher for the males compared to the females.

On comparing the mean weight range between males and females for each age group, it was observed that the weight range of the males were greater than
females in the initial ages, and as the age advanced, the weight range were similar among both the groups, for any given age. (Table 3)

The correlation between stunting and eruption of permanent teeth for each age group was analyzed. It was observed that stunting was present in around 10% of each age group up to 7 years, followed by 20-30% between 7-8.9 years. From 9-11 years, stunting was present in around 40% of the participants and beyond 10 year, it was present in around 50% of the participants. (Table 4)

Underweight was present in around 40% of the participants up to 5.5 years. Later on, the prevalence of underweight was as low as 13.2% up to 7.9 years. There was again an increase in the prevalence of underweight to around 40% till 9.9 years of age. Beyond this age group, underweight prevalence increased to as high as 80%. (Table 5)

### Table-1: Background characteristics of the study participants:

<table>
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<tr>
<th>S. No</th>
<th>Characteristics</th>
<th>Frequency N=963</th>
<th>Percentage (%)</th>
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<td></td>
<td>Females</td>
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<td>High</td>
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</table>

**Figure-1: Eruption of permanent teeth:**
Table-2: Mean height of the participants:

<table>
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<th>S. No</th>
<th>AGE GROUP</th>
<th>Mean height (cm)</th>
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<th>FEMALES</th>
<th>TOTAL</th>
</tr>
</thead>
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Table-3: Mean weight of the study participants:

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<th>FEMALES</th>
<th>TOTAL</th>
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### Table-4: Correlation between eruption of teeth and stunting:

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<th>Central incisor N(%)</th>
<th>Lateral incisor N(%)</th>
<th>First premolar N(%)</th>
<th>Second premolar N(%)</th>
<th>Canine N(%)</th>
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Table- 5: Correlation between eruption of teeth and underweight:

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<th>Central incisor N(%)</th>
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**Discussion**

Out of 963 subjects examined for height, 296 subjects belong to the low category, 441 belong to the middle category and 226 belong to the higher category. Similarly, for weight, 400 belong to the low, 393 belong to the middle, and 170 belong to high category. Height is a stable measurement of growth as opposed to body weight. Whereas weight reflects only the acute states of malnutrition, height indicates chronic malnutrition past also.[6] Weight and weight were considered in the study and there is no significant correlation of height and weight with socio-economic status and eruption of teeth. The comparison of nutritional status in terms of stunting and underweight in this study demonstrated that as the age advances, the prevalence of stunting and underweight significantly increased. However, this was not accompanied with delay in the eruption of the permanent teeth.

Dental age can reflect an assessment of physiological age comparable to age based on skeletal development, weight or height.[7] In addition, the crowns and roots of the teeth appear to be the tissues least affected by environmental influences at the time of formation. Dentition may be considered to be single best physiological indicator of chronological age among adolescents. Moreover, studies have proven that there would not be any deciduous teeth above 12 years.[8] The emergency of permanent teeth whether it is primarily in the mandibular or maxillary regions was not a part of this study as the emergence of teeth in any of the quadrants were taken as the corresponding age group of the individual but in the majority of the cases it was noted that the mandibular teeth erupts earlier than the maxillary teeth.

Although the present study did not document any statistical association between anthropometric measurements and eruption of permanent teeth, studies have demonstrated the linkages between obesity and non-eruption rates, measured in terms of waist hip ratio, weight for height and waist circumference. The present study has provided the need for further comparative analysis with respect to various other anthropometric parameters in order to identify the predictive role of various nutritional problems of childhood and adolescence.

**Conclusion**

Eruption of permanent teeth is an important phenomenon during childhood and is influenced by various factors, including nutritional status. Several anthropometric parameters like height for age and weight for age were used in the present study to correlate with eruption of permanent teeth. Although the present study did not demonstrate any correlation between these two variables, this study has highlighted the increasing prevalence of stunting and underweight during the early adolescence period, wherein a normal growth spurt is expected. There is a need for further comparative analysis with various other parameters including waist circumference and waist hip ratio in order to arrive at a consensus regarding this correlation.

**Conflict of Interest** – Nil

**Funding** – Nil

**Ethical approval** – Obtained

**References**


Effect of Purple Leaf Extract (Graptophyllum Pictum (L.) Griff) on the Number of Macrophage Cells in Pulp Perforation

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¹Staff of Conservative Dentistry Department, ²Staff of Oral Biology Department, ³Staff Dental Public Health, Department, Faculty of Dental Medicine, Universitas Airlangga

Abstract

**Background:** Purple leaf (Graptophyllum pictum (L.) Griff) is one of Indonesia’s traditional medicinal plants, which has anti-inflammatory properties which is expected to stop the inflammation of the pulp accompanied by perforation. **Purpose:** To determine the effect of giving purple leaves (Graptophyllum pictum (L.) Griff) to the number of macrophage cells in pulp perforation. **Method:** The study used 24 Wistar rats divided into four groups, namely control (K), and 3 treatment groups P1, P2, P3. Each group consisted of 6 rats prepared, then P1 was given 10% purple leaf extract, P2 was given 15% purple leaf extract, P3 was given 20% purple leaf extract. On the 3rd day, the Wistar rat was sacrificed and continued with the preparation of HPA. Calculation of the number of macrophages was obtained from the One-way ANOVA test. **Results:** There were significant differences between the control and treatment groups (K with P1, P2, P3), on the results of the One-way ANOVA difference-result test (p <0.05) **Conclusion:** Purple leaf extract (Graptophyllum pictum (L.) Griff) affected increasing the number of macrophage cells in pulp perforation after the 3rd day of treatment.

Keywords: Purple leaf (Graptophyllum pictum (L.) Griff); macrophages; pulp perforation

Introduction

Mechanical trauma to the pulp treatment procedure cannot be avoided especially if caries expand to deep depths. The action of cavity preparation or removal of carious tissue in deep cavities can cause pulp perforation¹. Pulp perforation can be caused by the use of burs or other dental tools. In the condition of an open pulp, the direct pulp treatment can be performed²⁻⁻³. The surface of macrophage cells have receptors and are immune cells⁴⁻⁻⁵ that first recognize the host cell debris as an antigen⁶⁻⁻⁷. Various efforts continue to be made to find a drug that can cure pulp inflammation. Lately, there has been a lot of research into various types of plants that are suspected of having medicinal activities for human health purposes⁸⁻⁻⁹. One of them is the purple leaf plant (Graptophyllum pictum (L.) Griff). Purple leaf (Graptophyllum pictum (L.) Griff) is one of Indonesia’s traditional medicinal plants, which has anti-inflammatory properties so it is expected to stop inflammation of the pulp. The chemical content of purple leaves includes flavonoids, tannins, non-toxic alkaloids, steroids, saponins, and glycosides¹⁰.

The research conducted aims to determine the effect of purple leaf extract (Graptophyllum pictum (L.) Griff) on the number of macrophage cells contributing to the healing process of pulp inflammation caused by mechanical injury. This research is an experimental laboratory study and the variable analyzed is the number of macrophages on the 3rd day after the treatment of the mechanical injury.

**Materials and Method**

**Materials**

This research was an experimental laboratory study, using male Wistar strain rats, aged 2-3 months, with an
average body weight of 250-300 grams, obtained from the Experimental Animal Laboratory of the Department of Biochemistry, Faculty of Medicine, Airlangga University, Surabaya. The animal experiments were 24, had been adapted for 1 week, then divided into 4 treatment groups randomly, namely control groups (K), P1, P2, and P3 each of 6 mice.

The herbs tested were purple leaves (Graptophyllum pictum L. Griff) varieties of lurid-sanguineum Sims which were obtained at the same time through plant determination tests at the Indonesian Institute of Plant Conservation Institute, Purwodadi Botanical Gardens, through Identification Certificate No. 445 / IPIL06 / HM / IV / 2019. The preparation of purple leaf extract gel based on polyethylene glycol (PEG) (Sigma-Aldrich, 25322-68-3) with a concentration of 10%, 15%, 20%, was carried out at the Prescription Formulation Laboratory of the Faculty of Pharmacy, Airlangga University, Surabaya.

Method

Extraction

Dry Simplicia was taken as much as 300 grams. The extraction was carried out by the maceration method using ethanol 96% as much as 3000 ml. Maceration was done by soaking 300 grams of Simplicia in 75 parts of 96% ethanol (2250 mL) for 5 days by shaking it periodically. After 5 days of waiting, it was squeezed so that the filtrate was obtained. Added the remaining solvent (750 mL) through the pulp until it reached 3000 mL of filtrate, and after that, it was filtered. The filtrate obtained was concentrated using a rotary evaporator at a temperature of 70 °C with a speed of 70 rpm.11

Total Flavonoid Level Test

A total of 100 mg of sample was dissolved with 5 mL of ethanol, then diluted 10 times. The mixture was added 300 µL NaNO2, shaken for 10 seconds and left at room temperature for 10 seconds. 300 mL of AlCl3 3, 2 mL of 1 M NaOH and 1.9 mL of distilled water were added to the reaction mixture, then shaken for 10 seconds and measured at the wavelength of 415 nm. Quercetin with concentrations of 10, 20, 40, 60 and 80 ppm was used as a standard solution. Purple leaf ethanol extract sample was dissolved with p.a. ethanol (2% -5%), added 0.10 ml of 10% AlCl3, and 0.10 ml of 1M sodium acetate and 2.80 ml of distilled water. The mixture was shaken homogeneously then left for 30 minutes. Then the absorption is measured using an ultraviolet-visible (UV-vis) spectrophotometer at a maximum wavelength of 4.

The test was carried out in triplo. The levels of flavonoids can be calculated using the formula:

$$F = \frac{c \times V \times f \times 10^{-6} \times 100\%}{m}$$

Information:

- F: number of flavonoids AlCl3 method
- c: Quercetin equality (μm / ml)
- V: total extract volume
- f: dilution factor
- m: sample weight (g)

Animal Experiment Treatment

Before cavity preparation was performed, pain management was firstly performed on experimental animals in the form of intramuscular anesthesia with a combination of 0.2 ccs of ketamine (Ketalar®, PT.Pfizer, Indonesia) and 0.5 cc xylazine (Xyla®, PT.Tekad Mandiri Citra, Indonesia). The maxillary left molar was prepared on an occlusal surface using a diamond round bur low-speed ISO 008, diameter of 0.84 mm (Intensiv, Switzerland) forming a Class I Black cavity with a depth of 1.5 mm and a diameter of 0.84 mm to reach the pulp roof, marked with a reddish color on the base of the cavity, making pulp perforation using the tip of a straight sonde (Martin, Germany), the tip diameter of a 0.35 mm sonde was visually formed a bleeding point and was confirmed with a sterile paper point tip. Furthermore, the topical application procedure of purple leaf extract at the bottom of the cavity, the extract was measured using microsyringe as much as 0.5 µl, then applied to the base of the cavity using a straight sonde tip, and topped with the restoration of Glass Ionomer Cement (GIC) type II (Fuji IX, GC Corp, Tokyo, Japan).

On the 3rd day, the animal was terminated and the procedure was done to take the left maxilla. Maxillary tissue was fixed with 10% buffered formalin and decalcified using EDTA 10% pH 7.4. The making of histopathological preparations using Hematoxylin-Eosin (HE) staining was carried out at the Research Center of the Faculty of Dental Medicine, Airlangga.
University, Surabaya. The preparation was observed under a microscope with 400x magnification.

Data Analysis

Test data normality using Kolmogorov Smirnov. Then the results of the treatment group research data were carried out homogeneity tests using Levene’s test followed by the One-way ANOVA test to determine the data distribution. Data that were normally distributed continued with the Tukey HSD test to determine differences between different treated groups.

Results

The purple leaf ethanol extract used contained a total flavonoid of 1.49% (SD = 0.04) (Tabel 1). Data obtained from histopathological readings (HPA) indicated a predominance of macrophage cell numbers.

Based on Table 2, there were differences in the mean macrophage cells in the control group and the treatment group. In the treatment group with the given of purple leaves, it affected the concentration of 10%, 15%, 20%, therefore increasing the number of macrophage cells. The number of macrophage cells in each group could be seen in graph 1.

Figure (K) was the distribution of macrophage cells (arrows) in the control group treated without treatment on the 3rd day; (PGP10) was a distribution of macrophage cells in the treatment group given lesion + 10% purple leaf extract on the 3rd day; (PGP15) treatment group was given 15% purple leaf + seras + extract on the 3rd day; (PGP20) treatment group was given lesions + 20% purple leaf extract on the 3rd day.

Kolmogorov Smirnov test results on the number of macrophage cells showed a significant value between the control and treatment groups that is equal to 0.894. This value was greater than the significance level (α) = 0.05, meaning that the data on the number of macrophage cells in each treatment was normally distributed. The homogeneity test continued using Levene’s test obtained p > 0.05 referring to the homogeneous data. To see the differences between treatment groups, the One-Way ANOVA test was obtained, the value of p = 0.000 (p < 0.05) showing that there were significant differences between the concentration groups. Followed by the Tukey HSD Post-Hoc test to find out each sample group.

Table 1. Determination of total flavonoid levels of purple leaf ethanol extract by the colorimetric-AlCl3 method

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Table 2. Mean results and standard deviations in the number of macrophage cells in the control and treatment groups

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Figure 1. Graph of the mean number of macrophage cells in each group
Figure 2. Picture of macrophage cells with histopathological examination of 400x magnification with 4 visual fields.

Table 3. Results of Post Hoc Tukey HSD statistical analysis of macrophage cell counts

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Keterangan: (*) : terdapat perbedaan bermakna

Discussion

Pulmonary perforation caused by mechanical trauma caused the formation of debris cells from odontoblast damage that the host responded to as Damage-Associated Molecular Patterns (DAMPs), and later to be able activating pro-inflammatory macrophages, with the “classically activated” nitrite oxide (NO) phenotype that played a role in neutrophil migration to the affected tissue. When inflammation occurred, macrophage infiltration increased especially on days 3 to 5.12

Macrophages had many roles especially in injured tissue including host defense, promotion and resolution of inflammation, apoptotic cell removal, and initiation of cell proliferation and tissue recovery after injury.13 In the inflammatory response, there were 2 types of macrophage cells, namely M1 and M2. M1 (Classically activated) was a cell producing pro-inflammatory cytokines, recognizing, and killing pathogens, and regulating the inflammatory response. M2 (Alternatively activated) was a cell producing anti-inflammatory cytokines and activating tissue repair.
The herbal plants used as a treatment for inflammation of the pulp in this study were purple leaves (Graptophyllum pictum L.Griff) varieties of lurid-sanguineum Sims, because these varieties had the potential as herbal medicines in the fields of medicine and dentistry, compared to the other two varieties that were generally used for ornamental plant needs. Purple leaves with lurid-sanguineum Sims varieties were reported to have anti-inflammatory, antioxidant and analgesic activity. The making of purple leaf extract in this study was done by the maceration method because the technique was simpler, safer and did not risk the damage of active substances because it was a cold extraction method without heating. One of the active compounds of purple leaf ethanol extract which functioned as an anti-inflammatory mediator in response to mechanical injury that caused dental pulp perforation, one of which was flavonoids. Following the previous studies, in this study a UV-visible spectrophotometer test was observed with ultraviolet light with a wavelength of 366 nm, an intensive yellow fluorescent solution appeared, indicating the presence of flavonoids. The mechanism of flavonoids as anti-inflammatory through inhibition of cyclooxygenase (COX). Cyclooxygenase (COX) functioned to trigger the formation of prostaglandins, and prostaglandins caused inflammation. If there was a decrease in the inflammatory process, the process will accelerate the initiation of the proliferation phase and the healing process and tissue repair. One of the cells that played a significant role in tissue repair was macrophages.

An important role of macrophages in the process of tissue healing was the production of growth factors needed to initiate the proliferation of fibroblast cells that play a role in the healing process and tissue repair. The presence of macrophages in the injured area reached peak concentrations around the third and fourth days and remained in the tissue until the healing process was completed.

Application of polyethylene glycol (PEG) was used as a control group because PEG gave no influence in triggering the host immune response, PEG was considered a placebo in this study. The results of the study proved that the administration of purple leaf extract affected in increasing the number of macrophage cells on the third day after treatment, which on the 3rd day was the end of the inflammatory phase leading to the initial fibroblastic phase, and this was when macrophages actively produced the growth factors.

**Conclusion**

This study concludes that the purple leaf extract significantly affects the number of macrophage cells in Wistar rats that are preceding given a mechanical perforation of the pulp, where between purple leaves extract concentrations of 15% and 20% have the same potential in increasing the number of macrophage cells.

**Conflict of Interest**: None

**Source of Funding**: Self-Funding

**Ethical Clearance**: The use of experimental animals had received approval from the Ethics Commission of the Faculty of Dental Medicine, Airlangga University (Number: 008 / HRECC.FODM / 1/2020).

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Therapeutic Effect of Statins and LPS Antibody on Proinflammatory Mediator and Biochemical Markers of Sepsis Rat Model Induced by *E. coli*

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Abstract

This study aims to determine the effect of statins and LPS antibodies administration combined with *E. coli* intraperitoneal injection toward proinflammatory mediators (TNF-α, hs-CRP, PCT, and MDA) urea, BUN, and creatinine) and liver function (SGPT, SGOT, and total bilirubin) in sepsis rats. This study used 30 male white rats (*Rattus norvegicus* strain Wistar) divided into 6 groups induced by *E. coli* bacteria combined with statins, LPS antibody (Ab-LPS), and a combination of statins+Ab-LPS. Examination of proinflammatory mediators (TNF-α, hs-CRP, PCT, and MDA) was carried out by the ELISA method through the examination of biochemical markers namely renal function (urea, BUN, and creatinine) and liver function (SGPT, SGOT, and total bilirubin) were analyzed by using the autoanalyzer. The data obtained were statistically analyzed using the T-test. The result shows that *E. coli*+statins gave significant changes on the MDA level at 0th hour administration and TNF-α and hs-CRP at 3rd hour administration. The *E. coli*+Ab-LPS treatment showed significant changes at the 0th hour administration for MDA, creatinine, and total bilirubin and at the 3rd hour administration for MDA. The *E. coli*+statins+Ab-LPS treatment showed significant changes in MDA, creatinine, and total bilirubin at 0th hour administration and on creatinine and total bilirubin at 3rd hour administration.

Keywords: antibody, LPS, *E. coli*, proinflammatory mediator, biochemistry marker, statins

Introduction

Sepsis is a clinical syndrome that causes body excessive response to infection. Sepsis is also followed by a doubling response of the host to the infection that will lead to dysregulations of the host response[1,2]. Sepsis is characterized by fever, mental disorder, hypotension, decreased urinary excretion, and thrombocytopenia. Up to now, sepsis is still the main cause of death in the intensive care unit[3].

Sepsis was caused by various microorganisms including viruses, bacteria, fungi, and protozoa. Gram-positive bacteria, such as *E. coli*, also plays a role in 30-50% of sepsis cases[5,6]. The main cause of sepsis is lipopolysaccharide (LPS) exposure. LPS is a proinflammatory endotoxin[7]. Elimination of natural killer cells (NK) and T cell activation can also be used as a sepsis therapy[4,8]. Anti-LPS antibodies were combined with statins. Statins acted as anti-inflammatory compounds to inhibit the expression of TNF-α and MCP-
induced by LPS as well as inhibit the activation of NF-kB and AP-19. Side effects of statins administration are myopathy, a higher chance of diabetes, and increased transaminases serum[10]. Statins are usually prescribed with aspirin to prevent and treat cardiovascular disease by decreasing lipid serum levels[11,12].

In this study, we created sepsis rats model by inducing of *E. coli* intraperitoneally to determine changes in proinflammatory mediators (TNF-α, hs-CRP, PCT, and MDA) and biochemical markers on the kidney (urea, BUN, and creatinine) and liver (SGPT, SGOT, and total bilirubin).

**Materials and Method**

**Ethical Clearance:** All procedures involving animal care in a laboratory were approved by the Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia.

**Study Design**

The research method used was an experimental laboratory using a post-test only control group design. The experimental animals used were male white rats, 7-9 weeks old, 150-170 grams body weight, had not undergone any treatment or had not received any chemicals, and were in a healthy condition (actively moves and no fall out feather). Thirty male white rats (*Rattus novergicus* strain Wistar) were divided into 6 groups. All groups were treated with *E. coli* bacterial induction. Then statins, Ab-LPS, and statins+Ab-LPS were added at 0th hour and 3rd hour respectively and were examined after 6 hours. The tools used in this study were mouse cages, water baths, stirrers, laminar airflow, ELISA readers, spectrophotometry, test tube rack, test tubes, micropipettes, intragastric feeding tube, and analytical balance. Examination of proinflammatory mediators (TNF-α, hs-CRP, PCT, and MDA) was performed using the ELISA method. The analyzes on kidney function (urea, BUN, and creatinine) and liver function (SGPT, SGOT, and total bilirubin) were done by using the autoanalyzer.

**Data Analysis**

All data were analyzed by using a T-test. The test was performed using SPSS Statistic 18 Software (IBM Corporation, USA).

**Results**

The effect of statins, Ab-LPS, and statins+Ab-LPS combination at 0th and 3rd hour toward proinflammatory mediators and biochemical markers in sepsis rats model induced by *E. coli* is presented on Table 1.

<table>
<thead>
<tr>
<th>Variables</th>
<th>E. coli+Statins (X±SD)</th>
<th>E. coli+Ab-LPS (X±SD)</th>
<th>E. coli+Statins+Ab-LPS (X±SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0th-hour treatment</td>
<td>3rd-hour treatment</td>
<td>0th-hour treatment</td>
</tr>
<tr>
<td>TNF-α</td>
<td>0.75±0.12ab</td>
<td>0.63±0.12a</td>
<td>0.66±0.15ab</td>
</tr>
<tr>
<td>hs-CRP</td>
<td>0.96±0.15ab</td>
<td>0.72±0.23a</td>
<td>0.96±0.24abc</td>
</tr>
<tr>
<td>PCT</td>
<td>0.94±0.18a</td>
<td>0.93±0.25ab</td>
<td>0.90±0.34a</td>
</tr>
<tr>
<td>MDA</td>
<td>0.17±0.07a</td>
<td>0.16±0.06a</td>
<td>0.23±0.11a</td>
</tr>
<tr>
<td>Urea</td>
<td>24.43±0.58b</td>
<td>21.28±4.23ab</td>
<td>19.96±7.04a</td>
</tr>
<tr>
<td>BUN</td>
<td>11.53±0.25b</td>
<td>10.18±1.97ab</td>
<td>9.35±3.30ab</td>
</tr>
<tr>
<td>Creatinine</td>
<td>0.46±0.05b</td>
<td>0.30±0.10a</td>
<td>0.34±0.13a</td>
</tr>
<tr>
<td>SGPT</td>
<td>39.40±12.22</td>
<td>33.20±12.99</td>
<td>28.00±6.96</td>
</tr>
<tr>
<td>SGOT</td>
<td>90.00±28.83</td>
<td>69.15±31.72</td>
<td>67.80±18.29</td>
</tr>
<tr>
<td>Bilirubin</td>
<td>0.36±0.11a</td>
<td>0.30±0.07ab</td>
<td>0.26±0.05a</td>
</tr>
</tbody>
</table>
Discussion

*E. coli* is gram-negative, rod-shaped bacterium that generally causes extraintestinal infections, such as neonatal meningitis, bacteremia, pyelonephritis, cystitis, prostatitis, and sepsis. Ironically, this microorganism is also a dominant facultative member of normal human gut microbiota. Adhesion is the first step of pathogenic bacteria to infect its host cell. Furthermore, the events include tissue colonization and, in certain cases, cellular invasion followed by intracellular multiplication or persistence. The adhesion process begins when the surface structure, known as an adhesin, binds to their specific ligands, receptor host cells or extracellular matrix proteins[13].

The results showed that at the 0th and 3rd hour of administration the proinflammatory mediator TNF-α on *E. coli*+statins group, *E. coli*+Ab-LPS group, and *E. coli*+Statins+Ab-LPS group did not differ significantly (p<0.05). Statins administration at the 3rd hour gave a significant change in TNF-α. This was due to excessive amounts of LPS so that it was able to induce a high level of proinflammatory cytokines (TNF-α, IL-6) production in blood circulation. This condition has caused acute inflammation, tissue apoptosis, lead to endotoxic organ injury[14,15,16].

The administration of statins at the 3rd hour gave a significant change in hs-CRP, while at the 0th hour there was no significant change. Hs-CRP has been used to help the diagnosis or refers to some therapies[17]. Significant changes occurred in PCT both at the 0th and 3rd hours. PCT is a group of peptides consisting of 116 amino acids and calcitonin precursors. The protein is synthesized by parafollicular cells, lung neuroendocrine cells, and few amounts were located in the small intestine[18]. In this study, statins and Ab-LPS administration gave significant changes to MDA at 0th hour and 3rd hour, whereas statins+Ab-LPS combination showed significant changes in MDA at 0th hour administration. MDA levels play a role as a marker of oxidative damage that occurs in polyunsaturated fatty acids (PUFA) due to the induction of *E. coli*. MDA is an aldehyde molecule that results from the formation of free radicals in polyunsaturated fatty acids. The measurement of MDA levels was performed to indicate oxidative damage[19,20,21].

Statins treatment did not give any significant changes in biochemical markers of the kidney (urea and BUN), in either the 0th hour or the 3rd hour administration. However, there was a significant change in creatinine in both the 0th and 3rd hour. The administration of Ab-LPS did not show significant changes in urea and BUN in both the 0th and 3rd hours. The administration of statins+Ab-LPS combination did not change the urea and BUN significantly. It was due to many factors that influence urea and BUN increase so that the levels of urea or BUN are easy to change sepsis condition or before sepsis occurs.

In this study, the administration of Ab-LPS and combination of statins+Ab-LPS showed a significant change in creatinine at the 0th hour administration. Whereas statins administration and statins+Ab-LPS combination showed significant changes in creatinine at the 3rd hour administration. Statins+Ab-LPS administration did not give significant changes on SGPT and SGOT, however, it gave significant changes on bilirubin at 0th and 3rd hour administration. In this study, there was no significant difference between SGPT and SGOT in terms of examination time (p>0.05). The increase in SGPT and SGOT enzymes occurs after hepatocyte damages due to inflammation caused by *E. coli*. The increases of SGPT and SGOT occur after more than 24 hours of *E. coli* infection[22]. Study on using statins as therapeutic agents in sepsis cases has been able to prove that statins can increase survival, ability, function, and protection of organs in sepsis rat induced by LPS or caused by CLP[23,24,25,26].

Conclusion

In sum, this study found that the administration of *E. coli*+statins at 0th hour gave significant changes to MDA levels and TNF-α and hs-CRP at 3rd hour administration. The *E. coli*+Ab-LPS treatment showed significant changes in MDA, creatinine, and total bilirubin levels at 0th hour administration and only MDA at 3rd hour administration. The *E. coli*+Statins+Ab-LPS treatment showed significant changes in MDA, creatinine, and total bilirubin levels at 0th hour administration and creatinine and total bilirubin at 3rd hour administration.

Conflict of Interest : The authors declare that they have no conflict of interest.

Source of Funding: This study funded by the the Ministry of Research, Technology, and Higher Education of the Republic of Indonesia.

Acknowledgement: We thank EJA – Professional Translation Services for editing the manuscript.
Ethical Approval: This study was approved by the Faculty of Medicine, Universitas Brawijaya, Malang, Indonesia.

References


Correlation between Urinary Bisphenol A (BPA) Levels and Male Reproductive Functions among Sample of Egyptian Population

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Abstract

BPA as a xenoestrogen negatively influences male reproductive functions as well as sperm quality. This study aimed at evaluating the correlation between urinary BPA concentrations and male fertility by assessing semen parameters as well as hormone profile. It included (150) males divided into two groups; infertile cases (n= 100) and fertile controls (n= 50). Results showed highly significant difference in mean urinary BPA concentrations between both groups being higher among infertile group (P-value < 0.001). Besides that, there was statistically significant correlation between the mean urinary BPA concentrations and deterioration of sperm concentration and motility among cases with P-values (< 0.001). Finally, there was statistically significant correlation between mean urinary BPA and hormone levels FSH, LH, T and E2 levels with P-values 0.002, 0.033, 0.001 and < 0.001 respectively.

Keywords: Bisphenol A (BPA); Endocrine disruptors; Male infertility; Sperm functions; Xenoestrogens

Introduction

Infertility is the inability of sexually active and non-contracepting couples to achieve spontaneous conception within one year duration with overall incidence about 10–15% of couples worldwide. Male factor infertility can be classified to pre-testicular causes (at the level of hypothalamus or pituitary gland), testicular (primary testicular failure) or post-testicular (obstructive or coital) exposure to gonadotoxins (either environmental or occupational) as; heavy metals, xenoestrogens, pesticides and organic solvents may negatively influence the Hypothalamo-Pituitary-Gonadal (HPG) axis, sperm functions and DNA integrity.

BPA is an endocrine disruptors of xenoestrogen family (diphenylmethane derivatives ) that possess a chemical structure [(CH₃)₂C(C₆H₄OH)₂] similar to estrogens, thus interacting with estrogen receptors as agonist or antagonist via specific signaling pathways. It is widely used in plastic industries to make them shiny, flexible and durable. It may enter the body via several routes as; contaminated food or drinks, environmental (from polluted air and water), domestic (household products and cosmetics), medical (from contaminated equipment and devices), and occupational sources (inhalation, dermal contact, and ingestion during manufacturing processes or industrial use).

Several studies have reported the potential risk of BPA exposure and various health hazards among animals and humans including; infertility, precocious puberty, and polycystic ovary syndrome, hormone dependent tumors (breast, ovarian and prostate cancer) and various metabolic disorders including diabetes mellitus and thyroid dysfunction.

Many mechanisms have been suggested its effect on male fertility including; disturbance in HPG axis with subsequent dysfunction of steroidogenesis.

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and spermatogenesis. Additionally, BPA may affect sperm functions and integrity through increased DNA damage, epigenetic methylation, oxidative stress, lipid peroxidation and mitochondrial dysfunctions. Up till now, ongoing researches are being conducted to verify the exact effect of BPA on the male fertility potential and sperm functions.

**Material and Method**

Total of (150) participants were enrolled in this prospective study being age matched from 20 to 50 years old. All were recruited from the outpatient clinic of Andrology - Cairo University from February 2018 to August 2019. Approval of the local ethical committee was obtained after getting written informed consent from the participants about the purpose of the study conforming to Helsinki declaration. Notably, cases were assorted according to certain inclusion and exclusion criteria, which were:

**Inclusion criteria**

All cases (n=100) were males complaining of infertility (either primary or secondary) for at least one year duration with no obvious cause of female factor of infertility. On the other hand, the Control group included (50) fertile males with history of previous conceptions in the last year confirmed by normal semen parameters.

**Exclusion criteria**

All subjects with uncontrolled medical disorders, chronic heavy smoker (smoking index ≥ 400), and history of drug abuse, radiotherapy and/or chemotherapy, or abdomino-pelvic surgery were ruled out. Furthermore, any subjects with obesity (BMI ≥30), clinical varicocele, genetic infertility (e.g. Klienfelter’s syndrome and Y-chromosome microdeletions), or Leukocytozoospermia were also excluded.

Notably, all participants were assessed for urinary BPA concentration, semen analysis as well as hormone profile (FSH, LH, testosterone, E2 and PRL).

**Urinary BPA**

Urine specimens were collected from all included subjects in clean, glass containers labeled with the subject identification number, whereas turbid samples or those containing blood were excluded. Afterwards, all specimens were stored frozen below 20°C, and then analyzed for the mean BPA (i.e. the mean value was calculated using 3 different readings in different occasions) by High Performance liquid chromatograph (HPLC).

**Conventional Semen analysis**

The patients were instructed to abstain for (2-7 days), and bring the sample by masturbation using no lubricants in a sterile container. The samples were then incubated for 1 hour at 37°C for liquefaction and were examined using a light microscope [Olympus Co., BH-2 (BHTU), Japan] with an objective optical magnification (40 X). The standard criteria for evaluation were according to (WHO) criteria of normal semen parameters [Volume >1.5ml, Concentration >15x10^6 sperm/ml, Total sperm count >39x10^6/Ejaculate, Vitality >58%, Total motility >40%, Progressive motility >32%, Abnormal forms ≤ 96%, Pus cells < 1 million / ml].

**Hormone profile**

All studied subjects were subjected to withdrawal of venous blood sample between (8:00-11:00 am) for measurements of FSH, LH, testosterone (total), prolactin and Estradiol (E2) using an electro chemiluminescence immunoassay analyzer [Roche Co., Cobas e 602, Japan]. The normal reference values were as follow; FSH = 1.5 - 12.4 mIU/ml, LH= 1.2 -7.8 mIU/ml, testosterone (total) = 2.5 - 8.4 pg/ml, prolactin = 2-18 ng/ml, and E2 less than 40 pg/ml).

**Statistical methods**

By the end of the study, all collected Data were coded and entered using the statistical package for the Social Sciences (SPSS) version 25 (IBM Corp., Armonk, NY, USA). Data were summarized using mean, standard deviation, median, minimum and maximum in quantitative data and using frequency (count) and relative frequency (percentage) for categorical data. Comparisons between quantitative variables were done using the non-parametric Mann-Whitney test. For comparing categorical data, Chi square (χ²) test was performed. Exact test was used instead when the expected frequency is less than 5. Correlations between quantitative variables were done using Spearman correlation coefficient. P-values less than 0.05 were considered as statistically significant.

**Findings**

In this prospective controlled study, a total number of 100 infertile males (either primary or secondary...
infertility) were included and then compared to 50 normal fertile controls. The mean age of the infertile patients was 33.53 ± 5.98, while the mean age of fertile controls was 35.20 ± 8.17; and there was no significant difference between the studied groups regarding the age (p = 0.3). Both groups were assessed for the urinary BPA levels, semen analysis as well as hormone levels (FSH, LH, testosterone, E2 and PRL) as shown in table (1).

Table (1): The mean urinary BPA level, semen parameters and hormone profile among cases and controls

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Cases (n=100)</th>
<th>Control (n=50)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Urinary BPA level</td>
<td>10.07</td>
<td>9.98</td>
<td>1.69</td>
</tr>
<tr>
<td>Sperm concentration</td>
<td>27.93</td>
<td>25.75</td>
<td>45.34</td>
</tr>
<tr>
<td>Motility</td>
<td>37.01</td>
<td>22.04</td>
<td>61.40</td>
</tr>
<tr>
<td>Abnormal forms %</td>
<td>55.59</td>
<td>23.47</td>
<td>59.50</td>
</tr>
<tr>
<td>FSH</td>
<td>8.28</td>
<td>5.63</td>
<td>4.23</td>
</tr>
<tr>
<td>LH</td>
<td>6.38</td>
<td>2.96</td>
<td>3.36</td>
</tr>
<tr>
<td>Testosterone</td>
<td>4.34</td>
<td>1.40</td>
<td>4.74</td>
</tr>
<tr>
<td>E2</td>
<td>33.60</td>
<td>11.26</td>
<td>27.56</td>
</tr>
<tr>
<td>PRL</td>
<td>12.26</td>
<td>4.09</td>
<td>8.99</td>
</tr>
</tbody>
</table>

Concerning the mean urinary BPA levels, there was a highly statistical significant difference between both groups; whereas the mean levels among cases was 10.07 +/- 9.98 compared to controls that was 1.69 +/- 1.32 with P-value <0.001.

On the other hand, the semen analysis parameters among both groups showed a highly significant statistical difference concerning sperm concentration and sperm motility (p < 0.001), whereas mean sperm concentration and motility among cases were 27.93 +/- 25.75 and 37.01 +/- 22.04 respectively, compared to controls that were 45.34 +/- 22.90 and 61.40 +/- 13.78 respectively. However, there was no significant difference concerning abnormal forms among both groups (P= 0.315).

Furthermore, there was a highly significant statistical difference between cases and controls concerning FSH, LH, PRL and E2 levels (p < 0.001), whereas the mean levels were 8.28 +/- 5.63, 6.38 +/- 2.96, 12.26 +/- 4.09 and 33.60 +/- 11.26 respectively, compared to controls that were 4.23 +/- 1.00, 3.36 +/- 0.84, 8.99 +/- 3.45 and 27.56 +/- 8.05. On contrary, there was no significant difference between both groups as regard to testosterone level (P= 0.064).

Regarding the correlation between mean urinary BPA level with semen parameters as well as hormone profile among the infertile group as shown in table (2); our results have shown that there was a highly statistically significant negative correlation between sperm concentration and mean urinary BPA level (p <0.001). Furthermore, there was statistically significant negative correlation concerning sperm motility and the mean BPA level (p= 0.003). However, there was no significant correlation concerning abnormal form of sperm and mean BPA level (p= 0.178).

In another perspective, there was statistically significant positive correlation concerning FSH, LH level and BPA level, whereas the p-values were 0.002 and 0.003 respectively. Eventually, there was a highly significant negative correlation between testosterone and E2 levels and BPA level with p-values 0.001 and <0.001 respectively. On contrary, there was no significant correlation concerning prolactin level and BPA level (p=...
Table (2): Correlation between the mean urinary BPA level with semen parameters and hormone profile among infertile group.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Mean urinary BPA (micro/l)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sperm concentration</td>
<td></td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td>-0.310</td>
</tr>
<tr>
<td>P-value</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Motility</td>
<td></td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td>-0.240</td>
</tr>
<tr>
<td>P-value</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Abnormal forms %</td>
<td></td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td>0.110</td>
</tr>
<tr>
<td>P-value</td>
<td>0.178</td>
</tr>
<tr>
<td>FSH</td>
<td></td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td>0.255</td>
</tr>
<tr>
<td>P-value</td>
<td>0.002</td>
</tr>
<tr>
<td>LH</td>
<td></td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td>0.174</td>
</tr>
<tr>
<td>P-value</td>
<td>0.033</td>
</tr>
<tr>
<td>Testosterone</td>
<td></td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td>-0.265</td>
</tr>
<tr>
<td>P-value</td>
<td>0.001</td>
</tr>
<tr>
<td>E2</td>
<td></td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td>0.294</td>
</tr>
<tr>
<td>P-value</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>PRL</td>
<td></td>
</tr>
<tr>
<td>Correlation Coefficient</td>
<td>0.090</td>
</tr>
<tr>
<td>P-value</td>
<td>0.275</td>
</tr>
</tbody>
</table>

Discussion

Urinary metabolites of BPA represent exposures to chemicals from all routes of exposure including oral, dermal, inhalation and ingestion. As a non-persistent chemical with an elimination half-life of a few hours, the BPA concentrations in blood are lower than those in urine and decrease quickly after the exposure. There was substantial day-to-day variation of urinary levels of BPA with considerable variability with in the same subject. Therefore, the assessment of BPA exposure on the base of multiple urine measurement was recommended. In addition, consistent individual time activity patterns may lead to stable concentrations over long periods of time, so the assessment of BPA exposure on the base of multiple urine measurement. Also, one semen sample may be representative of semen quality over several weeks in epidemiological studies. Therefore, in our study we have obtained three urinary samples for the same subject in different occasions and we have calculated the mean urinary BPA levels.

Concerning urinary bisphenol (BPA), the mean levels was 10.07 +/- 9.98 for cases and 1.69 +/- 1.32 for controls denoting a highly significant difference between both groups (p < 0.001) and this agreed with Lassen et al., (2014) who found a clear match between individual exposure to biphenol A and male reproductive dysfunction.

Our results showed a highly statistically significant correlation between sperm concentration and mean BPA level (p < 0.001). Besides that, there was significant correlation between sperm motility and the mean BPA...
level (p= 0.003). These results agreed with Li et al., (2011) who found a significant correlation between the urinary BPA concentrations and the poor semen quality. However, there was no significant correlation between sperm abnormality and mean BPA level (p = 0.178). These results agreed with Li et al., (2011) who found a significant correlation between the urinary BPA concentrations and poor semen quality. However, Meeker et al., (2010) found significant correlation between higher urinary BPA concentrations and poor sperm morphology.

On the other hand, there was a highly significant statistical difference between cases and controls concerning FSH, LH, PRL and E2 levels (p < 0.001). However, there was no significant difference concerning testosterone level (P = 0.064). These results agreed with Liu et al., (2015) who found a significant correlation between the urinary BPA concentrations and the reproductive hormones. Additionally, there was statistically significant correlation concerning FSH, LH level and BPA level, whereas the p-values were 0.002 and 0.003 respectively. Eventually, there was a highly statistically significant correlation between testosterone and E2 levels and BPA level with p-values 0.001 and <0.001 respectively.

In correlation of BPA level and hormonal assay among cases, there was significant correlation with FSH, LH, Testosterone and E2, and this agrees with Liu et al., (2015) who had observed the same findings. On contrary, there was no significant correlation concerning prolactin and BPA among cases (p= 0.275), and this agrees with Meeker et al., (2010). However, this goes against Liu et al., (2015), who stated that increased urine BPA level was associated with increased prolactin.

Finally, there were some differences in results and this may be attributed to differences in races, age, sample size, environmental circumstances, and requirements of product labeling in different countries and also due to different combinations of the studied parameters that may affect the results. Additionally, it must be taken into consideration that these results are only presented as a preliminary study, thus increasing the sample size is recommended.

Conclusions

BPA is an endocrinal disruptor that negatively influences male fertility. The current study showed higher levels of urinary BPA among cases compared to controls. Furthermore, it demonstrated negative effects of BPA on semen parameters and hormone profile among the infertile group. Notably, those findings need to be confirmed in future large scale and multi-centric studies.

Ethical Clearance: Ethical committee approval was obtained from the department of clinical toxicology at the faculty of medicine – Cairo University.

Source of Funding: Self-funded by the authors.

Conflict of Interest: Nil.

References


Effect of Video-Based Rehabilitation as an Adjunct to Physiotherapy in Post Stroke Patients

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²Professor and Dean, Department Of Neurosciences, Krishna college of Physiotherapy, KIMS “Deemed To Be University” Karad, Maharashtra, India

Abstract

Objectives: Objective of this study was to evaluate the effects of video-based rehabilitation along with physiotherapy in improving the activities of daily living in stroke patients and evaluating its effects on spasticity.

Methodology: There were total 37 subjects, out of which 30 stroke patients were the participants of the study. This was a study to evaluate the effects of video-based rehabilitation along with physiotherapy in stroke patients. Here patients were evaluated on the basis of Modified Ashworth Scale and Modified Barthel Index before the treatment. Patients were showed videos of activities of daily living for 3 minutes every day after their physiotherapy session for 12 weeks and were assessed daily. At the end of the last session the patients were reassessed and re-evaluated on the basis of the same scales.

Result: There is a significant change in performing the activities of daily living and spasticity of the patients after 12 weeks of treatment compared to before treatment.

Conclusion: Activity of daily living can be performed better with the help of videos, and daily physiotherapy sessions, video-based rehabilitation and physiotherapy also has an impact on reducing spasticity in stroke patients.

Keywords: action observation therapy, video-based rehabilitation, physiotherapy, stroke, activities of daily living, spasticity, Modified Ashworth scale, Modified Barthel Index

Introduction

The World Health Organization definition of stroke is,” rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than of vascular origin.”⁷

The high incidence and severity of stroke outcomes are so shocking that this disease is considered to be the third common cause of death after cancer and cardiac problems. It is the most common cause of disability in adults.⁸

Motor deficits are characterized by paralysis or weakness, typically on the side of body opposite the lesion.⁷

women have a lower age-adjusted stroke incidence than men. However, this is reversed in older age.⁷ incidence of stroke increases dramatically with age.⁷

Major risk factors of stroke are, hypertension, heart disease, disorders of heart rhythm, diabetes mellitus, cholesterol.

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Tone-flaccidity is present immediately after stroke.\textsuperscript{7} Spasticity emerges in about 90% of vases and occurs on the side of the body opposite the lesion.

In stroke patients, upper extremity spasticity is frequently strong in scapular retractors, shoulder adductors, depressors, and internal rotators; elbow flexors and forearm pronators; wrist and finger flexors. In the neck and trunk, spasticity may cause increased lateral flexion to the hemiplegic side.

In lower extremity, spasticity is strong in pelvic retractors, hip adductors and internal rotators, hip and knee extensors, plantar flexors and supinator and toe flexors. Spasticity results in tight muscles that restrict movement.

It causes physical problems like hypertonicity which has an influence on patient’s functional capacity causing problems in performing activities of daily living.\textsuperscript{8} Stroke is an important cause of hemiplegia which causes severe disabilities in hand functions.\textsuperscript{1,2} It is very important to find a therapy that makes the patient functionally independent. Video based rehabilitation works on the principle of action observation therapy. Action observation is a dynamic state where the observer understands what is shown in the video by initiating the actions.\textsuperscript{3} The action observation therapy has two phases, the observation phase and the execution phase, thus allowing the patients to safely practice what is shown in the video.\textsuperscript{4} This technique promotes functional reorganization within the brain by activating mirror neurons.\textsuperscript{5} It also recovers damaged cerebral networks and rebuilds motor function when complemented to physiotherapy.\textsuperscript{6} The goal of this therapy is to promote functional reorganization within the brain of stroke patients via activation of these mirror neurons in order to promote function recovery.\textsuperscript{5} Mirror neurons are a unique set of neurons that represent an “observation-execution matching mechanism” which unites the sensing and implementation of an action.\textsuperscript{7,9}

The aim of this therapy is to make use of this mechanism for the rehabilitation of stroke patients in performing activities of daily living.

**Methodology**

An approval for the study was obtained from protocol committee and institutional ethical committee of KIMSDU. Total 37 stroke patients were approached from Krishna Hospital, Karad, Maharashtra out of which 30 stroke patients were selected for the study who fulfilled inclusion criteria. The procedure was explained and consent was taken from those willing to participate. The patients were assessed on the basis of Modified Ashworth Scale and Modified Barthel Index, after their physiotherapy treatment, they were be made to sit in a comfortable place and a video of functional activity was shown, the patient was then asked to observe the task carefully first and after the video was stopped, they were asked to perform the same activity. The task became more complex as and how an activity was achieved. After the therapy concluded, the patients will be were re-assessed. Both the results were compared and statistically analysed.

**Result**

**Table No. 1 Modified Barthel Index (Activity Of Daily Living)**

<table>
<thead>
<tr>
<th></th>
<th>Mean±Sd</th>
<th>P Value</th>
<th>Interference</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEFORE TREATMENT</td>
<td>13.533±2.145</td>
<td>&lt;0.0001</td>
<td>EXTREMELY SIGNIFICANT.</td>
</tr>
<tr>
<td>AFTER TREATMENT</td>
<td>16.767±2.029</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

INTERPRETATION: The above table shows comparison of variables of modified Barthel index scale before and after treatment, with the p value <0.0001 which is statistically extremely significant. There is 23.89% increase in scores.
Table no. 2 MODIFIED ASHWORTH SCALE (SPASTICITY)

<table>
<thead>
<tr>
<th>MEAN±SD</th>
<th>P VALUE</th>
<th>INTERFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEFORE</td>
<td>2.467±0.5074</td>
<td>&lt;0.0001 EXTREMLY SIGNIFICANT.</td>
</tr>
<tr>
<td>AFTER</td>
<td>1.7±0.7022</td>
<td></td>
</tr>
</tbody>
</table>

**INTERPRETATION:** The above table shows comparison of variables of Modified Ashworth Scale before and after treatment, with the p value <0.0001 which is statistically extremely significant. There is 31% reduction in scores.

Table no. 3 MODIFIED BARTHEL INDEX- MALE

<table>
<thead>
<tr>
<th>MALES</th>
<th>BEFORE</th>
<th>AFTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEAN±SD</td>
<td>13.000±2.196</td>
<td>16.111</td>
</tr>
<tr>
<td>P VALUE</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>INTERFERENCE</td>
<td>EXTREMLY SIGNIFICANT</td>
<td>EXTREMLY SIGNIFICANT</td>
</tr>
</tbody>
</table>

**INTERPRETATION:** The above table shows comparison of variables of modified Barthel index scale of males before and after treatment, with the p value <0.0001 which is statistically extremely significant. There is 23.93% increase in scores.

Table no. 4 MODIFIED BARTHEL INDEX- FEMALES

<table>
<thead>
<tr>
<th>FEMALES</th>
<th>BEFORE</th>
<th>AFTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEAN±SD</td>
<td>14.333±1.875</td>
<td>17.750±1.545</td>
</tr>
<tr>
<td>P VALUE</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>INTERFERENCE</td>
<td>EXTREMLY SIGNIFICANT</td>
<td>EXTREMLY SIGNIFICANT</td>
</tr>
</tbody>
</table>

**INTERPRETATION:** The above table shows comparison of variables of modified Barthel index scale of females before and after treatment, with the p value <0.0001 which is statistically extremely significant. There is 23.84% increase in scores.
**Table no. 5 MODIFIED ASHWORTH SCALE- MALES**

<table>
<thead>
<tr>
<th>MALES</th>
<th>BEFORE</th>
<th>AFTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEAN±SD</td>
<td>2.444±0.5113</td>
<td>1.778±0.7321</td>
</tr>
<tr>
<td>P VALUE</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>INTERFERENCE</td>
<td>EXTREMELY SIGNIFICANT</td>
<td>EXTREMELY SIGNIFICANT</td>
</tr>
</tbody>
</table>

**INTERPRETATION:** The above table shows comparison of variables of Modified Ashworth Scale of males before and after treatment, with the p value <0.0001 which is statistically extremely significant. There is 27.25% reduction in scores.

**Table no. 6 MODIFIED ASHWORTH SCALE- FEMALES**

<table>
<thead>
<tr>
<th>FEMALES</th>
<th>BEFORE</th>
<th>AFTER</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEAN±SD</td>
<td>2.500±0.5222</td>
<td>1.583±0.6686</td>
</tr>
<tr>
<td>P VALUE</td>
<td>&lt;0.0001</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>INTERFERENCE</td>
<td>EXTREMELY SIGNIFICANT</td>
<td>EXTREMELY SIGNIFICANT</td>
</tr>
</tbody>
</table>

**INTERPRETATION:** The above table shows comparison of variables of Modified Ashworth Scale of females before and after treatment, with the p value <0.0001 which is statistically extremely significant. There is 36.68% reduction in scores.

**Discussion**

Stroke is one of the major leading causes of functional impairments that affects the activities of daily living. Activities of daily living include all the minor and major activities performed in daily life, from lifting toothbrush to applying paste on it. Spasticity of the limbs secondary to stroke causes limitations in performing these activities. The patient becomes functionally dependent. The main goal of a physiotherapist is to make their patient functionally independent. One of the many approaches of rehabilitation is video-based rehabilitation. It works on the principle of Action-Observation Therapy.

This research was undertaken with the aim to study and compare the effect of video-based rehabilitation along with physiotherapy in post-stroke patients on activities of daily living and spasticity.

30 post-stroke patients (18 males, 12 females), age group 40-70 years approaching to OPD of Krishna College of Physiotherapy participated in the study. The patients were assessed on the basis of Modified Barthel Index for activities of daily living and Modified Ashworth Scale for spasticity.

After each patient’s routine physiotherapy session, they were made to sit in an isolated room where a video of a simple task was played, the patient was first asked to observe the task for 2-3 minutes and perform the task when the video was stopped. Each task was shown for 3 days. The task got more complex on every new video. The tasks included activities of daily living like lifting spoon and eating, opening water bottle, opening door, buttoning and unbuttoning shirt, combing, brushing, tying shoe laces.

Statistical analysis was done using paired ‘t’ test within group and unpaired ‘t’ test was applied to compare the results between two groups.
In the study pre-interventional Modified Barthel Index values were 13.533 ± 2.145, whereas the post-interventional values were 16.767 ± 2.029 (p<0.0001) the changes in the values showed statistically extremely significant. The post-intervention study shows 23.89% increase in score of Modified Barthel index (activities of daily living).

In the study pre-interventional Modified Ashworth Scale values were 2.467 ± 0.5074, whereas the post-interventional values were 1.7 ± 0.7022 (p<0.0001) the changes in the values showed statistically extremely significant. The post-intervention study shows 31% reduction in score of Modified Ashworth Scale (spasticity).

In the study gender-wise distribution of Modified Barthel Index, pre-interventional values of males were 13.000±2.196, whereas the post-interventional values were 16.111 (p<0.0001) the changes in the values showed extremely significant. The post-intervention study shows 23.93% increase in score of Modified Barthel index (activities of daily living).

In the study gender-wise distribution of Modified Barthel Index, pre-interventional values of females were 14.333±1.875, whereas the post-interventional values were 17.750±1.545 (p<0.0001) the changes in the values showed extremely significant. The post-intervention study shows 23.84% increase in score of Modified Barthel index (activities of daily living).

In the study gender-wise distribution of Modified Ashworth Scale, the pre-interventional values of males were 2.444±0.5113, whereas the post-interventional values were 1.778±0.7321 (p<0.0001) the changes in the values showed statistically extremely significant. The post-intervention study shows 27.25% reduction in score of Modified Ashworth Scale (spasticity).

In the study gender-wise distribution of Modified Ashworth Scale, the pre-interventional values of females were 2.500±0.5222, whereas the post-interventional values were 1.583±0.6686 (p<0.0001) the changes in the values showed statistically extremely significant. The post-intervention study shows 36.68% reduction in score of Modified Ashworth Scale (spasticity).

In above study, the treatment was divided in two phases, routine physiotherapy session followed by video-based rehabilitation session. This activated the mirror neuron cells in the brain. Physiotherapy session adjunct to video-based rehabilitation also reduced spasticity making it easier to perform the task shown in the video.

Therefore, action observation therapy along with physiotherapy benefited the stroke patients, both males and females. Statistically it was found that the results showed significant difference before and after 12 weeks of treatment.

**Conclusion**

On the basis of the results of the study, it can be concluded that, there is 23.89% increase in the overall score of modified Barthel index and 31% reduction in the overall score of Modified Ashworth Scale. Thus, concluding that, activities of daily living has improved and spasticity has decreased after treatment when compared to that of before treatment.

**Conflicts of Interest:** There were no conflicts of interest in this study

**Ethical Clearance:** Ethical clearance was taken from institutional committee of Krishna institute of medical sciences.

**Funding:** This study was self funded.

**References**


Knowledge & Perception of General Population on Forensic Autopsy in Ahmedabad City

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¹Assistant Professor, ²Associate Professor, ³Tutor, ⁴Professor& Head, Department of Forensic Medicine, Dr. M. K Shah Medical College & Research Centre, Ahmedabad, Gujarat. India

Abstract

The Autopsy is beneficial in determining the cause of death, time since death, validity of therapeutic modalities, potential medico-legal issues surrounding death and providing data on disease & injury. This cross-sectional study was carried out on a general population of Ahmedabad City with the help of questionnaires specially prepared in vernacular language i.e. Gujarati. We observed that overall awareness is quite good regarding the aims and objectives of postmortem examination in the general population. But general populations have poor knowledge about legal procedure regarding post mortem examination. Among the respondents who rejected autopsy, most of them feared of disfigurement of the body of their near ones, followed by delays in funeral, the involvement of police/court & fear of removal of the organs. Refusal on the religious ground was the least common reason cited by the participants. People have to be made aware of the process and importance of a medico-legal autopsy by various programs & seminars so that the relatives won’t resist autopsy of their near ones.

Keywords: Knowledge; Perception; Medico-legal Autopsy; General Population

Introduction

The Autopsy is beneficial in determining, the cause of death, time since death, validity of therapeutic modalities, potential medico-legal issues surrounding death and providing data on disease & injury¹. Autopsy is still under the umbrella of misconceptions, myths and emotions by lay people as well as by the physicians². Though medico-legal autopsy is mandatory in most of the cases of unnatural death, the relatives of the deceased may have a negative attitude towards autopsy³.

In medico-legal autopsy the consent of the relatives is immaterial according to Indian law. In such a scenario, the response of relatives can vary greatly, ranging from objection to approval. The investigation into the experiences of the next of kin will help both family and forensic experts to deal with the borderline situations that are so often encountered⁵.

A recently expressed opinion of Behra C et al states that autopsy is not something that should be performed as a favor to the family, but is something to which the family has a right, of which they should be informed⁶. Researchers have shown that people have developed positive attitudes towards autopsy and even understood the technical aspects of the autopsy⁶, ⁷. Although social aspects affect the public view more than religious facts, Islam also now accepts autopsies when useful⁸.

It is important to explore the knowledge and perception of public towards medico-legal autopsy as it helps the police and doctors to understand the required fields where they have to inform the near relatives of the deceased about the legal requirements and procedure of an autopsy⁹. The present study was carried out to know perspective, attitude and knowledge on medico-legal autopsy among the general population.

Material and Method

This cross-sectional study was carried out on the general population of Ahmedabad City from January to June 2019. A total of 500 peoples participated in the study. The study was done with the help of questionnaires specially prepared in vernacular language i.e. Gujarati.
for the study. Questionnaires were given to interested participants after obtaining informed written consent &
responses were made anonymously. The questionnaires consisted of perspective and knowledge of the medico-legal
autopsy. After obtaining the response, some facts of postmortem examination regarding given questionnaires were
acquainted and tried to clear their doubt if any.

Results

Questionnaires were distributed among a small group of the general population and obtained a response. Total
of 500 respondents were successfully participated & included in the study. The data regarding socio-demographic
characteristics of respondents, response to a questionnaire about knowledge and perception particularly factors for
rejection for medico-legal autopsy obtained, was tabulated and analyzed. The data obtained are shown in Tables 1
& 2.

Table 1: Knowledge of medico-legal autopsy among the participants

<table>
<thead>
<tr>
<th>Sr No</th>
<th>Questionnaire/Statements</th>
<th>Yes (%)</th>
<th>No (%)</th>
<th>Don’t Know (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Postmortem Examination is medical examination to find out the cause of death, time &amp; manner of death</td>
<td>476 (95.2)</td>
<td>0 (0)</td>
<td>24 (4.8)</td>
</tr>
<tr>
<td>2</td>
<td>The family members must give consent before performing a postmortem examination</td>
<td>381 (76.2)</td>
<td>102 (20.4)</td>
<td>17 (3.4)</td>
</tr>
<tr>
<td>3</td>
<td>Postmortem Examination is not needed if the nearest relatives of the deceased do not request for it.</td>
<td>317 (63.4)</td>
<td>125 (25)</td>
<td>58 (11.6)</td>
</tr>
<tr>
<td>4</td>
<td>The whole body has to be dissected during Postmortem Examination</td>
<td>450 (90)</td>
<td>44 (8.8)</td>
<td>6 (1.2)</td>
</tr>
<tr>
<td>5</td>
<td>Blood sample is collected during postmortem examination</td>
<td>253 (50.6)</td>
<td>204 (40.8)</td>
<td>43 (8.6)</td>
</tr>
<tr>
<td>6</td>
<td>Internal organs collected for further investigation during postmortem examination</td>
<td>293 (58.6)</td>
<td>191 (38.2)</td>
<td>16 (3.2)</td>
</tr>
<tr>
<td>7</td>
<td>The internal organs are stolen for selling purpose during postmortem examination</td>
<td>103 (20.6)</td>
<td>393 (78.6)</td>
<td>4 (0.8)</td>
</tr>
<tr>
<td>8</td>
<td>Dissected Body is stitched &amp; reconstructed to make it presentable after completion of postmortem examination</td>
<td>488 (97.6)</td>
<td>11 (2.2)</td>
<td>1 (0.2)</td>
</tr>
<tr>
<td>9</td>
<td>The body is disfigured after Postmortem Examination</td>
<td>442 (88.4)</td>
<td>53 (10.6)</td>
<td>5 (1)</td>
</tr>
<tr>
<td>10</td>
<td>After postmortem examination body emits foul smell</td>
<td>306 (61.2)</td>
<td>191 (38.2)</td>
<td>3 (0.6)</td>
</tr>
<tr>
<td>11</td>
<td>Postmortem examination is indicated in</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Accidental Death</td>
<td>495 (99)</td>
<td>4 (0.8)</td>
<td>1 (0.2)</td>
</tr>
<tr>
<td></td>
<td>b) Suicidal Death</td>
<td>478 (95.6)</td>
<td>21 (4.2)</td>
<td>1 (0.2)</td>
</tr>
<tr>
<td></td>
<td>c) Homicidal Death</td>
<td>498 (99.6)</td>
<td>2 (0.4)</td>
<td>0 (0)</td>
</tr>
<tr>
<td></td>
<td>d) Sudden &amp; Suspicious Death</td>
<td>471 (94.2)</td>
<td>25 (5)</td>
<td>4 (0.8)</td>
</tr>
</tbody>
</table>
Table 2: Perception of medico-legal autopsy among the participants

<table>
<thead>
<tr>
<th>Sr No</th>
<th>Questionnaire/Statements</th>
<th>Yes (%)</th>
<th>No (%)</th>
<th>Don’t Know(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>If your relatives would have to undergo an autopsy, would you object it?</td>
<td>234 (46.8)</td>
<td>260 (52)</td>
<td>6 (1.2)</td>
</tr>
<tr>
<td>2</td>
<td>If you object, what are the reasons (n=234)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>a) Fear of Disfigured</td>
<td>210 (86.74)</td>
<td>22 (9.40)</td>
<td>2 (0.85)</td>
</tr>
<tr>
<td></td>
<td>b) Fear of removal of organs</td>
<td>103 (44.02)</td>
<td>127 (54.27)</td>
<td>4 (1.71)</td>
</tr>
<tr>
<td></td>
<td>c) Religious Reason</td>
<td>26 (11.11)</td>
<td>203 (86.75)</td>
<td>5 (2.14)</td>
</tr>
<tr>
<td></td>
<td>d) Involvement of police/court</td>
<td>146 (62.39)</td>
<td>85 (36.32)</td>
<td>3 (1.28)</td>
</tr>
<tr>
<td></td>
<td>e) Delay in funeral</td>
<td>198 (84.62)</td>
<td>32 (13.68)</td>
<td>4 (1.71)</td>
</tr>
</tbody>
</table>

Discussion

We observed that almost all people (more than 90%) were agreed upon that the postmortem examination is required to find out cause of death, time & manner of death. The whole body has to be dissected during postmortem examination which is then stitched & reconstructed to make it presentable before handing over to police/relatives. Our findings are consistent with Subedi N et al9. We also observed that 50.6% population were agreed upon that, Blood samples collected during postmortem examination & 58.6% population were agreed upon that internal organ collected for further investigation during postmortem examination. Overall awareness is quite good regarding the aims and objectives of postmortem examination in the general population.

We observed that 76.2% people were agreed upon that, the family members must give consent before performing postmortem examination and 63.4% were agreed upon that postmortem examination is not needed if the nearest relatives of the deceased do not request for it. General populations have poor knowledge about legal procedure regarding post mortem examination. People think that if the relatives request the concerned authority, then only autopsy is initiated. Medico-legal autopsy is performed to determine the cause, manner and time since death for legal purposes and is initiated by the state. So, it is the responsibility of the relatives or anyone who suspects unnatural death of a person to inform the police. Then, police conduct necessary inquest and can forward the body to perform medico-legal autopsy10. It is no need to take consent from the relatives before the autopsy.

We observed that 20.6% of people agreed upon that, internal organ were stolen for selling purpose during postmortem examination. The percentage is relatively high and raised our eyebrows. There are myths present that internal organs were stolen for selling purpose for organ transplantation & some facts already published in the news that organs were stolen for the black magic procedure by postmortem workers in absence of doctors which was published in “The Times of India” on 5th July 2015 at Meeruth(UP).

Majority people (88.4%) were agreed upon that body is disfigured after postmortem examination, while 61.2% of people were agreed upon that, after postmortem examination body emits a foul smell. Most of the respondents were aware that medico-legal autopsy is indicated in unnatural deaths like accidental, suicidal,
homicidal, and sudden suspicious deaths.

When we had asked them whether they would reject the autopsy of their relatives, 52% of people responded that they would not. It is an important issue that many people now accept autopsies if indicated. Behera et al\textsuperscript{6}. But still large population have objection regarding the autopsy of their relatives.

Among the respondents who rejected autopsy, most of them feared of disfigurement of the body of their near ones. Similar findings were presented in studies of Behra et al\textsuperscript{6} and Parmar P et al\textsuperscript{11}. One of the objectives of a medico-legal autopsy is to cosmetically reconstruct the body. Not only the post mortem incisions have to be stitched properly, but also other injuries and tissue loss should be reconstructed for better appearance before presenting to the relatives of the deceased. This will help them to better tolerate autopsy of their near ones. Autopsy delays funeral (83.62%), the involvement of police/court (62.39%) and the fear of removal of the organ (44.02%) were other most common causes for autopsy refusal by family members or relatives of the deceased. Refusal on the religious ground was the least common reason cited by the participants.

**Conclusion**

The present study throws some light on today’s perception and knowledge of general population regarding forensic autopsy. Awareness is quite good regarding the aims and objectives of postmortem examination in the general population. But Knowledge about the legal procedure is poor. People have to be made aware of the process and need of a medico-legal autopsy so that the relatives won’t resist autopsy of their near ones. Autopsy surgeons should communicate with relatives before starting postmortem examination explaining the whole procedure and need of autopsy and clear their doubt if any. Feedback must be obtained after completion of autopsy and utilize them in future.

**Source of Funding:** Self

**Conflict of Interest:** Nil

**Ethical Clearance:** Taken from Institutional Ethical Committee of our Institute.

**References**

Correlation between High Sensitivity-Crp Level and Executive Function Disorders in Elderly Patients

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Abstract

Background: C-Reactive Protein is a marker of inflammation and vascular disease. The high serum of high-sensitivity C-Reactive Protein (hs-CRP) concentration was associated with interruption the integrity of the frontal-subcortical circuit.

Objective: To determine the correlation between high serum concentration of hs-CRP and executive function disorder in elderly patients.

Method: Thirty six elderly patients was examined by using a case control study. The subjects were enrolled from the out-patient at Neurology Deparment Dr. Soetomo General Hospital, Surabaya, Indonesia. The time period was 4 months (April to July 2015). Executive function was measured with the Trail Making Test B (TMT B) and divided into two groups, case and control. Complete blood count and serum hs-CRP concentration were measured from nonfasting blood samples. Chi-square test was used for data analysis.

Results: Eighteen subjects were enrolled in the case group (3 men, 15 women) and the other 18 subjects were enrolled in the control group (4 men, 14 women). Executive function disorder was found in 17 (94,4%) subjects of case group and 11 (61,1%) subjects of control group. High levels of hs-CRP was not associated with executive function, with p = 0,149 and adjusted OR 5,629 (CI 95% 0,538-58,860).

Conclusion: These data suggested that high levels of hs-CRP was not associated with executive function in elderly patients.

Keywords: High hs-CRP, Executive Function, Elderly Patient

Introduction

The inflammation plays an important role because it was involved in all stages of atherosclerosis. Atherosclerosis is a chronic inflammatory process that occurs in the arterial endothelium.¹ The CRP has been shown to be a marker and mediator of atherosclerosis. The previous laboratory testing methods were not sensitive enough to measure the CRP levels <10 mg /L. Hs-CRP, that was a quantitative methode of CRP concentration which could measure the levels up to <0.2-0.3 mg/L. It was an acute phase plasma protein, synthesized by hepatocyte cells and the most sensitive marker of systemic infection. Various studies reported that the high serum hs-CRP or CRP will lead to increasing the risk factors for vascular dementia, Alzheimer’s disease, cognitive disorder and White Matter Hyperintensities (WMH) ¹.

The high levels of CRP in microvascular cerebral might accelerate atherosclerosis. Narrowing of the vascular lumen and cerebral regulatory damage lead to cerebral microangiopathy. The process will affect the integrity of the frontal-subcortical circuitry thus providing a clinical picture of cognitive disorder ².
The results of Kirova et al.’s study using the prospective cohort method showed that the increase in serum CRP was associated with cognitive disorder in individuals with metabolic syndrome. In the elderly population, high levels of CRP and Interleukin 6 (IL-6) will cause worsening of cognitive function. Six meta analysis studies have shown that elevated CRP could be used as a predictor of cognitive and dementia disorders. However, some studies showed that there was no association between hs-CRP and cognitive disorder. Even four cohort studies in Scotland have shown no association of CRP gene variation with cognitive function in old age. Yilmaz et.,al investigated parents aged 64 to 85, and the results suggested that α1-antichymotrypsin was associated with decreased cognitive function, but not for CRP, IL-6, and albumin.

The difference results might be due to the measurement of inflammatory markers using the different types, the methods, and the sensitivities. The CRP levels were varied in each population. Then, more importantly, the selection of measuring instruments for assessment of cognitive function was on executive function. There were several studies relying solely on the examination of the Mini Mental State Examination (MMSE). The MMSE instrument was not as diagnostic but as a screening for cognitive disorder. One of the most sensitive and widely applied measures of executive function was TMT B.

Additionally, because of the different results and the minimal use of hs-CRP as the most sensitive atherosclerotic marker in the previous studies, it needed to determine the correlation between hs-CRP levels and executive function measured by using TMT-B.

**Method**

This study used a case-control design in all elderly patients who visited the Neurosurgery Outpatient Unit at Dr. Soetomo General Hospital and fulfilled the inclusion-exclusion criteria during the period April-July 2015. The inclusion criteria were elderly patients aged 45 - 65 years old who able to read and write also willing to participate the study. The case group was determined by value of TMT B >180 seconds, while for the control group has the value of TMT B ≤180 second.

The exclusion criteria were cognitive disorder with a definitive cause of structural lesions (cerebral tumor, moderate to severe brain injury, stroke, Parkinson Disease, brain infection); suffering from rheumatoid arthritis, lymphoma, Systemic Lupus Erythematosus, cancer; using corticosteroid drugs; showing a Systemic Inflammation Response Syndrome; hsCRP ≥10 mg/L; and they had has a history of alcoholism, schizophrenia, and depression. The elderly patients who fulfilled the inclusion and the exclusion criteria were given a careful physical examination and neurologic examination. Then they were examined the value of TMT B by Resident in Training of Neurology Department. After that, the subjects were performed complete blood tests and hs-CRP levels by Prodia laboratories.

The high hs-CRP levels were defined if the hs-CRP levels in plasma >1.0 mg/L. Plasma were taken from 0.5 ml of venous blood by using the immunometric assay technique method; and hs-CRP was examined by Immulite 2000 hs-CRP and expressed in mg/L units. The executive function disorder was defined if there was an extension of TMT-B time than normal value of ≤180 seconds.

Statistical analysis was performed using SPSS 22.0 program. Collected categorical data were tested by Chi Square test and Fisher test, meanwhile Unpaired T test was used for numerical data. The difference in the proportion of executive function in both groups was tested using Chi Square test, then analyzed using logistic regression.

**Result**

The total subjects of the study were 36 subjects then 18 subjects were included in the case group (3 men, 15 women) and the other 18 were included in the control group (4 men, 14 women). The basic characteristics of subjects consisted of demographic and clinical data were shown in table 1.

Table 2 showed the correlation between high hs-CRP levels and executive function in elderly patients. This difference was statistically significant with p = 0.041 and OR=10.818 (95% CI 1.165 – 100.439). Then, we obtained type II error (β error) of 1% in this study.
Logistic regression on the level of education, hypertension and high levels of hs-CRP was analyzed. The analysis obtained p value of education level was 0.029 with adjusted OR of 5.713 (95% CI 1.195 - 27.314). Hypertension obtained p = 0.053 with adjusted OR (95% CI 0.978 - 27.933). Meanwhile, high levels of hs-CRP did not have a significant correlation to the executive function with the p = 0.149 with adjusted OR 5.629 (95% CI 0.538 - 58.860).

Table 1. The Basic characteristics of Subjects

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Groups</th>
<th>Total n=36</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Case n=18</td>
<td>Control n=18</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>3 (16,7%)</td>
<td>4 (22,2%)</td>
<td>7</td>
</tr>
<tr>
<td>Female</td>
<td>15 (83,3%)</td>
<td>14 (77,8%)</td>
<td>29</td>
</tr>
<tr>
<td>Age</td>
<td>56,17</td>
<td>53,22</td>
<td>0,169</td>
</tr>
<tr>
<td>Education Level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary, Junior High</td>
<td>11 (61,1%)</td>
<td>4 (22,2%)</td>
<td>15</td>
</tr>
<tr>
<td>Senior High, College</td>
<td>7 (38,9%)</td>
<td>14 (77,8%)</td>
<td>21</td>
</tr>
<tr>
<td>Hypertension</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>9 (50,0%)</td>
<td>3 (16,7%)</td>
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</tr>
<tr>
<td>No</td>
<td>9 (50,0%)</td>
<td>15 (83,3%)</td>
<td>24</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>6 (33,3%)</td>
<td>5 (27,8%)</td>
<td>11</td>
</tr>
<tr>
<td>No</td>
<td>12 (66,7%)</td>
<td>13 (72,2%)</td>
<td>15</td>
</tr>
<tr>
<td>Obesity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>12 (66,7%)</td>
<td>8 (44,4%)</td>
<td>20</td>
</tr>
<tr>
<td>No</td>
<td>6 (33,3%)</td>
<td>10 (55,6%)</td>
<td>16</td>
</tr>
<tr>
<td>Use of NSAID</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>8 (44,4%)</td>
<td>6 (33,3%)</td>
<td>14</td>
</tr>
<tr>
<td>No</td>
<td>10 (55,6%)</td>
<td>12 (66,7%)</td>
<td>22</td>
</tr>
<tr>
<td>High Hs-CRP Levels</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>17 (94,4%)</td>
<td>11 (61,1%)</td>
<td>28</td>
</tr>
<tr>
<td>No</td>
<td>1 (5,6%)</td>
<td>7 (38,9%)</td>
<td>8</td>
</tr>
</tbody>
</table>
Table 2. The Correlation between High Hs-CRP level and Executive Function

<table>
<thead>
<tr>
<th>High hs-CRP Levels</th>
<th>Executive Function</th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Case</td>
<td>Control</td>
<td>P</td>
<td>OR (CI 95%)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>17</td>
<td>94,4</td>
<td>11</td>
<td>61,1</td>
<td>0,041</td>
</tr>
<tr>
<td>No</td>
<td>1</td>
<td>5,6</td>
<td>7</td>
<td>38,9</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>100</td>
<td>18</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Discussion

In our study, sex did not have a significant correlation to the executive function. The data were in accordance with the previous studies that showed no correlation between sex and TMT B. Studies conducted in 1447 healthy people aged >18 years reported that sex did not affect the results of TMT examination B.21 Other studies conducted in Korea with 997 subjects aged 60-90 years, indicating sex also had no significant correlation to TMT B.22 The sex effects on TMT examination results in the elderly population were still under debate.24 Meanwhile, another study reported the results of the Concept Shifting Test (CST) showed that women were superior. CST was a TMT modification that aimed to measure shifting and executive functions 12.

The median age of the subjects in our study showed that the age of case group was the older one. However, there was no difference in the mean age of executive function. Demographic data on other studies used a cross-sectional method with the aim of finding a relationship between hs-CRP with executive function and cerebral microstructural integrity, and obtained that the age range of subjects was 40-80 years, with average of 63.3 ± 0.4 years . Lukas et al reported that individuals aged> 50 years associated with abnormal TMT results. Previous studies have shown that increasing age was associated with duration to complete an executive function examination. The studies with similar results were also reported in the Dutch population, Korea, Americans, and Brazil 13.

Based on our research, the level of education had a significant correlation with the executive function. The subjects with primary education level and junior high school had a probability of 5.713 times more often to experience executive function disorder than those with high senior education level and college. Our results were consistent with the study by Hamdan AC et al. which reported that the subjects with an educational level of ≥9 years completed TMT B shorter than subjects with low education level (2-8 years). However, there was no significant difference between subjects with average education period of <9 years and subjects with education period of ≥9 years.28 Another study also proved that low levels of education was related to completion duration of TMT examination B 25.

In our study, there was no relationship between hypertension and executive function. In addition, variable dyslipidemia and obesity had no significant correlation with executive function. Our results did not match with the cross sectional study conducted by Collinson et al that consisted of 55 asian subjects aged >55 years were suffering from metabolic syndrome and 44 healthy people as the control. The definition of metabolic syndrome in the study used the International Diabetes Federation modification criteria of obesity (BMI >23) followed by at least 2 of hypertensive risk factors, type 2 DM, triglyceride elevation and low HDL. The results showed that subjects suffering from metabolic syndrome were associated with disorders in the memory domain and executive function rather than with the control group 5.

The characteristic of NSAID use had no significant correlation with executive function. Our results also did not match with the Baltimore Longitudinal Study on Aging, Rotterdam, the Cache County Memory Study, which indicated that the strongest dementia risk reduction occurred in people who have been using NSAIDs for more than two years. Thal et al reported that if the COX-2 inhibitor (rofecoxib 25 mg)/day was adminstered for 4 years, it could not prevent the progression of Alzheimer’s Disease in patients with MCI.

Our study showed that there was no correlation between high hs-CRP levels and executive function in
elderly patients. The results of this study were according to the Longitudinal Aging Study Amsterdam. The study used a cohort method, involving 1,284 subjects with an age range of 62-85 years. The cognitive examination of MMSE, memory (auditory verbal learning test), Intelligence (Raven’s Colored Progressive Matrices) and information processing (coding test) were performed then followed up after 3 years. The CRP levels were not associated with cognitive disorder in all examination modalities in the study (Dik et al, 2006). Another study investigated subjects included 97 women aged 60-70 years, who were examined the levels of hs-CRP and cognitive function (MMSE, word recall test, and Stroop test). Other cross-sectional study of 1331 subjects with age >65 years proved that high hs-CRP levels did not related with the domain of executive function and language interference 14.

However, several studies had shown that high levels of hs-CRP were correlated with cognitive function disorder. One of them, was a cross-sectional study by Rizzi and his colleagues on 149 CHD patients aged ≥50, then did the MMSE examination. The result showed that 34 subjects had cognitive disorder (case group) and the rest were in the control group. Subjects with high CRP levels (≥5 mg/ L) had 2.9 (95% CI 1.26 - 6.44) times more often suffering from cognitive disorder (p = 0.012) and leukoaraiosis was only 5.98% (p = 0.005). Thus high hs-CRP levels were associated with an increased risk of cognitive disorder in elderly patients. The results of other studies also showed that high levels of hs-CRP were associated with executive function disorder aged of 40-80 years old 15.

In this study, there was no correlation between the high hs-CRP levels and the executive function in elderly patients. This might be due to the significant differences in the number of subjects, racial differences from the study subjects and might also be influence of the confounding factors. It was such as the educational level that makes it difficult to ascertain whether the cause of impaired executive function was found purely because of high levels of hs-CRP alone 16. Vijay & Kumar reported that the inflammatory parameters measured from peripheral blood did not directly describe the inflammatory process in the brain.7 In addition, although CRP was a marker of vascular disease, elevated CRP levels did not directly affect vascular outcomes 17.

**Conclusion**

There was no correlation between the high hs-CRP levels and executive function disorder in elderly patients.

**Ethical Clearance:** The research process involves participants in the survey using a questionnaire that was accordant with the ethical research principle based on the regulation of research ethic committee. The present study was carried out in accordance with the research principles. This study implemented the basic principle ethics of respect, beneficence, nonmaleficence, and justice.

**Conflict of Interest:** The author reports no conflict of interest of this work.

**Source of Funding:** This study is done with individual funding.

**References**

6. Pahlevi R, Putra ST, Sriyono S. Psychoneuroimmunology Approach to Improve Recovery Motivation, Decrease Cortisol and


Islamic Ethical Value of Customary Basis of Marriage Proposal Application in Indonesia

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Abstract
This community legal observance in the field of Islamic marriage is based on the concept of good deeds which can be said to be deontologically valid. The approach is based on deon/obligations arising from the principles of Islamic life. This research method is an empirical method that looks at social reality and is carried out with an ethical approach to understanding the meaning of deeds in the marriage process. Philosophical analysis is used to analyze values in the conduct of the marriage process of Islamic societies in Indonesia. The results showed that in Indonesian Islamic society, marriage and marriage registration had become a community culture that had a philosophical value of worship. This happens because there is enculturation in the form of symbols of Islamic teachings that make it easier for people to recognize the value of an action. Proposal and registration of marriage has become the culture of the Islamic community with the symbol of halal and worship in marriage. Thus the community’s obedience to Islamic law and state law is not coercion carried out by state power, but is the legal culture of Islamic society.

Keywords: charity, ethical approach, Islamic teachings, marriage.

Introduction
Good action theory according to Islamic teachings, has long been rooted in Indonesian society, and has an influence on the law-abiding behavior of the Indonesian people. This theory, academically can be said to enter into deontological ethics because it is based on an intention that gives rise to an obligation (deon) to act.\(^1,2\) The approach used is normative ethics which looks at moral existence in a good deed. Morals become the principles to do good that encourage good intentions, so this theory can also be called the Islamic moral obligation theory. Philosophy of moral obligations in Indonesia does not originate from Immanuel Kant’s teachings on obligation,\(^3\) but comes from the teachings of Islam that entered Indonesia around the 7th century AD. The philosophy can be categorized as deontology because the approach is from the perspective of the intention that is in the act or often referred to as an obligation.\(^1,4\) Human actions, depending on their intentions, in the sense that intention raises the obligation to obey the rules even though the morals contained in intention are different. These differences in intentions give rise to the quality of human actions so that some are seen as good deeds and some are seen as futile deeds. Good and bad actions are not seen in the outcome or form but in their intentions, because this intention has a dimension of value.

An ethical approach to deeds in Islamic teachings was taught as part of Islamic morality. The root of that teaching is hadith of “innamal’ amalu bi niyat”, that one’s actions depend on their intentions. It should be understood that in Islam the term “charity” only applies to good deeds legally not to bad deeds legally called immorality. Within the framework of fostering the good deeds of mankind that there is a hadith, so that the quality of good deeds becomes stratified, some are pious and some are in vain. For example, the act of marriage. In Islamic law marriage is included in charity or good deeds, but the quality of the deed depends on the intention. Intention is an invisible but real existence as a moral perspective that motivates actions. Formal intentions are formed in sentences which are the purpose and ethical basis of the action carried out. The purpose in the intention is built based on moral values, for example the moral value in marriage is to form a family, not just to justify sexual relations, then intentions that are not based on that value, have qualities as bad or vain actions in the dimensions of worship. The ethical basis in intention is a specific part of Islam which is the value of faith or
belief in God. This paper aims to examine the public understand the legal categories in their implementation of Islamic good deeds, and the effect of understanding on the compliance of religious and state law.

Islamic moral teaching

Islamic teachings contain 3 parts of which all three are interconnected, one giving meaning to the other, namely: First, the doctrine of faith or belief. Second, sharia teachings or law and third, moral teaching. The perspective of legal theory, looking at all the rules and norms in the Qur’an and Hadith which are the source of Islamic teachings is the *ius constitution*, which is the ideal rule, and will become the *ius constituendum* through the implementation of these teachings by each adherent. Jurisprudence, are detailed rules of Islamic teachings, which regulate the practice of actions which can be carried out directly by humans, both the order to do it and the command to leave it. Every human deed regulated in Islamic jurisprudence law has a legal category related to morals and creeds, namely the categories of *wajib*, *sunnah*, *halal*, *makruh* and *haram*. The first three categories of actions are philosophically the roots of good deeds, because these categories are taught to be moral as well as beliefs for Muslims in performing daily actions. The two other categories, namely *makruh* and *haram*, are orders to leave acts that are not legally permissible. The proposition of “*innamal a’malu bi niyat*” is that every act can be obligatory, *sunnah* and *halal* is still very dependent on its intention.

The introduction of Islamic teachings in Indonesian society through this category, so that people recognize it as a moral mindset of good deeds or charity.

An ethical approach is taken to understand that Islamic law is not just a regulation regarding normative conduct, but has religious values and moral values, both of which are precisely the source of Islamic society’s adherence to Islamic law. Community obedience to the law actually depends on the value of worship and moral values believed in the normative rules. The term Islamic is for a law whose normative rules do not deviate from Islamic creed and morals, including Indonesian national law. An assessment that a law is Islamic or not, is if the legal norm does not conflict with Islamic creed and morals, because in legal matters between members of the community, Islamic law adheres to the principle that the origin of all economic transaction (*muamala*) is lawful/ permissible, except for those which clearly have restrictions in the shari’a. Therefore, even though there is no prohibition in Islamic Sharia regarding economic transaction law rules governed by the state, it does not mean that the law is Islamic if it is contrary to Islamic creed and morals. This is the shape of the Islamic teachings between the Islamic theology, sharia and morals.

Islamic theology and moral also serve to provide a categorical imperative to the intention to carry out an act that obeys the law. Categorical imperative is a command that says what must be done from the point of view of purely reasoning; something is said to be categorical because what is ordered from the perspective of pure reason does not depend on plausible circumstances and always carries a primary value. This is in the form of faith with the Islamic creed and noble character taught by Islam. Existing beliefs in adherents of Islam encourage to act in accord with the faith and morals, in the form of a categorical imperative. This imperative ordered something not to achieve a certain goal, but because the command was good on him. In accepting this imperative, we are very much determined by ourselves, because we not only determine our actions freely, as Kant believes in humans in all the training of selected talents; we also accept a principle whose content is determined by what is very important to us as actors, namely our practical ratio. We thus follow our own laws (which are in the faith and morals) and therefore have autonomy when we accept categorical imperatives. Otherwise, we fall into heteronomy, or the acceptance of (free) principles whose contents are determined independently of the nature of our own rational existence. Categorical imperative reveals the power of supernatural freedom within us so we must regard ourselves as part of a world that can be understood, that is a power that is ultimately determined not by natural law but by the law of reason.

Marriage Proposal Application

In the field of marriage, the Islamic community is familiar with the culture of Islamic law. All marital procedures are actually Islamic law which has become the morality of the community. People recognize it from generation to generation and appreciate it as glory/dignity. Legal symbols make people understand actions very easily without having to understand the legal details, but are able to distinguish which good deeds are truly good, with deeds that are not good because of their intentions. Marriage in the Islamic community in Central Java must be morally preceded by an application or proposal, which is determined that someone who has
been applied for/proposed cannot accept someone else’s proposal. This provision has become a moral culture of Islamic society.

In the Compilation of Islamic Law there are provisions regarding application, Article 1 letter a stated that stipulation that a proposal is an activity in the direction of an arranged marriage between a man and a woman. Chapter 3, articles 11-13 stated that proposition can be directly carried out by people who want to find a mate partner, but can also be done by intermediaries who can be trusted. Candidates can be carried out on a woman who is still a virgin or on a widow who has expired iddah, and women whose husbands are retained are in the period of iddah raj’iah, haram and forbidden to be married. It is also prohibited to propose a woman who is being married to another man, as long as the man’s proposal is not broken or there is no rejection from the woman. Termination of proposals for men, due to a statement about the termination of discourse or secretly. The proposing man has shunned and left the woman he is asking for.

The proposal has not caused legal consequences and the parties are free to terminate the marriage relationship. Freedom to break the marriage relationship is done in a good manner in accordance with the guidance of local customs and customs, so that it is maintained harmony and mutual respect. The provisions have become the people’s morality for generations, becoming the beliefs and rules of the people’s habits. They implement these provisions for the common good and no single member of the community does not want to comply with these provisions, because marriage is something that is considered sacred and there must be a procedure. The role of intention that determines marital deeds starts from marriage. In theory, every good action depends on the intention, so also the value of the implementation of the proposal depends very much on the intention, even though the proposal is a good act legally. The act of marriage which is then carried out with worldly intentions is considered not a good deed because it does not intend to worship, only to justify mere sexual relations. Islamic teachings see that the intention can change depending on the consciousness of the person who is doing it, so that even at the time of marriage the intention is to be carnal but if there is then awareness of intention to worship, then the value of marriage becomes the value of worship to build a good household. The existence of this theory of good deeds is evident in Islamic societies, as evidenced in Islamic societies there are far more harmonious households than divorced households.

Registration of Marriage by the State

Marriage registration, is not an act that determines the legality of marriage, but determines the effect of the law that has been regulated by the state, both through the provisions of Islamic law and by the provisions of state law in general. In Indonesia there are general provisions regarding marriage because Indonesia is a multi-religious state, not only one religion is recognized by state law but there are some religions, namely Islam, Christianity, Catholicism, Hinduism, and Buddhism. These general provisions are contained in Law No. 1 of 1974 concerning Marriage. Therefore there are the same provisions that apply to all Indonesian citizens in marriage, namely marriage registration, which aims to provide legal protection to those who do marriages.

The results of research on the Islamic community in Central Java there are cases of marriage that are not recorded in a relatively small number compared to the Muslim population as a whole. It was caused by various factors, including lack of understanding of the function of marriage registration, social economic factors, and marriages that were conducted before the issuance of Law No. 1 of 1974. The Government has made efforts to improve the population administration system that can cause marriage registration to become sociologically mandatory for every married population, namely with a population identification system in managing all socio-economic and legal needs. Identification of the population requires proof of marriage that can only be done with a marriage certificate, so that the recording of marriage among Islamic societies gradually becomes a culture of society that has social sanctions in the form of denunciation, in addition to obtaining legal sanctions in the form of neglect concerned in social and economic traffic that requires verification marriage.

Obedience in the law of marriage registration in Islamic society, mainly based on the concept of the deeds of “innamal a’malu biniyah”. In this concept, marriage registration is seen as a variable of good deeds (or charity) and intention is seen as a determining factor of observance of marriage. The habit of the Islamic community in using the symbol of halal and haram causes the ability of the community to distinguish the value of the act of “registering marriage” into the value of social and religious necessity because registering marriage is not an act that is prohibited by Islamic teachings, even
encouraged by Islam. By viewing marriage registration as a variable determined by intention, it can be measured that people who do not register their marriages have ill intentions based on the assumption that: they understand the legal consequences of marital registration; and there are no socio-economic factors that hinder marriage registration.

The ethical perspective in this study shows that anatomically the act of recording marriage is a charity (good deeds) based on good intentions that have become a necessity/obligation from within the members of the Islamic community itself, is not a coercion from the state. To realize a society that has good faith must use a legal system that is rationally in accordance with the religious values of Islamic societies. The deed of innamal a’malu biniyah is the main basis of all observance of the Islamic community to the law, where the teaching has become public awareness that the nature of worship of an action depends on its intentions, not on the form of good deeds.

**Conclusion**

The Islamic community in Indonesia basically already has the concept of “good deeds” based on the deed of “innamal a’malu biniyah” which academically can be said to be deontology because they see deeds based on “deon” arising from the principles of Islamic religious life. Legal awareness of the Islamic community in Indonesia is broadly legal awareness for worship, is a social culture that contains religious values of Islam. Based on reality, this awareness exists because the regulation by the state does not conflict with Islamic law, but instead is based on Islamic teachings which strengthen and provide legal certainty to the community. Arrangements regarding marriage registration have existed since Indonesia’s independence, so it can be concluded that the process of legal awareness requires a relatively long time depending on the socialization and enculturation in Islamic societies. The problem faced in other socio-economic sectors such as banking, economics and others is how to build people’s behavior through an ethical approach, not from the perspective of comparison between Islamic law and state law.

**Ethical Clearance:** This research was ethically approved by Faculty of Law, Universitas Diponegoro, Semarang, Indonesia

**Funding:** This research receives no external funding.

**Conflict of Interests:** There are no conflict of interests

**References**


Puberty Knowledge and Communication among Adolescent Sexual Offenders in Indonesia: A Qualitative Study

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Abstract

Introduction: Rape against women, as one of sexual assaults form, which has been became a serious issue throughout the world in social and public health. It is a gross violation on the women’s human rights, which is cannot be accepted from any perspectives. In the latest cases, the perpetrators of rape are conducted by adolescent or minor.

Purpose: This article presents the study how the young sexual offenders’ knowledge on puberty and their sexual communication.

Method: This research was qualitative toward 30 sexual perpetrators, all informants are being undergone sentences in Correctional Institutions of Bengkulu province, Indonesia. The informants were all child convicts, (aged less than 18 years) at four correctional institution in Bengkulu province.

Results of the study: The perpetrators of sexual assault were middle adolescents who were in-between 16 to 18 years. Based on the results of analysis were found that there were ineffective sexual communication patterns among perpetrators, both informants communication parents, friends, teachers and couples. Moreover, this study found inadequate puberty knowledge among sexual offenders.

Research limitations: This article only describes sexual communication and knowledge on puberty, while other individual factors and social aspects are not discussed at all in this article.

Originality: Based on the various results of previous studies, there are no researches have been found that specifically examines the behavior of sexual violence by minors in Bengkulu province.

Keywords: knowledge, puberty, communication, adolescent, sex offenders.

Background

Sexual health is an important element for realizing the goals of reproductive goals. WHO (2002) defines sexual health as the welfare state of physical, emotional, mental and social in relation to sexuality, it is not only the absence of disease, dysfunction or weakness. Sexual health requires a positive approach and respects for sexuality and sexual relations; the possibility of pleasant sexual experience, safety, free of coercion, discrimination and violence. Therefore, sexual health must be achieved and maintained, and all people’s sexual rights must be respected, protected, and fulfilled.

Women and men implicitly have the same rights to achieve a healthy sexual status without violating others sexual rights or outrage the law.

Some researches, the sexual harrassments such as rape against women is a serious problem that demands massive cost consequences due to depressive events, unwanted pregnancy and HIV/AIDS virus [¹]. Many of health problems are caused by the sexual violence, these are not only a concern on criminal law throughout the world, but also the field of public health [²].

The sexual aggression is rampant by perpetrators under age group 18 years as an illustration of the
low quality of sexual health understanding among young adolescent. It is because the sexual behavior plays an important role in producing mental and social health outcomes. But, now there has not been found a theoretical or conceptual model that is fully able to explain the relationship between sexual behavior and various aspects of health [3].

Method

Design and participants

This research used qualitative method toward 30 male adolescents less than 18 years who were the perpetrators of rape. All respondents are being undergone sentence at four Correctional Institutions of Bengkulu province.

Data collection

This research conducted within 6 months from 24 May to 26 October 2019, through semi-structured interview manner. This model is conducted with face to face interview, and strongly believed able to explore more profound exposure among each respondent. This manner will be a bridge for exploring various experiences and places within more specific context, thus allows informants (perpetrators) to re-construct their experience more details.

Data Analysis

Data analysis and theoretical interpretation refer to the formulation of research problem: how the forms of communication are conducted by the perpetrators and how the knowledge of informants on puberty. Analysis and interpretation of the data in this study was carried out by providing interpretation and production process of meaning of the text of the interview with the informant and comparing it with various studies and previous studies.

Ethical Clearence: The ethical clearence for this research was taken from Ethic Committee of Health Research Faculty of Nursing, Airlangga University with ethical approval numbers 1278-NREC.

Findings

Based on the semi-structured interview manner toward child sexual offenders, our analysis have narrowed down into two issues on sexual coercion by child offenders are knowledge on puberty and sexual communication. The cases above are not spontaneously, but as a combination of problems that are being experienced by perpetrators, family background and external influences as well from their peers or environment. As a prepubescent group, most of their attitudes are still unstable and fragile, as a result these trigger their sexual offending like rape or other sexual harrassment forms.

Knowledge on Puberty

Majority informants usually got the knowledge in term of puberty from schools; through biology subject and counseling program by health workers. Moreover, they also admitted due to the peers and older friends. Their knowledges were the puberty signs between men and women; they mentioned several signs of puberty in men, such as wet dream, Adam’s apple, mustache and beard. In women, it is usually marked by the arrival of menstrual period and enlarge breast size. However, they have wrong understanding on puberty signs; enlargement of breast size on women due to the factors often touched by opposite of sex. This reflects that sexual health of informants in term of puberty is still low. In addition, they do not know what have to do when at their puberty. The low understanding on puberty is due to there is no any program that more specific contains about puberty education both males and females. As a result of this, young adolescents have not ready yet to undergo pre-puberty and puberty period as well.

One of the main reasons why many of young adolescents have deviant sexual behavior, for instance rape, is due to the influence of peers, because peers can activate the ‘reward system’ in adolescents’ brain. The change of brain function creates psychological vulnerabilities, which can contribute to behaviors that endanger health and enhance emotions. At the same time, brain plasticity combined with social and cognitive change make adolescents’ thinking and false behavior which further have significant implication for future of health and welfare [4].

Meanwhile, in adolescents puberty, there is a change in the hypothalamus-pituitary-adrenal (HPA) system, which make adolescents more vulnerable to get stress [5]. It also has a profound affect on their vulnerability to get depression and serious health problems in the future [6]. Physical, emotional, and social changes in puberty can cause them to become stressed, especially when they feel misunderstood or have inadequate coping skills. Adults, within puberty period need to explain the problems of
puberty, emotional change and the importance of peers as part of puberty education, all are aimed at normalizing change, reducing stress, ensuring healthy choices. At this time, the puberty rises faster than before, for instance, the breast enlargement on females were at the age of 8 or 9 years, while the development of genetal organs on males begun at the age of 9 or 10 years.

The cases above indicate the necessity a puberty education system based on the stages of child development. At pre-puberty, teens need enough information to face several changes during puberty. While, adolescents who have experiencied on puberty, they need more information and strategies for facing these changes.

**Sexual Communication**

**Communication with parents**

The sexual communication practice is still rarely done openly within the family of informants; either parents or other family members. The pattern of communication are quite monotonous and in one-way communication toward older and younger persons. The talks model are between parents and informants were only shortly and allowed to discuss about general things, such as taking a bath order (Islamic belief), dating prohibition and having sex with a couple. Informants were only prohibited without being accompanied by discussion and explanation why this should be done or prohibited. This communication form allegedly rises the causative factor of deviant sexual practices among informants, for instance rape. Some previous researches have pointed out that open sexual communication between parents and young adolescents can be significant protective factor to reduce the risks of sexual behaviors by putting off intimate relationship and increase the frequency of contraception and condom use. This finding is reinforced by the results of a meta-analysis of 50 studies that confirm that parent-teen sexual communication is positively associated with safer sex behavior. Thus emphasizing the importance of understanding parental communication as a possible predictor that contributes to teenage sexual decision making.

Sexual communication between parents and children has an important role to realize sex education on children. Previous research has shown that adolescents relationships with their parents influence interactions with peers. This is because the quality of adolescent relationships with friends that develops in early life as the result of socializing experiences within family. Adolescents who have supportive values and warm relationship are more socially competent and report/tell more positive friendships.

This research found the reasons of sexual assault including rape, because it was influenced by friends and could not control the lust. Similarly, Reeb who explained sexual behavior generally occurs when adolescents begin to have romantic relationships. During this time, parents may be able to influence life style choices positively or negatively by discussing their behavior. Parents are expected to be able to play an important role for transmitting reproductive health information and skills on adolescents to ensure they can grow and achieve reproductive and safe sexual lifestyles.

**Sexual communication with friends.**

During the transition period, children tend to spend more time to be alone and with friends, on the other hand, time with parents will decrease significantly. This research found that sexual communication that occurs between informants and friends is more directed to the topic of sexual relations, pregnancy and pregnancy prevention. At the developmental stage as early adolescents, they are usually more open to friends than parents to discuss topics relating to sex.

The negative impact found in communication between informants and friends, there were wrong understanding among informants related to sexuality issues, related to some information obtained from friends. Some of these myths, among others: sexual intercourse will certainly cause a pregnant woman, it is not possible to only have sex once can cause the victim to become pregnant. Besides being related to the process of pregnancy also found myths of female reproductive organ development, especially the size of the breast with sexual behavior. Another myth related to pregnancy termination efforts, is by consuming foods such as pineapple or coffee mixed with soft drinks.

Friends can be an increasingly important source of information and become a critical social reference for adolescents. This condition can become a problem when friends who are partners within discussion also have an inadequate level of knowledge, so that it can provide wrong knowledge and understanding.
Sexual Communication with teachers at school.

Sexual communication was not specifically carried out but only became part of the subject matter at schools such as Biology and Islamic Religious Education. Information on sexuality was only obtained by informants when they are at the second and third grade of high school. The conditions revealed the contradictory results as mentioned by Butler ‘school-based sexuality education’ is believed to be the ideal context for teaching sexual communication skills on children and adolescents in the context of developing and practicing the use of these abilities. For example, from sexual education at schools, students can get training and instruction on how to communicate with parents regarding sexual issues [16].

This study found that informants obtained information related to sexuality, such as puberty, fertilization and infectious diseases when they were at second and third grade high school, while sexual behavior was formed earlier when they are at primary school. These conditions, it is necessary to provide sexual communication services that are tailored to the stage of child development. As stated by Crockett, et al (2019). Pre-puberty teenagers need enough information to deal with the various changes they will face when puberty comes, while in puberty teenagers, they need more in-depth information and strategies to be able to adapt to these changes (4).

Sexual Communication with Girlfriend

Sexual communication with their romantic partner are done face to face and through social media. Their conversation usually leads to the theme of sex. In some cases, sexual communication has become one of the triggers for sexual relations and rape by informants. There are three factors that influence the openness of early adolescent sexual communication with a couple namely length of relationship, relationship satisfaction and commitment [17]. Another phenomenon as seen from this research, the habit of having sexual communication with couples through social media What’s up and Facebook. This finding is similar to Jeff Temple’s idea on Sex and Chatting, which are often used by adolescents, it is well-known ‘sexting’. Sexting in adolescents is an important issue of public health because it can have negative psychological and legal consequences [18]. Such behavior is consistently related to adolescent sexual behavior [19]. Other researchers mentioned adolescents who have sexting have the possibility to have sex 7 times more when compared to those who are not abusers [20]. In addition, sexting also depicts adolescent sexual behavior in daily life [18].

Conclusions and Further Research

The communication practice in term of sexuality is still rarely done openly between parents’ informants. Communication that occurs between informants with friends, more leads to the theme of sexual relations. Communication with teachers is not done specifically but only becomes part of the material in one of the subjects at schools. While, the informant’s communication with a girlfriend is done directly or through social media. Their conversation was more about the theme of sex and in some cases became one of the triggers for rape. This research is only limited to sexual communication and knowledge on puberty. For the future studies may need to be conducted on sexual health practices, such as the use of condoms to prevent unwanted pregnancy and sexually transmitted infections.

Research Funding

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Conflict of Interest: There is no conflicts of interest associated to this publication, and financial support could not influenced its outcomes due to a compulsory report for those students who are under Domestic-Indonesian Lecturer Excellence Scholarship.

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Analysis of the *Moringa oleifera* Seed Oil Extract on Insulin Level in Alloxan-Induced Diabetic Rat (*Rattus norvegicus*)

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Abstract

*Moringa oleifera* is a plant that can be used and grown intensively in several Southeast Asian countries. This study aims to determine the effect of *Moringa oleifera* seed oil extract on the levels of the insulin and blood glucose levels of *Rattus norvegicus* induced by alloxan. This study used 30 female Wistar white rats induced by alloxan. Rats were divided into 6 groups. Groups 3 to 6 were injected 100, 200, 300, 400 mg/kg BW extract of *Moringa oleifera* seed oil, respectively. Group 1 neither had alloxan induction nor treatment while group 2 had been induced alloxan but no treatment. Data were analyzed using the Kruskal-Wallis test with a significance level of 0.05. The results showed that there was no effect of *Moringa oleifera* seed oil extract on insulin level (*p* value = 0.161). Conversely, there was an effect on blood glucose levels in alloxan-induced *Rattus norvegicus* (*p* value = 0.036).

**Keywords:** Diabetes mellitus, *Moringa oleifera*, *Rattus norvegicus*.

Introduction

Diabetes mellitus (DM) is a metabolic disorder of various etiologies characterized by chronic hyperglycemia due to absolute or relative deficiency in insulin secretion/insulin action or both. The number of DM patients was 171 million in 2000, which might increase to 360 million by 2030. As the number of people with DM has doubled worldwide, national and international health care budgets have increased[1,2].

Despite the many advances in therapy using expensive synthetic drugs, herbal medicines are growing. It is called not only effective with low side effects in clinical experience but also relatively spend the low cost. Herbal medicines or extracts are widely prescribed, even when the biologically active compounds are unknown[3,4]. Traditional medicine is generally obtained from natural ingredients[5]. One of the plants that has potential for traditional treatment is the *Moringa oleifera* plant.

*Moringa oleifera* is a plant that grows intensively in several Southeast Asian countries. This plant has been used for a long time since its compositions are good for traditional medicine. Almost all parts of the *Moringa* plant can be utilized especially the *Moringa oleifera* seeds. The use of *Moringa oleifera* seed oil extract can reduce blood glucose levels in hyperglycemic mice[6]. Szkudelski found that the main phytochemical element in *Moringa oleifera* seed extract is flavonoids. Bioflavonoids are known for their multi-directional biological activities including hypoglycemic effects[7].

Flavonoids are one of the most common groups of secondary metabolites found in plant tissues. Flavonoids act as an antioxidants by donating hydrogen atoms or chew metal in the form of glucosides which contain glucose side chains) or aglycones[1,2,3,4]. Extract of *Moringa oleifera* seed significantly can reduce alloxan-induced hyperglycemia because it contains not only elements like phytochemicals and micronutrient but also quercetin and kaemferol. Besides, kaemferol also have hypoglycemic activity[8].

Considering that *Moringa oleifera* plants are very potential but it is a lack of data showing the effect of *Moringa oleifera* seed oil can increase the blood insulin levels, this research aims to have further study. An extract of *Moringa oleifera* seed oil will be investigated at a dose of 100 mg/kg BW, 200 mg/kg BW, 300 mg/kg BW and 400 mg/kg BW to observe its effect on insulin levels in alloxan-induced diabetic rats. The effect of *Moringa oleifera* seed oil extract on the insulin and blood glucose levels of alloxan-induced *Rattus norvegicus* will be investigated.
Materials and Method

This study had a laboratory experimental research using a completely randomized design (CRD) in six treatment groups with five replications (6x5). This study used 30 female Wistar white rats with 30 treatment that consist of: Group 1 (K1): control animals that are only given food and drink without alloxan induction and treatment; Group 2 (K2): animals induced by alloxan without treatment; Group 3 (K3): alloxan-induced animals, and injected 100 mg/kg BW of *Moringa oleifera* seed oil extract orally; Group 4 (K4): alloxan-induced animals, and injected 200 mg/kg BW of *Moringa oleifera* seed oil extract orally; and Group 5 (K5): alloxan-induced animals, and injected 300 mg/kg BW of *Moringa oleifera* seed oil extract orally.

Alloxan monohydrate induction was given using intraperitoneal injection methods. Alloxan monohydrate powder was diluted using 0.95% NaCl saline water at a dose of 150 mg/Kg BW by measuring the body weight of experimental animals first. Injection was applied into the abdominal cavity through muscular tissue using a 1 mL syringe. *Moringa* seed oil injection was applied using the per oral method. The density of *Moringa* seed oil was created by having 1 ml of oil and measuring its mass through analytical balance. Injection volume is adjusted to the dose and weight of an experimental animal. Administration of seedling extracts was carried out for 14 days and then on the 15th day all the rats were euthanized, their blood was drawn for analyzing insulin levels using the ELISA method.

Results

Animal insulin levels after 14 days treatment were measured using INS ELISA Kit 96 and the wells from MyBiosource. The following table show the results:

<table>
<thead>
<tr>
<th>Number</th>
<th>K1</th>
<th>K2</th>
<th>K3</th>
<th>K4</th>
<th>K5</th>
<th>K6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4,192</td>
<td>8,804</td>
<td>4,404</td>
<td>0,142</td>
<td>1,364</td>
<td>7,322</td>
</tr>
<tr>
<td>2</td>
<td>4,192</td>
<td>11,884</td>
<td>1,246</td>
<td>3,450</td>
<td>3,009</td>
<td>3,708</td>
</tr>
<tr>
<td>3</td>
<td>4,192</td>
<td>8,823</td>
<td>1,259</td>
<td>3,450</td>
<td>3,262</td>
<td>1,789</td>
</tr>
<tr>
<td>4</td>
<td>1,509</td>
<td>3,230</td>
<td>0,644</td>
<td>3,450</td>
<td>11,936</td>
<td>0,314</td>
</tr>
<tr>
<td>5</td>
<td>19,453</td>
<td>17,064</td>
<td>1,259</td>
<td>17,149</td>
<td>3,262</td>
<td>9,117</td>
</tr>
<tr>
<td>Mean</td>
<td>6,708</td>
<td>9,961</td>
<td>1,762</td>
<td>5,528</td>
<td>4,567</td>
<td>4,450</td>
</tr>
</tbody>
</table>

Table 2. Data Normality Test.

<table>
<thead>
<tr>
<th></th>
<th>Kolmogorov-Smirnov*</th>
<th>Shapiro-Wilk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulin</td>
<td>Statistic</td>
<td>df</td>
</tr>
<tr>
<td></td>
<td>.282</td>
<td>30</td>
</tr>
</tbody>
</table>

a. Lilliefors Significance Correction

Tabel 3. Kruskal Wallis Test

<table>
<thead>
<tr>
<th></th>
<th>Insulin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td>7.923</td>
</tr>
<tr>
<td>df</td>
<td>5</td>
</tr>
<tr>
<td>Asymp. Sig.</td>
<td>.161</td>
</tr>
</tbody>
</table>
This study revealed that the DM condition arises caused by alloxan, alloxan injection can affect pancreatic cells so that type 2 DM occurs with blood glucose levels increased. Measurement of blood glucose levels was carried out after alloxan was induced as much as 150 mg/kg BW intraperitoneally in 5 treatment groups (K2-K6). Besides, glucose levels were measured routinely until reaching hyperglycemic levels ≥126 mg/dL. On the 15th day after the treatment of *Moringa oleifera* seed oil extract, blood glucose levels were measured again with the following results:

**Table 4. Blood Glucose of Rats (*Rattus norvegicus*).**

<table>
<thead>
<tr>
<th>Number</th>
<th>K1</th>
<th>K2</th>
<th>K3</th>
<th>K4</th>
<th>K5</th>
<th>K6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>86</td>
<td>116</td>
<td>147</td>
<td>435</td>
<td>130</td>
<td>111</td>
</tr>
<tr>
<td>2</td>
<td>79</td>
<td>126</td>
<td>132</td>
<td>121</td>
<td>118</td>
<td>141</td>
</tr>
<tr>
<td>3</td>
<td>132</td>
<td>189</td>
<td>425</td>
<td>112</td>
<td>443</td>
<td>153</td>
</tr>
<tr>
<td>4</td>
<td>108</td>
<td>600</td>
<td>118</td>
<td>336</td>
<td>124</td>
<td>122</td>
</tr>
<tr>
<td>5</td>
<td>88</td>
<td>346</td>
<td>152</td>
<td>118</td>
<td>168</td>
<td>128</td>
</tr>
<tr>
<td>Mean</td>
<td>98.60</td>
<td>275.40</td>
<td>194.80</td>
<td>224.40</td>
<td>196.60</td>
<td>131.00</td>
</tr>
</tbody>
</table>

**Table 5. Data Normality Test.**

<table>
<thead>
<tr>
<th>Blood Glucose</th>
<th>Kolmogorov-Smirnova</th>
<th>Shapiro-Wilk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistic</td>
<td>df</td>
</tr>
<tr>
<td></td>
<td>.336</td>
<td>30</td>
</tr>
</tbody>
</table>

a. Lilliefors Significance Correction

**Table 6. Kruskal-Wallis Test.**

<table>
<thead>
<tr>
<th>Blood Glucose</th>
<th>Chi-Square</th>
<th>df</th>
<th>Asymp. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11.938</td>
<td>5</td>
<td>.036</td>
</tr>
</tbody>
</table>

a. Kruskal Wallis Test

b. Grouping Variable: Group
Discussion

Table 1 shows that the highest average insulin level is in group K2 or alloxan-induced animals without *Moringa oleifera* seed extract. Then, the lowest result was in the group K3 (alloxan-induced animals, and injected 100 mg/kg BW seed oil extract orally). The increase of hormone levels due to antioxidant levels in *Moringa oleifera*. *Moringa* seed oil regenerates β-pancreatic cells in pancreatic organs. Based on Chumark et al., phytochemical screening results from *Moringa oleifera* plant extracts showed the presence of secondary metabolites such as flavonoids, terpenoids, saponins, and tannins. Study has shown that terpenoids and flavonoids have hypoglycemic activity[9]. Anti-inflammatory and antioxidant effects reported from flavonoids can also play an important role in reducing insulin resistance[10,11,12,13,14].

Table 2 shows that Kolmogorov-Smirnov and Shapiro-Wilk test reveals data were not normally distributed on insulin levels (p value 0.000 < α 0.05). Then the data were statistically proceed using Kruskal-Wallis test as in Table 3. The Kruskal-Wallis test obtained a significance value of 0.161 > 0.05. Since the significance is greater than specified value then H₀ is accepted and H₁ is rejected. It means that there is no difference in blood insulin levels on alloxan-induced mice.

Hypothesis called that administration of *Moringa oleifera* seed is possible to increase blood insulin levels. Ethanol extract of *Moringa oleifera* leaves has strong anti-diabetic activity because it not only decreases the lowers blood glucose levels but also increases insulin sensitivity and functional beta cells in diabetic mice[14]. There are some possible mechanisms for hypoglycemic action such as stimulation of pancreatic insulin secretion and improving tissue insulin resistance. Further research is needed to ascertain the right mechanism for the anti-diabetes effect of plant extracts and secondary metabolites involved.

The therapeutic use of *Moringa oleifera* leaves has been evaluated in diabetes since their capacity to reduce blood glucose concentration. It contains polyphenols such as quercetin-3-glycosides, routine, kaempferol and glycosides. Blood sugar decreased due to *Moringa oleifera* therapy can be observed on fasting blood glucose, oral glucose tolerance test and post prandial glucose in diabetic rats, in an average decrease of 25% or more. The antidiabetic activity of *Moringa oleifera* seed powder has been observed.

In mice, glucose and amelioration of lipid peroxide levels decreased. It reduced IL-6 level and immunoglobulin A compared with positive control of diabetes in both insulin-resistant and insulin-deficient bioassays. Meanwhile Sandanamudi et al. showed that *Moringa oleifera* contained soluble fiber which increased amelioration of glucose levels, lymphocyte proliferation and nitric oxide induced from macrophages[15]. Another study observed *Moringa oleifera* fortification in diabetes can reduce fasting blood glucose. It not only reduces the entry of glucose into the mitochondria and but also releases reactive oxygen species. Besides, it also promotes glycation end products (AGEs) which increase cell adhesion and inflammation in diabetic patients. Treatment with *Moringa oleifera* has shown that after histological examination of the pancreas of diabetic rats, significant damage is reversed in the histoarchitecture of the islets of Langerhans[16].

Having several studies carried out, it is revealed that the administration of *Moringa oleifera* seed oil extract can increase blood insulin levels in rats through the mechanism of pancreatic insulin secretion stimulation. It also improves insulin resistance in tissues by active compounds contained therein such as flavonoids, sterols, triterpenoids, alkaloids, saponins, and phenolics. Statistically, the rise of insulin hormones in treated mice still occurred although it was not significant. The increase of hormone levels almost reaches a significant value since the levels of antioxidants in *Moringa oleifera*. *Moringa oleifera* seed oil regenerates β-pancreatic cells in pancreatic organs. These cells produce insulin which is secreted when the blood sugar levels rise. In addition, glucose change to fat requires insulin which is produced by langerhans, a group of cells in the pancreas. High glucose levels with insulin increase cholesterol levels in the blood. Vitamin D is important for secreting insulin in the pancreas. This study shows that individuals with low vitamin D levels are very bad at handling blood sugar and a higher risk of having diabetes[17].

Insulin resistance is a condition showing a low potential for endogenous and exogenous insulin. An assessment of homeostatic model (HOMA) β cell function and insulin resistance (IR) was first described in 1985[18]. This technique is a method for assessing the function of β and IR cells from basal glucose and insulin or C-peptide concentrations. This model has been widely used since it was first published. Therefore, we present
here an overview of the model and its proper use and limitations in clinical science.

Insulin resistance is a disruption of insulin in metabolic response where blood glucose levels increase. It requires more levels of insulin to make blood sugar levels back to normal (normoglycemic). Insulin resistance occurs in the target cell receptors on skeletal muscle tissue and liver cells. Damaged receptors increase insulin secretion which is called hyperinsulinemia [19]. This study reveals that the highest blood glucose levels were in the K2 group which is called having positive control of DM rats (275.40 mg/dL). Meanwhile, the lowest glucose levels in the DM rats group were given Moringa oleifera seed oil extract (Moringa oleifera) dose 400 mg/kg BW (131 mg/dL). The Kolmogorov-Smirnov and Shapiro-Wilk tests determine whether the data distribution was normal or not. The results of Kruskal-Wallis test shows significance value of 0.036 < 0.05. Since the the significance is smaller than specified then H0 is rejected and Ha is accepted. It means that there is a differences in blood glucose levels on alloxan-induced mice.

Aloxan monohydrate will reach pancreatic tissue and attack β-pancreatic cells. The mechanism of aloxan monohydrate action cause oxidative stress on pancreatic tissue. It permanently damage the β-pancreas cells. Damage to β-pancreas cells decrease insulin levels and increase blood sugar (hyperglycemia). The aloxan monohydrate is used to make animals experienced with blood sugar increased (hyperglycemia) [20]. Statistical analysis showed that there was an increase in blood sugar levels due to the addition of Moringa oleifera. Moringa oleifera seed oil. It make fluctuation in the control until the treatment on group 5 (K1-K5). The highest increase occurred in group 6 (K6). Blood sugar increased because of Moringa oleifera L. level. Moringa oleifera seed oil is no longer effective even though it contains antioxidants.

The therapeutic use of Moringa oleifera leaves has been evaluated in reducing blood glucose because they contain polyphenols such as quercetin-3-glycosides, routine, kaempferol and glycosides. The blood sugar decreased can be noticed in different tests: fasting blood glucose, oral glucose tolerance test, and postprandial glucose in diabetic rats with an average decrease of 25% or more [4,20]. The antidiabetic activity of Moringa oleifera seed powder has been observed in mouse models. It shows decreased glucose, amelioration of lipid peroxide levels, reduced levels of IL-6, and immunoglobulin which was compared between positive control of diabetes in both insulin-resistant and insulin-deficient bioassays.

Meanwhile Sandanamudi et al. showed that Moringa oleifera contained soluble fiber which increased amelioration of glucose levels, lymphocyte proliferation and nitric oxide-induced from macrophages. In another study, fortification of Moringa oleifera in diabetes can cause fasting blood glucose decrease [15]. It reduces the entry of glucose into the mitochondria, reactive oxygen relief, and advance glycated end products (AGEs) [20]. Therefore, cell adhesion and inflammation increase in diabetic patients. Treatment with Moringa oleifera has shown that the pancreas of diabetic rats which is significantly damaged is reversed in histoarchitecture of islet cells after histological examination. Based on the explanation and some previous studies, it is called that there is no effect of Moringa oleifera seed oil extract in increasing rat blood insulin levels. It all carried out through stimulation of pancreatic insulin secretion and/or improvement of insulin resistance with flavonoids, sterols, triterpenoids, alkaloids, saponins, and phenolics.

**Conclusion**

In sum, Moringa oleifera seed oil extract can reduce blood glucose levels and can be used as a potential plant recommendation for traditional treatment of DM.

**Conflict of Interest**: The authors declare that they have no conflict of interest.

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**Acknowledgement**: We thank Arif Nur Muhammad Ansori for editing the manuscript. We thank to the LPPM, Universitas Islam Negeri Sunan Ampel, Surabaya, Indonesia for the support given during the study.

**Ethical Approval**: This study was approved by the Animal Care and Use Committee, Faculty of Veterinary Medicine, Universitas Airlangga, Surabaya, Indonesia.

**References**


Estimation of Age Using Kvaal Technique Based on Cone-beam Computed Tomography Images of Mandibular Canine Teeth in Bojnourd

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Abstract

Background and Objective: Identifying age in anthropology and forensic medicine and examining the proper development of children and adolescents is important. Age estimation techniques using teeth are of particular value. This study tends to evaluate the accuracy of age estimation by Kvaal technique using CBCT images of mandibular canine teeth in a sample of Iranian population.

Materials and Methods: In this crossvalidation study, data from 140 samples of records of patients aged 15 years and older, during 2018-2019, available at a private oral and maxillofacial radiology center in Bojnourd was used. The parameters used in Kvaal technique were measured in mandibular canine teeth on CBCT images of patients.

Results: Using multiple linear regression model to correlate parameters of Kvaal technique based on CBCT images of mandibular canine teeth and age with stepwise method showed that variables pulp length/root length, pulp width/root width in the middle, length teeth/root length were significant in predicting age (p<0.05 in all 3 cases). According to the above method, age = 551/5-500 (M) was obtained which was able to estimate age in 35% of the samples. The mean age of the patients was estimated to be 7.9 years, which is acceptable.

Conclusion: Kvaal formula was significant for use in Iranian population. The regression formula obtained from the control group could also be generalized to the test group.

Keywords: Age Estimation Using Tooth, Mandibular Canine Tooth, Cone-beam Computed Tomography, Forensic Dentistry

Introduction

Teeth are used when none of identification techniques is not satisfactorily used. In most adverse conditions, such as degradation of a cadaver or floating in the water for a long time, there is the slightest change in texture of tooth compared to other parts of the body.¹² The tooth is the hardest body tissue and has the highest resistance to trauma, external factors, and other factors³ and can withstand the effects of long-term physical, chemical, mechanical damages and passage of time, and also remains intact years after death, but is at least affected by nutritional factors, environment and living conditions.⁴ Forensic dentistry is a major contributor to estimation of age of corpses, immigrants and wanted criminals.⁵ However, age estimation in adults is challenging in both anthropological and judicial settings compared to adolescents due to full maturity of individual teeth and bones and inaccuracy of techniques based on degenerative process.⁶ Age estimation is
still a major challenge in forensic medicine. Several methods have been employed for this purpose, and a range of results have been obtained. In 1995, Kvaal invented a non-destructive technique for age estimation based on measurement of dental pulp and root space in 6 radiographic types, which have been adopted by the American Academy of Forensic Sciences. This technique is completely based on measurements of radiographic images and does not depend on other factors such as root transparency and periodontal retraction and therefore no tooth extraction is required. Based on dental ratios including tooth length, pulp length, root length and root width in three regions of CEJ, middle part of the root and between these two regions, and by examining the mean of these items, a formula can be obtained which is helpful in estimating age. Therefore, problems with undesirable tooth angle as well as superimposition will be resolved. Due to inconsistent results in previous studies and lack of consensus on efficacy of Kvaal technique in a sample of Iranian population as well as the lack of implementation of this project in North Khorasan province, this study tends to evaluate effectiveness of this technique in this province.

Materials and Method

Studied Population, Sample Size and Sampling

Participants included people referred to a private oral and maxillofacial radiology center in North Khorasan Province who required CBCT imaging and were older than 15 years. Based on previous studies, assuming type I error 0.05 (α = 0.05) and type II error 0.2 (β = 0.2), i.e. 80% test power, and taking into account minimum coefficient of correlation (r = 0.25), the sample size was set at 110 and 30 patients were considered for the control phase (13). That is, CBCT images of 140 patients over 15 years were selected (to avoid possible confounding of age and to increase estimation accuracy, age range was set at over 15 years). After selecting the samples, CBCTs were randomly divided into two groups of 110 and 30 each. Samples were obtained from a privately owned oral and maxillofacial radiology center.

Data Collection and Validity and Reliability of Instruments

Images of all patients were analyzed using a CBCT device, Ray scan alpha 3D (LED medical diagnostics Inc., Atlanta, GA, manufactured in South Korea) previously made and exposure parameters 90 kvp, 10 mA and 14.3s with standard resolution were used. In this study, mandibular canine teeth were used to estimate age, because they had a larger pulp and a longer probability of remaining in the mouth. The relevant parameters were calculated by OnDemand 3D dental software by oral and maxillofacial radiologist. Finally, data was transmitted via DICOM format to DVD.

Method

Factors evaluated by Kvaal technique for estimating age include:

- T: maximum tooth length
- P: maximum pulp length
- R: root length from CEJ to apex
- A: root width at CEJ (level A)
- C: root width at middle root level (level C)
- B: root width at midpoint between CEJ and root center (level B)

By software adjustment in coronal and axial dimensions of multiple planar reconstruction (MPR) images, sagittal cut of tooth containing the entire length of the crown and root. Then, using OnDemand 3D dental software, all of the above were measured by a radiologist after reorienting and reslicing in the sagittal dimension on sample teeth. Then, by using the above 6 measurements, 6 ratios was obtained including:

- T: tooth length/root length, P: pulp length/root length, R: pulp length/tooth length, A: pulp width/root width at level A, B: pulp width/root width at level B, C: pulp width/root width at level C.

The mean of all the above was calculated and included in the study as a new variable (M). First, the regression formulas first derived by Kvaal et al for age estimation using canine tooth, as age = 158/8-255/7(M), were set as template and used for the data (M mean of all ratios defined). In order to compare the results of this study with Kvaal results, mean of 6 variables mentioned above was calculated as record for each studied unit and considered as new independent variable M. This new variable was substituted in the above regression equation. By modelling the Kvaal regression model, mean of all the ratios was used; by SPSS software (version 22), the corresponding equation was obtained by using the obtained data for the Iranian population.
2.5. Ethical Considerations

In this study, CBCT images archived in a private oral and maxillofacial radiology center were used; thus, no intervention was performed for the studied patients. All information obtained from the patient records remained confidential. There was no specific ethical prohibition in this study. The plan did not contradict international treaties on medical sciences such as Nuremberg and Helsinki. All collected checklists were confidential and the results were reported only in general terms.

Results

The general regression formula for estimating age is \( M = a + b \times (x) \), where \( x \) is the estimated age; thus, \( x \) (age) = \( a + b/M \). The regression equations were derived from the above equation (Table 1). Using Kvaal technique and modeling their regression equation for canine tooth, \( M = 0.784-0.001 \) (age) was set for current data; thus, age = 784 – 1000 (M). As mentioned before, \( M \) is the mean of all data. The above equation was more acceptable than the Kvaal equation but it was able to estimate age in only 21 samples (15%). Therefore, by examining the correlation tables between each variable with age, it was found that three variables were not correlated with age. Thus, the three variables B, A and R were excluded. Excluding the three variables mentioned and substituting them into the formula above, \( M = 1.103-0.002 \) (age), again yields a new regression formula: age = 551.5-500 (M). In the formula above, three variables T, P, C were used to obtain the new \( M \) (Table 2). The formula was effective in 50% (35%) of patients, indicating a higher accuracy than the original formula. The second formula, by excluding variables that did not correlate with age, had a correct estimation of age in 50 patients. By analyzing variable data of these 50 people, it was found that this formula could accurately estimate the age when these variables were in a specific range: \( T = 1.47-1.70, \ P = 1.22-1.41, \ C = 0.06-0.38, \) and \( M = 0.96-1.09 \). Outside these ranges, this formula is not responsive (Table 3).

Table 1. Components of linear regression equation in SPSS by using mean of six variables

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
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<tr>
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<td>Beta</td>
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<tr>
<td>AGE</td>
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<td>.000</td>
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<td>-2.629</td>
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</tbody>
</table>

a. Dependent Variable: mean of 6 items

Table 2. Components of linear regression equation in SPSS using mean of three variables

<table>
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<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>T</th>
<th>Sig.</th>
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<td>Std. Error</td>
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a. Dependent Variable: mean2
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<th>VAR00003</th>
<th>VAR00007</th>
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<tbody>
<tr>
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<td>50</td>
<td>50</td>
<td>50</td>
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<tr>
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<tr>
<td>Mean</td>
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<td>1.2916</td>
<td>.1912</td>
<td>1.0276</td>
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<tr>
<td>Std. Deviation</td>
<td>.05496</td>
<td>.03825</td>
<td>.05641</td>
<td>.02479</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>.23</td>
<td>.19</td>
<td>.32</td>
<td>.12</td>
<td></td>
</tr>
<tr>
<td>Minimum</td>
<td>1.47</td>
<td>1.22</td>
<td>.06</td>
<td>.96</td>
<td></td>
</tr>
<tr>
<td>Maximum</td>
<td>1.70</td>
<td>1.41</td>
<td>.38</td>
<td>1.09</td>
<td></td>
</tr>
</tbody>
</table>

The distance between mean age of the patients and the age estimated by the formula derived from mean of three variables was 7.9 years, which is acceptable (less than 10 years). Moreover, the distance between mean age of the patients based on the formula derived from mean of 6 variables was 8.34 years (Tables 4 and 5).

**Table 4. Difference in mean age estimated and real age of participants by SPSS using mean of three variables**

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<td>Mean</td>
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<tr>
<td>Std. Deviation</td>
<td>27.27655</td>
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**Table 5. Difference in mean age estimated and real age of participants by SPSS using mean of six variables**

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<td>Mean</td>
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<td>Std. Deviation</td>
<td>40.74321</td>
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</table>

**Discussion**

The results of our study showed that Kvaal method parameters used on human mandibular canine is effective for predicting age in adults in our studied Iranian population. Although there is a stronger correlation between age and three T, P and C variables of mandibular canine, other variables other than these variables should be considered in predicting age in Iranian population. The reason for using secondary dentin in this study is because it is surrounded not only by harder tissues such as enamel and cementum, but also by primary dentin. Consequently, this parameter used for internal evaluation is significant due to its potential to eliminate the effect of environmental factors on human remains. Given the phenomenon that due to anthropological differences between different ethnic populations, a formula devised for one population may
not be applicable to other populations, we conducted this study for the Iranian population. However, this phenomenon can be due to two-dimensional radiographic images that cannot provide accurate information about a 3D object. Sakhdari et al. obtained the age estimation equation by using pulp-to-surface ratio by digital panoramic radiographs from 120 patients over 12 years. They finally reported that pulp-to-surface ratio (AR) as a pure indicator cannot be used alone to determine an individual’s age, but can be used in combination with other indices to estimate age.

In the present study, measurements were made on mandibular canine alone because of advantages of the mandibular canine teeth, and we used CBCT images that were more accurate than panoramic images with no magnification problems or angular limitations. In the present study, we evaluated the secondary dentin deposition in mandibular canine teeth using Kvaal parameters. Cantekin used the Demirjian classification to estimate evolution of the third molar, which is a qualitative method based on images, while the present study is based on measurement of Kvaal parameters on teeth which is a quantitative method and the operator is less involved in than in a qualitative study; this study, as our study, was efficient in age estimation. Kanchan-Talerja et al. evaluated versatility of the Kvaal method for estimating dental age in the Indian population and observed that there was a large difference between actual age and the age predicted using this method. They thus argued that this large error in the Kvaal formula for estimating age in the Indian population could be due to secondary dentin deposition rate influenced by both genetic and environmental factors in Indians. The present study is based on CBCT images that have higher accuracy than periapical images and especially angle bisector technique. In the present study, the results of crossvalidation in the control group showed less real and predicted age difference than the above study. Hazhastar et al. (2011) investigated the estimation of human dental age by calculating a pulp/tooth volume ratio based on CBCT images obtained clinically from single rooted teeth. Finally, they found that age estimation was gender-independent, and the highest association between pulp-tooth volume ratios and age in their study was related to incisors. Kvaal suggested to obtain a specific regression formula for each population. Therefore, the regression formula obtained by Kvaal et al. for mandibular canine was not appropriate for estimating age in our studied population. However, since there was a significant relationship between age and P, C and T variables, there is a need for further investigation in Iranian population to identify other potential interfering factors and to include them in the regression formula. Kvaal used periapical radiography in the original study, and we used CBCT images in the present study to correct the errors of simple radiographic technique.

**Conclusion**

The Kvaal formula was suitable for use in the Iranian population, but it seems that other variables besides those studied here should be considered for age estimation based on application of the Kvaal formula in mandibular canine teeth.

It is recommended that this study be performed on other teeth in the future. It is also recommended to compare different imaging methods with each other and to evaluate the volume methods of pulp to tooth ratio in future studies.

**Conflict of Interest:** Authors have declared that no competing interests exist.

**Funding:** None

**References**


The Effect of Acceptance and Commitment Therapy on the Quality of Life of Post Stroke Patients in Aloei Saboe Hospital

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²Researcher, Faculty of Public Health, Universitas Gorontalo

Abstract

Quality of life is a global concept that emphasizes dimensions of health status including finance, housing, and work. The quality of life of post-stroke sufferers can experience disturbances or obstacles due to physical disabilities, cognition, psychological and social disorders. The purpose of this study was to determine the effect of ACT interventions on changes in the quality of life of post-stroke patients at Aloe Saboe Hospital. The method used in this research is quasi-experimental research method pre-posttest with the control group. The sampling technique used was the purposive sampling technique. The number of samples studied was 60 respondents divided into the experimental group (ACT Therapy and health education) and the control group (health education). The variables used are independent variables namely ACT therapy and the dependent variable is the quality of life of patients after stroke. Based on the results of the analysis, there is an effect of ACT intervention on improving quality of life in post-stroke patients as evidenced by the results of t count = -9.015, then the Significant value is 0.000. This shows that the value of p <0.05 then Ho is rejected, so the research hypothesis is proven that there is an effect of ACT therapy on the quality of life of post-stroke patients at Aloei Saboe Hospital, Gorontalo City.

Keywords: ACT; post-stroke; quality of life; therapy; acceptance; commitment

Introduction

Stroke is a disease in the brain in the form of impaired local or global nerve function that appears suddenly, progressive, and fast. Impaired nerve function in stroke is caused by nontraumatic brain blood circulation disorders. Symptoms that cause paralysis of the face and limbs, speech is not smooth and impaired vision. Stroke can be interpreted as any damage to the brain of the central nervous system caused by abnormalities/abnormalities of blood vessels. The term stroke is always used when the symptoms occur acutely, while the term cerebrovascular disease is used more generally and is not related to the time of brain damage. The World Health Organization (WHO) states that stroke is a functional impairment of vocal and global brain affecting the quality of life of sufferers.(¹)

The incidence of stroke in Indonesia has been declining over time but the prevalence of rates has increased. This shows that the number of old stroke cases increases each year, thus meaning more people with disabilities due to stroke so that the rehabilitation function is more important. Stroke recovery rates are still low, as many as 15-30% sufferers will experience paralysis or permanent disability, loss of voice or memory and various other consequences. About 25% of stroke patients die within the first year after a stroke and 14-15% experienced a second stroke in the same year after a first stroke.(²)

According to the 2013 Basic Health Research (Riskesdas) data, the prevalence of stroke in Indonesia is 12.1 per 1,000 population. That number is up compared to Riskesdas 2007 which amounted to 8.3 percent. Judging from its characteristics, many strokes are experienced by
the elderly, have low education, and live in cities. Based on data from Aloe Saboe Hospital, Gorontalo City, it was found that there were 1560 stroke sufferers in nerve poly consisting of 739 Hemorrhagic stroke sufferers and 821 Non-Hemorrhagic Stroke sufferers.

Acceptance and commitment therapy (ACT and Commitment Therapy / ACT), is one of the most popular therapies today and is considered more flexible and more effective in handling various cases. This therapy teaches patients to accept thoughts that are distracting and considered unpleasant by placing themselves following their values so that patients will accept existing conditions.\(^3\)

Acceptance and commitment have a huge impact on the development of patients with anxiety to be better. Commitment means an agreement (attachment) to do something. ACT is very effective in creating acceptance, attention and being more open in developing the capabilities of depression, anxiety, drug abuse, chronic pain, schizophrenia patients and is very effective as a model of self-training. Therefore ACT is expected to improve the quality of life in patients with post-stroke.

The results of Bays\(^4\) in the United States showed a decrease in the quality of life of post-stroke patients including daily activities, communication patterns, social activities, work, rest and recreation. Declining quality of life can affect the lives of sufferers and caregivers. Therefore the family also plays a role in improving the quality of life of sufferers. According to Nurrohma\(^5\), quality of life as a center for health promotion, quality of life is based on three areas of human life that are important dimensions in human experience, namely: Being, Belonging and Becoming. These three things occur due to interactions between a person and his environment.

Based on the description that has been explained, the researcher is interested in researching with the title the effect of acceptance and commitment therapy on the quality of life of patients after stroke in Aloe Saboe Hospital, Gorontalo City.

**Method**

This research was conducted at the Regional General Hospital (RSUD) Aloe Saboe Gorontalo City. This type of research is a quasi-experimental research pre-post test with a control group. This research was a type of research that tests an intervention in a group of subjects with a comparison group. The intervention that was tested was the provision of ACT, which in the implementation stage was modified by researchers using a spiritual approach. The study population was patients who visited the Aloe Saboe Hospital in Gorontalo City, amounting to 60 patients who were determined by the purposive side technique. The sample used was by the inclusion criteria set by the researchers, namely a) outpatients diagnosed after stroke; b) experiencing changes in quality of life; c) the level of consciousness of compos mentis; d) cooperative and willing to be respondents given ACT therapy. Data were collected using a demographic data questionnaire, namely the WHOQOL-BREF quality of life questionnaire, which contained aspects of quality of life that included physical dimensions, psychological dimensions, social relations dimensions, and environmental dimensions. Besides, an examination of risk factors, namely blood pressure, and cholesterol to see the effect on the quality of life. Data were analyzed by paired sample t-test to prove the research hypothesis by looking at differences in quality of life in the intervention and control groups before and after the intervention. To determine the homogeneity of variables between the intervention group and the control group, the equality test was conducted. The independent sample t-test was used to determine the differences between the two groups. A multivariate analysis process was carried out to prove the relationship between the characteristics of post-stroke patients with the quality of life.

**Findings**

The results of the study are presented in the table 1. Based on the table 1, it shows that the characteristics of respondents consisted of gender, age, last education, and last occupation.
Table 1. Characteristics of respondents

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<th>Control</th>
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</thead>
<tbody>
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<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Gender</td>
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<td></td>
<td></td>
</tr>
<tr>
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<td>53.3</td>
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<td>· Female</td>
<td>14</td>
<td>46.7</td>
<td>17</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Adult (16-45)</td>
<td>5</td>
<td>16.7</td>
<td>8</td>
</tr>
<tr>
<td>· Elderly (46-&gt;65)</td>
<td>25</td>
<td>83.3</td>
<td>22</td>
</tr>
<tr>
<td>Last Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>· High</td>
<td>10</td>
<td>33.3</td>
<td>17</td>
</tr>
<tr>
<td>· Low</td>
<td>20</td>
<td>66.7</td>
<td>13</td>
</tr>
<tr>
<td>Last Occupation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Employee</td>
<td>19</td>
<td>63.3</td>
<td>21</td>
</tr>
<tr>
<td>· Unemployed</td>
<td>11</td>
<td>36.7</td>
<td>9</td>
</tr>
</tbody>
</table>

Based on table 2, there is an influence of cholesterol risk factors on quality of life before and after health care and ACT therapy in the treatment group with each value p-value = 0.000 (<0.05). and on hypertension risk factors there is no influence on the quality of life before the intervention with a p-value of 0.961, and after the intervention, there is an influence of hypertension risk factors on quality of life with a p-value = 0.000.

Table 2. Effect of risk factors on quality of life before and after health education and ACT therapy in the treatment group

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Quality of life</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good</td>
<td>Poor</td>
</tr>
<tr>
<td>Cholesterol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Normal</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>· Abnormal</td>
<td>0</td>
<td>12</td>
</tr>
<tr>
<td>After</td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Normal</td>
<td>18</td>
<td>2</td>
</tr>
<tr>
<td>· Abnormal</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Hypertension</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Normal</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>· Abnormal</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>After</td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Normal</td>
<td>27</td>
<td>0</td>
</tr>
<tr>
<td>· Abnormal</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>
Based on the table 3 there was no influence of cholesterol risk factors on quality of life before the provision of health education in the control group with a p-value = 0.0196 (>0.05) as well as after the intervention did not affect with a p-value = 0.0196 (>0.05). For risk factors for hypertension also did not have a good effect before the intervention with p-value = 0.0196 (>0.05) and after the intervention with p-value = 0.0196 (>0.05).

Table 3. Effects of risk factors on quality of life before and after health education and ACT therapy in the control group

<table>
<thead>
<tr>
<th>Risk factor</th>
<th>Quality of life</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good</td>
<td>Poor</td>
</tr>
<tr>
<td>Cholesterol</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Normal</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>· Abnormal</td>
<td>7</td>
<td>3</td>
</tr>
<tr>
<td>After</td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Normal</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td>· Abnormal</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>Hypertension</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Normal</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td>· Abnormal</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>After</td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Normal</td>
<td>12</td>
<td>3</td>
</tr>
<tr>
<td>· Abnormal</td>
<td>11</td>
<td>4</td>
</tr>
</tbody>
</table>

Based on the table 4, there was an effect of providing health education and ACT therapy in the experimental group with a p-value of 0.000 (<0.05). In the control group that was only given a health education intervention p-value = 0.139 (>0.05) then there was no effect of the intervention on quality of life.

Table 4. Influence of intervention on group experiments and control

<table>
<thead>
<tr>
<th>Group</th>
<th>Quality of Life</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Good</td>
<td>Poor</td>
</tr>
<tr>
<td>Experiment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Health Education and ACT)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>1</td>
<td>29</td>
</tr>
<tr>
<td>After</td>
<td>26</td>
<td>4</td>
</tr>
<tr>
<td>Control (Health Education)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>16</td>
<td>14</td>
</tr>
<tr>
<td>After</td>
<td>23</td>
<td>7</td>
</tr>
</tbody>
</table>
Discussion

According to Wijaya & Putri (6), the incidence of stroke increases with age. Data reported by the American Heart Association in the Heart Disease and Stroke Statistics-2011 Update that young stroke sufferers between 20-45 years have increased dramatically in recent years. In 2009 the age range of ischemic stroke patients was between 20-60 years, with an average age of 58.8 years. Meanwhile, in 2010 the age range of ischemic stroke patients was between 24-90 years with an average age of 48 years. This shows that both in Indonesia and in the world, stroke has attacked many productive ages and even children.(7)

Based on the results of the study, the gender frequency distribution of stroke clients in this study was more dominated by men. This is in line with the theory that men are more often found to suffer a stroke than women.(8) Bowman also revealed that the incidence of stroke in men was slightly higher than in women, this difference occurred probably related to the increased incidence of hypertension and diabetes in the group. (9) The study is in line with the theory that men are more at risk of stroke than women, with a percentage of 20 percent higher in men than women. But after a woman turns 55, when estrogen levels decrease due to menopause, the risk is actually higher than men.(4)

The results of the analysis of the relationship between work and the incidence of stroke show that most respondents have jobs. Researcher’s assumption, there is a significant relationship between work and the incidence of stroke. Work is a risk factor for stroke. This might be caused by the relationship between work and one’s stress level. A large workload, the salary that is not as expected, and pressure from superiors can trigger stress and be a risk factor for stroke. Stressful conditions can produce the hormones cortisol and adrenaline which contribute to the process of atherosclerosis. This happens because the two hormones increase the platelet count and the production of cholesterol which can damage cells lining the arteries making it easier for fat tissue to be buried in the artery walls.(5)

The analysis showed that cholesterol risk factors before and after health education and ACT intervention had a significant effect on improving the quality of life of respondents. Meanwhile, the risk of hypertension after being given health education and ACT Interventions has a significant effect on improving the quality of life of respondents. Researcher’s assumption that cholesterol and hypertension are risk factors that affect the quality of life of respondents after a stroke due to increased body cholesterol can cause atherosclerosis and the formation of fat embolism so that blood flow slows into the brain, brain perfusion decreases.(6)

Based on the results of the study, it shows that before being given ACT therapy the average quality of life score in the intervention group had a mean value of 67.0 with the bad category. And after the intervention, it becomes 81.0 with a good category. The researcher’s assumption, this shows an increase in the quality of life score that shows the increased quality of life experienced by respondents. ACT therapy with a spiritual approach to quality of life can be said to be influential because it gets the result of t count = -9.015, then significant is 0.000. an important role in determining abnormalities. Neurons or nerve cells are the basic units of structure and function in the nervous system. Neurons are communicators that send information between the body and brain.(7)

Emotional problems are common, anxiety and depression reactions are left-brain damage reactions while the damage to the right brain often causes a strange feeling or different from the situation at hand. This is experienced by many stroke patients. They cannot assess precisely the damage done. As a result, depression arises as a symptom that often accompanies this disease. Thus, psychospiritual assistance is very helpful in dealing with depression in dealing with this disease.(8) In implementing ACT therapy, researchers modify the therapy given at each stage with a spiritual approach.

At the ACT therapy stage which is the stage of “practicing accepting selected events and values”, the spiritual approach taken is to understand that illness, recovery, and treatment are provisions and decrees from God. Similarly, at the ACT stage “commit and prevent recurrence”, it was conveyed that prevention and treatment efforts can be done by surrendering and getting closer to God.

Some neurologists examine the existence of a god spot (God’s point) in the human brain. This spiritual center is located between the connections of nerves in the temporal lobe of the cerebrum. Based on observations using emission topographic observations and positrons, the area reacts when the research subjects discuss topics with religion. Worship, regardless of religion, will lead us to focus attention in the mind with the aim of
contemplation. The activity, besides having a spiritual function, also has a health function. In the spiritual function, the prefrontal cortex will work actively. This area is associated with positive emotions and makes the cerebral cortex thicken, due to the growth of glial cells supporting neuron cells and neurons that show positive reactions by forming relationships between neurons or synapses. This synapse plays a role in the delivery of information to and from the brain.\(^9\)

Based on the results of the study, it shows that before being given a health education intervention, the average quality of life score in the control group had a mean value of 77.13 with a bad category. Then after the intervention, it becomes 78.80 with a good category. In this study, health education interventions on quality of life can be said to not affect because the results obtained \(t\) count = -1.520, then significant is 0.139. The researchers assume that ACT therapy with a spiritual approach is more effective in improving the quality of life of post-stroke respondents compared to health education in the control group because there is no significant difference between the quality of life scores before and after health education interventions are given. The control group only experienced an increase in the quality of life score of 1.67.

**Conclusion**

Based on the study it was concluded that the difference in the response to improving the quality of life in post-stroke patients in the intervention group with the control group, where after the intervention of respondents the ACT treatment group the average quality of life score increased to 81.0 while the improvement in the quality of life of the control group of respondents after being given health education became 78.8 this can be interpreted that the improvement in the quality of life of patients after stroke in the intervention group was higher than in the control group.

**Conflict of Interest**- No

**Source of Funding**- Authors

**Ethical Clearance**- Yes

**References**

Capsaicin’s Inhibition Effects on Biofilm Aerococcus Viridans

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Abstract

Introduction: Aerococci has colony shape with Streptococcus viridans, so that it is usually missdiagnosed between of them. It has high difficulty on its identification, because it is rarely to be found and resistant of Antibiotic grup, called penicillin and vancomycin.

Material and Method: This research used two kinds of samples, such as: fried food sold on the road and toothbrush obtained from ten respondens. Then, it needs inducing its biofilm and measuring by Tissue Culture Plate (TCP) methode and ELISA.

Result: ANOVA one-way revealed that extract capsaicin has anti biofilm effect on 12.5% concentration with p=0,0000 (p<0,05) among each group.

Conclusion: Extract capsaicin can be used as an alternative herbal agent to treat infection caused by Aerococcus viridans because it has antibiofilm effect. As known before, biofilm causes antibiotic resistance to treat Aerococcus viridans’s infection.

Keywords: UTI; antibiotic resistance; Bioterrorism; ELISA; traditional herbal medicine.

Introduction

Aerococcus viridans is a bacteria that found in 1953, rarely described on the literature. It has some abilities to infect and cause some diseases for human being. Its infection is usually treated by antibiotic, namely: trimethoprim, sulphametoxazole, and penicillin. Aerococcus viridans is able to form biofilm, so that it triggers its resistancy, especially since it has been known that Aerococcus viridans can live on the root canal of the tooth. It needs searching an alternative therapy to treat biofilm Aerococcus viridans. One of the traditional herbas that can be used as an alternative therapy to treat Aerococcus viridans’s infection is capsaicin. Capsaicin is an alcoaloid crystal which formula is C₁₈H₂₇NO₃. Indonesian civilization commonly use capsaicin as a mixing substance on their food and medicine. Capsaicin has some effects, such as strong stimulant on blood and heart, and anti-bacteria. It is agonist of Transient Receptor Potential Vanilloid-1 (TRPV-1) which functioning as vanilloid receptor, that can be found on every sensory nerve ending and release neuropeptides, such as Substance P (SP) and Calcitonine Gene Related Protein (CGRP).

Aerococcus viridans has a strong relationship in dentistry, especially with decayed tooth and supragingival plaque. Another reason is Aerococcus viridans relates to the toothbrush, or everything that is usually used in oral cavity, antibiotic which can trigger its resistance, and hospitalized patients. As mentioned before, it is possible that using Aerococcus viridans as a bioterrorism agent which can endanger human civilization.

Material and Method

Experimental design
This was an experimental laboratory research which was done on Research Centre Laboratorium of Faculty of Dentistry Universitas Airlangga. There were two kinds of samples used in this research, such as: sample that was obtained from fried food sold on the road and sample was obtained from toothbrush’s. This research have been approved by the ethical committe of Faculty of Medicine Airlangga University 288/EC/KEPK/FKUA/2019.

**Experimental procedures**

![Figure 1. Samples that obtained from two kinds of samples, such as: toothbrush and food.](image)

This research was conducted by using two kinds of samples come from fried food sold on the road and the toothbrush’s respondents after being used for ten days as shown on Figure 1. There were some criterias of the respondents, 18-35 years old and did not eat pig as their food. Methode used in this research was an experimental laboratory, post test only group control design and its replication were counted by Federrer. Samples both from food and toothbrush were swabbed and cultured in Blood Agar Plate (BAP) media (Oxoid). BAP then incubated 1x24 hours at 37°C. The suspect isolate bacterias were sent to the Balai Besar Laboratorium Kesehatan (BBLK) to be Vitec tested.

The induction process was done by culturing *Aerococcus viridans* into BHIB inserted to anaerobic jar and incubator which was given gas kit, so that it could be in anaerobic condition, and incubated 2x24 hours. The specimen then was sentrifuged (Thermo Scientific), collected using micropipet 50-250 µL (Titertek) and cultured to the ELISA. There were two times and materials of staining, the first was Crystal Violet 0,1 % 50 µl. After being given Crystal Violet, it was washed using PBS 200µl and replied two times. The biofilm specimen wes fixated using ethanol 50 µl and transfered to the new ELISA. The capsaicin extract then was diluted from 100% until 0,78125% on the test tube.10,11

**Test of antibiofilm effect of extract capsaicin against *Aerococcus viridans*’s biofilm**

![Figure 2. The test of biofilm *Aerococcus viridans* using ELISA and extract capsaicin from the concentration 100% - 0,78125%.](image)

After the biofilm of *Aerococcus viridans* formed, it then inserted to the tube together with the capsaicin extract to be tested using TCP methode shown Figure 2. This methode was to test the Optical Density (OD).10,11,12

**Analysis data**

The data obtained was statistically analyzed using ANOVA one-way with post-hoct from SPSS (Statistical Package for the Social version 25 and EZR commander). The differences between group and pairwise comparison...
was conducted using ANOVA one-way and continued with post hoc to know the difference with significant level of
0.05.

Results

![Image](image.png)

Figure 3. The suspect of colony *Aerococcus viridans* and proven using Vitek Test.

Figure 3 showed that it could be seen that there were some growth of *Aerococcus viridans* colony on BAP and its
proven was done by using VITEK which was proven by Kementrian Kesehatan Balai Besar Laboratorium Kesehatan
(BBLK) on Jalan Karang Menjangan. We had to test its normality of the data using Kolmogorrov-Smirnow which
was shown both on table 1.

### Table 1. Statistical Normality check using both SPSS for Windows version 25 and EZR among each
group.

<table>
<thead>
<tr>
<th>Group</th>
<th>P value (p&gt;0.05)</th>
<th>Skewness</th>
</tr>
</thead>
<tbody>
<tr>
<td>100%</td>
<td>0.8491</td>
<td>-0.397</td>
</tr>
<tr>
<td>50%</td>
<td>0.9772</td>
<td>-0.279</td>
</tr>
<tr>
<td>25%</td>
<td>0.9941</td>
<td>0.173</td>
</tr>
<tr>
<td>12.5%</td>
<td>0.9762</td>
<td>0.0201</td>
</tr>
<tr>
<td>6.25%</td>
<td>0.9167</td>
<td>-0.287</td>
</tr>
<tr>
<td>3.125%</td>
<td>0.9888</td>
<td>0.20</td>
</tr>
<tr>
<td>1.5625%</td>
<td>0.6509</td>
<td>0.747</td>
</tr>
<tr>
<td>0.78125%</td>
<td>0.6657</td>
<td>-0.542</td>
</tr>
<tr>
<td>Positive Control</td>
<td>0.9266</td>
<td>0.069</td>
</tr>
<tr>
<td>Negative Control</td>
<td>0.732</td>
<td>0.537</td>
</tr>
</tbody>
</table>

Table 1 showed about the normality check using Kolmogorrov-Smirnov test done by two kinds of statistic
program, namely: SPSS (Statistical Package for the Social Sciences, version 25) and EZR commander. The
distribution among each group was normal, so that the next step was to examine the different among each group
using ANOVA one-way which was also shown on the table 2. The p value and skewness of each group has been
shown on the table 1.
Anova-One way showed significant difference between group, p<0.05. a,b denotes significant differences between groups (post-hoc test)

Table 2 showed that there were significant differences among each group with the concentration of capsaicin extract using both ANOVA one-way from SPSS for Windows version 25 and EZR commander and the mean and standard deviation of each group. A substance that could inhibit the growth of biofilm, such as: the cut off value between 0 until 2 showed that weak biofilm, 2 until 4 showed moderate biofilm, and over the 4 showed that strong biofilm.
The minimum extract capsaicin which could inhibit the growth of *Aerococcus viridans* biofilm was 12.5% using TCP method. *Aerococcus viridans* biofilm qualification using TCP method can be seen on Figure 4. 13

**Discussion**

This study confirmed that extract capsaicin can be used as an antibiofilm traditional herbal to treat *Aerococcus viridans* infection which has two common life cycle, such as: planktonic and biofilm, which biofilm is a community of the bacteria which they are embedded in a extracellular polymeric substances. Bacteria which living on biofilm will be more resistant for any kinds of antibiotic. 14

This result has revealed that extract capsaicin has some active compounds, so that it can easily penetrate to the peptidoglycan layer of *Aerococcus viridans* layer. Observation of biofilm OD values in each study group was carried out using the TCP method which is quantitative method biofilms in vitro. The discussion in the 1st group, namely in the 100% capsaicin extract concentration group with *Aerococcus viridans* bacterial biofilms that had an OD cut value of 0.484, the 2nd group with a 50% capsaicin extract concentration that had an OD cut value of 0.891, 3rd group with 25% capsaicin extract concentration which has a cut off value of OD 1,290, 4th group with capsaicin extract concentration 12.5% which has a cut-off OD value 1,624, 5th group with capsaicin extract concentration 6.25% who have a cut-off value of OD 2.253, the 6th group with a concentration of capsaicin extract 3.125% which have a cut-off value of 2,625, the 7th group with a concentration of capsaicin extract 0.78125% which has a cut-off value of OD value 4,213. For the positive control group it has an OD cut value of 4,410 and a negative control group that has an OD cut value of 0.471. 10,11

Analysis conducted on several OD cut-off values with SD values for each group is in accordance with the TCP method theory, namely: the cut off value of biofilm OD in the concentration group of 100% to 12.5% has a range between 0 to 2 which means weak. Capsaicin extract concentration group of 6.25% to 1.5625% has a range between 2 to 4 which means moderate. The capsaicin extract concentration group of 0.78125% has an OD value of 4. It reflects the strongest biofilm strength. The difference in the OD cut-off value between each group is significantly different and supported by the ANOVA-one way test value between each group, namely: $p = 0.000$ which means that the $p$ value is below 0.05 so that there are Significant differences between each study group. 12,13

From the results of this research, capsaicin extract has an effect or inhibitory effect on Aerococcus viridans bacterial biofilms at a concentration of 12.5. This is consistent with the proven theory that capsaicin extract contains several active components, namely: carotenoids, phenols, flavonoids, alkaloids, and vitamin C. Flavonoids are chemical components explored in capsaicin, because they contain antibacterial compounds and removal of bacterial virulence. Flavonoids are also the largest and most polar phenol group, so they can easily penetrate into the peptidoglycan layer in both Aerococcus viridans and cause damage to cell walls. Peptidoglycan is an important component of gram-positive bacteria, especially Aerococcus viridans which functions as a protective barrier and material required for the attachment process of cleavage, morphogenesis, and bacterial pathogenesis. 14

Phenol is a compound for membrane damaging activity, activating enzymes, and denaturating proteins so that cause decrease in permeability to the cell membrane. Carotenoids, bind to porins which are transmembrane proteins found in the outer membrane of bacterial cell walls which resulting in damage to the porin and decreasing membrane permeability. Alkaloids inhibites the synthesis of cell membranes in bacteria and causes bacterial cells to be more permeable and its cytoplasmic contents easily leaving out. 14
Based on some of the things discussed above, it can be attributed to the bacteria Aerococcus viridans, biological bombs (bioterrorism), and the ability of capsaicin extract as an alternative ingredient in herbal medicine. Bioterrorism is the use of biological material as a weapon that threatens to health or death to the civilization. Bioterrorism has three types of categories, namely categories A, B, and C with the difference in each of these categories is for category A can cause high mortality rates, category B does not cause death but only causes high morbidity and category C consists of materials that can be designed to cause high levels of morbidity and effects on health care facilities. Based on the data presented above, the Aerococcus viridans bacteria can be a category B bioterrorism material because these bacteria can be easily obtained in nature and can cause high levels of morbidity. 15

**Conclusion**

Based on this research, the extract capsaicin can be used as an alternative herbal agent against the *Aerococcus viridans* biofilm.

**Conflict of Interests:** The authors declare that they have no conflict of interest in publishing this article.

**Sources of Funding:** The author and the co-authors acknowledges to Rector of Universitas Airlangga DIPA DITLITABMAS which number 519/UN3/2015, on March 26th 2015.

**Ethics Approval and Consent to Participate**

This study has been agreed by ethical commitee of Faculty of Medicine Airlangga University 288/EC/KEPK/FKUA/2019

**Acknowledgement:** The author would like to thank the Postgraduate School of Airlangga University and the chairman of Research Centre Faculty of Dental Medicine Airlangga University for facilitating the research.

**List of Abbreviations**

- UTI: Urinary Tract Infection
- TCP: Tissue Culture Plate
- OD: Optical Density
- ANOVA: Analysis of Varians
- PBS: Phosphate Buffer Saline

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The Evidence-Based Midwife Professionalism

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Abstract

Introduction: Midwife professionalism is the basic social contract between a midwife and society so that professionalism is considered to be very important. There are some cases related to midwife professionalism. Midwife as health practitioner should understand about midwifery practice very well. The midwife should realize that she works based on regulation and law.

Material and Method: The study was aimed to find out the professionalism in midwifery practice. Non-Doctrinal research was used as the research approach. The sample was taken with non-probability sampling, which is a snowball technique.

Findings: 93% of midwifery practices were qualified to administer code of ethics, 86% of midwifery practices were qualified to administer responsibility of midwifery practice, 93% of midwifery practices were qualified to precise collaboration and reference for midwifery practice, all the midwifery practices were qualified to administer continuing education in order to improve midwifery care, 93% of midwifery practices were qualified to competence for midwifery practice, 53% of midwifery practices were qualified to administer advocacy.

Conclusion: It can be concluded that the midwifery practice has fulfilled the professionalism indicators such as profession code of ethics, responsibility, precise collaboration and reference, continuing education, and competence. Nevertheless, there were some professionalism indicators which have not been fulfilled. It was giving advocacy. It was due to the lack of knowledge and comprehension about advocacy in midwifery practice.

Keywords: Professionalism, Midwife, Midwifery Service, Midwifery Regulation

Introduction

Midwife professionalism is the basic social contract between a midwife and society so that professionalism is considered to be very important¹. Midwifery is one of the professions in health area which based on theoretical knowledge, professional association, extensive education, competency test, institutional training, license, autonomous work, code of ethics, self-management, public service and altruism².

Midwifery regulation about midwife authority in administering the practice is regulated in Law No. 4 of 2019 about midwifery. Midwife authority is limited in term of health service administration. A midwife should only give help in physiological birth without complication when administering birth service. In addition, there are some residences which apply the policy that intranatal care should be administered at the public health clinic with the assistance of a midwife. In Semarang, there are only 7 referential public health clinics which become PONED (Basic Obstetric Neonates Essential Service). It is not equivalent compared to the neonatal rate which is 26.337. Besides, a midwife can only give family planning and immunization at the government’s health center and in order to do the governmental assignment³.

There were some midwifery cases which were related to professionalism. The cases mainly due to the lack of knowledge about midwife authority and competence in administering midwifery practice⁴. There were also a number of midwives who didn’t know about the newest regulation about midwifery. It can be said that most of them administer the practice based on their own experience only. One of the examples of a case in midwifery was when a midwife spontaneously helped
premature birth and the fetus experience severe asphyxia, but the midwife didn’t make any reference to the hospital. Instead, she gave treatment to the fetus and mother in her own midwife clinic. After an hour, the fetus was dead. From the case, it can be concluded that the midwife could not show professionalism since she did not give clear information about her patient condition, especially when the baby experienced severe asphyxia. In addition, a midwife should not have helped premature birth as the midwife did not have the authority and competence to do that. As a result, a maternal perinatal audit was done to give a detail description of the case, from the birth process until the death of the fetus.

One of the indicators used to measure the rate of public health achievement is mother and baby mortality rate. All the health practitioners including obstetrician-gynecologist, pediatrician, nurse, and midwife are responsible for it. A midwife is responsible to be a regulated health professional. Therefore, a midwife is supposed to understand the midwifery practice regulated by the system. A midwife should realize that they are responsible to work based on regulation and professionalism. Improving the understanding of the responsibility to be a midwife who works under the regulation is a part of midwife professionalism.

### Method

The approach used in this study was non-doctrinal research which includes empirical studies to find out the theories about the work and process of social law. This kind of research is also known as socio-legal research. The sample was taken using non-probability sampling, particularly the snowball technique. Snowball technique allows the data collection from one respondent to the other respondents which match the criteria through in-depth interview. The data collection stops when there is no new information, stuck interview, or there is repetition during the information delivery. The 15 samples were taken fulfilled the minimum education criteria, which was the diploma of midwifery.

### Results and Discussion

#### a. Professional Code of Ethics

<table>
<thead>
<tr>
<th>Professional Code of Ethics</th>
<th>Respondent</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Qualified</td>
<td>14</td>
</tr>
<tr>
<td>Unqualified</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
</tr>
</tbody>
</table>

Source: primary data, processed in 2018

From the frequency distribution data of respondents’ answer about the professional code of ethics, it was gained that only 93% of midwifery practices were qualified to administer code of ethics. Meanwhile, the rest 7% was unqualified for code of ethics. Based on Burtch’s research about midwifery code of ethics, code of ethics can be the indicator of midwife professionalism. According to the national standard competent, a midwife is responsible to make sure that she understands and has enough knowledge about professionalism. The violation toward the code of ethics cannot be considered as professional, and which is contrary to the professional standard. A midwife should be able to work professionally to maintain public trust.

#### b. Responsibility

<table>
<thead>
<tr>
<th>Responsibility of midwifery practice</th>
<th>Respondent</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Qualified</td>
<td>13</td>
</tr>
<tr>
<td>Unqualified</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
</tr>
</tbody>
</table>

Source: primary data, processed in 2018

From the frequency distribution data of respondents’ answer about responsibility of midwifery practice, it was gained that only 86% of midwifery practices were qualified to administer responsibility of midwifery practice. Meanwhile, the rest 14% was unqualified for responsibility of midwifery practice. A midwife is acknowledged as an occupation which accountable responsible as the trusted partner of women to give
support and care during pregnancy, intranatal, and postnatal period continuously and completely\textsuperscript{11}. It is in line with the research about responsibility conducted in England about the responsibility of midwife in the form of obeying the regulations about midwifery, give correct information and advice to the patient, give information to the patient with high risk pregnancy, make record and report about every given service, give midwifery service during antenatal, intranatal, and postnatal period, make reference to the healthcare facility in case of emergency, give maternal and fetal care\textsuperscript{12}.

c. Precise collaboration and reference

Table 3: Frequency distribution of respondents’ answer related to professionalism standard about precise collaboration and reference for midwifery practice

<table>
<thead>
<tr>
<th>Precise Collaboration And Reference</th>
<th>Respondent</th>
</tr>
</thead>
<tbody>
<tr>
<td>N &amp; %</td>
<td></td>
</tr>
<tr>
<td>Qualified</td>
<td>14 93</td>
</tr>
<tr>
<td>Unqualified</td>
<td>1 7</td>
</tr>
<tr>
<td>Total</td>
<td>15 100</td>
</tr>
</tbody>
</table>

Source: primary data, processed in 2018

From the frequency distribution data of respondents’ answer about precise collaboration and reference for midwifery practice, it was gained that only 93% of midwifery practices were qualified to precise collaboration and reference for midwifery practice. Meanwhile, the rest 7% was unqualified for precise collaboration and reference for midwifery practice. Interprofessional collaboration is important for patient’s safety, since the collaboration and communication failure may affect the mother and baby mortality rate\textsuperscript{13}. Collaboration is an act to share responsibility between partners or other health practitioners in performing health care for the patient. During the practice, collaboration is often needed to discuss the patient condition and cooperate in managing and performing healthcare\textsuperscript{14}. It is in line with the research conducted in Netherland about interprofessional collaboration in giving comprehensive midwifery care. Interprofessional collaboration is complex and suitable for midwifery care\textsuperscript{15}.

d. Continuing education

Table 4: Frequency distribution of respondents’ answer related to professionalism indicator about continuing education for midwifery practice

<table>
<thead>
<tr>
<th>Continuing education</th>
<th>Respondent</th>
</tr>
</thead>
<tbody>
<tr>
<td>N &amp; %</td>
<td></td>
</tr>
<tr>
<td>Qualified</td>
<td>15 100</td>
</tr>
<tr>
<td>Unqualified</td>
<td>0 0</td>
</tr>
<tr>
<td>Total</td>
<td>15 100</td>
</tr>
</tbody>
</table>

Source: primary data, processed in 2018

From the frequency distribution data of respondents’ answer about continuing education for midwifery practice, it was concluded that all the midwifery practices were qualified to administer continuing education in order to improve midwifery care. The continuing education for midwife is all of the activities which should be followed by midwives through non-formal education. It includes knowledge improvement (cognitive) as a process to comprehend particular knowledge\textsuperscript{16}. It is supported by research about continuing education for nurse and midwife which concluded that midwife competence is very important for midwifery care quality. In order to improve midwife competence, good quality continuing education is needed\textsuperscript{17}.

e. Competence

Table 5: Frequency distribution of respondents’ answer related to professionalism indicator about competence for midwifery practice

<table>
<thead>
<tr>
<th>Competence</th>
<th>Respondent</th>
</tr>
</thead>
<tbody>
<tr>
<td>N &amp; %</td>
<td></td>
</tr>
<tr>
<td>Qualified</td>
<td>14 93</td>
</tr>
<tr>
<td>Unqualified</td>
<td>1 7</td>
</tr>
<tr>
<td>Total</td>
<td>15 100</td>
</tr>
</tbody>
</table>

Source: primary data, processed in 2018

From the frequency distribution data of respondents’ answer about competence for midwifery practice, it was gained that only 93% of midwifery practices
were qualified to competence for midwifery practice. Meanwhile, the rest 7% was unqualified for competence for midwifery practice. The scope of midwifery care given in the midwife clinic includes the scope of premarital, antenatal, intranatal, postnatal, family planning program, neonates, baby, and toddler18.

A midwife is responsible for her patient to give safe and competent midwifery care. The responsibility of midwife to maintain their competence is important to improve their knowledge and ability. The competence improvement includes participation to maintain and improve knowledge, skill, and behavior based on the clinical practice, management, also education or training19.

f. Giving advocacy

Table 6: Frequency distribution of respondents’ answer related to professionalism indicator about Advocacy for midwifery practice

<table>
<thead>
<tr>
<th>Advocacy</th>
<th>Respondent</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Qualified</td>
<td></td>
<td>8</td>
<td>53</td>
</tr>
<tr>
<td>Unqualified</td>
<td></td>
<td>7</td>
<td>47</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>15</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: primary data, processed in 2018

From the frequency distribution data of respondents’ answer about advocacy for midwifery practice, it was gained that only 53% of midwifery practices were qualified to administer advocacy. Meanwhile, the rest 47% was unqualified for advocacy due to the lack of knowledge and comprehension about advocacy. Most of the midwives didn’t know about the form of advocacy they should give to the patient. As the administrator of health care, midwives should actively promote and protect women’s health, support women’s right to reproductive health, also respect ethnic and cultural diversity20.

Advocacy is the activities to exert all the resource to defend, improve, and even reform in order to achieve the demanded condition. Advocacy and women empowerment strategy to promote women’s right is needed to achieve optimum health condition 21.

Conclusion

From the findings, it can be concluded that the midwife practices have already applied midwifery professionalism by paying attention to the professionalism indicators which include a professional code of ethics, responsibility, precise collaboration and reference, continuing education, and competence. Meanwhile, advocacy is unqualified professionalism standard in the administration of midwifery practice. It is possible since some midwives didn’t know about the form of advocacy. The midwife should be able to perform professional midwifery care by implementing professionalism indicators.

Conflict of Interest: There is no

Ethical Clearance: Not required

Source of Funding: LPDP Founding

References

9. Burtch B. Trials of Labour: The Re-emergence of
Analytical Study of Railway Accidental Deaths

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Abstract

Travel but on the other hand caused lot of damage to human lives in the form of accidents. The present study conducted at Guntur medical college, Guntur over the period of two years among the autopsies done in the forensic medicine department. Out of 1748 autopsies railway accidental deaths were 114 with male predominance. Most of the railway accidental deaths were seen in the middle age. More deaths were due to decapitation.

Key words- railway accidents, suicide, decapitation.

Introduction

Britishers were the pioneers in introducing Railways in India. Their intension was to move their troops faster, and transport these goods to distant places with an idea of proving their trade and to establish their empire in India.

Post independence with advent of urbanization and globalization the government made major move in improving transportation system throughout the country. The major transportation system is available in the following form.

a) Air way
b) Road transportation
c) Sea
d) Railway

In developing countries like India where majority of population reside in rural areas and are below poverty line. Hence the earliest, simplest and most importantly cheapest way of transportation would be the railways. In view of this the Indian government allotted more budget and subsequently developed the Railway transportation system. In India railway is the largest public transportation system.¹

Bernard knight classified railway accidents broadly into three main groups. Train accidents, to train and rolling on or affecting and failures of rolling stock, track and structures. Movement accidents is the accidents to people caused by the movements of railway vehicles excluding those in train accident to people. On railway premises but not connected with the railway vehicle.

Whereas movements fatalities are primarily concerned with involvement of the Train without any fault of train. Main reasons for the Railway accidents are:

1. Due to errors and failure of Railways.
   A) Mechanical problems:
      1. Failure of breaks.
      2. Track faults.
      3. Electrical short circuits.
   B) Human Errors:
      1. Not observing the signals by the engine driver.
      2. Not giving proper signals by Guard and cabin crew.
      3. Carrying explosives by passengers.
   C) Natural
      1. Foggy weather
      2. Calamities like Floods and earth quakes.
II. Due to movements of the fatalities across Railway line.

a) Unmanned level crossing
b) Foot board traveling
c) Getting into running train
d) Tress passing
e) Roof Top traveling
f) Using Railway track for attending call off nature.
g) Crossing below stable trains.
h) Passing on long bridges.
i) Standing on track.

We must not forget Railway track could be the place of disposal for those dead bodies of Homicidal Origin to cancel the crime. Hence it is not correct to say that all bodies found on railway track are deaths due to train injuries.

It is not reliable to say that the injuries sustained on the railway track are of Ante mortem in nature.

Hence it is found necessary to make detailed examination and wounds present on the dead bodies and different other factors, to know the cause and manner of deaths.

Aims and Objectives

1. By analyzing the pattern of injuries – To arrive at a conclusion as per the manner of death.

2. To know socioeconomic, Human related problems and any other factors responsible for the deaths occurring on the railway track.

Material and Method

Among the autopsies conducted by the department of Forensic Medicine, Guntur Medical College, Guntur, during the period from 01-01-2003 to 31-12-2004, the cases of death attributed to railway injuries were studied in detailed.

The preliminary data was collected from the inquest reports, the hospital case sheet records and the history revealed from relatives, friends etc., of the deceased where the identity was established a detailed history has been collected about the victim of railway injuries where ever possible to know whether he was getting into a moving train or was crossing the track or walking along the track it self etc., and also gathered information whether the deceased had any hearing or sight defect and whether he was on an alcoholic or a drug addict. His socio-economic status also has been taken into account. A detailed history has been collected regarding the time and place of fatal occurrence.

Observations

During the period between 1-1-2011 to 31-12-2012, 1748 autopsies were conducted at Government General Hospital, Guntur out of which 114 were Railway accidental deaths. out of which 56(6.48%) were in 2011 and 58 in 2012 (6.56%) showing marginal increase of 0.8%. even though total number of autopsies shows marginal increase of 20 cases which indicates increase in tendency of railway deaths in accordance with increase in Urbanization.

During the two years study the male autopsies were more than females. During the year 2011, total number of autopsies were 56 the male number were 49 and female were only 7. During the year 2012 total number of autopsies were 58 out of which 52 cases were of male and 6 were female cases. This shows that there is increase of 3 cases of males in the year 2012, but there was decrease of female cases by one.

Regarding the age, in the age group of 0-9 yrs there were no railway fatalities, with regards to the age group of 20-39 yrs. The number of railway fatalities were 58 i.e. year 2011 and 2012 which account to 50.88%. this shows that the middle age group is more susceptible for railway accidents.

The un identified bodies were 16 in the year 2011 amounting to 28.57% and 23 cases in the year 2012 accounting a 39.66% which shows an increase of 11% in the year 2012.it shows that the accidental deaths in the year 2011 were 34 out of 56 railway autopsies which amounts to 60.71% and suicidal cases were 20 which amounts to 35.71% and there was 3.58% of other cases. It is clearly evident that there is slight increase of accidental
deaths in year 2012 compared to 2011 i.e. 3.08%.

The deaths occurred in outskirts were 57 in both years which amounts to 50%. The bodies which were recovered in the city limits were 29 which amounts to 23.44%. The bodies found in the station limits were 28 amounting to 24.56%. The Bodies Found in the station limits were 28 amounting to 24.56% from the above, it is evident that the more deaths occurred due to railways on the outskirts of the city.

It is conclusive that the deaths during the night time are more i.e. 72 out of 114 cases amounting to 63.16%. The witnessed railway deaths were 67 out of 114 cases amounting to 58.77%.

Out of 114 cases 93 persons died on the spot amounting to 81.58% and 10 persons survived for 24 hours amounting to 8.77% and 11 persons could survived for more than two days amounting to 9.65%. 66 deaths were due to decapitation associated with lacerations, contusions and fractures amounting to 57.89%. the remaining 42.11% were having only contusions, fractures and lacerations.

During the months on November, December and January and February the railway deaths were 45 amounting to 40% of total cases.

**Discussion**

During the period between 1-1-2011 to 31-12-2012, 1748 autopsies were conducted at Government General Hospital, Guntur out of which 114 were Railway accidental deaths. out of which 56(6.48%) were in 2011 and 58 in 2012 (6.56%). this study results were closer to study of Basu, R., Bose, T.K. et al(2002) who found 299 (6.11%) cases of Railway fatalities among a total of 4893.2

There is increase of railway deaths in the year 2012 as compared to year 2011 by 0.08% because of increase in population and increase of passengers travelling by train and it is a cheaper mode of travel compared to other modes like Bus, Air and Water ways.

The deaths are more in males due to as most of times he is the responsible and earning person for the maintenance of the family, The age group between 20-40 yrs are more involved in railway deaths. which was similar to a study conducted by Pelletier A,3,4,5,6,7,8,9,10,11 which could be due to various reasons like

- Failure in examination
- Failure in love
- Un successful marital life which are common in India,
- Un employment
- Psychological problems

In India, the villagers will not have any kind of Identity cards unlike other countries, where each and every person will be having an Identity card. Due to this, it is difficult to find out the Identity of the individual in railway accidents as in most of the cases, the body will come in multiple pieces, which makes it even more difficult for identification.

The accidental deaths are more because:

1. People traveling the train even though there is heavy rush, by standing on foot board.
2. Traveling on top of the train.
3. Getting in and out of the running train and some people will use the track when the gate is closed in a hurry.
4. The Youngsters have fades like by watching movies they try to imitate the film Heroes by crossing the running train, running across the train which in films is just filmy.

In India we have some unmanned level crossing gates, some persons will cross the tracks without noticing on either side of the track in unmanned level crossing. There are number of incidences where the vehicles were made to stay on the railway track due to mechanical failure which subsequently resulted in the railway accidents.

The suicidal cases are due to

- Certainty and easy mode of death
- Some poor and under privileged people
like beggars, very frequently travel in train without purchasing tickets. Who have, chronic diseases will die in the railway compartments and platforms and lavatories of the train.

In India the distance from the residence is no bar for the occurrence of suicide or accidents but many of the accidents occurred on the track which were near to their residences as the residents in those locality are accustomed to the railway track and many of them use the tracks for daily passage, nature of call during which period accidents occur

People prefer the outskirts of the railway station for committing suicide

- Avoid witnessed by others
- As the train will be moving fast, the movement of people will not be there.

Because of the above said reasons the number of deaths are also more during the night times as it will not be witnessed by other because of darkness.

The survival period is very less in the railway fatalities which will cause instantaneous deaths in majority of the cases in the form of decapitations, fractures and multiple injuries.

Very few cases may survive for one to two days with same injuries.

The majority of suicidal cases in railway deaths – the person will lie down over the track to make certain that death occurs either by decapitation or traumatic amputation.

The more number of deaths occurred during the months of November, December, January and February are due to

- Winter season – In winter season there will be fog, mist and covering of the face and head by towel and clothes to avoid wind and chilliness for not noticing the train while crossing the track level.
- During the night most of the times under the influence of Alcohol – there will be visual disturbances and level of consciousness which results in railway accidents.

Due to failure of signals, dislocation of the tracks unfunctioning of the breaks, natural calamity even though the driver excepted the accident he will not be in a position to avoid it because of above said problems.

As per the Indian railway act the driver who notices the railway deaths on the track is supposed to inform the next near rail way station which is not being done in most of the cases resulting in dismembering of the body by animals which subsequently leads to difficulty in identification.

**Conclusion**

1. An autopsy study of 114 railway deaths are carried out during the period from 01-01-2011 to 31-12-2012. Railway deaths constituted 6.52% of total autopsies. The male and female ration of railway fatalities was 7.77:1% on average.

2. The maximum incidence of cases were in the second decade followed by third and forth decade

3. The railway deaths were more accidental less frequently suicidal and very rarely homicidal. I have not come across a single case of homicidal railway death in my study.

4. The accidental deaths in railway injuries are mostly while crossing the track or walking along the track.

5. The more deaths occurred on outskirts of railway station.

6. Decapitation or transaction of trunk is fatal injury in the majority of the suicidal cases.

7. Viscera commonly involved are spinal cord followed by brain, intestines, lungs, liver etc., it is also found that injuries to the upper half of the body are more common than compared to the lower half of the body.

**Suggestions:**

1. Most of the railway deaths are not properly investigate and even the identity of the victim has not been established in most of the cases. It is proper for the investigating Officer to establish the identity of the victim. Which in turn rule out the motive, to clear the doubts of the litigant public.

2. Most of the railway deaths are investigated by the lower level police officer – usually the Head Constable, who carries out the task as a routine one, with the sole idea of how to shift the body to the nearest mortuary and
how to cope with the expenditure. In most of the cases the scene panchanama is not properly made, let alone taking the photographs of the scene. Resgetau which becomes the main linking evidence in the interpretation of nature of death in the later part of the investigation. Hence, it is a advisable to entrust the investigation to a police officer not below the rank of sub inspector the police, the scene should be investigated properly and photographs particularly, colour photographs should be taken in different angles as far as possible before shifting the body for autopsy.

3. It is common to see people often crossing the railway track carelessly, just in front of the on coming running train even when level crossing gate is closed. It is also common to see the pedestrians and two wheeler drivers crossing the railway track. It is observed that most of the accidents victims are illiterate and ignorant people from low socio-economic strata. Grater public awareness and preventive measures may reduce the tremendous human and financial costs of train related accidents. The data sets and accidents at the crossings should made by studying the characteristics i.e., like warning devices, volume of vehicle traffic, volume of train traffic, visibility condition etc., preferably on models. This facilities are sufficient base from which the accident potential of any level crossing can be estimated and preventive measures can be taken like construction of over bridges.

4. At the unmanned level crossings there is not one to warn, regarding the fast approaching trains. The accidents are very common here, especially due to collision with two or four wheelers, hence even at unmanned gates steps should be taken to install warning devices like sirens, so that the public know that the train is approaching. Another draw back noticed with the Indian Railways is closure of railway gates some times 15 to 30 minutes before a train passes through that point. This results in traffic jams and unrest in the public crossing resulting in unlawful particularly in urban areas, this in turn has its role in increased accidental fatalities from railways. Hence, steps should be taken in such a way that the on coming train should pass to that through particular point within stipulated time [with in 5 or 10 minutes] after the closure of the railway gates.

5. To discourage suicidal or accidental death from railway injuries trespassing of railroad property should be declared as prohibited and unlawful. By taking steps like

1. Reducing public access to the tracks.
2. improving surveillance by railway staff.
3. facilitating emergency staff.
6. Getting in or down of a running train, travelling on roof tops and standing or leaning from the doors of the compartments, should be discouraged by educating the public if permitted penalized.
7. Ticket control, surveillance, law enforcement and safety engineering are also other methods of injury control interventions.
8. Environmental changes, like changing of Locomotive front design, lowing of catch guard is also suggested as strategy for reducing accidents and Suicides on railways.
9. To reduce personal injuries in train crashes suggestions are made to the improved maintenance of the seats and their frames and the use of safety belts.

Last but not the least suggestion to the Medical Officer who conducts autopsy of railway fatality, the Medical Officer should not think such a case merely as an intrusion in to his routine medical or medico-legal work. The autopsy should be carried out in similar lines. Like other medico-legal deaths, particularly violent deaths. Attention should be imparted to every minute detail, photographs taken where ever necessary supplemented by chemical and histopathological examinations, if necessary steps should be taken to preserve of chain of evidence. Re construction of events at the scene, study of injury pattern on the body corroborative evidence might lead to correct diagnosis regarding the cause and nature of death, if autopsy is carried out in a proper perspective.

Ethical Clearance- Taken from institutional ethical committee

Source of Funding- Self

Conflict of Interest - Nil

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Life Support in the Arctic Upon Synchronizing the Development of the Northern Territories of Yakutia

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Abstract

The role of the Arctic and Northern regions, especially the Republic of Sakha (Yakutia) in the geopolitical position of Russia in the world is increasing every day. The purpose of the study is to investigate the branches of life support in the Arctic upon synchronizing their development. The leading research method for this problem is the analysis method. The paper describes innovative ways to manage the life support sectors in the Arctic upon synchronizing their development, restructuring and reforming. The comparison of the Strategy for the development of a unified energy system of the Republic of Sakha until 2030 and the Republican target program is provided. The novelty of the study is determined by the fact that it analysed the urgent problem of the need to separate the management system by industry, by creating branch ministries corresponding to the structure of the Government of the Russian Federation. The practical significance of the study is determined by the need to expand and implement the existing program of targeted training, to ensure close communication between the enterprises of fuel and energy complex and educational institutions of the Republic.

Keywords: geopolitical position, infrastructure, energy, innovation, management system.

Introduction

The role of energy in the development of the Arctic is paramount. With fierce competition between technologies, machines and mechanisms, only one that consumes less energy and produces more products will win. Therefore, issues of efficient management and introduction of innovations in the field of management in the Arctic and remote areas come to the fore. The upcoming five-year plan for 2020-2025 will be significant for the energy system of the Republic of Sakha (Yakutia). When implementing strategic projects to develop the power system of Yakutia with the launch of a 220 kV transmission line, Sukhoi Log substation, 220 kV Peleduy substation in the West, and a 220 kV Tommot-May transmission line will be electrically connected to the Sibir Interconnected System in the west of Yakutia and to the Vostok Interconnected System in the east. The structure of the Vostok Interconnected System will include the Central Energy District; the Southern Energy District became part of the Vostok Interconnected System in 2007. At the first stage, the main transmission lines will be transferred to the Vostok Main Power Networks of the FSK PJSC. At the same time, in pursuance of the agreements reached on gasification of the regions with PJSC Gazprom, investment projects for gasification of the regions of the Russian Federation, including the Republic of Sakha (Yakutia), are being developed and implemented.
In the medium term, with the help of PJSC Gazprom investments, there is a real opportunity to switch the natural settlements of the Vilyui, central, southern and western parts of the Republic to natural gas. With that, the zone of centralized electricity supply in the future will affect the formation of heat supply systems through the gasification of settlements during the creation of a unified gas transmission system and through electric heating. This will significantly change the approaches to heat supply in the above regions of the Republic.

The problems of ensuring Eurasian security primarily concern Russia and the entire EAEU. For them, the CSTO acts as a security shield, the area of responsibility of which, according to the Collective Security Treaty Organization for the period up to 2025, is “the territories of the Organization’s member states, limited to state territories with other states that are not members of the CSTO (external borders), including inland waters, the territorial sea and the airspace above them, within which the interests of national and collective security of member states of the CSTO”. And this is 20.5 million km², i.e. 37% of the entire Eurasian space. In this regard, the aim of this paper is to investigate innovative ways to manage the life support sectors in the Arctic upon synchronizing their development, restructuring and reforming.

Analysis of the Structure of the Arctic Life Support Industries

With regard to the Russian Arctic, the main international treaty applicable to the Arctic Ocean is the 1982 UN Convention on the Law of the Sea, which is of strategic importance since it establishes a comprehensive legal regime for the world’s oceans and seas, and regulates all uses of the oceans and their resources and serves as the basis for national, regional, and international actions and cooperation in the maritime sector, including in the Arctic. As of June 2016, its participants are 168 states. Russia ratified the 1982 Convention; it follows that the CSTO area of responsibility is the Northern Sea Route.

In accordance with the Federal Law of July 28, 2012 No. 132-FZ “On Amending Certain Legislative Acts of the Russian Federation Regarding State Regulation of Merchant Shipping in the Northern Sea Route”, the Northern Sea Route is defined as a body of water adjacent to the northern coast of the Russian Federation, covering the internal sea waters, the territorial sea, the adjacent zone and the exclusive economic zone of the Russian Federation and limited from the east by the line of delimitation of sea spaces with the USA and the parallel to the Cape Dezhnev in the Bering Strait, from the west by the meridian of Cape Zhelaniya to the Novaya Zemlya archipelago, the eastern coastal line of the Novaya Zemlya archipelago and the western borders of the Matochkin Shar, Kara, Yugorski Shar straits, therefore, the relevant provisions of the 1982 Convention apply (Articles 2-33, 55-75, etc.).

If we compare the Strategy for the development of a unified energy system of the Republic of Sakha (Yakutia) until 2030 and the Republican target program “Gasification of settlements of the Republic of Sakha (Yakutia) in 2009-2011 and the main directions of gasification until 2020”, it is clearly evident that the development of gas supply systems will take place in the zone of centralized power supply i.e. in uluses with centralized power supply. Thus: a unified gas transmission and electric power system will be created in the Vilyui, central, southern, and western parts of the republic. The creation of these centralized systems will entail a reduction in the expenses of enterprises and the population of these regions on public utilities.

The historically evolving situation of the presence of two vital industries in the north of the republic, which are currently organizationally fragmented, necessitates the merger of SUE “Housing and Utilities of the Republic of Sakha (Yakutia)” and Sakhaenergo PJSC, and, at the second stage, Teploenergoservice PJSC into a single whole, which will lead to the effect of synergy and optimization in solving common problematic issues of industries and their complex solution. In addition to the foregoing, enterprises have the following prerequisites for combining into one structure: related goals and objectives; pronounced social orientation of both sectors; similarity of the problems being solved; a single vertically controlled system, the similarity of organizational and technical structures; single entry bases; a single organizational system of tariff setting; single supervising ministry.

Thus, at the first stage, the territorial and energy industry systems should be combined in an isolated zone into a single structure, i.e. the organizational and territorial division of the State Unitary Enterprise “Housing and Public Utilities of the Republic of Sakha (Yakutia)” should follow the principle of territorial separation of the electric power industry. At the second
stage, Teploenergoservice PJSC can be involved in the reform process.

For this, synchronization of the restructuring and reforming of the housing and utilities services and energy industry is necessary. The following actions are suggested:

– capitalization of state property leased by Yakutskenergo PJSC and Sakhaenergo PJSC, an increase in the state’s share in the authorized capital of Sakhaenergo PJSC;

– corporatization of newly created enterprises upon the division of the State Unitary Enterprise “Housing and Utilities of the Republic of Sakha (Yakutia)”;

– inclusion of a joint-stock company created upon division of the State Unitary Enterprise “Housing and Utilities of the Republic of Sakha (Yakutia)”.

Restructuring of enterprises should go along the path of introducing into the Sakhaenergo PJSC a newly created JSC formed upon the division of the State Unitary Enterprise “Housing and Utilities of the Republic of Sakha (Yakutia)” and operating in the coverage area of Sakhaenergo PJSC. This path is conditioned upon the following factors:

– extensive experience of Sakhaenergo PJSC and Yakutskenergo PJSC;

– State Unitary Enterprise “Housing and Utilities Services of the Republic of Sakha (Yakutia)”;

– work experience of Sakhaenergo PJSC in the organization of a joint stock company;

– the presence of professional training of the staff of Sakhaenergo PJSC and its high degree;

– the presence of a centralized and multi-level system of operational dispatch service, equipped with modern means of communication and information processing;

– well-established sales activities of Sakhaenergo PJSC.

An important factor determining the merger of the State Unitary Enterprise “Housing and Utilities of the Republic of Sakha (Yakutia)” and Sakhaenergo PJSC is the receipt of federal funding of the Housing and Utilities of the Republic of Sakha (Yakutia) for the cross-subsidization of diesel power. The newly formed enterprise will be financed from two levels of the budget: federal – energy industry, and republican – housing and utilities, which will increase the financial and economic stability of the new enterprise.

**Features of Innovative Ways of Managing the Life Support Sectors in the Arctic by the Government of the Russian Federation**

Currently, the electric power industry of the republic is under the control of the Ministry of Housing and Utilities and Energy of the Republic of Sakha (Yakutia). The Ministry of Housing and Utilities and Energy of the Republic of Sakha (Yakutia), in the form of which two directions are laid down (housing and utilities, and electric power industry), was created in the most difficult times (the consequences of the economic crisis of 1998 and the collapse of the post-Soviet space), when there was a need to combine problems and adopt consolidated decisions. This was the wisest decision of the Government of the Republic of Sakha (Yakutia) at that time, in the conditions of the far north, there was only one task – to survive.

The decision made by the Government of the Republic of Sakha (Yakutia) to sell the unfinished Vilyui HPS-3 of OAO AK Yakutskenergo to OAO ALROSA decided the fate of OAO AK Yakutskenergo (the country’s electricity industry), having stabilized the financial situation of the company, the creation of the State Unitary Enterprise “Housing and Utilities of the Republic of Sakha (Yakutia)” stabilized the work of boiler houses in settlements and streamlined the system of work of housing and utilities of local government. At present, the State Unitary Enterprise “Housing and Public Utilities of the Republic of Sakha (Yakutia)” has practically become an energy industry company, the key activity of which is the generation and transmission of thermal energy.

Currently, as a result of the work carried out, the republic has clear boundaries for the division of responsibility between industries and business. Also, the boundaries of responsibility of municipalities have been clarified, according to Federal Law No. 131-ФЗ “On General Principles of Organization of Local Self-Government in the Russian Federation” of October 6, 2003. However, under the pressure of numerous problems of a housing and utilities nature, the Ministry directed all efforts at solving issues of housing and
utilities and thermal energy, and was transformed into a department that handles mainly and on a priority basis housing and utilities issues.

At the same time, another part of the republic’s fuel and energy complex (coal and oil and gas sector) was subordinated to the Ministry of Industry of the Republic of Sakha (Yakutia), and then to the Ministry of Economic Development and Industrial Policy of the Republic of Sakha (Yakutia). Currently, it is subordinate to the newly created Ministry of Industry of the Republic of Sakha (Yakutia). As history shows, the direction of energy industry (FEC) has undergone many changes and reforms at the federal level as well. This is explained by the need for the control system to meet the requirements of the time. After the privatization phase of state enterprises was completed, the Ministry of Energy of Russia was created in 2008.\(^3\)\(^-\)\(^10\)

The Ministry of Energy of the Russian Federation develops and implements national policy in the industry and regulates the fuel and energy complex, including on electricity, oil-producing and oil-refining industry, gas, peat, coal, and shale industry, products of their processing, renewable energy sources development of hydrocarbon deposits on the basis of production sharing agreements in the petrochemical industry, including law enforcement and public services functions, state property management in the production and use of fuel and energy resources.

The Government of the Russian Federation, having considered all the problems and the causes of the problems existing in the country’s public utilities, decided to create a new Ministry of Construction and Housing and Utilities of the Russian Federation, which should manage all activities in the construction and housing and utilities of the country. The Ministry of Construction and Housing and Utilities of the Russian Federation was given the functions of developing and implementing national policy and legal regulation in the field of construction, architecture, urban planning, and housing and utilities, the provision of public services, management of state property in the field of construction, urban planning, and housing and utilities, including to coordinate the activities of the Federal Housing Development Fund, the state corporation – the Support Fund for the Reform of the Housing and Utilities Sector.

In the Republic of Sakha (Yakutia), there are the Ministry of Housing and Utilities and Energy of the Republic of Sakha (Yakutia) and the Ministry of Construction of the Republic of Sakha (Yakutia), which separately solve the problems of housing construction, operation of buildings and the provision of utilities, often duplicating or making inconsistent decisions. In Yakutia, the process of “construction and operation of housing facilities” has been broken at the level of government, which results in a low quality of housing construction in northern conditions. The situation would be significantly improved provided the state control and management of the process “Housing construction and operation” being performed by a single governing body.

**Conclusions**

Proceeding from the foregoing, it turns out that there is a necessity of separating the management system by industry, by creating sectoral ministries corresponding to the structure of the Government of the Russian Federation. We can state the pressing issue of considering the creation of the Ministry of Energy of the Republic of Sakha (Yakutia). For the creation of the Ministry, additional expenses beyond the budget considered by the Republic of Sakha (Yakutia) will not be required, since the existing departments and divisions of the two ministries will merge.

Also, with the development of the fuel and energy complex, the risk of impact on ethnic groups and the ecology of the republic will be minimal than in other non-mining industries, such as gold and diamond mining. The reason for this is the minimum number of specialists for the implementation of projects, less impact on the environment than in the extraction of gold and diamonds. For a clear interaction with the Ministry of Energy of Russia, it is necessary to unify the structure of the Ministry of Energy of the Republic of Sakha (Yakutia) with the federal structure.

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**Conflict of Interest:** There is no conflict of interests.

**Ethical Clearance:** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study. A study was approved by Central Ethics Committee of the Ministry of Health and Social Development of the
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Legal Aspec Bioprospecting Conservation of Medicinal Plants in Indonesia

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Abstract

The country of Indonesia is an archipelago, which has various types of plants. One of them is a medicinal plant. This plant has ingredients that can be used as a treatment. But by seeing the high population growth of Indonesia, the medicinal plants are threatened. This makes the need for an action that can maintain the existence of these medicinal plants. Bioprospection conservation is an effort to preserve and develop medicinal plants so that their presence is not lost.

Keywords: Medicinal Plants, Bioprospection Conservation

Background

Indonesia is the country of the archipelago(1), which has a vast area; besides that, Indonesia is also a tropical region that has forests and even a considerable plantation area. One of the enormous potentials in Indonesia is the potential of traditional medicinal plants(2). The World Conservation Monitoring Center reports that Indonesia is a critical region because it is rich in medicinal plants. WHO defines medicinal plants are plants that contain ingredients that can be used as treatment and active ingredients can be used as synthetic, medicinal ingredients. For the Indonesian people, traditional medicine derived from plants has been used hundreds of years ago, the ancestors of the Indonesian people who have a life that is close to nature are very dependent on nature primarily in order to maintain health or heal their illnesses.

The growth of Indonesian society which is increasing makes a concern for the possibility of the destruction of medicinal plants that are in Indonesian nature, land changes from productive land both in forest friends and not in forest areas vulnerable to extinction, the need for housing, the need for industrialization causes loss or damage to medicinal plants in Indonesia.

Findings

Medicinal plants are each type of plant which in certain parts both roots, stems, bark, leaves,⁴ and the results of its expression are believed to be able to treat a disease or be useful in terms of health care. Medicinal plants in Indonesia are not only in the forest but also outside Forest. There are forest areas that are in the conservation forest but also in wood that is not conservation.

The World Health Organization estimates that some 80% of developing countries depend on traditional medicines and, of these, 85% use plants or their extracts as active substances (Sheldon et al., 1998). This means that nearly 3 billion people depend on medicinal plants⁵.

Medicinal plants are useful in the health sector, education sector, and bring economic contribution to the local community⁶. Medicinal plants (MP) are essential for the livelihoods of poor people throughout the world. Most medicinal plants are flowering plants. Out of 32000 species of higher plants (Prance, 2001), more than 10% is used as medicine⁷. Various ethnophytomedical-ethnobotany studies conducted by Indonesian researchers have been known, at least 78 species of medicinal plants used by 34 ethnic groups to treat malaria, 133 species of medicinal plants to treat fever by 30 ethnic groups, 110 species of medicinal plants to treat disorders digestion by 30 ethnicities and 98 species of medicinal plants are used to treat skin diseases by 27 ethnicities⁸.
them due to changes in the pattern of human life to start consuming drugs from natural ingredients and reduce the consumption of chemical medications, by the concept of returning to nature (back to view). Another cause is the high cost of modern synthetic medicines, so choices of herbal medication with natural ingredients are an option.

The government, through its policy, must carry out conservation of medicinal plants, one of which can be done is to conduct bioprospection. Bioprospecting (bioprospecting) is a systematic search, classification, and investigation for commercial purposes from sources of new chemical compounds, genes, proteins, microorganisms, and other products with actual and potential economic value, which are found in biodiversity.(8)

Bioprospection activities. (bioprospecting) the medicinal plant is a significant effort to obtain value-added benefits of the diversity of medicinal plants found in an area, both in forest areas and non-forest areas. Through bioprospecting (bioprospecting) of medicinal plants, it is expected that all components involved in these activities can feel the benefits, especially benefits that can be received by local communities and interests that can be acquired by an area where the medicinal plants are located.

**Discussion**

**Types of Traditional Medicinal Plants In Indonesia**

Indonesia, which is rich in natural resources, has many medicinal plants, and Indonesia is the second tropical country after Brazil Of a total of 40 thousand 30 thousand plants thought to be in Indonesia. Besides, in Brazil, many medicinal plants are found in India(9).

The types of medicinal plants that have been utilized by the Indonesian people include the following:

1. Turmeric
2. Ginger
3. Bangle
4. Brotowali
5. Curcuma

**The regulation of medicinal plants conservation**

The Government of the Republic of Indonesia conducts legal protection through preventive aspects by issuing various regulations. The regulations/policies in the development of bioprospecting are the Convention on
Biological Diversity (CBD) which regulates biodiversity that has been ratified by the Government of the Republic of Indonesia to in the Law of the Republic of Indonesia Number 5 of 1994 concerning Ratification of the United Nations Convention on Biological Diversity which was ratified on August 1, 1994\(^\text{(10)}\). The objectives of the issuance of the regulation are; First, the sustainable use of its components; The concept of sustainability is important in order to prepare for the children and grandchildren in the future and also the sustainability of development. Second, Share the benefits resulting from the efficient and equitable use of genetic resources, including through adequate access to genetic resources and with the appropriate transfer of technology, and by taking into account all rights to those resources and technology, as well as with adequate funding.

In addition to the aforementioned regulations, the government also ratified the Nagoya Protocol. Which is an international regulatory instrument for the implementation of the third objective of the Convention on Biological Diversity (CBD) which has also been ratified by the Government of the Republic of Indonesia into Law of the Republic of Indonesia Number 11 of 2013 concerning Ratification of Nagoya Protocol on Access to Genetic Resources and The Fair and Equitable Sharing of Benefits Arising from Their Utilization to the Convention on Biological Diversity (Nagoya Protocol on Access to Genetic Resources and Equitable and Balanced Benefit Sharing Arising from Utilization of the Convention on Biological Diversity) which was ratified on May 8, 2013.

The Nagoya Protocol is an international agreement on the environment in the framework of the Convention on Biological Diversity which regulates access to genetic resources and the fair and balanced distribution of benefits between the use and supply of genetic resources based on agreement based on initial information and collective bargaining and aims to prevent theft of diversity biological (biopiracy)\(^{11}\). The Nagoya Protocol Agreement is a significant agreement for the Indonesian State to get a fair and balanced benefit arising from its use of the Convention on Biological Diversity\(^{11}\) (RI Law No. 11 of 2013).

As for the benefits obtained by Indonesia through the ratification of the Nagoya Protocol, among others\(^{12}\) (RI Law No. 11 Tahun 2013):

1. Protect and preserve genetic resources and traditional knowledge related to genetic resources.
2. Preventing theft (biopiracy) and illegal use (illegal utilization) to biodiversity.
3. Ensure equitable and balanced distribution of benefits (financial and non-financial) on the use of genetic resources and traditional knowledge related to genetic resources to genetic resource providers based on mutually agreed terms.
4. Laying the legal basis for regulating access and equitable and equitable distribution of benefits from the utilization of genetic resources and traditional knowledge related to genetic resources based on mutual agreement.
6. Affirming State sovereignty over the regulation of access to genetic resources and traditional knowledge relating to genetic resources.
7. Providing incentives and funding support by statutory provisions.
8. Creating opportunities for technology transfer access to conservation activities and sustainable use of biodiversity\(^{13}\).

Also, the basis for other regulations/policies in the development of bioprospection of medicinal plants, especially in conservation areas, are as follows\(^{13}\):

- Law of the Republic of Indonesia Number 5 of 1990 concerning Conservation of Living Natural Resources and its Ecosystems
- Law of the Republic of Indonesia Number 12 of 1992 concerning Cultivation Systems
- Law of the Republic of Indonesia Number 16 of 1992 concerning Animal, Fish and Plant Quarantine
- Law of the Republic of Indonesia Number 41 of 1999 concerning Forestry
- Law of the Republic of Indonesia Number 24 of 2000 concerning International Treaties
- Law of the Republic of Indonesia Number 29
the Year 2000 concerning Protection of Plant Varieties

- Law of the Republic of Indonesia Number 18 of 2002 concerning the National System of Research in the Development and Application of Science and Technology

- Law of the Republic of Indonesia Number 32 of 2004 concerning Regional Government

- Law of the Republic of Indonesia Number 27 of 2007 concerning Management of Coastal Areas and Small Islands

- Law of the Republic of Indonesia Number 32 the Year 2009 concerning Environmental Protection and Management

- Law of the Republic of Indonesia Number 36 the Year 2009 regarding Health

- Republic of Indonesia Government Regulation Number 7 of 1999 concerning Preservation of Plant and Animal Species

- Republic of Indonesia Government Regulation No. 8/1999 concerning Utilization of Wild Plants and Animals

- Republic of Indonesia Government Regulation No. 6/2007 concerning Forest Management and Forest Management Planning and Forest Utilization

- Republic of Indonesia Government Regulation No. 3/2008 concerning Amendment to Government Regulation No. 6/2007 concerning Forest Management and Forest Management Planning and Forest Utilization

- Republic of Indonesia Government Regulation Number 28 of 2011 concerning Management of Nature Reserves and Nature Conservation Areas

- Republic of Indonesia’s Presidential Decree Number 100 of 1993 concerning Research Permits for Foreigners

- Regulation of the Minister of Forestry of the Republic of Indonesia Number: P.56 / Menhut-II / 2006 concerning National Park Zoning Guidelines

**Conclusion**

One of Indonesia’s abundant natural resources is medicinal plants that must be protected. The protection of medicinal plants can be done through bioprospection. This effort emphasizes the government’s efforts in conducting in-depth identification of medicinal plants in Indonesia, as well as strengthening the laws and regulations regarding medicinal plants in Indonesia.

**Source of Funding**: Self

**Conflict of Interest**: Nil

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12. Peluang dan Tantangan Indonesia Pasca Ratifikasi Protokol Nagoya - Pusat Penelitian Bioteknologi-LIPI.

Stature Estimation in Egyptian Primary School Children from Giza Governorate

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Abstract

Stature is one of the used parameters for identification in forensic anthropology. This study aimed to develop a formula to estimate the stature of children using anthropometric measurements. Ten anthropometric measurements were measured for 350 students randomly selected from two primary schools. The arm span exceeds height at old ages and the majority of measurements were higher in girls. A strong correlation was found for stature and majority of measurements.

Keywords: Stature, Estimation, Egyptian, Primary school, Children, Giza.

Background

Anthropometry is the scientific study of a variety of methods to estimate the measurements of the human body and skeleton. Stature is a measure of biological development and is determined by a combination of genetic and environmental factors.1

Stature expresses a lot of features of humans and is an inherent characteristic; therefore, its estimation is essential for identifying and clarifying the unknown livings and the human remains.2

Stature estimation resulted from measuring segments and bones in different parts of the human body, precisely upper and lower extremities, has a long history to be mentioned.3, using humerus length are nearly limited and the majority of these studies were undertaken on adults.4

Material & Methods

The current study was conducted on 350 Egyptian healthy children aged 6 to <13 years were recruited randomly from two primary schools in Giza governorate, then children were divided into 7 groups according to age each group was 50 children (25 boys and 25 girls). Children who were non-Egyptian, below or above the age and had fractures, deformities or previous surgical operations were excluded from the study. A written consent was taken from The Ministry of Education and head masters of the schools. Measurements were taken by the same person from the right side of the child. The birth data (day, month, and year) of students were taken from their school records.

- **Body Weight (kg)** was measured using Secca weight scale; the subjects were instructed to stand over the scale bare feeted with light clothing and weight recorded to nearest 0.01 kilogram.

- **Standing height**: Subjects were in standing barefoot position; with straight back. The head was in the Frankfurt horizontal plane and then the head vertex was contacted to firm and the number was recorded approximated to the nearest 0.1 cm.5

- **Sitting height**: was measured by using portable Holtain anthropometer. The child was sitting erect on a desk with her/his legs hanged free and knee flexed at 90° and fixed to the edge of the desk. The mean of three measurements was calculated and approximated to the nearest 0.1 cm.6

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Maximum head Length: measured using the sliding caliper from the glabella (the most prominent point above the root of the nose on the frontal bone, between the eyebrows) to the opisthocranion (the most prominent part of the occiput) and the measures approximated to the nearest 0.1 cm.7

Head Circumference: Head circumference was measured using a plastic tape, placed over the eyebrows and passed around the head, and over the very posterior protuberance of the occiput.8

Arm Span: measured from the left middle fingertip to the right middle fingertip using a calibrated steel tape. It was approximated to the nearest 0.1 cm.9

Upper arm Length: The distance between acromion end of clavicle and olecranon process by a sliding caliper.10

Forearm Length: measured in arm flex position from the tip of olecranon to the point between radius and ulnar tuberosity.11

Lower Limb Length: calculated by subtracting the sitting height from the stature.12

Leg Length: Measurement is taken from medial articulation of the knee joint to the most distal point of medial malleolus.13

The statistical package SPSS version 24 used for data coding and entering. Unpaired t test used to Compare between groups and Chi square (χ2) test was used for comparing categorical data but when the expected frequency is less than 5 the exact test was used. For Correlation between quantitative variables the Pearson correlation coefficient was performed. To detect factors affecting stature and age, linear regression was performed. There was a statistical significance when the Probability (P) values equal or less than 0.5.

Findings

The arm span length was shorter than height in both boys and girls at ages 6 – 9 years old. The mean of the majority of measurements was higher in girls at ages 6 & 9 years old, while at ages 7 & 8 years it was higher in boys (Table 1).

The arm span length was shorter than height in girls but exceeds in boys at 10 years, while exceeds the height at ages 11 & 12 years. There was increasing mean in the majority of measures in girls than boys (Table 2).

A significant correlation between stature and all measurements was found (Table 3). In addition, linear regression analysis revealed that stature can be estimated in boys and girls (Tables 4 and 5).

Table (1): Anthropometric dimensions among 6 – 9 years old children

<table>
<thead>
<tr>
<th></th>
<th>6 years (n=50)</th>
<th>7 years (n=50)</th>
<th>8 years (n=50)</th>
<th>9 years (n=50)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Boys</td>
<td>Girls</td>
<td>boys</td>
<td>girls</td>
</tr>
<tr>
<td>Age</td>
<td>mean±SD</td>
<td>6.51±.30</td>
<td>6.44±.29</td>
<td>7.44±.31</td>
</tr>
<tr>
<td>Height</td>
<td>122.04±3.86</td>
<td>123.12±4.47</td>
<td>127.64±4.37</td>
<td>125.36±4.29</td>
</tr>
<tr>
<td>Weight</td>
<td>22.06±2.48</td>
<td>24.65±0.75</td>
<td>25.31±4.14</td>
<td>25.95±6.88</td>
</tr>
<tr>
<td>AS</td>
<td>119.80±4.07</td>
<td>120.98±5.51</td>
<td>125.44±5.52</td>
<td>122.52±5.39</td>
</tr>
<tr>
<td>UAL</td>
<td>24.26±1.01</td>
<td>24.41±1.07</td>
<td>25.80±1.42</td>
<td>24.92±1.30*</td>
</tr>
<tr>
<td>FAL</td>
<td>18.55±.65</td>
<td>17.88±.94</td>
<td>18.80±.78*</td>
<td>18.00±1.26</td>
</tr>
</tbody>
</table>
Cont.. Table (1): Anthropometric dimensions among 6 – 9 years old children

<table>
<thead>
<tr>
<th></th>
<th>boys</th>
<th>girls</th>
<th>boys</th>
<th>girls</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean±SD</td>
<td>10.45±.26</td>
<td>10.44±.31</td>
<td>11.41±.26</td>
<td>11.50±.26</td>
<td>12.50±.31</td>
<td>12.48±.28</td>
</tr>
<tr>
<td>Height</td>
<td>141.04±6.51</td>
<td>141.88±6.46</td>
<td>147.32±7.49</td>
<td>150.20±5.27</td>
<td>151.80±5.48</td>
<td>153.64±5.31</td>
</tr>
<tr>
<td>Weight</td>
<td>34.86±9.66</td>
<td>34.64±5.04</td>
<td>43.27±12.68</td>
<td>41.76±7.46</td>
<td>44.28±11.18</td>
<td>51.68±12.10*</td>
</tr>
<tr>
<td>AS</td>
<td>141.76±7.76</td>
<td>141.44±7.19</td>
<td>147.44±9.31</td>
<td>151.76±6.08</td>
<td>153.00±7.78</td>
<td>155.96±8.02</td>
</tr>
<tr>
<td>UAL</td>
<td>28.96±1.63</td>
<td>29.04±1.83</td>
<td>31.33±3.06</td>
<td>31.61±1.64</td>
<td>32.27±2.45</td>
<td>33.01±2.36</td>
</tr>
<tr>
<td>FAL</td>
<td>21.06±1.26</td>
<td>21.15±1.27</td>
<td>22.60±1.79</td>
<td>22.88±.99</td>
<td>23.19±1.47</td>
<td>23.68±1.32</td>
</tr>
<tr>
<td>LLL</td>
<td>69.60±4.20</td>
<td>71.56±4.98</td>
<td>73.76±4.42</td>
<td>76.00±3.54</td>
<td>77.52±3.62</td>
<td>77.32±3.88</td>
</tr>
<tr>
<td>LL</td>
<td>32.00±2.25</td>
<td>32.20±2.12</td>
<td>33.56±2.53</td>
<td>34.76±1.54*</td>
<td>35.44±2.08</td>
<td>35.12±2.20</td>
</tr>
<tr>
<td>MHL</td>
<td>16.65±.73</td>
<td>16.73±.55</td>
<td>17.23±.59</td>
<td>17.04±.41</td>
<td>17.07±.39</td>
<td>16.98±.64</td>
</tr>
<tr>
<td>HC</td>
<td>51.84±2.03</td>
<td>51.48±1.29</td>
<td>53.16±1.52</td>
<td>52.44±1.53</td>
<td>52.80±1.29</td>
<td>53.08±1.68</td>
</tr>
</tbody>
</table>

* significant

** highly significant

Arm Span (AS), Forearm Length (FAL), Head Circumference (HC), Leg Length (LL), Lower Limb Length (LLL), Maximum head Length (MHL), Upper arm Length (UAL),

Table (2): Anthropometric dimensions among 10 – 12 years old children.
Table (3): The correlation between stature and measurements in boys and girls.

<table>
<thead>
<tr>
<th>Measurements</th>
<th>Boys Pearson’s correlation</th>
<th>P - value</th>
<th>Girls Pearson’s correlation</th>
<th>P - value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS</td>
<td>0.974</td>
<td>&lt; 0.001</td>
<td>0.978</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>UAL</td>
<td>0.941</td>
<td>&lt; 0.001</td>
<td>0.952</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>FAL</td>
<td>0.927</td>
<td>&lt; 0.001</td>
<td>0.959</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>LLL</td>
<td>0.950</td>
<td>&lt; 0.001</td>
<td>0.959</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>LL</td>
<td>0.958</td>
<td>&lt; 0.001</td>
<td>0.959</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>MHL</td>
<td>0.273</td>
<td>&lt; 0.001</td>
<td>0.619</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>HC</td>
<td>0.559</td>
<td>&lt; 0.001</td>
<td>0.708</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

Table (4): Linear regression coefficients for stature estimation in boys.

<table>
<thead>
<tr>
<th>Regression Equation</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>P value</th>
<th>95.0% Confidence Interval for B</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stature=12.119+0.489<em>arm span+0.573</em> lower limb+0.431* age+0.295*head circumference.</td>
<td>12.119 4.496</td>
<td>2.696 0.008</td>
<td>3.245 20.994</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.431 0.138 0.077 3.123 0.002 0.159 0.704</td>
<td>0.426 0.551</td>
<td>0.384 0.973</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.489 0.032 0.565 15.429 &lt; 0.001 0.426 0.551</td>
<td>0.378 0.621</td>
<td>0.298 0.460</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LLL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.573 0.052 0.350 10.970 &lt; 0.001 0.470 0.676</td>
<td>0.378 0.621</td>
<td>0.298 0.460</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.295 0.103 0.045 2.867 0.005 0.092 0.498</td>
<td>0.052 0.470</td>
<td>0.298 0.460</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table (5): Linear regression coefficients for stature estimation in girls.

<table>
<thead>
<tr>
<th>Regression Equation</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>P value</th>
<th>95.0% Confidence Interval for B</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stature=19.872+0.379<em>arm span+0.500</em> lower limb+0.679* age+0.384<em>leg length+0.261</em> head circumference</td>
<td>19.872 4.461</td>
<td>4.454 &lt; 0.001</td>
<td>11.065 28.679</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.679 0.149 0.115 4.553 &lt; 0.001 0.384 0.973</td>
<td>0.298 0.460</td>
<td>0.384 0.973</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.379 0.041 0.451 9.224 &lt; 0.001 0.298 0.460</td>
<td>0.298 0.460</td>
<td>0.298 0.460</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LLL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.500 0.062 0.302 8.117 &lt; 0.001 0.378 0.621</td>
<td>0.378 0.621</td>
<td>0.378 0.621</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.384 0.139 0.118 2.772 0.006 0.111 0.657</td>
<td>0.111 0.657</td>
<td>0.111 0.657</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.261 0.106 0.042 2.462 0.015 0.052 0.470</td>
<td>0.052 0.470</td>
<td>0.052 0.470</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Discussion

In the current study, girls were taller than boys at ages 6 and 9 up to 12 years and heavier than boys at ages 6 – 8 and 11- 12 years, while at ages 9 - 10 years the boys were heavier than girls. This is agreeing with Reyes et al. & Tee et al.14, 15 This is can be illustrated by the fact that the growth at age (10 – 13 years) of puberty in girls is earlier than boys then boy’s puberty growth occur after age of 12 years old.

In this study, the mean arm span values were shorter than the height and longer in boys at younger ages, while exceeds height and longer in girls at older ages. This is may be related to the rapid growth at age of puberty and this is in agreement with Zhu et al., Zverev and Chisi.& Grimberg and Lifshitz. 18, 16, 17 However, disagree with Zverev and Chisi., who found that the mean arm span values exceeded height in all age groups of boys and in older girls.16

In this study the arm length was higher in girls at ages 6, 9 &12, while at ages 7- 8 and 10 - 11 years it was higher in boys. These results are in agreement with Zhu et al. & Karakas et al.18, 19

The mean forearm length values were higher in girls than boys in older ages and this agree with Karakas et al. & Zhu et al.19, 18

The mean lower limb length was higher in girls at ages 6, 9, 10, 11 years, while in boys it was higher at ages 7,8, 12 years. Agree with Reyes et al. and Malina et al.14, 20

The leg length was longer in girls in all ages except age 12 years. This result is in agreement with Malina et al. & Zhu et al.20, 18 However, Karakas et al. found that the leg lengths of girls were longer than boys at ages 8, 10 & 11 years.19

The head length was higher in boys in all ages except age 10 years and this agree with Hansi and Ashish with values less than our study.21 and this may be related to genetic, environmental factors like dietary habits, vitamin deficiencies and ethnic variability. In accordance Chowdavarapu et al. found in their study that the mean value of head length was higher in girls.22

The mean head circumference was greater for boys at ages 6 - >12 years. These results agree with Neyzi et al.23 However, disagree with Batterjee et al., who found that, it was higher in girls at ages 8 – 12 years old.24

These differences could be ascribed to the surrounding environmental, nutritional and genetic factors.

In the current study arm span, length of the upper arm, forearm, lower limb and leg showed a strong positive correlation for stature. These agree with Mishra et al. & Zhu et al.25, 18

Mishra et al. Conducted regression equations using arm span.25 and Smith using humerus, femur & tibia.26

Conclusion

The girls exceeded boys in the majority of measurements. Arm span exceeds height in older ages in both boys and girls, while head length and circumferences were higher in boys. The majority of these measurements are useful for estimating stature using multiple regression equations. Further studies should be conducted on large numbers and different regions.

Acknowledgement: Nil

Conflict of Interest: None

Source of Funding: Self

Ethical Clearance: Obtained from Ethical Committee, Faculty of medicine, Cairo University.

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Gene expression and Levels of Plasma Protein Tyrosine Phosphatase Non-Receptor Type 22 (PTPN22) in Pulmonary Tuberculosis Patients and their Household Contacts in Makassar, Indonesia

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Abstract

Background: The protein tyrosine phosphatase non-receptor type 22 (PTPN22) gen, has been involved in the immune response to tuberculosis infection by affecting the inflammatory response and subsequent antimicrobial immunity. This study aims to determine the PTPN22 expression and differences in the levels of PTPN22 in pulmonary TB patients (PTB) with household contacts and healthy control.

Methods: We analyzed PTPN22 expression and the level of plasma PTPN22 from pulmonary tuberculosis patients (PTB), household contacts and healthy control using real time PCR and ELISA method.

Results: Thirty PTB, 30 household contacts and 30 control were involved in this study. Analysis of the association of PTPN22 gene expression against TB showed that PTPN22 gene expression was 7.3 times upregulated compared to household contact and 12.1 times upregulated compared to healthy controls. Levels of plasma PTPN22 in PTB: 10.0620 ng/ml, in Household contact: 6.7923 ng/ml and in control: 4.4293 ng/ml. These values did not differ significantly between the patients, household contact and control.

Conclusion: Our study results found that PTPN22 gene expression is significantly increased in PTB than household contact and control. Levels of plasma PTPN22 in PTB patients did not differ significantly than in household contact and control.

Keywords: PTPN22, Pulmonary tuberculosis, Gene expression, Real time PCR, ELISA, Level of plasma.

Introduction

Pulmonary tuberculosis (TB), an infectious disease caused by Mycobacterium tuberculosis (Mtb). TB remains a major cause of morbidity and mortality in humans worldwide. One-third of the population worldwide is infected by Mtb. About 5-10% of them manifest clinically to be active TB1,5,10,15. World Health Organization in Global Tuberculosis Report 2019 revealed that there were an estimated 10 million new TB cases worldwide in 2018. TB is the top infectious killer in the world. There were 1.5 million people died from TB2,3,11,12,18. TB is the leading killer of people with HIV and a major cause of deaths related to antimicrobial resistance. Indonesia is one of the countries with the highest TB burden in the world. There were 845 thousands TB incidence (316 per 100 thousands population) and 98.3 thousands (37 per 100 thousands population)4,6,7,8,21.

Studies in United States revealed that 20-30% of the household contacts occured latent infection and about 10% became active TB9,10,13,14,28. A person susceptibility to TB infection and developing active TB is influenced by several factors including host genetics, host immunity, mycobacterium virulence and environment. The prevalence rate of TB was significant different among several ethnic minorities, therefore,
the differences in susceptibility to TB may be related to a genetic predisposition. Genetic predisposition as one of the host factors influencing risk factors for the development of TB\textsuperscript{15,16}.

Studies revealed the pivotal function played by cellular immunity in Mtb infection. The immune responses are implicated to control the infection through cytokine production and specific surface molecules interactions. T-cell activation is a crucial step in the immune response against Mtb. Several genes are associated with TB pathogenesis, one of them is protein tyrosine phosphatase nonreceptor type 22 (PTPN22)\textsuperscript{17,18,23}. The PTPN22 gene were involved in maintaining the T cells in the resting stage. PTPN22 were also responsible for bringing back the activated T cells to the resting phenotype in the absence and presence of antigen. Phosphotyrosine phosphatases are involved in reversion of T lymphoblastic proliferation Tyrosine phosphorylation in T cells is regulated by phosphatase activity.

Several transmembrane molecules, like PD-1 (programmed death 1) and CTLA-4 (cytotoxic T-lymphocyte antigen 4), play an important role in downregulating signalling through the T-cell receptor (TCR). The PTPN22 is a cytosolic inhibitor of TCR signalling. The PTPN22 geneis located on chromosome 1p13.3-p13.1. This gene product is the intracellular protein tyrosine phosphatase known as Lyp and expressed in cells of the immune system, including dendritic, T and B cells. Lyp is expressed in cells of haematopoietic origin and has a variety of substrates, including Lck, Zap70, Valosine containing protein (VCP), Vav and TCRzeta, all of them are important players in T-cell signalling. The dephosphorylation of these substrates by LYP negatively modulates T-cell activation. Lyp forms a protein complex with the intracellular tyrosine kinase (protein tyrosine kinase) Csk. The Csk protein tyrosine kinase is a potent suppressor of T cell activation due to its ability to phosphorylate tyrosine residue at Src family kinases, thereby antagonizing the action of CD45, that mediates dephosphorylation of the inhibitory C-terminal SH2 domain of Lck.\textsuperscript{19,1,4}

Numerous studies from several countries result, suggest that the PTPN22 gene affect susceptibility to TB. However, no research has been conducted in Indonesia about PTPN22 and TB\textsuperscript{4,7,12}. The purpose of this study was to compare gene expression and levels of plasma PTPN22 in pulmonary tuberculosis patients and their household contacts in Makassar, Indonesia. The results of this study are expected to provide a better understanding of the relationship gene expression and levels of plasma PTPN22 with susceptibility TB.

**Materials and Method**

**Research design and study subjects**

We analyzed gene expression and the levels of plasma PTPN22 from pulmonary tuberculosis patients (PTB), household contact and control samples using real time PCR and ELISA method. QuantiFERON-TB Gold Plus (IGRA) was used to screening latent TB infection among household contacts. A total of 90 samples were collected in this study, consisting 30 pulmonary tuberculosis patients, 30 household contacts and 30 control. Pulmonary TB patients who were participants in this study were recruited from the Community Center for Lung Health Makassar, Indonesia, which is one of the referral health facilities for tuberculosis.

All TB patients were diagnosed based on clinical manifestations, chest radiograph, microscopic smear which was further confirmed through TB culture with MGIT medium. Inclusion criteria for TB patients in this study included new TB cases (no history of anti-tuberculosis drugs treatment), ages 18 years and over, willing to participate in this study by giving written consent and having positive smear results. The exclusion criterion was HIV-positive (SD Bioline). The inclusion criteria for household contact are those aged 18 years and over, have no clinical symptoms of TB, have no history of TB or anti-tuberculosis drugs, and stay at home with TB patients for at least 6 months and are willing to participate by giving written consent. We collected blood and sputum samples from 30 TB patients, blood samples from only 30 household contacts that met the criteria and 30 blood samples from healthy control. Positive sputum samples were decontaminated and continued with the culture process at the Tuberculosis Unit of the HUM-RC Laboratory (Hasanuddin University Medical-Research Center), Makassar, Indonesia. Blood samples were centrifuged at 4,400 rpm for 10 minutes at 250C to separate plasma samples. Plasma samples were stored at -200C before ELISA. Specifically from the contact sample, we examined IGRA with the QuantiFERON Gold Plus TB Test (Qiagen, Germany) according to the manufacturer’s instruction manual\textsuperscript{20,21,4,7}.
Measurement levels of plasma PTPN22

Concentration PTPN22 was determined by the ELISA method using an ELISA Human PTPN22 kit (Diagnostics Biochem Canada Inc., Ontario, Canada) according to manufacturer’s instructions. Linear curves are used to determine the concentration of PTPN22 samples from a calibration curve. **Measurement gene expression of PTPN22 by real timePCR**

Amplified complementary DNA (cDNA) from RNA extracted blood sample by Reverse Transcriptase-PCR based on the method of Invitrogen. Using SuperScript First-Strand Synthesis System for RT-PCR. This cDNA strand stored in -20°C until used for real time PCR. Measurement gene expression (up regulation or down regulation) PTPN22 by SYBR Green Dye using the real time PCR (qPCR) method according to manufacturer’s instructions. Before amplified, a master mix was prepared by mixed 12.5 ml SYBR green dye, 0.5 ml cDNA and 0.5 ml forward primer (5’-ACAACCTGTGGCTGAGAAGCCA-3’), 0.5 ml reverse primer (5’-GTAGCTGGAATCCTCATCAGG-3’) (each primer 5 pmol/ml) and 11.3 ml H2O. The same procedure was carried out for the GAPDH gene as a control but using a different primer sequence. GAPDH forward primer (5’-CCTGCACCACCAACTGCCTTA-3’)

and GAPDH reverse primer (5’-GGCCATCCACAGTCTTCTGAG-3’) 3,7,9,10. The qPCR cycle with a condition of 50°C for 2 minutes, 95°C for 1 minute each cycle, denaturation 95°C for 15 seconds then followed by annulling 60°C for 30 second and extension 72°C for 30 seconds was repeated 40 times (cycles). The last cycle was the final extension at 72°C for 10 minutes 1,4,9,15,17.

Statistical Analysis

All experimental data were analyzed using SPSS software (version 21.0, Chicago, IL, USA). P values <0.05 were considered statistically significant. Data obtained from ELISA results were analyzed and assessed for differences between the three groups (pulmonary TB patients, household contacts and control). The Chi-square test is used for the comparative analysis of nominal variables. Data (parametric) will be presented as mean ± SD (median) and will use statistical analysis to distinguish values between the three groups. Data were analyzed using the One-way ANOVA test which compared levels of plasma PTPN22 in the three groups.

Results

We analyzed a total of 30 TB patients, 30 household contacts and 30 healthy control for the PTPN22 gene expression and levels of plasma.

Table 1. Distribution of study participants according to the demographic characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>TB patients n=30</th>
<th>Household contact n=30</th>
<th>Healthy control n=30</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>17 (56.7%)</td>
<td>6 (20%)</td>
<td>15 (50%)</td>
<td>0.009*</td>
</tr>
<tr>
<td>Female</td>
<td>13 (43.3%)</td>
<td>24 (80%)</td>
<td>15 (50%)</td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17-30</td>
<td>7 (23.3%)</td>
<td>9 (30%)</td>
<td>3 (10%)</td>
<td>0.475*</td>
</tr>
<tr>
<td>31-45</td>
<td>10 (33.3%)</td>
<td>13 (43.3%)</td>
<td>12 (40%)</td>
<td></td>
</tr>
<tr>
<td>46-60</td>
<td>11 (36.7%)</td>
<td>7 (23.3%)</td>
<td>13 (47.2%)</td>
<td></td>
</tr>
<tr>
<td>&gt; 60</td>
<td>2 (6.7%)</td>
<td>1 (3.3%)</td>
<td>2 (6.7%)</td>
<td></td>
</tr>
</tbody>
</table>

* Chi-square test.
Table 1 shows the gender and age of study participants. There was a gender difference between groups (p=0.009). There were more male subjects (56.7%) than female (43.3%) in the TB patients group. However, more female subjects (80%) than male (20%) in household contacts group. It can be seen that there was no age difference between the three groups (p=0.475).

PTPN22 levels were measured using ELISA. The lines on the boxplot indicate the median and the points show extreme values. PTPN22 levels in TB patients group: mean 10.06 ng/ml with standard deviation 15.98 ng/ml. PTPN22 levels in household contacts group: mean 6.79 ng/ml with standard deviation 10.24 ng/ml. PTPN22 levels in control group: mean 4.43 ng/ml with standard deviation 6.68 ng/ml. Data were analyzed using the One-way ANOVA test which compared PTPN22 levels in the three groups.

The mean value PTPN22 levels in TB patients compared to household contacts and control, did not differ significantly (p = 0.175).

Gene expression of PTPN22 in TB patients group: 12.11629, household contacts group: 1.65801 and control 1.00000. Analysis of the association of PTPN22 gene expression against TB showed that PTPN22 gene expression was 7.3 times upregulated compared to household contact and 12.1 times upregulated compared to healthy controls.

**Discussion**

In this study, from 90 participants, there were more male subjects in the TB patients group. This was in accordance with the theory. We found that PTPN22 gene expression is significantly increased in PTB than household contact and control. Several studies analyzing the role of PTPN22 in TB show an association between
PTPN22 and susceptibility to active TB disease. Some of the earlier studies reported a significant association between PTPN22 and TB. These studies results suggest that PTPN22 gene may affect susceptibility to TB like in Colombian population, Moroccan population, Brazilian Amazon population and Chinese Uygur population.23,10,15

The mean of levels plasma PTPN22 gene on TB patients group was higher than mean of levels plasma PTPN22 gene on household contacts and healthy control. But these values did not differ significantly levels plasma of the PTPN22 gene between the three groups.24,10,28 Several studies results also found that PTPN22 gene is not associated with the susceptibility to TB, such as in Iranian population and Indian population.2,9,17,19

There were differences in terms of genetic predisposition and serum levels in TB and non-TB subjects. It was likely due to geographical location, genetic differences and the presence of other disease conditions. A person susceptibility to TB infection and developing active TB is influenced by several factors including host genetics, host immunity, mycobacterium virulence and environment.25,26 Several factors were increased susceptibility TB, such as malnutrition, Diabetes mellitus and age by suppressed the immune system.27,4,22

**Conclusion**

The PTPN22 gene expression is significantly increased in pulmonary TB patients than household contact and control. Patients with active TB have higher levels of plasma PTPN22, but did not differ significantly, compared to household contacts and control.

Acknowledgments: The authors would like to thank the patients, household contacts and healthy subjects who willingly participated in the study, and all the partners and staffs who help us in the process of this study.

**Source of Funding** - Self-funding

**Conflict of Interest** - None of the authors has competing interests.

**Ethical Clearance** - This research was approved by the Research Ethics Commission of the Faculty of Medicine, Hasanuddin University Makassar, South Sulawesi, Indonesia (No. 583/H4.8.4.5.31/PP36-KOMETIK/2018), and all research subjects gave written informed consent.

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Awareness Program of Pesticides Used among Farmers using Difficulty-Usefulness Pyramid (A Suggestion for Health Laws and Policies Regarding the Use of Pesticides)

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Abstract
Pesticides are toxic chemical substances that are used in agriculture to control plant pests. Excessive use of pesticides and uncontrolled can cause negative effects among farmers, such as vomiting, diarrhea, dyspnea, blurred vision, paresthesia, slurred speech, and chest pain. The prevention effort through health education was used to prevent the risk behavior of farmer, however, it still found obstacles. There are many elements need to be improved and it must be selected which element that significant and priority to change risk behavior among farmers. This study had selected the elements based on Difficulty-Usefulness Pyramid (DUP). The sample was 100 respondents who knew about pesticides in Indonesia. Personal protective equipment (PPE), storage of pesticides, procedure for using pesticides, use of pesticide doses, duration and frequency of spraying pesticides, cleaning the equipment, spraying pesticides based on the wind direction, time of pesticide spraying were selected elements in this study. Difficulty and usefulness were indicators to determine the priority of attributes. Attribute scale (1 to 10) was used based on the level of importance in each attribute. Google form questionnaire was used to collect the data. Each element was measured by: (1) difficulty and usefulness; (2) the mean score of difficulty and the mean score of usefulness; (3) range (from mean score of difficulty to mean score of usefulness). Then the range was sorted starting from the smallest and presented in the form of a pyramid. The pyramid showed that the priority elements were use of pesticide doses, procedures for using pesticides, personal protective equipment (PPE), cleaning the equipment, time spraying pesticides, duration and frequency of spraying pesticides, storage of pesticides, spraying pesticide based on the wind direction.

Keywords: Difficulty-Usefulness Pyramid; awareness; chemical pesticides

Introduction
Pesticides are all chemicals substances to control plant pests such as insects, rodents, nematodes, weeds, viruses, bacteria and microorganisms.¹ Pesticides can increase agricultural product, but it also harm the environment and human health. Excessive use of pesticides and uncontrolled can cause negative effect among farmers. The negative effects of pesticide exposure were vomiting, diarrhea, dyspnea, blurred vision, paresthesia, slurred speech, and chest pain.² Pesticide exposure also depends on the amount of pesticide dose, duration of exposure and exposure modification factors such as the use of personal protective equipment (PPE).³

Pesticide exposure is caused by improper management of pesticides, low levels of knowledge about the dangers of pesticides, not paying attention to safety regulation.⁴ The Thai Department of Occupational Health reports that farmers’ blood tests show an increase in pesticide exposure in the previous year (16% to 18%).
This is due to the low level of knowledge, and the risk behavior of formulating pesticides that inappropriate with the instructions.\(^5\)

Spraying pesticides is the most method to used pesticide, because 75\% of pesticides are applied by spraying.\(^1\) If the application inappropriate, it can have negative effect among users, targeted pests, as well as the environment.\(^4\)

The World Health Organization (WHO) estimates that 1-5 million cases of pesticide poisoning occur annually in agricultural workers with death toll raise until 220,000. However, the Ministry of Health and the Department of Agriculture of Indonesia has already given the information related to pesticides.\(^6\)

Farmers as chemical pesticide users often apply it without the standardized rules. Various efforts to control the use of pesticides from the ministry of agriculture to prevent negative effect of exposure and poisoning pesticide but it did not have affect on the behavior of farmers. The survey showed that farmers who use chemical pesticides did not use personal protective equipment (PPE) when spraying, the dosage used was according to their preferences, spraying was not based on wind direction, and it made high exposure to pesticides. Based on these problems, it is necessary to conduct awareness program by identifying priority elements related to risk behavior of exposure to chemical pesticides.

Considering that many pesticide control programs in Indonesia are still in the initial and development stages, so this research aimed was to identify and collect public opinion about the difficulties and usefulness of awareness programs for risk behaviors of exposure to chemical pesticides among farmers by using difficulty-usefulness (DUP) pyramid.

Nugroho, et al (2018) introduced DUP as a method for selecting priority elements. In this method, the determination of the elements is conducted through literature review, while the attributes that used as the basis for determining priorities are difficulty and usefulness. DUP gives equal weight to these two attributes, also the level of importance of difficulty and usefulness as a basis for improvement of elements is equal.\(^7\) Everyone has different views on the importance of difficulty and usefulness. Some people will assume that the difficult elements should be prioritized to be improved, but some people will assume that useful element should be prioritized to be improved. Based on the background, we proposed a method for selecting elements that will be prioritized, using DUP.

**Method**

The study was conducted in 2019. The sample was the general public who knew about the use of chemical pesticides in Indonesia. This study involved 100 respondents spread in Indonesia. This study used DUP to select elements based on priority and the difficulty and usefulness attributes. The following steps were:

1. **Determination of the elements**

   The selection of the priority elements of the awareness program on the use of chemical pesticides among farmers based on DUP creation study.\(^1\) The selected elements based on the review literature. Applications of pesticides from Djojosoemarto were: using personal protective equipment (PPE), storage of pesticides, the procedure for using, use of pesticide doses, duration and frequency of spraying pesticide, maintain cleanliness of equipment, spraying pesticides in the direction of the wind.

2. **Determination of attributes**

   According to DUP, difficulty and usefulness were used as priority attribute.\(^7,\text{8}^\) Based on DUP, difficulty was scored with a negative symbol (0 to -10), so the higher the difficulty of an element, the score was negative. Usefulness was scored with a positive symbol (0 to 10), so the higher the usefulness of an element, the score was positive.\(^7,\text{8}^\)
Table 1. Questionnaire for selecting elements of awareness of pesticides used based on priority

<table>
<thead>
<tr>
<th>Difficulty</th>
<th>Elements</th>
<th>Usefulness</th>
</tr>
</thead>
<tbody>
<tr>
<td>High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1</td>
<td>Personal protective equipment (PPE)</td>
<td>Low 0 1 2 3 4 5 6 7 8 9 10 High</td>
</tr>
<tr>
<td>0 Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1</td>
<td>Storage of pesticides</td>
<td>Low 0 1 2 3 4 5 6 7 8 9 10 High</td>
</tr>
<tr>
<td>0 Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1</td>
<td>Procedure for using pesticides</td>
<td>Low 0 1 2 3 4 5 6 7 8 9 10 High</td>
</tr>
<tr>
<td>0 Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1</td>
<td>Use of pesticide doses</td>
<td>Low 0 1 2 3 4 5 6 7 8 9 10 High</td>
</tr>
<tr>
<td>0 Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1</td>
<td>Duration and frequency of spraying pesticides</td>
<td>Low 0 1 2 3 4 5 6 7 8 9 10 High</td>
</tr>
<tr>
<td>0 Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1</td>
<td>Maintain cleanliness of equipment</td>
<td>Low 0 1 2 3 4 5 6 7 8 9 10 High</td>
</tr>
<tr>
<td>0 Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1</td>
<td>Spraying pesticides in the direction of the wind</td>
<td>Low 0 1 2 3 4 5 6 7 8 9 10 High</td>
</tr>
<tr>
<td>0 Low</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High -10 -9 -8 -7 -6 -5 -4 -3 -2 -1</td>
<td>Time sprays pesticides</td>
<td>Low 0 1 2 3 4 5 6 7 8 9 10 High</td>
</tr>
<tr>
<td>0 Low</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Data collection and analysis

At this stage, data collection was carried out through questionnaires (Table 1). Respondents were asked to fill in the Google form questionnaire that was sent via the Whatsapp application, one mobile number only can fill the questionnaire once. The next step was descriptive data analysis: (1) making the difficulty scores of each element with the importance of difficulty; (2) making the usefulness score of each element with the importance of usefulness; 3) calculating the mean score of difficulty and the mean score of usefulness; 4) calculating the range that starts from the mean score of difficulty to the mean score of usefulness; 5) rank according to the smallest range; 6) draw a pyramid diagram based on the sorted range; 7) determine the elements based on priority order according to the pyramid diagram.

Findings

The results of descriptive data analysis were shown in Table 2. The ranges were arranged sequentially starting from the smallest as shown in Table 3. The sorted ranges were presented in the form of a pyramid diagram. The largest range was in the lowest position, while the smallest range was in the top position (Figure 1).
Table 2. Mean score and range

<table>
<thead>
<tr>
<th>Mean score of difficulty</th>
<th>Elements</th>
<th>Mean score of use usefulness</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.47</td>
<td>Personal protective equipment (PPE)</td>
<td>7.32</td>
<td>12.79</td>
</tr>
<tr>
<td>5.28</td>
<td>Storage of pesticides</td>
<td>7.1</td>
<td>12.38</td>
</tr>
<tr>
<td>5.85</td>
<td>Procedure for using pesticides</td>
<td>7.01</td>
<td>12.86</td>
</tr>
<tr>
<td>5.94</td>
<td>Use of pesticide doses</td>
<td>7.03</td>
<td>12.97</td>
</tr>
<tr>
<td>5.68</td>
<td>Duration and frequency of spraying pesticides</td>
<td>6.92</td>
<td>12.60</td>
</tr>
<tr>
<td>5.54</td>
<td>Maintain cleanliness of equipment</td>
<td>7.19</td>
<td>12.73</td>
</tr>
<tr>
<td>5.26</td>
<td>Spraying pesticides in the direction of the wind</td>
<td>7.09</td>
<td>12.35</td>
</tr>
<tr>
<td>5.49</td>
<td>Time spraying pesticides</td>
<td>7.12</td>
<td>12.61</td>
</tr>
</tbody>
</table>

Figure 2 showed the largest range (the lowest position in the pyramid) was the use of pesticide doses. Thus, to awareness of the use of chemical pesticides was priority “Use of pesticide doses, then the next priority is procedure for using pesticides, personal protective equipment (PPE), maintain cleanliness, time spraying pesticides, duration and frequency of spraying pesticides, storage of pesticides, and finally spraying pesticides based on wind direction. Further recommendation, the five elements with the largest range are prioritized for improvement (Use of pesticide dosages and links to resources, procedures for using pesticides, personal protective equipment (PPE), maintain cleanliness, time spraying pesticides, duration and frequency of spraying pesticides)

Table 3. The rank of mean score based on range

<table>
<thead>
<tr>
<th>Mean score of difficulty</th>
<th>Elements</th>
<th>Mean score of use usefulness</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.26</td>
<td>Spraying pesticides in the direction of the wind</td>
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<tr>
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<td>Storage of pesticides</td>
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<td>7.03</td>
<td>12.97</td>
</tr>
</tbody>
</table>
From the pyramid, it can be concluded that the range of the eight elements is almost the same, but if examined based on priorities, the four main elements that are prioritized for improvement are the use of pesticide doses, procedure for using pesticide, PPE and maintain cleanliness of equipment.

**Discussion**

This study had a new method to refinement the DUP. DUP is the initial method to develop awareness program of pesticides used among farmers. Determination of the awareness elements of the use of chemical pesticides are based on ten elements used in popular pesticide exposure prevention programs, namely use of pesticide doses, procedures for using pesticides, personal protective equipment (PPE), maintain cleanliness of equipment, time spraying pesticides, duration and frequency of spraying pesticides, storage of pesticides, and spraying pesticides based on wind direction.

The attributes for determining priorities based on DUP were difficulty and usefulness. In the process of creating DUP, the two attributes were chosen based on literature review. The awareness program of pesticides used is a prevention program to prevent exposure to chemical pesticides when applying pesticides either in the field or in storage of pesticide. The determinants were selected by using the text book of “Application of Pesticides” written by Djojosumarto. The analysis used the Difficulty-Usefulness Pyramid (DUP) theory. DUP mentioned that “difficulty” was an attribute that had to be reduced, so it had a negative score; while “usefulness” is an attribute that must be improved, so it had a positive score.

Figure 2 showed that the different ways of scoring for difficulty and usefulness, the result was the bars in the opposite direction. The left for “difficulty” and right for “usefulness”. In this case, the priority is the element with the largest range starting from the value of “difficulty” to “usefulness”. The use of pyramid diagrams is intended to analysis and understood the result quickly. From the pyramid, it can be concluded that the range of the eight elements is almost the same, but if examined based on priorities, the four main elements that are prioritized for improvement are the use of pesticide doses, procedure for using pesticide, PPE and maintain cleanliness of equipment.

Pyramid diagrams can be depicted using computers manually or using statistical software that provides facilities such as SPSS. In this study, DUP was created by using population pyramid, with several changes, namely: 1) “variable” form is filled by mean score, 2)
“show distribution over” form is filled by elements of alertness program use of pesticides, 3) “split by” form is filled by attributes.\(^\text{7,8}\)

By using DUP, drawing can be conducted easily because the results of data analysis are presented visually in the form of a pyramid. In this case, the element at the lowest position was the first priority, while the element at the top position was the last priority. Recommendations can also be conveyed more easily because they only refer to the priorities. Based on the conclusions and recommendations, managers can immediately plan for the improvement of the elements of awareness program of the pesticides used.

In this study, the DUP process was used to increase awareness of chemical pesticides used in the health and agriculture sectors, but it is also recommended to use DUP into other objects, such as hospital information systems, telemedicine, health service systems, e-Health, health e-journal and so on. In advance, elements must be selected through literature review, focused group discussion or brainstorming that involving the users of the related system.

**Conclusion**

Based on the result, it can be concluded that the four main elements that are prioritized for improvement are the use of pesticide doses, procedure for using pesticide, PPE and maintain cleanliness of equipment. This finding is expected to contribute significantly to increase awareness program of the pesticides used among farmers in agriculture, environmental toxicology and health.

**Conflict of Interest:** No

**Source of Funding:** Authors

**Ethical Clearance:** Yes

**References**

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Regional Disparities of Stunted Toddler in Indonesia

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Abstract

Although there has been a decline in the prevalence of stunting in Indonesia in the past decade, the figure is still the highest among countries in Southeast Asia. The purpose of the study was to analyze the regional disparity of stunted toddlers in Indonesia. The analysis in this study uses data from the 2017 Indonesian Nutritional Status Monitoring. The sample used in this study was 149,571 toddlers aged 0-59 months. Data were analyzed using the Binary Logistic Regression test. Toddlers in the Sumatra region have the possibility of 0.921 times stunted compared to toddlers in the Papua region. The Java-Bali region was 0.805 times more likely than toddlers in the Papua region to be stunted. The Nusa Tenggara Region was 1.39 times more likely than toddlers in the Papua region to be stunted. Kalimantan Region has 1.161 times more likely than toddlers in the Papua region to be stunted. The Sulawesi region has 1.18 times the possibility of toddlers in the Papua region being stunted. Maluku region has a probability of 0.88 times that of toddlers in the Papua region to be stunted. There was a regional disparity of stunted toddler in Indonesia.

Keywords: child health, child nutrition, health survey

Background

A linear growth curve for toddlers with age is the best indicator in describing whether there is quality inequality in achieving optimal children’s health. Inadequate food in meeting nutritional needs and the emergence of infectious diseases is the direct and most frequent cause of this growth failure¹. Stunting is a form of growth failure that reflects chronic and multidimensional nutritional problems in the first 1000 days of life that have an impact on the quality of human resources². Decreased cognitive abilities, increased morbidity and the onset of metabolic syndrome in the future are the serious effects of stunting³.

Stunting is marked by the z value of height according to age below -2 standard deviations from the global growth reference. Data from the Global Health Observatory shows that globally nearly 150 million children under five in the world, or around 21.9%, are still in the stunting category. In line with the agenda of public health priorities in the world, it is expected that the prevalence of stunting will decrease by 2030 to 17.5%⁴. Indonesia is a country with a high enough stunting rate. Indonesia Basic Health Survey data for 2007, 2013 and 2018 show the prevalence of national toddler stunting in Indonesia respectively 36.8%; 37.2%; 30.8%⁵. Although there has been a decrease in the prevalence of stunting in the past decade, the figure still shows more than 30%. This figure is the highest among countries in Southeast Asia. This condition can be interpreted that one in three toddlers born in Indonesia is still stunted. This figure varies in 34 provinces and 541 regencies/cities, which is between 17.6%-42.3%⁶.

The success of stunting prevention cannot be separated from cross-sectoral and multidimensional collaboration. One index to measure the success of health development in the national context (Indonesia) is the Public Health Development Index (PHDI). Collection of public health indicators that comprehensively form 1 value that has a connection with life expectancy and is one of the efforts to see the ranking and progress of health development at the regional level⁷. The PHDI data for 2013 and 2018 illustrate the disparity in health development at the regency/city and provincial levels in Indonesia. Differences in the geographical environment, access, socioeconomics as well as human development underlie this inequality. Based on the background, this study was conducted to analyze the regional disparity of...
Materials and Method

This study analyzes the 2017 Indonesian Nutritional Status Monitoring data (PSG 2017). PSG 2017 was a national-scale survey using a multi-stage cluster random sampling method conducted by the Nutrition Directorate of the Indonesian Ministry of Health. The unit of analysis in this study was toddlers aged 0-59 months. The sample size analyzed in this paper was 149,571 toddlers.

The region was the division of territory grouped by the largest island. Divided into 7 regions, namely Sumatra, Java-Bali, Nusa Tenggara, Kalimantan, Sulawesi, Maluku, and Papua. The variable selection was done by using the Chi-Square test to test the dichotomous variable, while for the continuous variable the T-test was used. This statistical test was used to assess whether there was a statistically significant relationship between regional variables and other variables related to the nutritional status of toddlers for height per age. There were 8 variables in 3 groups of variables to be tested, namely the characteristics of children under five (nutritional status and age), the context of the region (urban-rural), and the characteristics of mothers of children under five (age, marital status, education level, work status). A binary logistic regression test was used at the final stage to determine the variables that were predictors of stunting in toddlers in Indonesia.

Findings

The results of the bivariate analysis found that on average each region is dominated by rural areas. On average, each region is dominated by toddlers with normal nutritional status. The largest prevalence of stunted children is in the Nusa Tenggara region. There is a significant difference between the nutritional status of children under five by region category in Indonesia. Table 1 shows that the average age of children under five is slightly older in the Papua region compared to mothers of children under five in other regions. While the average age of mothers of children under five is slightly older in the Nusa Tenggara region compared to mothers of children under five in other regions.

Based on marital status, toddlers in all dominant regions have married status. While based on the level of education of mothers of children under five in the region of Sumatra, Java-Bali, Sulawesi, and Maluku, they have a dominant high school education. While the regions of Nusa Tenggara, Kalimantan and Papua predominantly have a primary school and under. Based on work status, mothers of the toddler are dominated by those who do not work.

Table 1 displays the results of the binary logistic regression of the nutritional status of the toddler. Table 1 shows that in the Sumatra, Java-Bali, Nusa Tenggara, Kalimantan, Sulawesi, and Maluku regions, the stunted incidence disparity in toddlers has proven to be significant compared to the Papua region as a reference.

### Table 1. Multinomial Logistic Regression of Nutritional Status of Toddler (n=149,571)

<table>
<thead>
<tr>
<th>Predictors</th>
<th>Stunted</th>
<th>OR</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Region</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Region:Sumatra</td>
<td>***0.92</td>
<td>0.88</td>
<td>0.96</td>
<td></td>
</tr>
<tr>
<td>Region:Java-Bali</td>
<td>***0.81</td>
<td>0.77</td>
<td>0.84</td>
<td></td>
</tr>
<tr>
<td>Region:Nusa Tenggara</td>
<td>***1.39</td>
<td>1.32</td>
<td>1.48</td>
<td></td>
</tr>
<tr>
<td>Region:Kalimantan</td>
<td>***1.16</td>
<td>1.10</td>
<td>1.22</td>
<td></td>
</tr>
<tr>
<td>Region:Sulawesi</td>
<td>***1.18</td>
<td>1.13</td>
<td>1.24</td>
<td></td>
</tr>
<tr>
<td>Region:Maluku</td>
<td>**0.88</td>
<td>0.82</td>
<td>0.95</td>
<td></td>
</tr>
</tbody>
</table>
Table 1 informs that toddlers in the Sumatra region are 0.92 times more likely than toddlers in the Papua region to be stunted (OR 0.92; 95% CI 0.88-0.96). The Java-Bali region is 0.81 times more likely than toddlers in the Papua region to be stunted (OR 0.81; 95% CI 0.76-0.84). The Nusa Tenggara Region is 1.39 times more likely than toddlers in the Papua region to be stunted (OR 1.39; 95% CI 1.32-1.48). Kalimantan Region has 1.16 times more likely than toddlers in the Papua region to be stunted (OR 1.16; 95% CI 1.10-1.22). The Sulawesi region has 1.18 times the possibility of toddlers in the Papua region being stunted (OR 1.18; 95% CI 1.13-1.24). Maluku region has a probability of 0.88 times that of toddlers in the Papua region to be stunted (OR 0.88; 95% CI 0.82-0.95). It could be interpreted that toddler in the Sumatra, Java-Bali, and Maluku regions had a lower possibility than the Papua region to be stunted. While the Nusa Tenggara, Kalimantan, and Sulawesi regions had a greater risk than the Papua region to be stunted. These results are in line with some of the results of other studies that found that health development in the West (Sumatra, Java-Bali) has a better tendency than in Eastern Indonesia.8,9

Table 1 informs that toddlers living in urban areas are 0.81 times more likely to be stunted than toddlers living in rural areas. (OR 0.81; 95% CI 0.79-0.84). This means that toddlers living in urban areas were less likely to be stunted. Table 3 also shows that age, both in infants and mothers, proved to be a significant predictor of stunted events in infants.

The analysis shows that urban areas have a lower risk of stunted children. This result is in line with the results of research in several countries which found that people who live in urban areas tend to have better health status. The tendency for better health status in this urban area is found in South Africa and Iran.10,11

In the context of Indonesia, empirically it is known that the Western region has more urban areas than the Eastern region. The condition of urban areas that are more advanced makes those who live in the area have the opportunity and access to better health services than...
those in the Eastern region\textsuperscript{12,13}. This phenomenon is exacerbated by conditions in Eastern Indonesia which also tend to have an archipelago topographic, which makes physical access difficult\textsuperscript{14}.

Table 1 shows that the mother’s characteristics found to be predictors, besides age, are marital status, education, and work status. A toddler who has a married mother is 0.85 times stunted than a toddler who has a divorced/widowed mother (OR 0.85; 95% CI 0.77-0.94). This means toddlers who have married mothers have a lower risk of being stunted.

Table 1 shows that the lower the mother’s education level, the toddler is more likely to be stunted than a toddler who has a college graduate mother. A toddler who has a non-working mother is 1.03 times stunted than a toddler who has a working mother (OR 1.03; 95% CI 1.28-1.39). This means that toddlers who have mothers who do not work are less likely to experience stunted.

The results of the analysis found that some maternal characteristics also contributed to being stunted in infants. Toddlers who have married mothers have a lower risk of being stunted. Married mothers tend to have better mental states\textsuperscript{15} because the mother can share the burden and role with her husband. A better parental process will reduce the risk of fives being stunted\textsuperscript{16}.

The analysis shows that the lower the mother’s education level, the toddler has a greater risk of being stunted. These results are in line with the results of research in Malawi which found that maternal knowledge also became a predictor of undernutrition in infants. Better mother’s knowledge will reduce the risk of undernutrition in infants\textsuperscript{17}. In line with the results of research in Malawi, findings in India also received the same thing. Women’s education can reduce child stunting\textsuperscript{18}.

Toddlers who have mothers who do not work are less likely to experience stunted. Working mothers tend to have less time for their children. Poor parental time is also known to have a negative impact on the nutritional status of children\textsuperscript{19}.

**Conclusions**

Based on the results of the present study, it can be concluded that there was a regional disparity of stunted toddlers in Indonesia. While other variables that were found to influence the stunted toddler were rurality, age of toddler, age of mother, marital status of mother, education level of mother, and work status of mother. The results of this study are important for policymakers to determine the region target of an accelerated intervention program to reduce the prevalence of stunting in children under five appropriately in Indonesia.

**Source of Funding:** Self-funding

**Conflict of Interests:** Nil

**Ethical Clearance:** The PSG 2017 already has an ethical license approved by the National Ethics Committee (ethical number: LB.02.01/2/KE.244/2017). In this survey, informed consent was used during data collection, which considers aspects of procedures for data collection, voluntary and confidentiality.

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Correlation Between Influenza Virus Replication and ATP6V0C of Trivalent Influenza (TIV) Vaccination in Ferret

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Abstract

Influenza virus infections are a major public health threat. Influenza viruses are associated with high mortality and morbidity worldwide through seasonal epidemics. Vaccination programs are available, but unpredictable antigenic changes in circulating strains require annual modification of seasonal influenza vaccines. Influenza vaccines are given, one of which is a trivalent influenza vaccine (TIV) aimed at the formation of antibodies that are specific to influenza viruses by B cells. In this study TIV vaccination has an effect in the form of decreasing viral replication in ferret that have been tested with H1N1 and H3N2 viruses. The results of this study are data about viral replication obtained from hemagglutination tests (HA test) and ATP6V0C expression with SDS-Page.

Keywords: ATP6V0C expression, ferret, TIV vaccination, viral replication

Introduction

Influenza virus infections are a major public health threat. Influenza viruses are associated with high mortality and morbidity worldwide through seasonal epidemics. Recent studies estimate that 290,000–645,000 deaths occur worldwide due to seasonal influenza annually1.

Influenza is an acute respiratory infection caused by influenza viruses that circulate in all parts of the world. Viruses multiply through the process of replication. Measurement of the amount of virus in the body can be done after the incubation period, which is around days 1 to 3 after infection occurs. Viruses can be obtained from several specimens taken from the respiratory tract, which are recommended to detect the virus in patients with respiratory infections, for example from nasal swabs, swabs and nasopharyngeal aspirations, endotracheal swabs, and bronkoalveolar tissue2,3.

Infection starts when a virus enters a cell, the virus uses many cellular functions of the host cell in each stage of its life cycle, so the identification of the function and role of the host cell in virus replication is an important key to understanding the life cycle mechanism of the virus4.

The RNA replication process of influenza viruses occurs in the host cell nucleus, the ribonucleoprotein (RNP) complex of viruses released from the virus must be moved into the nucleus through the nucleus pore5. The transport process triggers the host cell to express the vATPase complex gene, one of which is the ATP6V0C gene. This complex gene is a gene that will encode the vacuolar ATPase component, a component in the vATPase complex that is needed in the process of acidification of intracellular organelles in the RNP transport process into the host cell nucleus6,7. Based on the recommendations of the WHO, the influenza vaccine is currently a trivalent inactivated vaccine (TIV)/trivalent whole virus vaccine made from a live attenuated virus, consisting of A/California/7/2009 (H1N1) pdm09-like virus, A/Switzerland/9715293/2013 (H3N2)-like virus and B/Phuket/3073/2013-like virus8.

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Materials and Method

Object of research

Subjects in this study were Ferret, the gold standard laboratory animals in influenza virus infections and aerosol infections compared to other animals, the reasons include the similarity in clinical symptoms if ferrets were infected by influenza viruses with clinical symptoms that occur in humans, there is a distribution of similar receptors in the channel breathing in ferrets and humans and the ability to be infected with human isolates without the need for adaptation. This study used 25 ferrets that were divided into 5 groups, with the treatment of one shot vaccination with different doses.

Research Methods

The administration of intramuscular TIV vaccine in this study used an one shot method with dosage variation of 3.8 µg; 7.5 µg; 15µg; and 30µg. The vaccine and viruses used in this study came from PT. Biofarma. Blood samples were taken at the time of termination which is the 36th day. Whereas nasal wash and oral swab sampling was performed on days 3, 4, 5, 7, 9, and 14 after the challenge test.

Challenge tests using H1N1 and H3N2 viruses in the form of mixed infections. The presence and linkages of ATP6V0C host cell expression and post-vaccination virus replication can be taken into consideration in regard to the effectiveness of various vaccine doses and the vaccine delivery methods that have been given.

Samples used for examination of viral replication by hemagglutination test are samples from nasal wash and oral swab collection, while for the examination of ATP6V0C expression ferret blood serum is used, which is done by SDS-Page (Sodium Dodecyl Sulfate-Polyacrylamide Gel Electrophoresis). The SDS-Page results were followed by reading the expression of ATP6V0C protein using the DocTM EZ Gel (Biorad).

Result and Discussion

All groups showed positive results of viral replication with HA test since day 3 after the challenge test, indicating that the challenge test was successful so that positive HA values were obtained for all groups. This is in accordance with the standard pattern of influenza virus growth in the infected human body, virus titers will experience exponential growth within 2-3 days after the challenge test, then experience an exponential decline until undetectable on days 6 to 8 after the challenge test.

Table 1. Mean replication of the virus with the HA test after the challenge test.

<table>
<thead>
<tr>
<th>Group</th>
<th>n</th>
<th>Viral load titre (in HAU units), day after challenging test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>3rd</td>
</tr>
<tr>
<td>A1</td>
<td>5</td>
<td>23.2 ± 25.9</td>
</tr>
<tr>
<td>B1</td>
<td>5</td>
<td>9.6 ± 8.8</td>
</tr>
<tr>
<td>C1</td>
<td>5</td>
<td>6.8 ± 6.3</td>
</tr>
<tr>
<td>D1</td>
<td>5</td>
<td>10.4 ± 13.7</td>
</tr>
<tr>
<td>E1</td>
<td>5</td>
<td>11.2 ± 7.2</td>
</tr>
</tbody>
</table>

TIV vaccine is expected to be able to increase the production of antibodies, antibodies that are formed are expected to be able to recognize HA proteins from viruses, so they cannot be attached to sialic acid receptors on host cells. Viruses that cannot bind to the host cell receptor are blocked from entering the cell, so they cannot use the replication machine in the host cell to multiply themselves. This mechanism can reduce the number of virus replications detected in the HA test in this study.

One of the virus strains used in the TIV vaccine used in this study was the H1N1 A/California/7/2009 (H1N1) pdm09 virus, this strain corresponds to the
virus used in the challenge test, the A/California/7/2009 (H1N1 virus) pdm09-like virus. The degree of vaccine protection depends on the compatibility of the strain in the vaccine with the circulating virus. The H3N2 virus used in the challenge test is different from the H3N2 virus strain used in the vaccine, but this is expected to cause cross protection so that the antibodies produced are still able to provide protection.

Research conducted by Skowronski and the team in 2014, which carried out a vaccination test with a dose of 30 µg/mL, showed no significant difference in growth of viral titers between groups, and peak viral titer growth on days 1 to 2 then decreased from day to day 3rd after challenge testing. In another study using variations in vaccine dosage and type of vaccine administration through aerosols, it turned out that the results of growth of virus titers did not show significant differences between groups, on the 3rd day after the challenge test.

Normal clinical dose, which usually does not exceed 15 µg HA protein, WIV (Whole Inactivated Virus) induces adequate neutralizing antibody titers, but generally fails to induce any cellular response regardless of the route of administration. Research by Budimir shows that some high doses of WIV, are able to induce significant amounts of CTL (cytotoxic T lymphocyte) specific inactivated viruses in mice. This is in accordance with this study which also uses a vaccine with a dose twice the usual which is 30µg. It is possible that high doses of vaccine in this study could induce CTL thus providing a better protective role, but unfortunately this study did not measure the immune response of host cells. However, from the level of virus replication in the D1 group (dose 30 µg) there was indeed a significant decrease in the average viral replication from day of 3rd to 4th.

The important role of membrane fusion activity and the presence of viral ssRNA for CTL induction are established. This role is also in accordance with this study which suggests the role of ATP6V0C in endosome membrane fusion. Intramuscular administration of WIV has proven to be more effective in inducing CTL compared to intranasal. This was confirmed by Takeda who found that intranasal vaccination with WIV failed to induce T cell responses. This may cause viral replication to be detected several days after the challenge test in almost all vaccinated groups.

It is thought that the WIV inactivation method can have an effect on its immunogenicity. In addition to increasing doses, the cellular response induced by WIV can also be increased by the addition of adjuvants. Similar to studies with WIV, the addition of alum into the virus has been shown to damage cellular responses in mice, because it further increases the tendency for TH responses to TH2.

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**Fig. 1 Results of SDS-Page serum ferret.** The blue ribbon and the pink line emphasized show protein expression in the area approaching the marker. Note: M: Marker 10-250 kDa; 1-9 serum ferret samples before treatment and after vaccination and challenge test. 1 = A1.3 pre vaccination; 2 = B1.3 pre vaccination; 3 = B1.3 post vaccination; 4 = C1.2 pre vaccination; 5 = C1.3 post vaccination; 6 = D1.2 prev. 7 = D1.2 post vaccination; 8 = E1.2 pre vaccination; 9 = E1.3 post vaccination.
The humoral immune response generated by inactivated virus vaccines currently does not provide adequate cross-protection against inactivated virus vaccines that do not match the type of infecting virus. Specific inactivated virus vaccine T cells must recognize the epitope that they are conserving and therefore must have the potential for cross-protection.\(^{21}\)

ATP6V0C is one of the factors expressed by host cells, which have a role in the process of replicating influenza virus cells. Vaccination is expected to prevent the virus from entering the cell, so ATP6V0C will not be expressed by the group that gets the vaccination but it will be expressed by the control group.

ATP6V0C is a protein with a molecular weight of 16 kDa, with SDS-Page examination its expression can be seen at the bottom approaching the marker region in the 15 kDa region. The ribbon that appears positive in the area is located at well number 9 filled by the control group. The ATP6V0C band was not expressed in all vaccination treatment groups, but was expressed in the control group.

**Table 2** Results of analysis of SDS-Page 1 protein expression dimensions of one shot serum ferret samples

<table>
<thead>
<tr>
<th>Molecular Weight (kDa)</th>
<th>Marker</th>
<th>well 1</th>
<th>well 2</th>
<th>well 3</th>
<th>well 4</th>
<th>well 5</th>
<th>well 6</th>
<th>well 7</th>
<th>well 8</th>
<th>well 9</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>250</td>
<td>180</td>
<td>155.6</td>
<td>147.8</td>
<td>147.8</td>
<td>150.0</td>
<td>161.4</td>
<td>139.1</td>
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<td>232.4</td>
</tr>
<tr>
<td>2</td>
<td>150</td>
<td>143.4</td>
<td>137.1</td>
<td>131.0</td>
<td>131.0</td>
<td>135.0</td>
<td>135.0</td>
<td>68.6</td>
<td>54.7</td>
<td>173.6</td>
</tr>
<tr>
<td>3</td>
<td>100</td>
<td>64.5</td>
<td>87.6</td>
<td>49.4</td>
<td>112.8</td>
<td>116.2</td>
<td>118.0</td>
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<td>48.9</td>
<td>56.0</td>
</tr>
<tr>
<td>4</td>
<td>75</td>
<td>51.5</td>
<td>50.6</td>
<td>38.8</td>
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<td>47.7</td>
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<td>49.4</td>
<td>37.2</td>
<td>49.1</td>
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<tr>
<td>5</td>
<td>50</td>
<td>41.1</td>
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<tr>
<td>6</td>
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<td>13.7</td>
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<tr>
<td>7</td>
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<td>27.0</td>
<td>26.9</td>
<td>23.7</td>
<td>26.2</td>
<td>25.2</td>
<td>24.2</td>
<td>26.7</td>
<td>15.5</td>
<td></td>
</tr>
<tr>
<td>8</td>
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<td>25.0</td>
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<td>23.4</td>
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</table>

Table 2 shows that well number 9 containing the control group obtained a ribbon filled in kDa 15.5. This is close to the size of ATP6V0C which is 16 kDa. Whereas in other wells namely the group that got the vaccination, the band that was close to the 15 kDa marker was almost non-existent.

Research conducted by Pavelin et al. proved that ATP6V0C produced almost complete blocks in cytomegalovirus production. This shows that endosome acidification is very important for HCMV replication. Cell viability tests show that the reduction in viral replication is not due to cellular toxicity caused by ATP6V0C knockdown and small transfection of RNA does not induce interferon responses.\(^{22}\)

Targeting ATP6V0C can represent a blocking mechanism in the assembly and release of virions during latent infection. Acidification has been proven to be necessary for efficient signaling by toll endosome residents such as receptors and for efficient class II MHC presentations.\(^{23,24}\) Blocking endosome acidification by targeting ATP6V0C may be an effective way for viruses to interfere with both innate and adaptive immune responses.\(^{27}\)

Another study on flavivirus conducted by Barrows et al. revealed that the endoplasmic reticulum
membrane protein complex facilitated the biogenesis and / or assembly of receptors needed in the plasma or endosomal membrane which had an indirect effect on viral infection, namely the mechanism of virus entry in cells. This shows that ATP6V0C plays an important role in virus replication, so that when ATP6V0C is not expressed due to vaccines, the virus cannot replicate and ultimately the results of virus replication will go down.

**Conclusion**

In this study TIV vaccination has an effect in the form of decreasing viral replication in ferret that have been tested with H1N1 and H3N2 viruses. The results of this study are data about viral replication obtained from hemagglutination tests (HA test) and ATP6V0C expression with SDS-Page.

**Conflict of Interest**: The authors declare that they have no conflict of interest.

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**Ethical Approval**: This study was approved by the Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia.

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3. WHO. Preliminary review of D222G amino acid substitution in the haemagglutinin of pandemic influenza A (H1N1) 2009 viruses; 2009.


Changes in Immunological Parameters in Patients Treated Using Direct and Indirect Restorations of the Hard Tissues of the Anterior Teeth in Combination with an Antioxidant

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Abstract

The problem of aesthetic restoration of the hard tissue defects in the anterior teeth and the choice of materials for quality restorations, which can include direct composite or indirect ceramic restoration, in particular ceramic veneers, is currently extremely important in clinical dental orthopedics. Currently used composite and ceramic materials are known to have different effects on the conditions of the marginal periodontium and the local immunity in the oral cavity. Therefore, we propose a new approach to treatment, which is the use of indirect ceramic restorations in combination with an antioxidant. The purpose of this article is to increase the effectiveness of treatment in patients with defects in anterior teeth using indirect ceramic restorations with antioxidants. To study the intensity of immune reactivity in patients with existing defects of the coronal part of the anterior teeth, we analyzed the levels of lysozyme and sIgA in the oral fluid. The results of the studies confirm the advantages of indirect ceramic restorations over direct composite ones in the treatment of hard tissue defects in the anterior teeth, taking into account the levels of immunological reactivity and using an antioxidant drug Resveratrol.

Key words: peroxide compounds, bactericidal effects, caries, tooth tissues.

Introduction

With food and air, we consume a significant amount of different types of exogenous bacteria which can cause certain diseases in the body. The first barrier is the surface of the mucous membranes, including the oral cavity. The main specific protective mechanism of these surfaces is the production of lysozyme and secretory sIgA. Protection of the oral mucosa is due to specific and non-specific protective mechanisms. The main factors in the humoral protection of the mucous membranes are sIgA and a number of protein-carbohydrate compounds, which include saliva anti-proteases, lysozyme, lactoferrin and mucus glycoproteins. Antibody deficiency – the main specific immunity factor – is a consequence and integral manifestation of the impaired cellular quantitative composition and their functional characteristics in the process of immunogenesis where the lymphoid and non-lymphoid cells and cytokine regulation play an important part.

The cytokines formed during an inflammatory process damage the tissues of the periodontium and result in the alveolar bone resorption, which is clinically manifested as the symptoms of generalized periodontitis. Therefore, a comprehensive study of the clinical symptoms of periodontal tissue pathology with determination of such local immunity parameters as sIgA and lysozyme levels in the oral fluid seems reasonable.

The immune system, along with the endocrine system, plays a leading role in the relationship between the human body and the environment. This is implemented through nonspecific resistance factors at different stages (barrier – skin, mucous membranes, histogematic barriers; cellular and humoral) and specific immune response (through cooperation among antigen-presenting cells, T and B lymphocytes). The oral cavity shows a wide range of immunological reactions, especially considering constant antigen stimulation by microorganisms. With age and in pathological processes, as well as in cases of various orthopedic and orthodontic structures, immune changes occur, which
are manifested at different levels, first of all, at the level of intercellular interactions.\textsuperscript{7,8,9} The barrier properties of the oral cavity are associated both with the protective mechanisms of the saliva (oral fluid) and structural features of the mucous membranes. The oral fluid has pronounced bactericidal properties. The following factors are the most important: immunoglobulins, lysozyme and other saliva enzymes, leukocytes and leukocyte factors.\textsuperscript{9}

Lysozyme is one of the most important factors in antimicrobial protection in the oral cavity. It shows both antibacterial activity and stimulates immunoglobulin secretion, enhancing their bactericidal activity. There is an association between the amount of lysozyme and immunoglobulins in the oral fluid: in insufficient lysozyme amounts, more immunoglobulins are secreted into the oral cavity. Lysozyme is a necessary component of the local immunity, as in its absence, according to many investigators, the immune response with slgA is impossible.\textsuperscript{6,7,8,9}

The main source of lysozyme in the oral cavity are the salivary glands (80\%) and, to a lesser extent, leukocytes in the oral fluid (20\%). Oral bacteria also produce a part of lysozyme, although their contribution to the total amount of synthesized lysozyme is very small. In the salivary glands, lysozyme is formed in the epithelial cells of the ducts. Total lysozyme activity in the mixed saliva is 4 times higher than its activity in the blood plasma and its secretion increases when salivation is stimulated. Lysozyme activity depends on the acid-base balance in the oral cavity. The optimum activity of lysozyme is observed at pH 5-7. An important stimulus for lysozyme formation and secretion is an increase in microflora in the oral cavity, and vice versa, with a decrease in the number of microorganisms, the amount of lysozyme formed decreases sharply.\textsuperscript{5,6,8,9}

The main class of the immunoglobulins in the oral cavity is IgA. From 50 to 250 mg of IgA are secreted with the saliva, which is 5-10\% of the total amount of Ig of this class. The saliva contains secretory slgA, which consists of two IgA molecules bound to the secretory component (SC). The concentration of immunoglobulins in the saliva does not always correlate with their amount in the blood. IgA enters the oral cavity with the saliva with the highest concentration observed in the secretions of the parotid glands and a 2-fold lower concentration in the saliva of the sublingual and submandibular glands. Secretory IgA has a pronounced bactericidal, antiviral and antitoxic activity. The amount of IgA in the saliva is a factor that determines the occurrence and nature of pathological processes. As for the cariogenic flora, IgA inactivates the enzymatic activity of cariogenic streptococci and reduces the adhesion of microorganisms to the tooth tissues, thus preventing the formation of caries. In addition, slgA prevents the development of inflammatory diseases in the oral mucosa.\textsuperscript{5,7,9}

\textbf{Materials and Method}

Foreign bodies, dental prostheses, are believed to be one of the factors that negatively affect local immunity in the oral cavity. When non-removable precious metal prostheses are used, a rapid normalization of the content of IgA and slgA is observed, which is due to the bactericidal effects of metal ions. The number of microbial antigens in the saliva decreases. This effect is not observed when the prostheses are made of steel or plastic.\textsuperscript{2,5,7,8} Therefore, to determine the effectiveness of treatment with the proposed metal-free dentures, we conducted immunological studies, i.e. lysozyme and IgA levels in the oral and crevicular fluids, during Resverasin administration.

Antioxidants are drugs that can inhibit free radical oxidation processes in the body or eliminate reactive oxygen species and peroxide compounds. During this process, non-toxic products (H2O and CO2) are formed in the body. In dental practice, intensification of free radical oxidation processes is observed in gingivitis, periodontitis, ulcerative stomatitis, and inflammatory processes of the soft tissues and bones.\textsuperscript{8,10,11} The development of free radical lipid peroxidation (LPO) with oxygen can be stopped using the inhibitors that restore free radicals to a stable molecular form that is unable to continue the auto-oxidation chain. LPO inhibition in the body is carried out by an antioxidant system that includes a chain of antioxidants that can inhibit free radicals and a group of enzymes that eliminate reactive oxygen species and peroxide compounds.\textsuperscript{10,12,13,14}

Resveratrol, a phytoalexin, a polyphenolic natural compound that is produced by some plants (grapes, Japanese knotweed, peanut) may become an effective product. Interest in resveratrol increased after an epidemiological study conducted in the 1970s and 1980s, known as the “French paradox.”\textsuperscript{14,15,16} Resveratrol (active substance) has the ability to prolong life, shows powerful antioxidant, anti-inflammatory, cardioprotective, neuroprotective,
antitumor and antidiabetic effects.\textsuperscript{16,17,18,19} Wine extract contains organic acids, polyphenols and minerals such as magnesium, zinc, potassium and manganese. Polyphenols contained in red wine have antioxidant and anti-inflammatory effects, prevent platelet aggregation and improve lipid metabolism. Trace elements contained in wine extract are able to enhance the activity of the body’s antioxidant system via antioxidant enzyme and immune cell catalysis.\textsuperscript{13,14,19}

The initiation of systematic treatment with antioxidants, lutein complexes and vasoactive drugs is able to slow down the progression of dystrophic changes, preserve and improve functions. The use of methyl ethylpyridenol in dental orthopedics for indirect restorations and in studies of immunological parameters shows the effectiveness of this drug, especially in concomitant periodontal tissue diseases.\textsuperscript{16,20,21}

**Results and Discussion**

Thirty six patients, divided into 2 groups, were treated and followed up. The results of the study confirm that indirect ceramic restorations have a number of significant advantages over direct composite restorations. Use of ceramic veneers in combination with Resverasin had positive effects on the immune reactivity in the oral cavity which resulted in a significant increase in the levels of lysozyme and sIgA in the oral fluid, compared to direct light cure polymer restorations. Based on our data immediately after treatment and after 3 and 6 months of follow-up, we can confirm the durability of the structures and a satisfactory aesthetic result, provided the correct assessment of the clinical situation and strict adherence to the stages of veneer production. Therefore, the results obtained justify a significant expansion of the indications for indirect restorations in dental orthopedics.

To study the intensity of immunological reactivity in patients with existing defects of the coronal part of the anterior teeth, we analyzed sIgA and lysozyme levels in the oral fluid. 36 patients were selected for the study and divided into groups as follows: Group 1 – 12 patients aged 18 to 45 years with proposed indirect restorations – ceramic veneers; Group 2-12 patients aged 18 to 45 years with direct restorations performed with Estet X HD light cure polymer materials (Dentsply, USA); and control group – 12 patients aged 18 to 45 years without carious lesions and clinically healthy periodontium.

The method used for the crevicular fluid study is as follows: the area to be examined was carefully cleaned of plaque, isolated with cotton swabs and air-dried. Gum fluid was collected using standard paper pins by immersing them effortlessly in the gingival crevice for 1 minute in the area of the upper and lower incisors. The crevicular fluid was collected prior to treatment, immediately after treatment and 3 and 6 months after treatment.\textsuperscript{9} The analysis of the data obtained in the study groups showed the differences in the parameters and their dependence on the chosen treatment method. As shown in Table 1, the level of lysozyme in the oral fluid increased after treatment, compared to the level before treatment, and was 105.2 + 6.3 μg/mL in Group 1 and 99.4 + 5.2 μg/mL in Group 2 respectively.

<table>
<thead>
<tr>
<th>Table 1. Lysozyme and sIgA levels in the oral fluid in patients with direct and indirect restorations</th>
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<tbody>
<tr>
<td><strong>Treatment method</strong></td>
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<tr>
<td><strong>Before treatment</strong></td>
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<tr>
<td><strong>Veneers (Gr.1)</strong></td>
</tr>
<tr>
<td><strong>Direct restorations (Gr. 2)</strong></td>
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</table>
Six months later, lysozyme levels in the oral fluid was 91.7 + 6.1 μg/ml in Group 1 following the use of Resverasin and 72.8 + 2.3 μg/ml in Group 2, where treatment was performed using direct restorations, respectively. Changes in immunoglobulins (sIgA) had the following pattern: sIgA level, which was 0.97 + 0.14 g/L in the oral fluid before treatment in Group 1 treated with Resverasin, significantly increased to 1.67 + 0.12 g/L immediately after treatment. In Group 2, the parameters after treatment were as follows: 1.82 + 0.11 g/L in the crevicular fluid and 1.52 + 0.14 g/L in the oral fluid. Three months later, sIgA levels in Group 1 treated with Resverasin were 1.56 + 0.16 in the oral fluid, and after 6 months of follow-up we observed stabilization of the parameters at the level of 1.39 + 0.13 g/L in the oral fluid. Following direct restorations, 3 months after treatment, an increase to 1.42 + 0.15 g/L in the oral fluid was observed, but after 6 months of follow-up, there was a significant decrease in sIgA to 1.12 + 0.11 g/L in the oral fluid, respectively.

Therefore, the analysis of the immune reactivity following the use of direct composite restorations and ceramic veneers in combination with Resverasin for the treatment of patients with hard tissue defects of the anterior teeth showed the superiority of the latter. The use of ceramic veneers for indirect restorations resulted in the increase in lysozyme and sIgA levels in the oral and crevicular fluids immediately after treatment and their stabilization 6 months later, which was not observed after direct light cure polymer restorations.

Conclusions

The study confirms that indirect ceramic restorations have a number of significant advantages over direct composite restorations. Ceramic veneers have no effects on the immune reactivity in the oral cavity and may be a recommended construction of choice in the treatment of the coronal defects in the anterior teeth of carious and non-carious origin. The analysis of immune reactivity in patients with defects in anterior teeth following direct composite restorations and ceramic veneers confirms the advantage of the latter in combination with Resverasin.

The use of ceramic veneers had positive effects on immune reactivity in the oral cavity resulting in a significant increase in the levels of lysozyme to 91.7 + 6.1 μg/ml and sIgA to 1.39 + 0.13 g/L in the oral fluid 6 months after treatment, which was as close as possible to normal, in combination with Resverasin. According to the results of our clinical studies, Resverasin significantly shortens the duration of the adaptation period and increases immune reactivity in the oral cavity, especially in combined pathology, i.e. defects of the hard tissues of the anterior teeth and diseases of periodontal tissues.

Acknowledgment: None.

Conflict of Interest: There is no conflict of interest.

Ethical Clearance: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study. A study was approved by Central Ethics Committee of the Ministry of Health of Ukraine, October 3, 2019, No 1785-A.

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References


Morphology of Endometrial Scrapings in Early Spontaneous Abortions

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Abstract

Objective: Study of morphological changes in the endometrium and fetal membranes during spontaneous abortions in 9-12 weeks of pregnancy to clarify the etiopathogenetic mechanisms.

Materials and methods: Study material was endometrial scrapings with components of fetoplacental tissue obtained after spontaneous abortions (176 cases) in 9-12 weeks of pregnancy, received at the Republican Pathological Bureau from several City Maternity Hospitals of Bishkek (Kyrgyz Republic). The histological sections were stained with hematoxylin and eosin (H&E), and a mixture of acid fuchsin and picric acid. The Periodic acid–Schiff (PAS) reaction was performed.

Results: Of the 176 cases in 80 cases, by the medical reports, pregnant women had concomitant gynecological infectious pathology in the form of chronic endometritis, chronic salpingoophoritis, chlamydia, colpitis, and adnexitis. Histological examination revealed inflammatory changes in the form of deciduitis (24.5% of cases), endometritis (20.5% of cases), villitis (17.3% of cases) in 70% of cases. Pathological changes in the decidual membrane are determined as foci of leukocyte infiltration in 65% of cases, in 30% - foci of necrosis and in 20% - foci of hemorrhage. In 60% of cases, as their combination.

Conclusion: Histological examination of endometrial scrapings and fetal membranes after spontaneous abortions in 9-12 week pregnant women, with a history of infectious inflammatory pathology, revealed the tissue inflammatory changes of varying severity, with the following additional microscopic characteristics: the compact arrangement of endometrial glands, weak vascularization of villus chorion; sclerotic, dystrophic, and necrotic changes with hemorrhages in the endometrium and decidual membrane.

Keywords: Spontaneous abortion, Endometrium, Morphology, Periodic acid–Schiff (PAS) reaction, Fetal membranes.

Introduction

Spontaneous abortions are one of the pressing problems of modern medicine. The number of early abortions varies from 10 to 30% of all pregnancies3 and 80-85% is observed in early pregnancy2. Often, the lack of knowledge and underestimation of the causes of the first spontaneous abortion is the cause of subsequent spontaneous abortions and other gynecological abnormalities. In the development of prevention issues and adequate methods of treating this pathology, along with clinical studies, the study of morphological changes in the endometrium and fetal membranes is essential.
This contributes to a more detailed understanding of the pathogenetic mechanisms of spontaneous abortion at different stages of pregnancy, taking into account etiological factors and concomitant pathology. Although many works exist on the study of various aspects of spontaneous abortion1,4, some questions of the morphological criteria of this pathology at different stages of pregnancy require more detailed clarifications.

**Objective**

Study of morphological changes in the endometrium and fetal membranes during spontaneous abortions in 9-12 weeks of pregnancy to clarify the etiopathogenetic mechanisms.

**Materials and Method**

The Ministry of Health of the Kyrgyz Republic obligates every City Maternity Hospitals to send placental tissues to the Republican Pathological Bureau for mandatory morphological examination. In the present study, study material was endometrial scrapings with components of fetoplacental tissue obtained after spontaneous abortions (176 cases) in 9-12 weeks of pregnancy, received at the Republican Pathological Bureau. Inclusion criteria are confirmed cases of spontaneous abortions between 9-12 weeks of pregnancy and presence of gynecological inflammatory disorder in patient’s previous treatment history. Exclusion criteria are non-confirmed cases of spontaneous abortions (such as induced abortion) and cases of abortions in less than 9 or above 12 weeks of pregnancy. Microscopic examination characterized by the study of histological sections stained with hematoxylin and eosin (H&E), and a mixture of acid fuchsin and picric acid (orange, red, blue colors) used to study the structure of the connective tissue. The Periodic acid–Schiff (PAS) reaction performed to determine neutral and acid mucopolysaccharides. The study area is confined to Bishkek, Kyrgyzstan. The study was conducted for five years (2012-2017).

A histological examination determined the presence and severity of the inflammatory reaction, the severity of angiogenesis, the presence and severity of sclerotic, dystrophic, necrotic, and other changes.

**Results**

The average age of women was 25.7 year-old. Among all the endometrial scrapings examined, we identified 80 cases of spontaneous abortion, where according to the analysis of the medical records, the patients had concomitant gynecological infectious pathology in the form of chronic endometritis, chronic salpingoophoritis, chlamydia, and vaginitis.

The results of histological examination showed that in most of the cases (more than 70%) inflammatory changes were noted with the following rate: deciduitis (24.5% of cases), endometritis (20.5% of cases), villitis (17.3% of cases), and mixed inflammatory changes (37.7% of cases). The mixed inflammatory changes were characterized by a combination of endometritis with deciduitis and villitis. Upon staining with H&E, histologically, changes in the endometrium were characterized as follows: the glands are mainly oval-round in shape, and glands with a sawtooth shape were also found. The lumen of the glands are empty or contains a small amount of homogeneous secretion. There is a slight decrease in the number of endometrial glands - 3-4 in one field of view, which are located compactly. In 30% of cases, partial destruction of these glands is noted. Flattening of the epithelium of these glands is noted in 40% of cases, with nuclei located at the same level. In other cases, the epithelium of the glands is cylindrical with an uneven apical edge. Histological changes in the stroma of the endometrium were characterized by the presence of leukocyte infiltration in 25% of cases (Fig. 1a), in 17% in combination with edema and foci of necrosis expressed to a various extent. In 70% of cases, spiral vessels are determined, which are hyperemic in 86% of cases. In 60–70% of cases, changes in chorionic villi were characterized by their hypovascularization (1 or 2 vessels present). In 30% of cases, stromal edema was noted (Fig. 1b), in 10% - leukocyte infiltration of villi, and in 20% - villous stromal sclerosis. In 50% of cases, varying degree hemorrhages of the intervillous space are noted.
Pathological changes in the decidual membrane are determined as foci of leukocyte infiltration in 65% of cases (Fig. 2A), in 30% - foci of necrosis and in 20% - foci of hemorrhage (Fig. 2B). In 60% of cases, as their combination.

Discussion

In our study, the decidualization of the endometrial stroma is well expressed in almost all cases. Decidual membrane cells have a light cytoplasm with relatively large nuclei. The PAS reaction determined decreased amount of neutral mucopolysaccharides in the epithelium of the endometrial glands.

The most frequent manifestation of mixed inflammatory pathology was the combination of endometritis and deciduitis, less often, there was a combination of endometritis and villitis or a total inflammatory reaction. There is a decrease in the number of endometrial glands with a decrease in the content of neutral mucopolysaccharides in the epithelium.

The objective of our research is to study morphological changes in the endometrium and fetal membranes during spontaneous abortions in 9-12 weeks of pregnancy to clarify the etiopathogenetic
mechanisms. Microscopic examination revealed varying degrees of inflammatory changes in the endometrium and fetal membranes, with the following additional characteristics: the compact arrangement of endometrial glands, sclerotic, dystrophic, and necrotic changes with varying degrees of hemorrhages in the endometrium and decidual membrane.

Although there are many works associated with investigation of different aspects of spontaneous abortions, our study emphasized the morphological aspect of the pathology, describing the morphological changes in endometrial scrapings and fetal membranes.

This study helps to determine the underlying etiopathogenic causes of spontaneous abortions, more specifically the ratio of inflammatory disorders among other causes. Identifying the inflammatory character of the endometrial scrapings can be a strong impact for the development of further prevention issues. Additionally, treatment of the concomitant gynecological infectious pathology during pregnancy may reduce the incidence of spontaneous abortions.

The only limitation of our study is the sample size; further studies with higher samples required to validate our results and receiving precise results are essential. Therefore future research needed using more advanced equipment and methods.

In Conclusion, histological examination of endometrial scrapings and fetal membranes after spontaneous abortions in 9-12 week pregnant women, with a history of infectious inflammatory pathology, revealed the tissue inflammatory changes of varying severity, with the following additional microscopic characteristics: the compact arrangement of endometrial glands, weak vascularization of villus chorion; sclerotic, dystrophic, and necrotic changes with hemorrhages in the endometrium and decidual membrane.

Conflict of Interest: The authors declare no conflict of interest

Source of Funding: This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethical Clearance: Taken from the Committee on Bioethics, I.K. Akhunbaev Kyrgyz State Medical Academy.

References
The Correlation of Length of Work and Mental Workload with Work Stress at University Lecturers

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Abstract
The main role of lecturers at Tri Dharma University, namely education, research, and community service. That makes them have certain responsibilities which if it lasts a long time will cause stress. This study aims to determine the correlation between work time and mental workload with work stress on college lecturers in Surabaya. This descriptive study was conducted on 43 active lecturers who teach at a university in Surabaya. The results of this study were analyzed to determine the lecturer’s length of work, the mental workload of lecturers with categories from NASA TLX and their correlation with work stress. The results stated that 22 people had worked for more than 20 years, as many as 25 people had very high mental workloads, and 30 people with mild stress. Most of the lecturers already have a lot of experience and a large number of task demands but are still able to deal with everything well so that work stress does not arise. The correlation value between the length of work and work stress is 0.461, and the correlation value between mental workload and work stress is 0.808. This value states there is no correlation between the length of work and mental workload with work stress. Recommendations are given to universities, lecturers and all those involved in efforts to maintain the atmosphere and work culture to improve comfort for all parties, such as adding green areas in the workspace, providing remuneration for lecturers who excel, and maintaining communication between lecturers.

Keywords: length of work, mental workload, work stress, lecturer.

Introduction
Work stress is a physical and emotional response related to the work, resources, and needs of workers1. All types of work, both related to physical and mental competencies that have the opportunity to cause work stress. The existence of aspirations and dissatisfaction at work can also cause work stress9.

Lecturers are professional educators and scientists with the main task of transforming, developing and disseminating science, technology, and arts through education, research and community service8. Lecturers have three main tasks (Tri Dharma University), namely education, research and also community service as their basis and obligation to carry out their daily activities. The lecturers’ main tasks and the burden of positions on several lecturers causes high work demands that must be completed in accordance with predetermined targets which in turn can cause work stress. There are research results that state that there is a sufficient and direct correlation between workload and work stress4. The length of work is one of the factors characteristic of individuals describing their abilities and experiences in dealing with work problems and can affect the existence of work stress because it provides a different stress response to workers. It has a negative effect if it causes boredom due to monotonous activities, and is positive when it is able to improve its work experience4. Long
working periods and limited work environments can cause boredom and in the end can cause work stress\textsuperscript{10}. There are research results that state that the longer the working period, the lower the perceived stress\textsuperscript{12}. There is also a conclusion that there is no correlation between the length of work with work stress\textsuperscript{2}.

The purpose of this study was to analyze the correlation between the length of work and mental workload with work stress on the lecturers of one of the faculties of a university in Surabaya.

**Material and Method**

This research is a descriptive study to find out the correlation between the length of work and mental workload with work stress on university lecturers in Surabaya. This study uses a workforce analysis approach based on individual data and mental workload using the NASA TLX method. The sample in this study were 43 lecturers with several criteria including active lecturers, were in a healthy condition and were not in the period of consuming certain drugs.

The research design was to collect preliminary data and the number of lecturers. The next step is primary data collection in the form of individual identity, mental workload, and work stress. secondary data needed is a description of the location of the study. This study uses more primary data obtained through questionnaires as research instruments provided to each lecturer. The data collection process takes 3 months.

Data analysis was performed using the Spearman test to find out the correlation between the length of work and mental workload with work stress on university lecturers in Surabaya.

**Findings**

**Lecturer Length of Work Distribution**

Table 1 shows that most of the lecturers are 22 people (51.2% of 43 lecturers) have a service life of >20 years. While other lecturers have varied working periods ranging from <6 years to 20 years. There are 6 people (14%) with a length of work less than 6 years, 3 people (7%) with tenure of 6-10 years, 7 people (16.3%) with tenure of 11-15 years, and 5 people (11.6%) with a service life of 16-20 years. This means that most of the lecturers in one of the universities in Surabaya are senior lecturers who have a lot of relevant experience in their fields.

<table>
<thead>
<tr>
<th>Length of Work</th>
<th>The Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>&lt; 6 Years</td>
<td>6</td>
</tr>
<tr>
<td>6 – 10 Years</td>
<td>3</td>
</tr>
<tr>
<td>11 – 15 Years</td>
<td>7</td>
</tr>
<tr>
<td>16 – 20 Years</td>
<td>5</td>
</tr>
<tr>
<td>&gt;20 Years</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
</tr>
</tbody>
</table>

**Lecturer Mental Workload Distribution**

Table 2 shows that most of the lecturers, 25 people (58.1%) were in the very high workload category, as many as 17 people or around 39.5% with high workloads and 1 person who had rather high workloads. It can be concluded that the workload of university lecturers in Surabaya is dominant in the very high workload category.

<table>
<thead>
<tr>
<th>Mental Workload</th>
<th>The Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Rather High</td>
<td>1</td>
</tr>
<tr>
<td>High</td>
<td>17</td>
</tr>
<tr>
<td>Very High</td>
<td>25</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
</tr>
</tbody>
</table>

**Lecturer Work Stress Distribution**

Based on table 3, it can be concluded that most of the lecturers are 30 people or around 69.8% experience work stress in the mild category, 12 people experience work stress in the moderate category and 1 lecturer experiences severe work stress. It shows that the majority of university lecturers in Surabaya experience mild to moderate work stress.
Table 3. Lecturer Characteristics Based on Work Stress at the University in Surabaya in 2019

<table>
<thead>
<tr>
<th>Work Stress</th>
<th>The Result</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>Mild</td>
<td>30</td>
</tr>
<tr>
<td>Moderate</td>
<td>12</td>
</tr>
<tr>
<td>Severe</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
</tr>
</tbody>
</table>

Cross-tabulation Length of Work and Mental Workload with Work Stress

The Correlation between Length of Work and Work Stress

Table 4. Cross-Tabulation of Length of Work and Work Stress of Lecturer at the University in Surabaya in 2019

<table>
<thead>
<tr>
<th>Length of Work</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>&lt;6 Years</td>
<td>2</td>
<td>33.3</td>
<td>4</td>
<td>66.7</td>
</tr>
<tr>
<td>6 – 10 Years</td>
<td>3</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>11 – 15 Years</td>
<td>6</td>
<td>85.7</td>
<td>1</td>
<td>14.3</td>
</tr>
<tr>
<td>16 – 20 Years</td>
<td>3</td>
<td>60</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>&gt;20 Years</td>
<td>16</td>
<td>72.7</td>
<td>6</td>
<td>27.3</td>
</tr>
</tbody>
</table>

Table 4 show that most of the lecturers with a very long length of work have relatively mild levels of work stress. There are lecturers with a working period of >20 years, 16 of whom experience mild work stress and 6 others experience moderate work stress. In addition, there are lecturers with heavy work stress who have worked for 16-20 years. The variation in the level of work stress on lecturers with different lengths of work shows that one of the causes is the adaptability of the lecturer. The value obtained from the statistical test results is 0.461 which is greater than 0.05 (α) concludes that there is no correlation between lengths of work with work stress on lecturers.

The Correlation between Mental Workload and Work Stress

Table 5. Cross Tabulation of Mental Workload and Work Stress of Lecturer at the University in Surabaya in 2019

<table>
<thead>
<tr>
<th>Mental Workload</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>%</td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Rather High</td>
<td>1</td>
<td>100</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>High</td>
<td>12</td>
<td>70.6</td>
<td>4</td>
<td>23.5</td>
</tr>
<tr>
<td>Very High</td>
<td>17</td>
<td>68</td>
<td>8</td>
<td>32</td>
</tr>
</tbody>
</table>


Table 5 shows that most lecturers or as many as 17 people with very high mental workloads are experiencing mild work stress. Also, there are 12 people with high mental workloads who are experiencing mild work stress and 1 person with a rather high burden also experiences mild stress.

The significant value obtained is 0.808 which means there is no correlation between mental workload with work stress felt by the lecturer. The heavy workload does not always have a high-stress impact on lecturers.

**Discussion**

**Length of Work**

The length of work is individual characteristic that illustrates the length of time the workforce is counted from when it was first entered until now it still works. It is related to experience and understanding because if someone has worked for a long time, the worker will be able to adapt to his work. The length of work will also improve workers’ psychological well-being because they tend to have a mutual need for one another. The positive effect of a long work period if the worker can improve his experience at work, and becomes a negative effect if the length of work can cause boredom to workers. A long work period with a limited work environment will make workers feel bored quickly because of work activities that tend to be monotonous.

The length of work is divided into several categories, namely <6 years, 6-10 years, 11-15 years, 16-20 years, and >20 years. Table 1 shows that most of the lecturers, namely 22 people (51.2% of 43 lecturers) have a working period of >20 years. While other lecturers have varied working periods ranging from less than 6 years to 20 years. This means that most of the lecturers in one of the universities in Surabaya are senior lecturers who have a lot of relevant experience in their fields and have adapted to their work.

**Mental Workload**

Work is a burden for workers that can be a physical, psychological and social burden to meet and satisfy the needs for survival. The workload is the burden experienced by workers due to the work done and has a quite dominant influence on the performance of human resources and can cause negative effects on the safety and health of workers. The weight of the workload can be assessed from the amount of burden with the willingness of time, monotonous activities, fluctuations in workload and demands that overlapping work. Workload analysis uses the NASA TLX to measure mental workload measured in 6 dimensions, including mental demands, physical demands, time demands, performance, business levels, and frustration levels.

Table 2 shows that most of the lecturers (58.1%) are in the very high workload. These results indicate that the mental workload on university lecturers in Surabaya is predominantly in the very high workload. The results of the recapitulation of all scores, the workload of lecturers with high scores are in the dimensions of effort, temporal demand, and own performance. The lowest score is in the physical demand dimension. So, the mental workload on lecturers is more focused on the existence of their business factors in carrying out their main activities within the allotted time and still providing the best performance to make their students become superior human resources and able to compete in the world of work.

**Work Stress**

Work stress occurs because the workload is too much or too little and will disrupt the health of workers both physically and psychologically. Physical health disorders such as headaches, gastrointestinal, etc. While psychological health is mad easily, decreased performance and productivity to cause work accidents. Work stress is measured using a questionnaire that has been submitted for validity and reliability with approval based on effects on individuals including physiological, psychological conditions, changing habits, and changes in conditions in the organization.

Table 3 shows that most of the lecturers, as many as 30 people experienced work stress in the mild category. The overall recapitulation results state that the lowest average score on stress reactions in psychological reactions and the highest average values in organizational relations. This means that the problem of stress in the faculty lot of influence on the psychological reactions such as a decrease in the ability to remember, hard to concentrate, irritability, and less impact on organizational correlations in the workplace.
Correlation between Length of Work and Mental Workload with Work Stress

Older/seniors workers will have the ability and better understanding of their work compared to new/juniors workers because they usually do not have much experience and are still adapting to work so often feel stressed at work and cause stress. As stated earlier, the long work period and the limited working environment lead to worker boredom which can ultimately lead to work stress. Table 5 shows that the majority of lecturers with very long tenure have relatively mild levels of work stress. There are lecturers with a working period of more than 20 years, 16 of whom experience mild work stress.

The significance value of the statistical test that is 0.461 means that there is no correlation between work period with work stress on the lecturer. These results state that both new lecturers and old lecturers have the same opportunity to experience work stress. Other results show that only a small proportion of lecturers with more than 5 years of work experience severe stress because they can adapt to their work. The results of his analysis stated that workers who have not worked long ago are likely to experience work stress because they have to work and learn/adapt many things.

Workload that is too little/too much will cause problems such as boredom, irritability, decreased morale, bad relations between workers, increased mistakes, doubtful at work, decreased ability to remember and so on. Table 6 presents the results of the study which stated that the majority of lecturers as many as 17 people with very high mental workload experienced mild work stress. A small proportion of other lecturers with high to high workloads experience moderate to severe work stress.

The significant value is 0.808, meaning that there is no correlation between mental workload with work stress. So, the weight of the workload does not always have a high-stress impact on lecturers. In contrast to the results of the previous study, some state that there is a strong and unidirectional correlation between mental workloads with work stress which means that the higher the workload the more work stress. The work demands of lecturers in the form of material preparation, conducting research, assisting students in community service activities, and some job assignments. Mismatching physical capacity with so many work demands that can lead to work stress.

Conclusion

The measurement results show that the majority of university lecturers in Surabaya have worked and carried out their profession for more than 20 years, with mental workloads in the very high category and experiencing mild stress. Statistical test results prove that there is no correlation between the length of work and mental workload with work stress experienced by lecturers. So, lecturers with long work periods and high mental workloads do not necessarily experience high work stress. Add green areas in the workspace, provide remuneration for outstanding lecturers, and maintain communication between lecturers to improve work comfort.

Conflicts of Interest: There is no conflict.

Source of Funding: The source of the research cost from myself.

Ethical Clearance: This research was discussed by the Ethics Committee of the Faculty of Dentistry, Airlangga University.

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Epidemiological Profile of Fatal Poisoning Autopsy Cases Conducted at Gims, Kalaburagi, Karnataka- A Retrospective Study

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Abstract

Background- Pesticide poisoning is a major public health problem worldwide, with thousands of deaths occurring every year, mainly in developing countries. Its usage has been increased in recent past leading its misuse to commit suicide. The aim of this study was to determine the profile of fatal poisoning cases in and around Gulbarga district & to find out its correlates.

Methodology- The present study is a retrospective study of fatal poisoning autopsy cases performed at GIMS, District Hospital, Kalaburagi, Karnataka from January 2018 to December 2018. During this period a total of 647 autopsy cases were conducted of which 85 cases were due to fatal poisoning. Relevant information and subjective data like age, sex, marital status, religion, seasonal variation, type of poison consumed and manner of death have been collected from medicolegal autopsy register, police inquest and treatment history using a predesigned proforma.

Results- A total of 647 cases were autopsied during the year Jan 2018-Dec 2018. Out of 647 cases 85.9% cases were due to unnatural deaths of which 85 cases (13.1%) were due to suspected poisoning. In our study males outnumbered females with 67 cases (78.8%) compared to females with 18 cases (21.2%), maximum number of cases were in the age group between 21-30 years with 36 cases (42.4%). Maximum number of cases were from rural locality with 69 cases (81.2%) & majority of poisoning cases were seen during summer with 42 cases (49.4%). Maximum number of deaths were due to suicide (95.2%) followed by accidental poisoning (4.8%). Majority of poisoning cases were seen in Hindu population (82.3%) and maximum cases were seen in married people (74.1%).

Conclusion- Agrochemical pesticides especially Organophosphorus compounds are responsible for most of the poison related fatalities, which is seen in our present study. Strict legal enforcement in selling and handling of agrochemicals is the need of the hour, and establishment of poison detection centres and early management of poisoning cases at all hospitals, primary health care centres could considerably minimise the morbidity and mortality due to poisoning.

Keywords- Pesticide poisoning, Suicide, Medicolegal autopsies.

Introduction

Poison is a substance that causes damage or injury to the body and endangers one’s life due to its exposure by means of ingestion, inhalation or contact.1 Poisoning is a major public health problem worldwide, with thousands of deaths occurring every year, mainly in the
developing countries. In the last few decades, owing to tremendous advances in the fields of agriculture, medical pharmacology and industrial technologies, there is increase in the incidence of poisoning. Acute poisoning due to accidental and suicidal exposure causes significant mortality and morbidity throughout the world. According to World Health Organization (WHO), globally more than three million of acute poisoning cases with 2,20,000 deaths occur annually. It has been estimated that, in India five to six persons per lakh of population die due to acute poisoning every year.

Organophosphorus (OP) compounds cause most common suicidal deaths in southern, central India. In northern India, Aluminium phosphide causes most deaths. In general, accidental poisoning is more common in young children, whereas suicidal poisoning is more common in young adults. In developed countries, the rate of mortality from poisoning varies from 1 to 2%, while in India the incidence is alarmingly high at 15-30%. The aim of this study is to determine the epidemiological profile of fatal pesticide poisoning in and around Gulbarga district as this part of Karnataka has large agriculture area taking into account demographic data, place of consumption, type of poison involved and the manner of poisoning.

### Material and Method

The present study is a retrospective study of fatal poisoning cases autopsied at the mortuary attached to Gulbarga Institute of medical sciences, Kalaburagi, Karnataka, India from January 2018 to December 2018. Detailed information regarding the circumstances of death was collected from inquest, panchanama, hospital records and medico legal autopsy register. During the study period 647 medico legal autopsies were conducted in the mortuary of district hospital, Kalaburagi of which 85 cases were due to poisoning. Data was compiled and analyzed as per age, sex, marital status, religion, calendar month, residence, & manner of death using a predesigned proforma.

### Results

A total of 647 medico legal autopsies were conducted during the period of 1 year from January 2018 to December 2018. Poisoning cases constituted 85 in number (13.1%). Males outnumbered females with 67 cases (78.8%) compared to females with 18 cases (21.2%). It was observed in the study that the maximum number of cases in both sexes were in the age group between 21-30 years with 36 cases (42.4%) followed by the age group of 31-40 years and 41-50 years [Table 1 & 2].

### Table 1: Age wise distribution of cases

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>No. of Poisoning cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>08</td>
<td>9.4%</td>
</tr>
<tr>
<td>21-30</td>
<td>36</td>
<td>42.4%</td>
</tr>
<tr>
<td>31-40</td>
<td>24</td>
<td>28.2%</td>
</tr>
<tr>
<td>41-50</td>
<td>12</td>
<td>14.1%</td>
</tr>
<tr>
<td>&gt;50</td>
<td>05</td>
<td>5.9%</td>
</tr>
<tr>
<td>Total</td>
<td>85</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 2: Sex wise distribution of cases

<table>
<thead>
<tr>
<th>Gender</th>
<th>No. of Poisoning Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>67</td>
<td>78.8%</td>
</tr>
<tr>
<td>Female</td>
<td>18</td>
<td>21.2%</td>
</tr>
<tr>
<td>Total</td>
<td>85</td>
<td>100</td>
</tr>
</tbody>
</table>

From Table 3- Majority of cases were from rural locality with 81.2% of cases and 18.8% cases were from urban locality.

Table 3: Distribution of Cases according to Residence

<table>
<thead>
<tr>
<th>Region</th>
<th>No. of Poisoning Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>69</td>
<td>81.2%</td>
</tr>
<tr>
<td>Urban</td>
<td>16</td>
<td>18.8%</td>
</tr>
<tr>
<td>Total</td>
<td>85</td>
<td>100</td>
</tr>
</tbody>
</table>

From Table 4- Out of 85 poisoning cases autopsied, 74.1% cases were married and 25.9% cases were unmarried.

Table 4: Distribution of Cases according to Marital Status

<table>
<thead>
<tr>
<th>Status</th>
<th>No. of Poisoning Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>63</td>
<td>74.1%</td>
</tr>
<tr>
<td>Unmarried</td>
<td>22</td>
<td>25.9%</td>
</tr>
<tr>
<td>Total</td>
<td>85</td>
<td>100</td>
</tr>
</tbody>
</table>

From Table 5- Out of 85 poisoning cases autopsied, 95.2% cases were due to suicide followed by 4.8% cases were due to accidental poisoning.

Table 5: Distribution of Cases according to Manner of death

<table>
<thead>
<tr>
<th>Manner of death</th>
<th>No. of Poisoning Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accidental</td>
<td>04</td>
<td>4.8%</td>
</tr>
<tr>
<td>Suicidal</td>
<td>81</td>
<td>95.2%</td>
</tr>
<tr>
<td>Homicidal</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>Total</td>
<td>85</td>
<td>100</td>
</tr>
</tbody>
</table>

From Table 6- Out of 85 cases, maximum number of deaths due to poisoning involved Organophosphorus compounds (72.9%), followed by Carbamate compounds and alcohol (9.4%) & followed by Aluminium phosphide (3.5%).
Table 6: Distribution of cases according to type of poison consumed

<table>
<thead>
<tr>
<th>Type of Poison</th>
<th>No. of Poisoning Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>OrganoPhosphorus</td>
<td>62</td>
<td>72.9%</td>
</tr>
<tr>
<td>Carbamate</td>
<td>08</td>
<td>9.4%</td>
</tr>
<tr>
<td>Organochlorine</td>
<td>03</td>
<td>3.5%</td>
</tr>
<tr>
<td>Aluminium Phosphate</td>
<td>03</td>
<td>3.5%</td>
</tr>
<tr>
<td>Alcohol</td>
<td>08</td>
<td>9.4%</td>
</tr>
<tr>
<td>Others</td>
<td>01</td>
<td>1.3%</td>
</tr>
<tr>
<td>Total</td>
<td>85</td>
<td>100</td>
</tr>
</tbody>
</table>

Discussion

During the study period, a total of 647 cases of medico legal autopsies were performed at District Hospital mortuary, GIMS, Kalaburagi. Out of 647 cases, 85 cases were due to poisoning. The incidence of poisoning in the present study was 13.1%, which is comparable to other studies.10,11,12 Males outnumbered females with 67 cases (78.8%) as compared to females with 18 cases (21.2%) which is similar to studies by Basude et al9, Mrinal Haloi et al13, Srivastava et al.14 This high proportion of poisoning among males might be due to modern life style, cultural patterns in this area, familial, social, psychological and financial problems. These findings are also similar to findings of other studies conducted by Gunnar DG et al15 at Gulbarga which shows that 65.65% of cases were males. According to study of Vinay Shetty16 51.5% of cases were males.

In our study maximum number of fatal poisoning autopsy cases was in the age group between 21-30 years. These findings are in consistency with findings of other authors.10,11,15,16 This age group was the most active one, physically, mentally and socially and therefore more prone to stressful situations in life. In our study commonest manner of poisoning was suicidal with 81 cases (95.2%), followed by 4 cases (4.8%) due to accidental poisoning. Higher suicidal rate was found among males compared to females. The reasons for the suicide in males include lack of employment, poverty, high degree of stress in academic, financial and social sectors. Higher suicidal rate among males than females were similar with other studies done by Sharma et al12 and Dash et al.17

According to this study maximum number of poisoning cases were seen in Hindu population with 70 cases (82.3%) followed by Muslims with 12 cases (14.1%). These findings were in consistence with the findings of Bansude et al.9 This difference is due to majority of Hindu population in our area. Maximum number of poisoning cases were seen in married people with 63 cases (74.1%) mostly due to marital conflicts, extra marital affairs, followed by unmarried with 22 cases (25.9%) which may be due to unemployment, depression and love failure. These findings were in consistence with the findings of Bansude et al.9

In our study we found that Organophosphorus compounds was most common followed carbamates and aluminium phosphide, as organophosphorus pesticides are easily available at a cheap rate in the market. These findings are in consistence with findings by Jesslin et al18 and Jai prakash et al19 except for northern regions of India where Aluminium phosphide is reported as the most commonest type of poison.20 Majority of the organophosphorus pesticides were either easily available at home or purchased from the nearby shops. Maximum number of poisoning cases were reported in summer season with 42 cases (49.4%) followed by rainy season with 25 cases (29.4%). This was similar to the study done by Jesslin et al.18 Water scarcity during summer leads to crop failure and financial loses which indirectly increases the rate of suicide.

Conclusion

Study conducted at Gulbarga Institute of Medical Sciences Kalaburagi, to know the profile of fatal poisoning
autopsy cases during a period of one year from January 2018 to December 2018 comprising a total of 647 medico legal autopsies of which 13.1% cases were due to fatal poisoning. In our study we found that majority of cases were in 3rd decade of life, males outnumbered females, rural residents were more in number, Hindus being majority in number formed bulk of cases. Maximum number of cases were seen in the period between April-June and the most commonest type of pesticide involved was Organophosphorus compounds. Various other socio-economic factors responsible for high incidence of suicidal poisoning need early Government Policies. Agrochemical pesticides especially Organophosphorus compounds are responsible for most of the poison related fatalities, which is seen in our present study. Strict legal enforcement in selling and handling of agrochemicals is the need of the hour, and establishment of poison detection centres and early management of poisoning cases at all hospitals, primary health care centres could considerably minimise the morbidity and mortality due to poisoning. The sale of agrochemicals and other pesticides should be controlled through strict regulations & implemented by the concerned authorities.

Conflict of Interest- None

Source of Funding- Self

Ethical Clearance- Permission was not taken from IEC as it was a record based study without involving any live subjects or experimentation.

References


7. Atul M, Sharma GK; A comparative study of poisoning cases autopsied in LHMC, New Delhi, and JIPMER, Pondicherry. J Forensic Med Toxicol., 2002; XIX.


16. Shetty VB, Pawar GS, Inamadar PI; Profile of poisoning cases in district and Medical College Hospital of North Karnataka. Indian Journal of Forensic Medicine and Toxicology, 2008; 2(2).


Assistance in Child Feeding Influences the Nutritional Intake of Stunting Children: *Randomized Control Trial*

Hj. Sukmawati, 1,2 Sirajuddin 2

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2 Student Doctoral Public Health, Hasanuddin University, Makassar, Indonesia

Abstracts

**Background.** Basic Health Research (BHR) in 2018 noted the prevalence of stunting in Indonesia was still high 30.8%, and around 8.9 million Indonesian children stunted. The Province of South Sulawesi ranks the fourth highest stunting prevalence of all provinces in Indonesia. Nutrition Status Monitoring (NSM) results in the last three years show the percentage of stunting children in South Sulawesi in 2015, 2016 and 2017 was 34.1%, 35.6%, and 34.8%.

**Objective:** This study wants to investigate effect of assistance in child feeding for stunting children to nutrient intake and weight gain.

**Method:** The Randomized Control Trial (RCT). The sample is stunting children aged 2-3 years. There were 30 children (15 as the intervention and 15 as the control group). Study location in the Paccerakang Community Health Center in Makassar City. Statistical analysis used to test hypotheses using Mann-Whitney.

**Results:** an increase in the intake of carbohydrates, protein, vitamin A, z ink higher in the treatment group than the control group (p<0.05).

**Conclusion:** Child feeding assistance significantly influence the nutrition intake of stunting children and also have an effect but not significantly on weight gain of stunting.

**Keywords:** child feeding, food assistance, Nutrient Intake, stunting

Introduction

Stunting is a chronic growth disorder in children due to nutritional deficiencies for a long time, which is based on height index according to HAZ scores index. The Basic Health Research in 2018 noted the prevalence of national stunting was still high 30.8%, meaning that the growth was not maximized suffered by around 8.9 million Indonesian children or one in three Indonesian children and South Sulawesi ranks the fourth highest stunting prevalence of all provinces in Indonesia. in 2015, 2016 and 2017 respectively 34.1%, 35.6%, and 34.8%. The extent and magnitude of stunting under five sufferers in South Sulawesi is a very large impact on the development of human resources in the future. Efforts are needed to prevent the adverse effects of Stunting in infancy, so that its continuation can be prevented both physically and psychosocially.

The Indonesian government is committed to reducing stunting. Medium Term Development Plan National 2015-2019 health sector has targeted a decrease in the number of stunting of children under five years old to 28% in 2019. Specific programs related to improving under-five nutrition are supplementary feeding, provision of nutritional assistance packages such as high-dose Vitamin A supplementation, complementary feeding. In addition, capacity building has been carried out for health workers, implementing activities such as training for nutrition workers, sanitarians, and...
midwives engaged in community health. Funding support from various ministries programs has been carried out in the framework of overcoming and preventing malnutrition and health problems for mothers and children.7,8,9,10

Child feeding is a method that is believed to be able to increase food consumption that meets the child’s nutritional adequacy. The variables are consumption patterns that are influenced by food availability at the family level and food access to the regional level. The ability of the family economically to ensure food availability at the household level is also important to be assessed as an indirect variable related to child development.11,7,12,13

Knowledge and skills of mothers as caregivers of children become important as primary caregivers in the family. The better the mother’s knowledge and skills, the better the quality of her care in child feeding and child health care. Child feeding that is suitable for each stage of growth, is beneficial for children who are stunting to pursue growth retardation.14,15

Method

Design study is Pre Post Test Control Group Design. Data collection was carried out before and after the intervention. Primary data collected were Child Feeding, Child Health Care, Nutrition, Weight (BB), toddler characteristics, and family characteristics. Data on Child Feeding, Child Health Care, obtained from interviews based on questionnaire instruments. BB data was obtained from anthropometric measurements. Prior to the intervention, the Child Feeding and Child Health Care Training was conducted for mothers of children under five. The training was held for 2 days using lecture, discussion and practice methods. The sample of this study was stunting children under the age of 2-3 years in the area of the Public Health Center of Paccerakkang (PHCP) in Makassar City. Based on calculations using sample size formula, j obtained total sample as many as 30 children-where a group of 15 children as a treatment and 15 children as a control group. Respondents are mothers of children under five stunted, and study held April - November 2018.

Results

Subject Characteristics

Sample criteria in this study aged 2-3 years experienced impaired linear growth both short and very short. Determination of the treatment group in the study using simple random sampling. In detail, the characteristics of the sample can be seen in the following table.

<table>
<thead>
<tr>
<th>Sample Characteristics</th>
<th>Treatment</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Male</td>
<td>10</td>
<td>66.7</td>
</tr>
<tr>
<td>2. Girl</td>
<td>5</td>
<td>33.3</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>100</td>
</tr>
<tr>
<td>Nutritional Status (Height for Age)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Moderate Stunted</td>
<td>12</td>
<td>80.0</td>
</tr>
<tr>
<td>2. Severely stunted</td>
<td>3</td>
<td>20.0</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 01 designate k an sexes in the treatment group and the control group is almost the same. Children who have disorders linear growth (HAZ) well short of the treatment group (80.0%), the control group (86.7%) and very short in the treatment group (20%), the control group (13.3%).
Nutrient intake

Table 02 Nutrient Intake of Children Stunting

<table>
<thead>
<tr>
<th>Nutrient Intake</th>
<th>Intervention</th>
<th>Control</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrate (g)</td>
<td>54.11</td>
<td>19.45</td>
<td>0.049</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>9.52</td>
<td>2.8</td>
<td>0.000</td>
</tr>
<tr>
<td>Fat (g)</td>
<td>14.98</td>
<td>4.09</td>
<td>0.049</td>
</tr>
<tr>
<td>Zinc (mg)</td>
<td>0.97</td>
<td>0.5</td>
<td>0.014</td>
</tr>
<tr>
<td>Vitamin A (µg)</td>
<td>182.05</td>
<td>45.04</td>
<td>0.031</td>
</tr>
</tbody>
</table>

Table 02 shows that there was an increase in carbohydrate, protein, fat, zinc and vitamin A intake in both groups. Significant increasing of intervention than control group for across nutrient intake.

Discussion

The Indonesian Ministry of Social Affairs (2007) explains that mentoring is a process of social relations between facilitators and targets in the form of facilities (facilities) to identify needs and solve problems and encourage the growth of initiatives in the decision making process so that the independence of targets in a sustainable manner can be realized. The responsibility of a mentor when conducting assistance is greatly influenced by the knowledge of the assistant to the function of the implementation of assistance, where, when and for whom the assistance process is carried out.16,17,18,19 The purpose of assistance, the function of assistance is very dependent on the context of the problem being accompanied.

The ability to create behavioral change by assistants in the field becomes a benchmark of success in mentoring. Harmony and the warmth of relationships that establish active participation of assistants to help deal with the problem independently, of course, are inseparable from the emotional ties that have been fostered by assistants and mentors. In this study, the companion is a graduate in applied nutrition who has knowledge in the field of nutrition so that he understands very well about matters relating to feeding children under five who experience stunting. Mother of childrens get maximum assistance about child feeding so that the child’s feeding patterns have improved which is guided by a balanced menu with a sufficient amount in accordance with needs.20,21with a rapid reduction thereafter. We aimed to assess the role of different predictors on stunting reduction over time and across departments, from 2000 to 2012. Methods: We used various secondary data sources to describe time trends of stunting and of possible predictors that included distal to proximal determinants. We determined a ranking of departments by annual change of stunting and of different predictors. To account for variation over time and across departments, we used an ecological hierarchical approach based on a multilevel mixed-effects regression model, considering stunting as the outcome. Our unit of analysis was one department-year. Results: Stunting followed a decreasing trend in all departments, with differing slopes. The reduction pace was higher from 2007-2008 onwards. The departments with the highest annual stunting reduction were Cusco (-2.31%).22

The results of this study explain that child feeding assistance, child health care significantly influence the intake of nutrients (carbohydrates, protein, fat, zinc and vitamin A) stunting toddlers aged 2-3 years. This study is in line with research conducted by Sri Dara Ayu (2008) that the nutrition assistance program increases the mother’s nutritional knowledge, parenting patterns (patterns of child feeding), nutritional status of KEP infants in the 3 months after assistance.

The results of this study are in line with the theory that the mentoring process carried out aims to change risky behavior to be less risky or not risky in this case including behavior in how to feed children. Therefore that need to be considered when a companion conducts an educational intervention to someone in order to change behavior (behavior of feeding children) must go
through several stages, as follows: 1) Providing complete information will be able to increase knowledge. At this stage increased knowledge (awareness). 2) Provision of information that is continuous and more detailed, for example about the existence of several choices that can be considered before deciding to choose the right one for himself (precontemplative). 3) Deciding to choose the right choice for himself, from several options (comptemplative). 4) Make it ready to make its choices (ready to act). 5) They have often /almost implemented safe behavior (action). 6) The phase while still needs to be given support to be able to continue to maintain and carry out safe behavior (support and maintenance). 23,24

The assistance process carried out in this study has increased the knowledge of stunting mothers and toddlers about feeding and child health care in order to increase nutrient intake. After she understands how to feed and how to care for children’s health, then you get the opportunity to choose how to feed children and how to care for children’s health that is good and right. After the mother chooses and believes how to feed the child and how to care for the child’s health is good and right, then the mother will carry out the behavior of feeding and child health care according to the module guidelines. Mother of toddlers need to get support from families, companions and health workers so that they can maintain and carry out child feeding behavior and child health care that is good and right so that it can increase the intake of nutrients, especially carbohydrates, proteins, fats, zinc and vitamin A. Substance intake adequate nutrition both in quality and quantity will improve the growth of children under five years of age especially in stunting.

**Conclusion**

Assistance in child feeding influences the intake of nutrients (carbohydrates, proteins, fats, zinc and Vitamin A) toddler stunting aged 2-3 years.

**Ethical Clearance:** This study approved ethical clearance from The Committee of Research Ethics of Health Polytechnic of Makassar, Indonesia. The informed consent include the research title, purpose, participants’ right, confidentiality, and signature.

**Sources Funding:** The sources of this research cost from Health Polytechnic of Makassar

**Conflict of Interest:** The author declare that no conflict of interest

**References**


Determinant of Unmet Need for Family Planning in East Java Province Analysis of 2015 Inter-Census Population Survey Data

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Abstract

One of the government’s efforts to control population growth is the Family Planning (FP) program and one indicator of its performance is unmet need for contraception. Based on 2015 Inter-Census Population Survey Data, East Java is one of the provinces with high unmet need events in Indonesia. Unmet need for contraceptive in East Java is 16.3 percent. This study examines factors that correlate with unmet need in East Java. Chi-square test used to find correlation between independent variables and unmet need. The data used is the 2015 Inter-Census Population Survey Data - East Java Province. The results showed age, area of residence, work status, education, and number of children are related to unmet need events. Interventions that should be undertaken are improving counseling, communication, information and education, fulfilling demand of contraception and making it easier to access family planning.

Keyword: Demographic Characteristics, Unmet Need for Family Planning

Introduction

Unmet need occurs in many countries, especially developing countries. In many developing countries, 105.2 million married women are classified as unmet need, including Indonesia, with 4.4 million women(1). One from ten women of childbearing age in Indonesia who do not want to become pregnant, do not use contraception(2). As a result, many cases of unwanted pregnancy end in abortion. abortion cases in Indonesia are quite high, namely 1,500,000 to 2,000,000 abortions every year(3). sadly, most abortions are performed in an unsafe manner, in an unhealthy environment, and not according to health service standards.

One of the government’s efforts to control population growth is the Family Planning program and one indicator of its performance is the unmet need for contraception. Unmet need is defined as the percentage of women of childbearing age (15-49 years old) who are married who want to spacing or stopping, but do not use contraception(2).

The National Population and Family Planning Board makes unmet need for family planning an indicator of the performance of family planning programs, because the condition for unmet need is a sign that there are couples of childbearing age who want certain types of modern contraception but are not available, so they decide not to use modern contraception. The availability of modern types of contraception is the main key to the successful distribution of contraceptives by the central National Population And Family Planning Board. From contraception providers, they have limitations in providing contraception because of the expiration date in each contraceptive device so that the contraceptive provider cannot make a large amount. In addition, inconsistency of contraceptive users to a type of contraception so that the contraceptive provider cannot predict the need for contraception in the future(3).

The number of family planning needs and uses in Indonesia is quite high. Unmet need trends have increased over the past two decades, namely 17 percent in 1991, 15.3 percent in 1994, 13.6 percent in 1997, 13.2

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percent in 2002, 13.1 percent in 2007 and 11.4 percent in 2012. The results of several surveys indicate that lack of knowledge and information about contraceptive methods, health reasons, fear of side effects, low accessibility, rarely having sexual relations, husband or family opposing, customary restrictions, etc. are the causes of women of childbearing age experiencing unmet need\(^4\).

The high case of unmet need will also have an impact on three things: 1) increasing TFR; 2) decrease in the prevalence of family planning; and 3) an increased risk of maternal death because it often causes unintended pregnancies which end in unsafe abortions. The Guttmacher Policy Review report shows that the use of modern contraceptives has reduced many abortion cases in many countries, and will be able to reduce far more abortions if family planning needs are met\(^5\).

Factors that are assumed to contribute to the unmet need are: 1) individual internal factors (social, economic, demographic characteristics); 2) factors related to family planning behavior (family planning knowledge, attitudes towards family planning, family history of family planning use), and 3) factors of family planning services (availability of family planning logistics, ease of accessing family planning services, and family planning staff performance). These conditions can cause maternal and child health problems as well as an increase in the population if efforts are not made immediately to meet the needs of unmet need groups for rational, effective and efficient contraception. Therefore, this study contains information about the description of the condition of unmet need in East Java Province according to socio-demographic characteristics, and the test of the relationship between independent and dependent variables.

**Method**

This research is a cross-sectional study and used 2015 Inter-Census Population Survey Data. Unmarried women and individuals with missing data were excluded from the analysis. After weighed, this study was on 7,534,541 currently married women aged 15-49 years.

According to the definition, a woman is considered as unmet need if she:

1. Married status and still classified as reproductive age (15-49 years)
2. Have physiological and biological abilities to get pregnant
3. Stoping or spacing up to 2 years or more,
4. Not currently using modern or traditional contraceptive methods
5. Pregnant women or newborns from unintended pregnancy or mistimed pregnancy\(^5\).

**Causes of Unmet Need**

Survey research in several developing countries has found that there are a number of reasons that explain why many women want to delay or prevent pregnancy but do not use contraception\(^4\). Some reasons that prevent them from using contraception include:

1. Lack of information and knowledge about contraception;
2. Healthy reasons and fear of side effects;
3. Low accessibility to get quality family planning services (expensive fee, limited resources, far from service facilities);
4. Conflict from individuals, husbands, families, religions, cultural customs; and others, such as rarely having sex, the perceived risk is relatively small to get pregnant.

**Determinants of Unmet Need for Family Planning**

Attitudes toward family planning, social access, access to the type and quality of health services, and access to information have a significant influence on the incidence of unmet need for family planning\(^6\). Husband support also has a relationship with the unmet need for family planning, but there is no relationship between wife’s knowledge and wife’s attitude with the unmet need\(^7\).

Studies in Ethiopia show that unmet need for family planning is influenced by communication between a woman and health workers, women’s age, decisions regarding the number of children, and the type of previous contraception\(^8\). studies in Saudi Arabia show that women who are unmet need are women who are very young and very old, women who have a bad experience of the side effects of using previous contraceptives, women who have certain religious beliefs, and women who are forbidden by their husbands\(^9\).
From some of these studies, determinant factors that influence fertile age couples choose not to use birth control even though they no longer want children are maternal age, maternal employment status, women’s education level, number of children born alive, number of male sex children, and number female child.

Data were analyzed descriptively and using chi-square test for univariate analysis. Statistical analysis were performed using SPSS version 21.0; p < 0.05 indicated statistical significance. There are seven independent variables that are suspected as determinants of unmet need for family planning on married women. The seven variables include: mother’s age, area of residence, maternal work status, women’s education attainment, number of boys born alive, number of girls born alive, and total number of children born alive.

**Result**

Unmet need is the gap between women’s fertility preferences and contraceptive use. This gap is the focus of attention for the government to avoid unwanted pregnancy in the community. The percentage of unmet need will be presented in Figure 1.

![Unmet Need districts/cities in East Java Province](image)

Unmet need for contraceptive in East Java is 16.3 percent. There are 19 districts / cities that have a percentage of unmet need exceeding the percentage of East Java, three of which are three districts / cities that have the lowest CPR, namely District of Bangkalan, District of Sumenep, and City of Blitar. District of Bangkalan was the priority location because the lowest location was using contraception and the highest location was the unmet need, which was 25.5. While the lowest unmet need is District of Probolinggo, which is 7.0.

**Table 1. Factors Associated With Unmet Need**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Family Planning Needs Fulfilled</th>
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Table 1 shows the relationship between mother’s age, area of residence, mother’s education level, mother’s employment status, number of boys born, number of girls born, and total number of children born, with unmet need.

Based on the mother’s age, the cross tabulation results show a unique pattern, namely the older the mother’s age, the greater the percentage of unmet need events, and produces a sig value.<0.001 means that there is a relationship between maternal age and unmet need.

Based on the area of residence and employment status, unmet need is mostly experienced by mothers who live in urban areas and working mothers. This is closely related to the mobility of urban communities. The term city is identified with modern and advanced. Not a few people think that the city is a place to work. The busy work has an impact on the occurrence of unmet need (2).

2015 Inter-Census Population Survey also examined the respondent’s employment status to determine whether differences in urban and rural conditions were caused by work or not. Some of the results of previous studies indicate that the area of residence is closely related to employment status (5).

Women who live in urban areas are less likely to experience unmet need. This can be seen from the percentage of unmet need incidents in urban areas. Easy access to family planning sites and the ease of family planning tools are found, making women living in cities less opportunities for unmet need. Women who work more need contraceptives for spacing or stopping births (6).

Women who work have an impact on income every month. Women who are working have better income. Women who have better income will find it easier to
access information and use family planning, on the other hand, women who have income have the right to manage their income\(^{(13)}\).

Completed education is related to unmet need. It is hoped that the higher the education that is received by the woman, the woman will be better able to understand the physiology of her body, so that the assumptions about when the time of menopause and the ability to get pregnant are known precisely. The data shows that the majority of women who experience unmet need have a low level of education, so even the information available is small. One of them is information about contraception. This increases the chance for them to experience unmet need for family planning\(^{(6,11)}\).

When viewed based on the number of children, unmet need is mostly experienced by mothers who even have more than 2 children. Couples who have many children tend to experience unmet need than couples who have fewer children or do not have children. Couples who already have many children tend not to want more children, but there are other factors such as the choice of kb devices, the availability of tools, and the ease of obtaining kb tools\(^{(14)}\). Couples who already have many children are also more aware to have more children. So they decided to stop having more children\(^{(15)}\). In Indonesia, some residents still believe that if they do not have children of male or female sex, then the family is not yet perfect. This husband and wife has a big dilemma, that they do not want more children with the same sex as those already born, but if they are blessed with children with the opposite sex then they are very happy.

The following are some suggestions that can be used as input for efforts to reduce unmet need cases, especially in east java province.

1. In addition to contraception services, family planning program managers also need to improve the quality of family planning and counseling services for:

   a. Help couples of childbearing age in choosing and using contraception that is rational and suitable to their condition,

   b. Help to reduce women’s fear of contraception by providing clear and accurate information about complaints that are felt in order to fight incorrect beliefs or negative attitudes towards family planning,

   c. Show the target program how to deal with the possible side effects.

2. Increasing access to family planning program targets for adequate contraception and counseling services, for example by increasing the number of cadres, expanding the reach of mobile family planning service units, and the availability of logistical supplies that respondents want. These efforts are expected to:

   a. Accommodate more program target needs for effective and affordable contraceptive services,

   b. Responding to complaints about contraceptive use

**Conclusion**

The Government, in this case National Population And Family Planning Board, must be able to follow the dynamics of community inconsistency choices, as contraceptive users, so that modern contraception can be distributed appropriately, both on target and on time.

Thus, all obstacles for women who do not want to become pregnant to access effective family planning methods in accordance with the conditions themselves and their families can be met. Thus, every pregnancy that occurs is expected to be a pregnancy that is desirable, healthy, and continues with adequate pregnancy care and examination.

**Conflict of Interest:** The author states that there is no conflict of interest regarding the publication of this

**Sources of Funding:** National Population and Family Planning Board, Indonesia

**Ethical Clearance:** In writing this paper there was none, but in the collection of data there was an ethical clearance and informed consent to the respondents.

**Acknowledgement:** On this occasion the author would like to thank the National Population and Family Planning Board and Central Bureau of Statistics , Indonesia

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Correlation Analysis between Women’s Body Mass Index and Mechanical Low Back Pain

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Abstract

Background: Obesity can cause mechanical effects on spine, particularly lumbar spine, thus increased weight will cause spine, tendon and ligament muscle tensions. These problems can change lumbar curve with increased anterior pelvic tilt and hip flexion to maintain normal posture that may eventually cause low back pain. Women may experience weight gain, and it can cause low back pain. However, correlation between increased body mass index and low back pain is still debatable.

Objective: The research aimed to analyze correlation between women’s body mass index and mechanical low back pain.

Method: A total of 12 patients aged 50-60 were the subjects of the research. The subjects’ body mass index, pain scale and lumbosacral axis were measured. The study protocol was approved by the ethics committees of Dr. Soetomo Teaching Hospital (Surabaya, Indonesia). The correlation test was conducted using Pearson’s correlation test (Significant if p<0.05).

Results: The research found no correlation between increased body mass index and low back pain (p = 0.47), while there was a correlation between increased body mass index and lumbosacral axis (p = 0.04). Moreover, there was no correlation between increased lumbosacral axis and low back pain (p = 0.07)

Conclusion: The study found that the more the body mass index increased, the lumbosacral axis also increased, whereas no correlation between body mass index and low back pain.

Keywords: low back pain, obesity, overweight, women.

Introduction

Weight is an expression factor of lifestyle. People with unhealthier lifestyle cannot control their dietary habits and perform their activities, therefore, they will have higher obesity risks. Obesity and overweight are forms of abnormal body mass index that highly correlate with person’s life quality, and it gets worse due to musculoskeletal and systemic impairments. Overweight is a condition of excessive body fat accumulation under skin tissue. Overweight or obesity patients were reported to have medical aid due to low back pain ¹.

Back pain is a clinical syndrome characterized by pain or low spine discomfort and its surrounding. More than 80% of human population have experienced back pain. Although there is a low mortality rate, the morbidity rate due to low back pain shows high value and has a very significant economic effect ². The causes of back pain are multifactorial, such as malignant, aging, infection, musculoskeletal, trauma and psychological processes. A total of 40% of back pain patients have experienced back pain anxiety that will affect the patient’s working ability ³.

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Obese women aged 60 or more have a 22% prevalence to experience back pain. A woman will experience weight gain, and it is manifested in increased low back pain due to musculoskeletal changes or body fat that can cause changes in spine’s lumbosacral axis, increased lumbar lordosis and anterior pelvic tilt as well as hip flexion. Some studies found correlations between overweight and low back pain. According to World Health Organization (WHO), an estimated 1 billion people are overweight and 300 million people suffer from obesity. The National Survey conducted in 1996/1997 in capital cities across Indonesia found 8.1% overweight adult male population (≥18 years old; Body mass index (BMI) 22-27 kg/m²) and 6.8% suffered from obesity. Moreover, 10.5% of adult female population suffered from overweight and 13.5% suffered from obesity. The sample group aged 40-49 reached its maximum overweight and obesity at 24.4% and 23% respectively in male population, and 30.4% and 43% in female population. Other risk factors for low back pain are also increased with age, behavior, smoking, lack of activity and heavy work/occupational or psychosocial factors.

The visitation number of new patients with chronic low back pain and abnormal body mass index in Outpatient Medical Rehabilitation Clinic of Dr. Soetomo Teaching Hospital, Surabaya, Indonesia, in the last 3 months (January 2013-Maret 2013) were 1141 patients, consisting of 872 females (76.4%). Therefore, we aimed to analyze correlation between body mass index and mechanical low back pain in women patients at outpatient medical rehabilitation Clinic of Dr. Soetomo Teaching Hospital by assessing plain photo of lumbosacral axis changes in sagittal plane in upright position barefoot.

### Method

The subjects were women patients with back pain and body mass index ≥25 kg/m² who met inclusion criteria at medical rehabilitation unit of Dr. Soetomo Teaching Hospital, Surabaya, Indonesia, in June 2013. The inclusion criteria were women aged 50-60 with back pain, while the exclusion criteria were history of spinal surgery in the last 3 months, kyphosis or scoliosis, ankylosing spondylitis, rheumatoid arthritis or neurologic disease (stroke) and history of delayed spinal surgery. The subjects declared their willingness to become the subject of the study by signing informed consent. The study protocol was approved by the ethics committees of Dr. Soetomo Teaching Hospital (Surabaya, Indonesia).

The research is an observational analytic study with cross sectional, using 12 samples who met the inclusion criteria. The subject characteristics were then recorded that included age, height, weight and body mass index. Each subject was asked to do lumbosacral photography in sagittal plane in upright position barefoot. In addition, each subject was asked to show pain intensity level with visual analog scale. The correlation test was conducted using Pearson’s correlation test using SPSS software (SPSS, Inc., Chicago, IL).

### Results

The subjects were 12 women aged 50-60 with abnormal BMI (>25 kg/m²) and low back pain at outpatient medical rehabilitation clinic of Dr. Soetomo Teaching Hospital, Surabaya Indonesia. We measured subjects’ height, weight, body mass index, lumbosacral axis and Visual analogue scale (VAS) to describe low back pain. The subjects’ demographic characteristics were presented in Table 1. The subjects’ average age was 54.08 (4.00), with minimum and maximum age were 50 and 60 respectively. The subjects’ average height was 153.79 (3.56) cm, with minimum and maximum height were 149 cm and 161 cm respectively. Moreover, the subjects’ average weight was 74.95 (11.32) kg, with minimum and maximum weight were 62 and 93 kg respectively.

### Table 1. Subjects’ demographic characteristics (n = 12)

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<td>Weight (kg)</td>
<td>74.95</td>
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</table>
The subjects’ average BMI was 31.52 (3.83) kg/m², with the smallest BMI was 26.4 kg/m² and the biggest was 36.9 kg/m². The subjects’ average lumbosacral axis was 47.16 (4.50) degree, with the lowest and the highest lumbosacral axis were 40 and 54 degree respectively. Moreover, the subjects’ average VAS-described low back pain was 5.08 (1.50), with the smallest and largest VAS values were 3 and 8 respectively.

**Correlation between BMI and low back pain**

The research aimed to obtain correlation data between body mass index and low back pain. The statistical analysis was conducted using SPSS 17 software for Windows with p < 0.05. Pearson’s correlation test showed non-significant correlation between body mass index and low back pain (Table 2), with p = 0.47 (p > 0.05).

**Correlation between body mass index and lumbosacral axis**

Pearson’s correlation test showed significant correlation between body mass index and lumbosacral axis (Table 3), with r = 0.60 and p = 0.04 (p < 0.05). The greater a person’s body mass index, the greater the lumbosacral axis.

**Correlation between lumbosacral axis and low back pain**

Pearson’s correlation test showed a correlation between lumbosacral axis and VAS-described low back pain with p = 0.07 (p > 0.05). All subjects showed non-significant correlation between lumbosacral axis and low back pain (Table 4).

**Discussion**

The research was conducted in 12 patients at
outpatient medical rehabilitation clinic of Dr. Soetomo Teaching Hospital, Surabaya, Indonesia. The eligible subjects were asked to complete informed consent, were interviewed, and the process continued with taking lumbosacral x-ray with upright position barefoot in sagittal plane (at Radiology Unit of Dr. Soetomo Teaching Hospital, Surabaya, Indonesia).

The youngest subject was 50 years old, while the oldest was 60 years old. The subjects’ anthropometry characteristics were height, weight and body mass index. The anthropometry measurement conducted in the study was corresponded to World Health Organization (WHO) criteria, by measuring weight and height. The measurement findings were classified as normal if BMI was 18.5-24.99 kg/m², overweight if BMI was 25.00-29.99 kg/m² and obesity if BMI was >30 kg/m². Figure 5.1 showed 4 overweight subjects with BMI of 25.00-29.99 kg/m², and 8 obese subjects with BMI of >30 kg/m². The prevalence rate of weight gain and low back pain in Italy was 22% in 5724 obese population aged 60.

Obese menopause women aged 51-63 commonly suffered from low back pain (1). Nikolov’s finding suggested that with age, women tended to have weight gain that would cause low back pain due to musculoskeletal changes. Nikolov, in his research, found a correlation between fat accumulation around the stomach and low back pain (1). He suggested that a person had a high risk of having low back pain due to posture changes to maintain upright body position.

Correlation assessment between body mass index and lumbosacral axis

Lumbosacral axis is an axis created by parallel lines in sacrum superior surface and perpendicular axis line. Albert Barnett Ferguson was the first to introduce assessment method using this axis, before he published his study in Journal of Radiology in New York, 1934. The lumbosacral axis above 45 degree is called hyperlordosis, while the axis under 35 degree is called hypolordosis (2). The spinal function evaluation and low back pain assessment used parameters including inclination, lumbar lordosis and lumbosacral axis (14). Weight gain is a world health problem. An overweight or obese person has increased spine burden, discus and other spinal structures. Thus, such heavy loads can lead to a decrease in torso’s joint movement, weak abdominal muscles due to fat accumulation, and lumbosacral axis changes (2). Previous research found a correlation between increased lumbosacral axis and body mass index in female subjects with obesity, osteoarthritis and osteoporosis (15).

From a total of 12 subjects, 33.3% of which suffered from overweight, while 66% of which suffered from obesity. These findings were consistent with the previous studies that showed significant correlations between increased body mass index and lumbosacral axis (p = 0.04). These data showed that the greater the body mass index, the greater the lumbosacral axis degree.

Correlation between lumbosacral axis and low back pain

Lumbosacral is a vital area for spinal mobility and has a function to sustain a person’s weight. The mechanical impairment occurred in the area will cause low back pain, although there are many factors that may affect a person’s lumbosacral axis including age, sex, race, genetic, body mass index, physical activity,
trauma and spinal disease. The present study found no correlation between lumbosacral axis and low back pain \( p = 0.07 \).

This finding was consistent with studies conducted before in chronic low back pain patients, in which they found no correlation between low back pain and increased lumbosacral axis (14). After evaluating radiographic results of lumbar stability and lumbosacral axis based on x-ray screening, it found no lumbosacral axis nor sacral inclusion increment. The results of statistical analysis showed a weak correlation between lumbar stability and lumbosacral axis.

**Conclusion**

The research found no correlation between increased body mass index and increased low back pain as well as increased lumbosacral axis. Moreover, there was no correlation between increased lumbosacral axis and increased low back pain.

**Ethical Clearance:** The study protocol was approved by the Ethical Commission to conduct basic science/clinical research in Dr. Soetomo General Hospital Surabaya, Indonesia. The present study was carried out in accordance with the research principles. This study implemented the basic principle ethics of respect, beneficence, non-maleficence, and justice.

**Conflict of Interest:** The author reports no conflict of interest of this work.

**Source of Funding:** This study is done with individual funding.

**References**

Analysis of Health Utilization Services in Worship Place

M L I Ansori1, Aryo Dwipo Kusumo2, D.Y Tandy1, Windhu Purnomo3

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Abstract

Background. Good health services will greatly affect health improvement and treatment. One of the health service facilities is the mosque health service. The number of visits to mosque health services from 2016-2018 decreased by 49.1%. Purpose. This study aims to determine the factors that influence the worshipers of the mosque in the utilization of mosque health services in Surabaya Ittihad mosque. Method. This study design used descriptive method with cross sectional research design. Population and samples were the entire worshipers of the Ittihad mosque. The number of samples 123 respondents with sampling techniques conducted by means of purposive sampling. Data was collected by interview using a questionnaire. Data analysis used Chi Square test. Results. This study shows that the sex of mosque worshipers (p = 0.604), age (p = 0.617), education (p = 0.690), occupation (p = 0.243), knowledge about mosque health services (p = 0.999), mosque health service Tariff (p = 0.645), and access to information (p = <0.001). Conclusion. It can be concluded that the factors that influence the utilization of mosque health services are access to information provided by the mosque and mosque health services.

Keywords: Health Services, Access to Information, Utilization.

Introduction

Service is any activity or benefit offered by one party to another party, essentially intangible, and not result in ownership of something1. The basic concept of a service or the quality of a product can be defined as fulfilment that can exceed what customers want or expect (patients). The quality of a service is defined as an overall rating that is equivalent to the attitude of all customer satisfaction factors2. The quality of service obtained is a comparison between expectations and services obtained from suppliers3,4. Thus, if the expectations desired by customers are greater than the performance obtained, customer dissatisfaction will arise5.

Republic of Indonesia Presidential Regulation No. 12 of 2013 concerning health insurance states that health facilities are health service facilities that are used to complete individual health care efforts both promotive, preventive, curative6, and rehabilitative performed by the government, regional government, and / or the community7. Good health services will greatly affect health improvement and treatment8.

The mosque is a place of worship for Muslims. Besides its main function being a place to worship Allah, there are other functions of the mosque; social function, education function, and economic function9. Thus, many mosques create health service centres in order to facilitate mosque worshipers who need health checks. One example of Ittihad Mosque is located on Jl Medokan Semampir K / 1, Sukolilo, Surabaya, East Java.

Ittihad Mosque makes mosque health services with the aim of providing health facilities for mosque worshipers and residents around the mosque. The mosque health service performs health service activities which include promotion (information and education about
degenerative diseases\textsuperscript{10} and curative (examination and treatment\textsuperscript{11}). Types of treatment services provided at mosque health services are general services. The number of patient visits in mosque health services was 1,231 patients in 2016, there was a decrease in visits to 1,023 patients in 2017, and it decreased again to 740 patients in 2018 as well as it can also be seen that the visit of mosque health service patients at Ittihad Mosque tended to decrease by 491 visits patients or 49.1%. Based on these data, this study aims to find out the Factors that Influence Mosque Congregations in Utilizing Mosque Health Services in Ittihad Surabaya Mosque, it is hoped that this study can be used as input and evaluation thus the utilization of mosque health services can be increased.

**Material and Method**

This study was an analytical observational study using quantitative research methods. This quantitative research was a cross sectional design study because the measurement of variables was performed at the same time. Data collection on variables was conducted by using a structured questionnaire with a total of 19 questions in this study. The variables were respondent’s gender, respondent’s age, respondent’s education, whether the respondent’s job was working or not, respondent’s knowledge about mosque health services, the attitude of medical and non-medical staff in mosque health services, support from the closest relatives in using mosque health services, Tariffis on services mosque health and access to information provided from mosque health services. Respondents in this study were 123 people selected based on purposive sampling\textsuperscript{12}. Further data were analysed by using the chi square test to see the relationship between dependent and dependent variables.

**Results**

Based on the characteristics of the respondents in this study, it can be seen that the majority of respondents in the study were 82 women (66.7%) with the most respondents aged over 40 years, such as 88 people (71.5%), the highest level of education was high school, and below as many as 109 (88.6%), and the highest level of work was 66 respondents working (53.7%).

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<td>Access</td>
<td>Good</td>
<td>56</td>
<td>45,5</td>
<td>11</td>
<td>19,6</td>
</tr>
</tbody>
</table>

It can also be seen that most of the mosque’s health services were used as many as 73 respondents (59.3%), as many as 122 respondents (99.2%) have good knowledge about health services the mosque. The attitude of health care workers and social support from the immediate family to use the mosque’s health services included in the good category as many as 123 respondents (100%). Tariff was included in the category 119 respondents were cheap (96.7%), while access to information about mosque health services was not good as many as 67 respondents (54.5%).

The results of the chi-square test analysis as in table 1 showed that gender (p = 0.604), age (p = 0.617), education (p = 0.690), employment (p = 0.243), knowledge about mosque health services (p = 0.999), the attitude of medical personnel, and social support (p = -). Tariff (p = 0.645) was not significantly related to the utilization of mosque health services (p-value > 0.005) while access to information (p = <0.001) was significantly related with the utilization of mosque health services (p-value <0.05).

**Discussion**

Gender and age are among the factors in the utilization of health services as expressed by the Department of Education and Welfare, USA\(^\text{13}\). Female respondents use more mosque health services than men. This study is in accordance with conducted by Supariani (2013) which concluded that there is no meaningful relationship between sex, the use of dental, and oral health services\(^\text{14}\) and contrary to research conducted by Admas (2017) which concludes that there is a sex relationship with the utilization of health services\(^\text{15}\).

Age below 40 years old is more use of mosque health services than age above 40 years old. Age is a variable that is always considered in studies and one of the things that affects knowledge\(^\text{16}\). This study is not in accordance with Pourreza’s study (2009) which concluded that age influences the utilization of health services\(^\text{17}\) and this study also does not fit Yunita’s study (2017) which concludes that there is a relationship between age and the utilization of adolescent reproductive health services in Jayapura City\(^\text{18}\).

This study found that the education factor has no relationship with the utilization of mosque health services. This study was not appropriate conducted by Afolabi (2010) which concluded that in Nigeria, higher education would increase access to ARV12 therapy. However, appropriate study conducted by Kipgen J (2011) concluded that education had no significant relationship with access to health services\(^\text{19}\).

This study is consistent with what was conducted by Amir (2017). There is no employment relationship with the utilization of health services targeted by the healthy Tabalong guarantee program in Tabalong Regency, South Kalimantan\(^\text{20}\). However, this study is not in accordance with what was conducted by Burhan (2013) who concluded that work influences the utilization of health services by women infected with HIV / AIDS\(^\text{21}\).
Good respondent’s knowledge about mosque health services utilizes mosque health services more than respondents’ knowledge which is not good. In this study knowledge does not affect the utilization of mosque health services. This study is not in accordance with study conducted by Fennelly K (2004) which concludes that limited knowledge affects utilization and study by Asih P (2017) which concludes that knowledge has a relationship with health service utilization.

The results also found that the attitude factor of medical personnel made respondents use the mosque’s health services. This study is different from that conducted by Asih P (2017) who concludes that good attitude influences students in the utilization of health services and reinforced by Citra (2016) which concludes that there is a significant relationship between the attitudes of health workers and the utilization of health services.

Social support from family and closest relative serves respondents more to use the mosque’s health services than not to use them. This study differs from what was conducted by Margaret (1995) who concludes that there was a significant relationship between social support for the utilization of health services and also by Nara A (2014) who concludes that family support was significantly related to the utilization of adequate childbirth facilities at Kawangu Health Center.

Tariff is the price in the value of money that must be paid by consumers to obtain or consume a commodity that is goods or services that are in the hospital and known as service facilities and services. It was found that respondents who said tariff is not cheap made respondents use the health services of the mosque in this study. The results of this study are consistent with Mills’s (1990) opinion that one of the factors influencing the demand for health services is the willingness to pay. This study concludes that there is no relationship between Tariff and utilization of mosque health services. This is not in accordance with study conducted by Obiechina (2013), regarding the factors that influence students in the utilization of health services at the University of Oklahoma Nigeria influenced by cost factors.

Access to information is significantly related to the utilization of mosque health services in this study. This is consistent with study conducted by Ogundele (2014) which concludes that there is a relationship between information accessibility to health service utilization and accordingly also by Tey’s study (2013) which shows that media exposure correlates with health service utilization in South Asia and Sub-Africa-Sahara and also in accordance with study conducted by Asih P (2017) which concludes that the ease of information has a relationship with the utilization of health services.

Lack of information received by respondents due to publication or promotion about mosque health services is still low. Marketing efforts that are more innovative and following current trends will attract public interest, through electronic media, print media, and public relations activities such as cooperation and events. Dissemination of information can also be done by providing clear information from service providers to patients so as to increase patient expectations regarding the utilization of health services.

Conclusion

The results of this study indicates that only access to information is related to the utilization of mosque health services. Hence, for mosque health services must pay attention to access information, thus more and more are utilizing mosque health services as is the case through electronic or print media, publication, and promotion not only in mosque health services but also in mosques.

Conflicts of Interest: There are no conflicts of interest.

Source of Funding : Self-Funding

Ethical Clearance : Approved

References

4. Nasution SK, Mahendradhata Y, Trisnantoro L. Can a National Health Insurance Policy Increase Equity in the Utilization of Skilled Birth Attendants


Criminalization toward LGBT Community and its Implementation through the Aceh Qanun in Indonesia

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Abstract

This paper discussed some Criminal Laws on LGBT community regulated in the Criminal Code and in special legal provisions outside the Criminal Code. It also discussed criminalization toward LGBT people through the Aceh Perda, regulated in the Aceh Qanun and its implementation through the Banda Aceh Sharia Court. In the criminal law stipulated in the Indonesian Criminal Code today and in the legal provisions outside the Penal Code, some of the illegal acts committed by LGBT people are liable to imprisonment. The criminal law stipulated in the Aceh Qanun cleanly regulates the acts of lesbian and gay people as the ones which are strictly prohibited and liable to being punished. Therefore, based on this Aceh Qanun, their acts are considered as criminal acts. Aceh Qanun (which is considered as the Aceh Perda or Government Regulation), has criminalized the acts of LGBT people. In Aceh, committing sexual intercourse of gays and lesbians has been formulated in Article 63 and Article 64 of the Aceh Qanun No. 6/2014. The violation against these Articles has been implemented on the perpetrators who are punished with ‘uqubat’ or whipped 85 times before public as it is found in the Banda Aceh Sharia Court’s Verdict No. 19/JN/2017/Ms.Bna on May 17, 2017.

Keywords: criminalization, LGBT, aceh, qanun, indonesia

Introduction

In Indonesia, criminalization toward LGBT (the acronym of Lesbian, Gay, Bisexual, and Transgender) community is still in pros and cons even though some of their acts have been regulated in the Indonesian Penal Code which originally came from Dutch Criminal Law (Wetboek van Strafrecht). The term, LGBT has been used since the 1990s. Lesbian is the term for a homosexual woman who is led to her sexual orientation with other women or a homosexual woman who loves other women physically, sexually, emotionally, or spiritually. Gay is the term for a man who is led to his sexual orientation with other men or a man who loves other men physically, sexually, emotionally, or spiritually. Discussion on LGBT has been done from various points of view. Several researches reveal that sexual orientation is the enabling factor of discrimination for employment and vocational training.¹ The content analysis shows that trans-individuals experience physical, sexual, and emotional violence, in addition to experiencing discrimination in employment, housing, and healthcare.² Even though some companies do not care about homosexual marriage.³ Besides that, there is another writer who writes about the need for an approach viewed from security point of view toward the LGBT.⁴ In New Delhi, India, the government has decided that the act of LGBT is not a criminal act. In fact, in July, 2009, the Delhi Court ruled that consensual same-sex relations between adults in private could not be criminalized.⁵

This research analyzed two problems. First, it was concerned with law/legal provisions in Indonesia which regulate the criminalization toward LGBT people (not discriminative) in which it was regulated in the Criminal Code (in effect throughout Indonesia), and secondly, it was in specific regulations which were found in the Aceh Qanun (it was specifically in effect in Aceh Province). Therefore, this writing was related to the acts of LGBT people although it was not related to LGBT as individuals or their rights in politics, economic affairs (occupation), etc. Therefore, it was not discriminative toward LGBT as a group of people. It was focused on the regulations on their bizarre sexual behavior.
Regulation on the Acts of LGBT People in the Indonesian Criminal Law

Indonesia as a Unitary State and a Republic consists of several provinces which are divided into districts/towns. One of the provinces is Aceh Province that has the authority to make laws which are based on the Islamic Law as it is stipulated in Law No. 44/1999 and Law No. 11/2006.

In general, the provision on illegal acts (criminal acts) in Indonesia is regulated in the Criminal Code which comes from Dutch Government. Besides that, some criminal acts are specifically regulated outside the Criminal Code as a Special Law which partially regulates certain criminal acts. LGBT is not specifically regulated in the Criminal Code and in the other Special Laws. However, some acts which are related to LGBT (even though they are not indirectly related to it) are regulated in Article 281, Article 292, and Article 293 of the Criminal Code. Besides that, it is also regulated in the Law on Pornography (Article 4 of Law No. 44/2008), Law on Child Protection (Article 76E in conjunction with Article 82 of Law No. 35/2014).

Criminalizing LGBT People Based on the Aceh Qanun

Aceh Province as one of Aceh Special Regions which has been given the authority to regulate and make its Regional Regulation, based on the Islamic Sharia Law, has regulated the case of LGBT specifically in the Aceh Qanun No. 6/2014 on Jinayat Law (law on criminal matters).

The regulation which is regulated specifically in this Qanun is on Lesbians and Gays. Therefore, Aceh has done the process of criminalization toward LGBT people (especially toward Lesbians and Gays), a process to determine an act which has been originally not a criminal act is made and formulated as a criminal act. It is included in the criminal policy as it is pointed out as the science of crime prevention. This criminal policy is through some stages or processes (three stages): formulation policy stage, application policy stage, execution policy stage. In the formulation stage which occurs in the stage of a certain act is determined or formulated in the legal provisions by legislative institution (Law Maker Institution); it is a criminal act which is liable to be punished. The application stage is the stage of law enforcement by judicative institution (Law Enforcement Institution) on any violations against what has been formulated in the previous legal provisions (in the formulation stage). Therefore, when there is an act which has been formulated in law, its perpetrator will be tried to be determined his sentence through the court’s trial. In the execution stage is a stage where the verdict which has been handed down by the court will be executed by the executive institution according to what is read in the court’s verdict.

Formulation Stage in the Acts of LGBT People in the Qanun

The Qanun is actually the regulation in the level of Perda (Regional Regulation) which is in effect only in Aceh Province. The regulation in this Qanun is based on Law No. 11/2006 on The Law on the Governing of Aceh (henceforth abbreviated as LoGA) as it is stipulated in Article 1 of the LoGA. This Qanun cannot be equalized with the Regional Regulations of the other provinces or districts/towns in Indonesia. Therefore, equalizing the Qanun with the other government regulations in the other provinces in Indonesia is basically inaccurate. Qanun constitutes a legal provisions or legislation which content has to be based on the Islamic Sharia and is in effect only in the Special Region of Aceh Province which is, of course, different from the other regions which Regional Regulations are not always based on the Islamic Sharia.

Therefore, Qanun is not the same as Perda because its content has to be based on the Islamic principle or it must not be contrary to the Islamic Sharia. In the case of the hierarchy of laws in Indonesia, according to Law No. 12/2011 on the establishment of legislation, the position of Qanun is equalized with Perda in the other regions.

In the explanation of Article 7, letter f, it is stated that the types of provincial regulations include Qanun which is in effect in Aceh Province, Perdasus (Special Regional Regulations), and Perdasi (Provincial Regulations) in Papua Province and Papua Barat Province.

The position of Qanun is recognized in the hierarchy of the Indonesian legislation and is equalized with Perda. Understanding Law No. 12/2011 on the establishment of this legislation can be accepted in the case of the position of Qanun. This understanding will make easier for the Central Government to supervise and foster Regional Governments, especially those which are related to the establishment of regional policies. Nevertheless, we have to pay attention to the specificity given by the Central Government to Aceh. For example, based on the
specificity given by the Central Government to the Aceh Provincial Government, the House of Representatives of Aceh can validate Qanun on Jinayat or the Islamic Criminal Justice as law of procedure in the Sharia Court. Nevertheless, the Aceh Provincial Government has to fulfill the requirements for the product of Qanun as it is embodied in Chapter XVII of the Islamic Sharia and Its Implementation which is regulated in Article 125 of Law No. 11/2006 on Aceh Provincial Government.

The application stage is the upholding of law by judicative institution to apply legal provisions toward perpetrators who commit criminal acts according to the formulation of the law. One of the examples of the implementation of Qanun No. 6/2014 is the act of homosexual as it is stipulated in Article 63 of the Aceh Qanun No. 6/2014. The act of a gay in the Qanun is called Liwath committed by MT and MH on March 28, 2017 (the indictment was done separately). MT was charged by the prosecutor of having committed Jarimah Liwath as it was stipulated in Article 63, paragraph (1) in conjunction with Article 1, figure 28 of Aceh Qanun No. 6/2014. He was punished with caning sentence with 80 (eighty) times of whipping, reduced by the period of detention. The Judge of the Sharia Court handed down caning sentence of 85 times of whipping reduced by the period of detention as it was handed down in the Banda Aceh Sharia Court’s Verdict No. 19/JN/2017/Ms.Bna on May 17, 2017.

The Banda Aceh Sharia Court’s Verdict No. 19/JN/2017 on May 17, 2017 was executed by the executioner (as the executor) on May 23, 2017, witnessed by about 1,000 people. It took place in the yard of Lamgugob Mosque, Syiah Kuala Subdistrict, Banda Aceh. The execution was done by the executioner with 83 times of caning sentence. The punishment was reduced two times or equal to 2 months of detention which was in accordance with the Judge’s verdict.

**Conclusion**

It is obvious that the Aceh Qanun which becomes the Special Regional Regulation in Aceh Province has clearly stated that the acts of Lesbians and Gays are considered as criminal acts. Therefore, there is criminalization toward the acts of LGBT people in Aceh, based on the Qanun No. 6/2014. Some provisions of the Qanun have been implemented based on the Banda Aceh Sharia Court’s Verdict and have been executed with caning sentences in 83 times whipping.

**Ethical Clearance:** This research was ethically approved by Faculty of Law, North Sumatra University.

**Funding:** This research was privately funded.

**Conflict of Interest:** There are no conflict of interests.

**References**


Counseling Intervention to Reduce Violence and Promote the Psychosocial Well-Being of Women Who Experience Domestic Violence

Maha Mowafy, Dina Shorkry, Heba El Nahas, Asmaa Sayed, Arwa El Shafei

Abstract

Introduction: This study aims to review married women with domestic violence and detecting the effectiveness of counseling intervention on the reduction of intimate partner violence (IPV).

Methods: Phase one of this study was a cross-sectional in which 315 married women living in Al-Badrashin, a slum area in Giza-Egypt, were included and invited to participate in the study and screened for IPV, social support, and psychological status; phase two was an interventional phase in which all abused women detected in phase one invited to participate in the interventional counseling program.

Results: The study revealed that the overall prevalence of IPV among the studied group was (37.7%); the highest form (54.0%) was psychological abuse, followed by physical (52%) one then severe combined abuse including sexual abuse items (48.6%). However; less than one fourth (22.2%) were exposed to harassment. Also revealed the presence of high significant p-value (0.000) reductions in all forms of violence following the intervention program.

Conclusions: Counseling intervention had a positive effect on participants, demonstrating a decrease in violence exposure, improvement of social support and psychological status.

Keywords: Intimate partner violence, Effectiveness, Group counseling intervention, Married women victims.

Introduction

IPV is a very serious social phenomenon. It disturbs all aspects of human life. Its occurrence is increasing rapidly around the world. Inappropriately, many wives blame themselves for IPV due to the male-dominated culture. IPV violates human rights and has always been associated with some physical and mental health problems.

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In Egypt IPV is a violation of social and religious values though, fortunately where report on this issue has turned to an issue of community belief instead of being a stigma.

Dealing with the harm imposed by IPV is not an easy task. Most of the intervention studies on IPV victims were performed in domestic violence shelters. However, women living in continuous abuse are similarly need receiving support. IP intervention programs offer counseling which typically includes aiding survivors improve the sense of power and control.
Method

The Study design:

The study had two phases:

1. Cross-sectional descriptive phase in which 315 married women living in a Al-Badrashin (slum area) in Giza were invited to participate in the study and screened for IPV, social support and psychological disorders.

2. Interventional phase in which abused women detected in phase one had involved in the interventional counseling program.

The setting of the study:

This study was conducted in a governmental health center for maternal and child care in a slum area (Al-Badrashin) in Giza-Egypt.

The population of study:

The target populations were any married female, aged above 18 years old, visit Al-Badrashin Health Center for Maternal and Child Care.

Sample size determination:

A number of 315 married women were required to achieve the study objectives (according to the Epi Info 6).

Sampling procedure:

Systematic random sampling technique where every third client aged above 18 years old and met the inclusion criteria of the study were selected and invited to participate in the study.

Inclusion criteria:

- Women aged 18 years or above.
- Married female regardless duration of the marriage.
- Women live with their husbands.

Exclusion criteria:

- A widow or divorced women.
- Women find difficulties in providing informed consent or understanding the content of the study.
- Had experience of trauma unrelated to their abuse within the last year.

Women with serious mental illness.

participants were identified to be abused by their intimate partner, had a total score of 7 or more of the Composite Abuse Scale (CAS), were invited to participate in a group counseling program for IPV victims. Only 21 women were dropped out all through the sessions; meanwhile, the rest of the participants (98) continued until the end of the last session. They were divided into five groups offering each participant suitable days and group to join and attend. Each group consisted of about 20 participants.

The program was implemented over a period of three months. A total of six counseling education sessions took place at weeks (0, 2, 4, 6, 8, and 10), on a biweekly basis for each group and each session lasted two hours. Group members did actively participated in the sessions with a full chance to speak and present themselves.

The counselor started the first session by introducing herself and the objectives of the sessions. Then the pre-test was distributed among participants. For the following sessions, the counselor start with a summary of what occurred in the previous one, followed by the specific subject of the current session, and, at the end of each session, the participants were asked to discuss about the learned outcomes from the session. These sessions included non-judgmental listening, discussion of needs and providing integrated information on IPV.

The Intervention (counseling program for IPV victims as a part of (Spousal Abuse Counseling Program)) was applied for the abused women and aimed to improve the wellbeing of abused women, helping them for rehabilitation and protecting them against continued violence.

Data collection tools: Six tools were used:

1. The participant’s demographic profile sheet: it was used for collecting participant personal data and medical history.

2. The updated Socio-economic status (SES) scale

3. Valid Arabic version of the multidimensional scale of perceived social support (MSPSS)

4. The valid Arabic version of The CAS: Women
were asked to rate how often they experienced abuse in the past 12 months. A 29 abusive forms presented in a six-point format.\textsuperscript{13}

5. The General Health Questionnaire (GHQ-12)\textsuperscript{14} comprises 12 items describing mood.

6. The Arabic version of the Mental Health Checklists of the International Classification of Diseases10 Primary Care (ICD10 PC) version\textsuperscript{15}.

\textbf{Data Analysis}

All analyses were conducted using SPSS version 21 and statistical significance was set at $p \leq 0.05$. Paired sample t-tests were conducted to assess the effect of the overall intervention program.

\textbf{Results}

The mean age of the studied participants was 35.4 ± 9.3 years old; while the mean years of marriage were 13 ± 8.5 years. More than one-third (37\%) of the studied women had experienced exposure to IPV according to the composite abuse scale.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{fig1.png}
\caption{Prevalence of different types of abuse in the studied participants}
\end{figure}

Figure (1) reveals that 119 (37.7\%) of the studied women had experienced exposure to IPV.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|c|c|}
\hline
Total score of CAS Age groups & N Total (315) & Mean & SD & 95\% Confidence Interval for Mean & P value \\
\hline
18-24 & 35 & 23.2 & 22.5 & 15.5 & 30.9 & 0.007* \\
25-29 & 45 & 15.9 & 15.9 & 11.1 & 20.7 & \\
30-34 & 79 & 11.5 & 17.9 & 7.5 & 15.5 & \\
35-39 & 49 & 10.8 & 17.4 & 5.8 & 15.8 & \\
40-44 & 50 & 12.9 & 18.8 & 7.6 & 18.3 & \\
45-49 & 25 & 5.0 & 8.2 & 1.6 & 8.4 & \\
50-55 & 30 & 14.4 & 22.8 & 5.9 & 22.9 & \\
\hline
\end{tabular}
\end{table}

As shown in table (1) young women (<25 years) are more exposed to IPV. It also demonstrates that there is a significant statistical difference between different age groups of participants and violence exposure.
Table (2): Pre and post intervention social support of abused women denoting the effectiveness of the intervention on Perception of Social Support

<table>
<thead>
<tr>
<th>MSPSS SCORES</th>
<th>Pre-intervention Social support of Abused women (98)</th>
<th>Post-intervention Social support of Abused women (98)</th>
<th>t-test</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Friends Subscale</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Mean</td>
<td>2.8</td>
<td>5.5</td>
<td>17.7</td>
<td>0.000*</td>
</tr>
<tr>
<td>· SD</td>
<td>1.6</td>
<td>0.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Significant Other Subscale</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Mean</td>
<td>4.6</td>
<td>5.6</td>
<td>8.7</td>
<td>0.000*</td>
</tr>
<tr>
<td>· SD</td>
<td>1.5</td>
<td>0.70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Scale</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>· Mean</td>
<td>3.8</td>
<td>5.2</td>
<td>15.9</td>
<td>0.000*</td>
</tr>
<tr>
<td>· SD</td>
<td>1.2</td>
<td>0.65</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As shown in table (2) Paired samples t-tests conducted on the MSPSS scores for the 98 abused women completing the whole treatment program revealed a highly significant increase in perception of social support following the intervention program (p-value: 0.000).

Table (3): Pre and post intervention violence experiences of abused women denoting the effectiveness of the intervention on violence exposure

<table>
<thead>
<tr>
<th>Composite abuse scale</th>
<th>Pre-intervention violence experience of abused women (98)</th>
<th>Post-intervention violence experience of abused women (98)</th>
<th>t-test</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe combined abuse</td>
<td>6.7</td>
<td>3.9</td>
<td>9.1</td>
<td>0.000*</td>
</tr>
<tr>
<td>· Mean</td>
<td>4.8</td>
<td>3.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>· SD</td>
<td>8.8</td>
<td>5.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emotional abuse</td>
<td>12.9</td>
<td>7.6</td>
<td>10.3</td>
<td>0.000*</td>
</tr>
<tr>
<td>· Mean</td>
<td>8.8</td>
<td>5.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>· SD</td>
<td>8.8</td>
<td>5.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical abuse</td>
<td>5.8</td>
<td>2.1</td>
<td>10.7</td>
<td>0.000*</td>
</tr>
<tr>
<td>· Mean</td>
<td>4.5</td>
<td>0.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>· SD</td>
<td>8.8</td>
<td>5.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harassment</td>
<td>2.5</td>
<td>0.89</td>
<td>7.6</td>
<td>0.000*</td>
</tr>
<tr>
<td>· Mean</td>
<td>2.8</td>
<td>1.51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>· SD</td>
<td>8.8</td>
<td>5.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total scale</td>
<td>31.5</td>
<td>15.3</td>
<td>12.6</td>
<td>0.000*</td>
</tr>
<tr>
<td>· Mean</td>
<td>20.7</td>
<td>11.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>· SD</td>
<td>&lt;7 N (%)</td>
<td>30 (30.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>· &gt;7 N (%)</td>
<td>98 (100)</td>
<td>68 (69.4)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table (3) reveals the presence of high significant statistical reductions in all forms of violence following the intervention program (p-value: 0.000). The overall percent of abused women decreased to 68% post-intervention.

**Discussion**

Overall 119 (37.7%) of the studied women had experienced exposure to IPV. The prevalence of violence was less than that of Egypt Demographic Health Survey, 2005 (45.0%), and more than the report of the MOHP/Egypt that stated that 26% of married women aged 15-49 years revealed exposure to IPV at least once in their lifetime; while 14% of the same age group suffered IPV in the last 12 months.

The relationship between educational level and exposure to IPV experience matched the WHO multi-country study on women’s health and domestic violence amongst others which stated that achieving a secondary school education or higher protected against IPV experience. It can be explained that educated women are more aware of information needed for healthier marital life compared to women with lower or no educational level. Secondary education or higher may help women to have a reasonable decision during selecting her partner or not to continue in a violent relationship, and to marry men with matching their levels of education. Furthermore, higher educated women are more valued by their partner and have improved partner communication.

Moreover, the findings demonstrated that SES level is positively associated with violence. Higher SES is mainly protective, supporting theories stating that poverty impacts negatively on levels of IPV.

As regards the psychological status, the results demonstrated that the prevalence of depression in all studied participants was 20%. From the abused women 93% were depressed, Meanwhile; only 7% of the non-abused women were exposed to depression. Also, it presented a significant statistical relationship between depression and exposure to all forms of violence. These findings came consistent with Fanslow & Robinson 2004 who stated that many women exposed to IPV had depression.

Regarding anxiety, The results demonstrated that the prevalence of anxiety in all studied participants was about 83%. From the abused women 31% had anxiety disorder. These results agreed with several studies reporting the presence of an association between exposure to IPV and anxiety.

The percent of abused women decreased to 68% post-intervention denoting effectiveness of the intervention in the reduction of violence exposure. This echo the finding of McBride 2001 whose study targeted 23 female victims of IPV in Canada and evaluated the effectiveness of an 8-week group intervention program, on their cognitive-behavioral.

The women in this study reported an increase in levels of perceived social support after receiving the intervention program. These results matched with Iverson et al., 2009, who reported an increase in perception of social support, after receiving the intervention program, especially in the social support perceived from friends. The intervention created effective outcomes, as other studies had already reported. These findings proof that the intervention met the needs of female victims of IPV, improving their psychosocial well-being.

**Conclusion**

The overall prevalence of IPV was relatively high, it was more prevalent among the young, non-educated and low socioeconomic status. There is a significant relationship between IPV and partners’ levels of education. IPV negatively affects women psychological health. The performed counseling program was found to significantly reduce women exposure to violence, women’s psychological symptoms and improved levels of perceived social support throughout the intervention period.

**Strengths and limitations of the study**

It is the first study conducted in Egypt for assessment of the effectiveness of brief counseling intervention on the reduction of IPV and Promotion of the psychosocial well-being of women who experience IPV. Also, the ability to change the abused women from negative tool to a positive one is a great benefit of the study. However, the program was too lengthy to be applied completely; so the applicable core contents, which suit our culture, were extracted and applied. Invitation of the husband caused a high percentage of women to drop out during the pilot study; so we applied the victim’s group sessions only, ensuring women compliance and safety.

**Recommendations:**
Join the husband to the intervention counseling programs.

Provide follow-up assessments during a period of 12 months to increase the intervention effectiveness.

**Funding:** This research did not receive any fund from public funding agencies, commercial, or nonprofit sectors.

**Ethical Considerations:** This study was approved from the Scientific Research Ethical Committee of the Faculty of Medicine, Cairo University. The approval number is N-122-2018. Informed consent was obtained from each participant before they were enrolled in the study.

**Conflict of Interest:** There is no conflict of interest regarding this paper publication.

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Prevalence of Osteopenia and Osteoporosis in the Kyrgyz Republic

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Abstract

Objectives: To study the prevalence of osteopenia and osteoporosis (OP) among residents of the Kyrgyz Republic in 3 different age categories (18-39 years, 40-59 years, and 60-79 years), give a comparative assessment of the prevalence of osteopenia and OP depending on gender and based on the results, make proposals for the identification and diagnosis of osteopenia and OP in the Kyrgyz Republic.

Materials and Methods: An Ultrasound bone densitometry (USBD) studied the Bone mineral density (BMD) in a total of 1200 people with 691 women and 509 men of 3 different age categories (18-39 years, 40-59 years, 60-79 years).

Results: In the first group from 18-39 years, normal values found in 55.6% of people, osteopenia in 38.9% of people and OP in 5.5% of people. In the second group, from 40-59 years old, normal values found in 30.9% people, osteopenia in 60.2% people and OP in 8.9% people. Moreover, in the third group, from 60-79 years, normal values were found in 9.5%, osteopenia is seen in 50.2% and OP in 40.3% of older people.

Conclusion: Osteopenia and OP are quite common not only in the older age but even affect people of a younger age. The frequency of detection of osteopenia and OP is the highest recorded in older age groups. Women mostly exposed to OP that has pronounced degrees of BMD affection.

Keywords: Bone mineral density, Ultrasound bone densitometer, Ultrasound bone densitometry Osteopenia, Osteoporosis.

Introduction

Osteoporosis (OP) is a systemic disease of the skeleton, in which bone strength decreases, which leads to an increased risk of fractures¹. Osteoporosis is characterized by a low bone mineral density (BMD) and microarchitectural changes in bones, leading to increased bone fragility². When fractures occur because of OP, the quality of life decreased³. The World Health Organization (WHO) has proposed bone mineral density (BMD) measurements for diagnosing osteoporosis⁴. OP is three times more common in women than men⁵,⁶. WHO experts attributed OP to one of the most common diseases, which, along with myocardial infarction, cancer and sudden death, occupies a leading place in the structure of morbidity and mortality⁷,⁸.

OP is an health burden in both developed and developing countries⁹. According to the International
Fund for Osteoporosis, every three seconds in the world, there is one fracture caused by OP. A modern strategy for organizing care for patients with OP is an early diagnosis with identification of a high risk of fractures and the early appointment of pathogenetic treatment.

The problem of OP in the Kyrgyz Republic remains unsolved and not studied at all. Being in most cases an asymptomatic disease that cannot suspect in the absence of fractures, OP often remains undiagnosed. There are no unified approaches to prevention and treatment, due to the lack of the necessary medical equipment, and there are misconceptions on various aspects of diagnosis.

**Aim:** To perform ultrasound bone densitometry (USBD) in 3 different age categories of people (18-39 years, 40-59 years, and 60-79 years), to identify and study the prevalence of osteopenia and OP.

**Objectives:** To study the prevalence of osteopenia and OP among residents of the Kyrgyz Republic in 3 different age categories (18-39 years, 40-59 years, and 60-79 years), to give a comparative assessment of the prevalence of osteopenia and OP depending on gender and based on the results, make proposals for the identification and diagnosis of osteopenia and OP in the Kyrgyz Republic.

**Materials and Method**

The study was conducted by the Rheumatology Faculty of the Department of Hospital Internal medicine, Occupational Pathology with a Course of Hematology, based in the City Clinical Hospital No. 1, Bishkek, Kyrgyz republic. Ethical clearance taken from Committee on Bioethics, I.K. Akhunbaev Kyrgyz State Medical Academy. The survey included 1200 people, residents of the Kyrgyz republic. Of these, 691 women and 509 men of different age groups (Table 1).

**Table 1. Characteristics of the examined people**

<table>
<thead>
<tr>
<th>Age groups</th>
<th>Age of people</th>
<th>The number of people</th>
<th>Total women</th>
<th>Total men</th>
</tr>
</thead>
<tbody>
<tr>
<td>First group</td>
<td>18-39 years old</td>
<td>524 (43,7%)</td>
<td>285 (54,4%)</td>
<td>239 (45,6%)</td>
</tr>
<tr>
<td>Second group</td>
<td>40-59 years old</td>
<td>391 (32,6%)</td>
<td>227 (58,0%)</td>
<td>164 (42,0%)</td>
</tr>
<tr>
<td>Third group</td>
<td>60-79 years old</td>
<td>285 (23,7%)</td>
<td>179 (55,8%)</td>
<td>106 (44,2%)</td>
</tr>
<tr>
<td>Total:</td>
<td></td>
<td>1200</td>
<td>691 (62,8%)</td>
<td>509 (37,2%)</td>
</tr>
</tbody>
</table>

As can be seen from the table 1, the first group consisted of people aged 18-39 years, and the average age was 28.1 ± 1.93 years, the ratio of women to men was 1.1: 1.0. The second group includes people aged 40-59 years, and the average age is 51.2 ± 2.47 years, the ratio of women to men is 1.3: 1.0. Moreover, the third group consisted of older people aged 60-79 years, and the average age was 76.8 ± 2.81 years; the ratio of women to men 1.6: 1.0.

For screening, our study used the SONOST-3000 portable ultrasound bone densitometer, which measures bone mineral density (BMD). This study conducted among university students, medical staff and residents of Bishkek (Chuy region), Karakol (Issyk-Kul region) and Naryn (Naryn region). Senior age groups also recruited among the wards of Bishkek and Nizhne-Serafimovsky social inpatient facilities for the older people and people with disabilities (Chuy region, Kyrgyz Republic).

**Statistical Analysis**

Statistical data analysis and mathematical processing carried out using the Microsoft Excel program, the Statistica Excel application software package, and the Statistica 8.0 application software package. Parametric and nonparametric analysis methods, descriptive statistics with the calculation of the median, 25% and 75% quartiles used. Mutual influence of indicators is determined by, Spearman’s correlation analysis was
used (to determine the relationship between qualitative and quantitative indicators, the Spearman’s correlation coefficient) and Pearson (to determine the mutual influence between the quantitative indicators). Mann-Whitney criteria used to assess the significance of differences between groups. Differences were considered statistically significant at an error level of $p < 0.05$.

**Results**

In our study, the diagnosis of OP carried out based on a decrease in BMD detected by ultrasound bone densitometer, and the following classification used to interpret the results.

USBD in the first group from 18-39 years showed (Table 2) that, in 291 individuals, the T and Z scores were within normal limits to -1.0. In 204 people, the T and Z scores ranged from -1.1 to -2.5, and in 29 people, the T score was 2.9, and the Z score was 3.2. Thus, in the first age group, normal values were found in 55.6% of people, osteopenia in 38.9% of people, and OP in 5.5% of people.

<table>
<thead>
<tr>
<th>Bone densitometry Normal Values</th>
<th>Normal T and Z scores to -1.0 (people No.)</th>
<th>Osteopenia T and Z scores from -1.1 to -2.5 (people No.)</th>
<th>Osteoporosis T and Z scores below -2.5 (people No.)</th>
<th>Total (people No.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First group (18-39 years old)</td>
<td>291 (55.6%)</td>
<td>204 (38.9%)</td>
<td>29 (5.5%)</td>
<td>524</td>
</tr>
<tr>
<td>Second group (40-59 years old)</td>
<td>121 * (30.9%)</td>
<td>235 * (60.2%)</td>
<td>35 * (8.9%)</td>
<td>391</td>
</tr>
<tr>
<td>Third group (60-79 years)</td>
<td>27 ** (9.5%)</td>
<td>143 ** (50.2%)</td>
<td>115 ** (40.3%)</td>
<td>285</td>
</tr>
<tr>
<td>Total:</td>
<td>439 (36.6%)</td>
<td>582 (48.5%)</td>
<td>179 (14.9%)</td>
<td>1200</td>
</tr>
</tbody>
</table>

Note:
* - $p <0.05$ - differences are statistically significant compared with the indicators of the first group
** - $p <0.05$ - differences are statistically significant compared with the first and second groups

The second age group included people from 40-59 years old. In this study group of 121 people, indicators of the T and Z scores were within normal limits to -1.0. In 235 people, the T and Z scores ranged from -1.1 to -2.5. For the remaining 35 people, the T and Z scores were below -2.5. In this study group, normal values found in 30.9% of people, osteopenia in 60.2% of people and OP in 8.9% of people, which is significantly higher than in the first group of the study (Table 2). This shows that, with ageing, osteopenia worsens and the number of people with OP increases.

In the third age group from 60-79 years, as can be seen from table 3, in 27 people the indicators of the level of T and Z scores were within normal limits to -1.0; 143 people had T and Z scores ranging from -1.1 to -2.5, and 115 people had T and Z scores below -2.5. Thus, the USBD detected osteopenia in 50.2% and OP in 40.3% of the older age group. Normal values found in 27 (9.5%) people. Moreover, the normal values of USBD found regardless of the increase in age.

We also analyzed the data of USBD depending on gender (Figure 1). So, out of 691 women, normal values of BMD were in 253 (36.6%) women, osteopenia observed in 331 (47.9%) and OP in 107 (15.5%) of them. Of the 509 men, bone mineral density indicators were normal in 241 (47.3%) people, osteopenia diagnosed in 203 (39.9%) of them, and OP in 65 (12.8%) people.
As can be seen from the figure, the results obtained indicate that the prevalence of osteopenic syndrome and OP in our study is significantly higher in women ($p < 0.05$) than in men.

**Discussion**

Our primary objective was to study the prevalence of osteopenia and OP among residents of the Kyrgyz Republic in 3 different age categories (18-39 years, 40-59 years, and 60-79 years). By USBD, the frequency of detection of osteopenia and OP is the highest recorded in older age groups. At the age of 40-59 years (II group), osteopenia detected in 60.2%, OP in 8.9%, and in the III group of 60-79 years, osteopenia detected in 50.2%, OP in 40.3%.

Our secondary objective was to give a comparative assessment of the prevalence of osteopenia and OP depending on gender. Osteopenia in women was 47.9%, and in men, it was 39.9%; OP in women was 15.5% and in men was 12.8%. By this study, it’s clear that women majorly effected to OP that has pronounced degrees of BMD affection. This type of studies conducted by the Kazakh Academy of Nutrition and S.D. Asfendiyarov Kazakh National Medical University in 2011 (The prevalence of osteoporosis among the population of older age groups according to sonographic screening studies in the Republic of Kazakhstan), but their results differ from our data. So, in their study, both women and men are equally affected by a decrease in the mineral density of bone tissue, whereas in our case, significantly higher numbers in women. The severity of osteopenia in the work of Kazakh colleagues amounted to 74.4%, of which OP was 22.2%, in our study, this indicator is significantly lower.

Our studies clearly showed that with ageing, the situation of osteopenia and OP only worsens. At the same time, osteopenia and OP are quite common not only in the older age, regardless of age, they also affect people of a younger age. In real life, we faced with the fact that often not only society itself, but also the medical community accepts osteopenia and OP as an age-related disease, the lot of older people, and this is the most profound error and mistake that only relaxes vigilance.

The advantages of study are we included all age groups for study, included people from many regions, received good results which may pave the way for future studies. Only one limitation of our study is the sample size; further studies with higher samples required to validate our results and receiving precise results are essential.

**Conclusion**

1. According to USBD, the frequency of detection of osteopenia and OP is the highest recorded in older
age groups. At the age of 40-59, osteopenia detected in 60.2%, OP in 8.9%, and in the age group of >60 years, osteopenia detected in 50.2%, OP in 40.3%.

2. Women most exposed to OP that has pronounced degrees of BMD affection. So, osteopenia in women was 47.9%, on the contrary, in men - 39.9%; OP in women was 15.5%, while in men it was 12.8%.

3. It is necessary to develop and approve a detailed plan and strategy for the prevention of osteopenia and OP acceptable for use by regions of the Kyrgyz Republic, taking into account the study of specific disease risk factors.

Conflict of Interest: The authors declare no conflict of interest.

Source of Funding: Nil.

Ethical Clearance: Taken from the Committee on Bioethics, I.K. Akhunbaev Kyrgyz State Medical Academy.

References
Current Aspects of Disability in the Kyrgyz Republic

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Abstract

The objective is to study the epidemiological characteristics and assess the system for establishing a disability in the Kyrgyz Republic.

In establishing disability, a biomedical model of health is used, which does not provide an objective assessment of a person’s condition. This study analyzes data on the disability situation in the Kyrgyz Republic, which indicates a steady annual increase in the disability rate. For children under 18 years of age, the establishment of disability and assignment of the category “disabled child” is biased, since only the state of health and dysfunction of the child’s functional abilities are assessed and, despite the difference in the severity of the condition, the possibility of work capacity and the ability to participate in education is not evaluated.

Key words: Disability, Person with disabilities, Situation on disability, Medical and social expertise, Kyrgyz Republic.

Introduction

Disability is a social phenomenon that no society can avoid, and each state, following its level of development, priorities and opportunities, forms a social and economic policy for people with disabilities¹. Disability is the most crucial indicator of public health and has not only medical but also socio-economic importance. According to the UN, the level of disability in the world is 10%, that is, every tenth inhabitant of the planet is disabled². According to the data published in the “K-News” news feed, in the Kyrgyz Republic, there are currently about 180 thousand disabled people, which makes up 2.8% of the population³.

The problem of disability has enormous socio-medical and economic consequences, due to the withdrawal of a significant part of citizens from the sphere of social manufacture and the considerable state expenditures for organizing social protection of disabled people, provision with medical care, maintaining appropriate social institutions, carrying out activities aimed at the rehabilitation of disabled people⁴.

For many developing countries of the world, the issue of the policy of establishing disability has recently been relevant in the schedule of social policy since the establishment of disability is closely related to the costs of social protection: payments, benefits, services, etc.
Currently, the world standard for disability use WHO-recommended classifications, countries are working to improve disability methods, special needs and the relationship of compensation for needs with services and benefits.

In the Kyrgyz Republic, the old methodology for determining disability is still used. However, it should be noted that since 2013 the country has stepped on the path of reforming the medical and social examination service. In this connection, at this stage, we studied the general situation in a certain number of people with disabilities among adults and children. We also showed the methodology for establishing a disability in our country.

Objective: To study the epidemiological characteristics and assess the system for describing disability in the Kyrgyz Republic.

Materials and Method

The methodology of this study includes an annual analysis of the situation regarding the establishment of disability in the Kyrgyz Republic (Official data of the Republican Center for Medical and Social Expertise under the Ministry of Labor and Social Development of the Kyrgyz Republic).

For the analysis, we studied the reports of government agencies, materials from open sources, information from international and non-governmental organizations, official statistics, and publications on the Internet.

Results and Discussion

According to the National Statistics Committee, in 2019, 6,320,723 residents lived in the Kyrgyz Republic (KR), of which about 168,200 are people with disabilities (PWD), which makes up 2.8% of the total population. The total population of the Kyrgyz Republic is growing annually. So compared to 2000, when their number was 4,898,000 inhabitants, in 2018, the population increased by 1.2 times, and at the end of the year amounted to 6,294,587. With an increase in the number of people, there is an increase in the number of people with disabilities.

So, since 2000, the number of people with disabilities has been steadily growing (Figure 1). If in 2000, PWD totalled 87,314 people, then in 2004, their number exceeded 100,000 people, and in 2005 their number was 106,688 people. As can be seen from the figure, a sharp increase in the number of PWDs has been observed since 2010, when their number amounted to 133,398 people, and compared to 2000, and it increased by 1.5 times. The maximum growth occurred in 2010-2013 when the annual growth amounted to 8500, 9072 and 7218 people, respectively.

Figure 1. Dynamical change in the number of persons with disabilities in the Kyrgyz Republic.
As in previous years, cardiovascular diseases, traumatic injuries of varying localizations, diseases of the sensory organs, diseases of the musculoskeletal system, neoplastic disorders, mental illnesses, tuberculosis and diseases of the nervous system ranked the leading positions in the structure of disability in 2019 (Table 1). All other diseases are classified as miscellaneous nosological forms in Table 1.

Table 1. Disability distribution by nosological forms.

<table>
<thead>
<tr>
<th>Nosological Group</th>
<th>2016 год</th>
<th>2017 год</th>
<th>2018 год</th>
<th>2019 год</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood circulatory disorders</td>
<td>2835 (20,3%)</td>
<td>2877 (19,9%)</td>
<td>3022 (19,9%)</td>
<td>3041 (19,3%)</td>
</tr>
<tr>
<td>Traumatic injuries of varying localizations</td>
<td>1973 (14,1%)</td>
<td>2128 (14,7%)</td>
<td>2259 (14,9%)</td>
<td>2377 (15,1%)</td>
</tr>
<tr>
<td>Pathology of Sensory Organs</td>
<td>1582 (11,3%)</td>
<td>1724 (11,9%)</td>
<td>1745 (11,5%)</td>
<td>1783 (11,4%)</td>
</tr>
<tr>
<td>Diseases of the musculoskeletal system</td>
<td>1163 (8,3%)</td>
<td>1325 (9,3%)</td>
<td>1374 (9,0%)</td>
<td>1458 (9,3%)</td>
</tr>
<tr>
<td>Neoplastic disorders</td>
<td>1242 (8,9%)</td>
<td>1155 (8,0%)</td>
<td>1296 (8,5%)</td>
<td>1361 (8,7%)</td>
</tr>
<tr>
<td>Mental illnesses</td>
<td>972 (6,9%)</td>
<td>982 (6,8%)</td>
<td>1029 (6,8%)</td>
<td>1047 (6,5%)</td>
</tr>
<tr>
<td>Tuberculosis</td>
<td>967 (6,8%)</td>
<td>965 (6,7%)</td>
<td>1027 (6,8%)</td>
<td>1051 (6,7%)</td>
</tr>
<tr>
<td>Nervous system disorders</td>
<td>558 (4,0%)</td>
<td>618 (4,3%)</td>
<td>626 (4,1%)</td>
<td>641 (4,1%)</td>
</tr>
<tr>
<td>Miscellaneous nosological forms</td>
<td>2704 (19,3%)</td>
<td>2663 (18,4%)</td>
<td>2815 (18,5%)</td>
<td>2933 (18,7%)</td>
</tr>
<tr>
<td>Total</td>
<td>13996</td>
<td>14437</td>
<td>15193</td>
<td>15692 *</td>
</tr>
</tbody>
</table>

Note: p <0.05 - differences are statistically significant compared to 2016

Under state regulations, depending on the degree of body functioning and social life disruption, citizens of the Kyrgyz Republic are assigned I, II and III disability groups; children under 18 years old assigned the category of “disabled child.”

As for the examination of children, it should be noted that until 2002 the analysis was carried out by the treatment and prevention organizations of the Ministry of Health of the Kyrgyz Republic at the place of registration of the child. Since 2003, the examination transferred to the medical and social examination service under the Ministry of Social Development of the Kyrgyz Republic. An analysis of the situation showed that an annual increase in disability also observed in the category of children from 2000 to 2018 (Figure 2). Moreover, the increase in the number of children with disabilities varies significantly from 135 to 1235 cases per year.
Disability determination for children under 18 years: In the Kyrgyz Republic, all inter-district medical and social expert commissions (MSEC) conduct a mixed reception of children and adults. For children under 18 years of age, when determining disability, the state of health and impairment of functions are evaluated and, despite the difference in the severity of the condition, the category “disabled child” is established. When establishing a disability for children, the opportunities for activity and the ability to participate, special educational needs are not evaluated.

For the assessment of the child’s condition to be more objective, in different countries of the world and the European Union, the levels of ailment are set for children when setting the levels of ailment, WHO recommends that children under 18 years of age should be divided into four groups by age (from birth to 3 years; from 4 to 7 years; from 8 to 14 years; from 15 to 18 years). In the Kyrgyz Republic, WHO recommendations have not been implemented yet.

Disability determination for adults of working age and retirement age: In the Kyrgyz Republic, adults (from 18 years old) are assigned I, II and III disability groups. For people of working age and older people, the disability is determined by a biomedical health model and ICD-10 coding, without separating them by age groups. The identification of disability groups is closely related to benefits, payments, services and other assistance. This methodology for determining disability does not reflect the ability to objectively assess the state of a person of working age, as his ability to perform existing skilled work, acquire new qualifications, or present work that does not require professional skills, as well as other special assistance measures, are not evaluated.

When establishing a disability group in the Kyrgyz Republic, an individual rehabilitation plan should be developed according to regulatory enactments. This provision is declarative since, in practice, medical experts do not have the competence and knowledge to draw up such a program, and the poorly developed links of medical, social and professional rehabilitation do not contribute to this.

In the Kyrgyz Republic, for people with disabilities of working age and people with disabilities of retirement age, the establishment of disability groups does not reflect the situation of an objective assessment of the opportunities and particular needs of people of different ages and the active organization of the necessary rehabilitation, social and financial support.
For PWDs of working age, it is first of all essential to establish the level of working capacity (after all possible treatment and medical rehabilitation measures have been used), and with what rehabilitation measures - vocational and social, you can return PWDs to the labour market.

For people with disabilities of retirement age, the level of work capacity is not relevant. PWD of all age groups has special needs, the satisfaction of which would enable them to live with maximum independence and support in their natural living environment. Such special needs are met, taking into account the economic situation in each country.

Currently, the World Health Organization (WHO) recommends three main international classifications for assessing health status:

1. ICD – 10 - the international statistical classification of diseases and disorders, the tenth revised and supplemented edition (International Classification of Diseases (ICD));

2. ICF - International Classification of Functioning, Disability and Health;

3. ICHI - International Classification of Health Interventions.

The only changes in health, procedures and interventions (interventions) directly classified by ICD-10. The structural basis of this classification based on the etiology, methods and interventions.

ICF – is structured based on a biopsychosocial model of health, in which the restriction of activity and participation is the result of exposure to environmental factors and personality traits. ICF is a standardized language with a unified coding system for health and related conditions.

Both classifications (ICD - 10 and ICF) are recommended for simultaneous use by WHO. Thus, a description of health and related conditions would be complex.

The use of ICF coding in determining disability provides much more detailed and accurate information about human health and its functionality than the use of only ICD-10 coding. ICF essentially defines the state of a person, and not just a disease, as when using ICD-10.

ICD-10 is complete and sufficient for diagnosing diseases, treating patients, but for rehabilitation and other solutions, such as establishing disability, this is not enough. ICF is ideal to describe a person’s condition after treatment.

Guided by the ICF, attitudes towards human diseases and disabilities are changing. The ICF not only helps physicians in physical medicine and rehabilitation cope with disability issues but also requires the public to take responsibility for accepting people with disabilities in society. The ICF, is closely related to human health and health determining factors, helps to choose a profession that is compatible with a health condition and adapt the workplace to a particular PWD while searching for opportunities to integrate PWD into the labour market.

Many countries around the world have begun to use the ICF directly in establishing disability. The United Nations (UN) has adopted the ICF as one of the social classifications and applies it in the fields of insurance, social security, labour, education, economics, and social policy. Countries are actively analyzing ICF and are working on using it, assessing human health, working ability, and disability. Based on the ICF, tools have been created for the general assessment of disability.

In 2011, WHO presented a world disability analysis report prepared following the ICF Convention on the Rights of People with Disabilities. This report provides recommendations to all countries to assess disability using the ICF and the main directions for implementing this classification.

Analyzing the methodology for establishing a disability in the Kyrgyz Republic, a biomedical model of health is used when assessing a person’s condition, when health is determined by medical criteria and is focused on the patient’s body. A physician with specific knowledge of the body is the only expert, and the diagnosis becomes the primary criterion for determining the condition of a person. The biomedical model emphasizes the medical knowledge of the body, ignores the influence of psychological factors on human health and turns social problems into a body problem that essentially remains unsolvable.

In the world, the biomedical model of health is changing the biopsychosocial model, which provides an entirely different concept when health is assessed as the biological, psychological and social well-being of a person. Disability is defined as a long-term deterioration
in health due to disorders of the body structure or functions and the interaction of adverse environmental factors, reduced opportunities for participation in public life and activities. A person with disabilities experiences functional impairment and the influence of the social environment. A person is affected by his social environment, and he becomes the central axis in the health care system and social protection. That is when using the biopsychosocial model of health, and the assessment becomes more objective and comprehensive.

Taking into account the trends in the establishment of disability in the world and comparing the situation of establishing a disability in the Kyrgyz Republic, we must state that in the Kyrgyz Republic the methods of determining disability do not yet comply with international standards and cannot again provide an objective assessment of the state of a person.

**Conclusion**

1. In the Kyrgyz Republic, there is a gradual annual increase in the number of persons with disabilities.

2. In establishing disability, a biomedical health model is used that does not provide an objective assessment of a person’s condition, where a person’s situation is evaluated only by medical diagnosis and the impact of the social environment is not assessed.

3. For children under 18 years of age, the establishment of disability and assignment of the category “disabled child” is biased, since only the state of health and dysfunction of the child’s functional abilities are assessed and, despite the difference in the severity of the condition, the possibility of activity and the ability to participate in education is not evaluated.

4. The Kyrgyz Republic needs the introduction and widespread use of the international classification of functioning in establishing disability.

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**Ethical Clearance:** Taken from the Committee on Bioethics, I.K. Akhunbaev Kyrgyz State Medical Academy.

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About the Status and Prospects of Gerontology and Geriatrics in the Kyrgyz Republic

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Abstract

The objective is to assess the state and prospects of development of the gerontological service and to study the level of the demographic situation in the Kyrgyz Republic.

We studied Legislative, regulatory and legal documents and materials from open sources have studied since 1991. Using the example of Bishkek and Nizhne-Serafimovsk social stationary facilities, the state of health was analyzed, and 442 patients examined. Successes in the development of the gerontology: the Kyrgyz Republic became a member of the AgeNet International gerontological network (2005), the law “On Senior Citizens in the Kyrgyz Republic” (2011) was adopted, and an Action Plan to improve the quality of life of older citizens at 2019-2025. A high frequency of comorbidity revealed: 241 (56.4%) of the wards had from 1 to 3 diseases, 185 (43.3%) from 4 to 6 diseases and in 128 (29.9%) of the departments, seven or more diseases registered. The country needs to create a single coordinating body for gerontological and geriatric services, which will be responsible for its work and development.

Key words: Gerontology, Geriatrics, Old age, Social stationary institution, Kyrgyz Republic.

Introduction

Ageing of the population is one of the relevant problems of modern society. At present, negative medical, demographic processes observed, characterized by an increase in the number of people of older age groups in the general population structure of most countries, including Kyrgyzstan1,2.

According to the UN, the proportion of older people over the age of 65 exceeded 9%, by 2025 there will be more than 800 million people over 65 years old in the world, which will be about 10% of the population, and by 2050 this percentage can reach 16%3,4.

With age, the proportion of acute diseases decreases, and the number of various chronic diseases increases4. The risk of situations that require not only the provision of medical, social and rehabilitation assistance but also outside care increases5.

For Kyrgyzstan, the increase in the proportion of older people is a new phenomenon. Among the many consequences of this phenomenon, there is a need for various types of medical and social assistance. According to studies of the National Statistical Committee of the Kyrgyz Republic6, the older population suffers from multiple severe chronic diseases that occur in conditions of reduced compensatory capabilities of the body. Up to 80% of older people need medical and social assistance, more than 70% of this category have 4-5 chronic diseases of the cardiovascular, nervous, endocrine, hematopoietic, musculoskeletal, respiratory, digestive and others. The incidence of diseases in the older people from 60-74 years is almost two times higher and six
times in the elderly from ≥75 years, compared to young people.

The objective is to study the state and prospects of development of the gerontological service in the Kyrgyz Republic present stage, to assess the level of geriatric care provided to the population of the country, as well as to wards of stationary social institutions of the country.

**Materials and Method**

We studied legislative, regulatory documents, scientific publications and articles from open media sources on the older people, since 1991.

The object of the study was older people, wards of the Bishkek and Nizhne-Serafimovsk social stationary institutions of a general type for older people and people with disabilities (from now on referred to as SSI). We studied medical records of the wards in institutions; there were 506 of them at the time of the study.

Electrocardiography performed in 370 people, echocardiography in 70 people, ultrasound of internal organs in 347 people and ultrasound bone densitometry in 177 people. The following medical equipment of the I.K. Akhunbaev Kyrgyz State Medical Academy was used to conduct these studies: EK12T-01-R-D electrocardiograph, Mindray DP-50 portable ultrasound scanner, and SONOST-3000 portable bone densitometer. The echocardiographic study was carried out by researchers of the Alpine Medicine Department of the M.M. Mirrakhimov National Center of Cardiology and Internal Medicine of the Ministry of Health of the Kyrgyz Republic on the Philips Cx50.

Statistical processing of the results carried out using the program Statistica for Windows, v. 6.0 Data presented as the arithmetic mean ± standard error of the mean (M ± m). The significance of the differences in the frequency values in the observation groups evaluated using the Pearson χ2-criterion, the Student t-test and the Mann – Whitney rank U-test used. The values at p <0.05 were considered statistically significant.

**Results**

About 500 thousand citizens are overworking age or almost every eighth resident of the republic. The number of men over working age (63 years and older) is 4.7%, and the number of women (58 years and older) is 10.8%. The number of women in this age group exceeded the number of men by 2.3 times.

In 2018, life expectancy for men was 67.4 years, for women was 75.6 years. The retirement age of women comes five years earlier (for men at 63 years old, for women at 58 years old).

The solution to the problems and needs of older citizens in the Kyrgyz Republic until 2000 remained without proper attention.

In 2002, the Kyrgyz Republic became a member of the Madrid International Plan of Action on Aging.

In 2005, at the initiative of 22 organizations involved in ageing in Kyrgyzstan, Kazakhstan and Tajikistan, the International Gerontological Network AgeNet International was created. The goal was to help increase the responsibility of the government and civil society in improving the situation of socially vulnerable older people.

In 2011 the Law of the Kyrgyz Republic dated July 26, 2011 No. 133 “On Senior Citizens in the Kyrgyz Republic” was adopted in the country.

In October 2016, the Government of the Kyrgyz Republic decided to form an interagency working group to develop a State national program to improve the quality of life of older people for 2017-2027 years, with the inclusion of six partner organizations of AgeNet International. The recommendations developed by this interagency group formed the basis of the Action Plan to improve the quality of life of senior citizens of the Kyrgyz Republic for 2019-2025, which was approved by the Government Decree No. 442 dated August 30, 2019.

To implement the measures, four priority areas are defined:

1. Equality and non-discrimination;

2. Prevention and promotion of health, increasing the access of senior citizens to quality medical services through improving the health care system and promoting active longevity;

3. Ensuring well-being at all stages of the life cycle of senior citizens;

4. Ensuring the accessibility of senior citizens to state and municipal services by developing the social services market and expanding forms of support, including the private sector.
Geriatrics is a separate medical speciality, the purpose of which is to impact on the physical, mental, functional and social spheres of health and life of the elderly and senile people in acute and chronic diseases during treatment, prevention, rehabilitation and palliative care. The primary health care for the population of the republic provided by 148 medical institutions, 64 family medicine centres, 28 general practice centres, in which 694 groups of family medicine doctors and 1026 Medical- obstetric centres that are part of a system of the Ministry of Health of the Kyrgyz Republic. In the Order of the Ministry of Health of the Kyrgyz Republic No. 387 dated 05/30/2018, the nomenclature of medical and pharmaceutical specialities and the positions of employees with higher medical and pharmaceutical education in healthcare organizations documented the speciality “geriatrics” and the location of “geriatrician”.

There is still no comprehensive training system for geriatric specialists in the country, which should include not only medical personnel at all levels but also social workers. There are no educational programs on geriatrics before and after graduate training. The problems associated with geriatric care: there are no geriatric doctors, no geriatric rooms, no geriatric centres, geriatric medical care is not provided to the elderly, and the wards of stationary social institutions remain not surveyed. Decisive in this direction is the presence and functioning of a hospital for disabled war veterans in the republic, where, along with invalids of the World War 2 and home front workers, who are very few, the older people catered for. The work of stationary social institutions is one of the priority areas that determine the new policy of our state.


The mandatory minimum system includes stationary and semi-stationary organizations. The first contains social inpatient facilities for senior citizens and persons with disabilities. In total, there are 15 institutions in the Kyrgyz Republic, six of which serve for senior retirement and seniors. From table 1, of the six stationary social institutions of the country, the two largest located in the Chuy region, these are the Nizhne-Serafimovsk and Bishkek SSI with a capacity of 308 people and 205 people, respectively. The remaining four institutions situated in the south of the republic. It has Small capacity, designed for 204 beds.

### Table 1: Social Stationary Institutions (SSI) for the old people and persons with disabilities of the Kyrgyz Republic

<table>
<thead>
<tr>
<th>No.</th>
<th>Name of institution</th>
<th>Location (city)</th>
<th>Number of beds</th>
<th>Number of service employees</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nizhne-Serafimovsk social stationary institution of the general type for elderly and disabled people</td>
<td>Kant</td>
<td>308</td>
<td>231</td>
</tr>
<tr>
<td>2</td>
<td>Bishkek social stationary institution of a general type for the elderly and disabled people</td>
<td>Bishkek</td>
<td>192</td>
<td>76</td>
</tr>
<tr>
<td>3</td>
<td>“Boorukerdik” boarding house for the elderly people</td>
<td>Osh</td>
<td>63</td>
<td>36</td>
</tr>
<tr>
<td>4</td>
<td>Suzak boarding house for the elderly and disabled people</td>
<td>Jalal-Abad</td>
<td>86</td>
<td>60</td>
</tr>
<tr>
<td>5</td>
<td>Suluktinsky boarding house for single citizens</td>
<td>Batken</td>
<td>35</td>
<td>15</td>
</tr>
<tr>
<td>6</td>
<td>Toktogul boarding house for the elderly and disabled people</td>
<td>Jalal-Abad</td>
<td>20</td>
<td>16</td>
</tr>
</tbody>
</table>
The Nizhne-Serafimovsk SSI founded in 1936 and in 1978, a new 4-storey building, consisting of 3 residential buildings, during the Soviet Union. Currently, the capacity is 325 beds, located in the village of Nizhnyaya Serafimovka, Chuy region. The Bishkek Social Stationery Institution (SSI) was founded in 1961, by Decree of the Council of Ministers of the Kyrgyz SSR No. 99 dated February 15, 1955. The capacity is 205 beds and 83 living rooms, located in the Bishkek.

In our study, a total of 506 people lived in two institutions, of which 442 (87.4%) people of older age health status examined. The remaining 64 (12.6%) of the wards did not fall into the study; these were young and middle-aged people (up to 60 years) with disabilities. Of the 442 wards, men were 248 (56.1%) people, women were 194 (43.9%) people, their average age was 76.1 ± 3.27 years. SSI wards represented by residents of the Chuy region were 194 (43.8%) people, Bishkek were 149 (33.7%) people and Issyk-Kul region were 52 (11.7%) people. The remaining 47 (10.6%) of the wards were representatives of other areas of the republic. Doctors and nurses represent SSI. An average of 6 staff units per institution: a general practitioner, a surgeon and four nurses.

During the research, out of 506 medical observation cards, only 135 observation cards were examined and with the results of laboratory and functional tests. In all these cases, the wards studied in connection with emergency conditions and hospitalization in the clinic. The department staff organized visiting consultations and examination with the involvement of super-specialists from the departments of I.K. Akhunbaev Kyrgyz State Medical Academy.

A comparative analysis in table 2 showed that the percentage of diseases detected for some illnesses in the wards of the Bishkek SSI was significantly higher than in the departments of the Nizhne-Serafimovsk SSI. Summarizing the final figures, six classes of diseases, such as cardiovascular, diseases of the musculoskeletal and connective tissue, nervous and digestive systems, respiratory and visual diseases constituted the disorders that found in wards of SSI.

**Table 2: The main diseases in wards of social stationary institutions (SSI) identified in the process of analyzing medical records and examinations**

<table>
<thead>
<tr>
<th>№</th>
<th>Disease group</th>
<th>Bishkek SSI (n=201)</th>
<th>Nizhne-Serafimovsk SSI (n=241)</th>
<th>Total (n=442)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Diseases of the cardiovascular system</td>
<td>197 (98%)</td>
<td>174 (72,1%)</td>
<td>371 (83,9%)</td>
</tr>
<tr>
<td>2.</td>
<td>Diseases of the musculoskeletal system and connective tissue</td>
<td>172 (85,5%)</td>
<td>137 (56,8%)</td>
<td>309 (70%)</td>
</tr>
<tr>
<td>3.</td>
<td>Diseases of the nervous system</td>
<td>141 (70,1%)</td>
<td>116 (48,1%)</td>
<td>257 (58,1%)</td>
</tr>
<tr>
<td>4.</td>
<td>Diseases of the digestive system</td>
<td>123 (61,2%)</td>
<td>93 (38,5%)</td>
<td>216 (48,8%)</td>
</tr>
<tr>
<td>5.</td>
<td>Diseases of the respiratory system</td>
<td>97 (48,2%)</td>
<td>72 (29,8%)</td>
<td>169 (38,2%)</td>
</tr>
<tr>
<td>6.</td>
<td>Diseases of the visual organs</td>
<td>91 (45,3%)</td>
<td>69 (28,6%)</td>
<td>160 (36,2%)</td>
</tr>
<tr>
<td>7.</td>
<td>Diseases of the genitourinary system</td>
<td>46 (22,8%)</td>
<td>21 (8,7%)</td>
<td>67 (15,1%)</td>
</tr>
<tr>
<td>8.</td>
<td>Mental and behavioral disorders</td>
<td>17 (8,4%)</td>
<td>15 (6,2%)</td>
<td>32 (7,2%)</td>
</tr>
<tr>
<td>9.</td>
<td>Endocrine diseases</td>
<td>15 (7,5%)</td>
<td>13 (5,4%)</td>
<td>28 (6,3%)</td>
</tr>
<tr>
<td>10.</td>
<td>Diseases of the skin and subcutaneous tissue</td>
<td>13 (6,5%)</td>
<td>11 (4,5%)</td>
<td>24 (5,4%)</td>
</tr>
</tbody>
</table>

Note: p <0.05 - the differences are statistically significant compared with the indicators of the Nizhne-Serafimovsk SSI
A high frequency of comorbidity revealed: 241 (56.4%) of the wards had from 1 to 3 diseases, 185 (43.3%) from 4 to 6 diseases and in 128 (29.9%) of the departments, seven or more diseases registered.

**Discussion**

According to the UN age classification\(^{13}\), if the share of people aged 65 years and over in the total population is below 4\%, then the population of that country is considered young, if, in the range from 4\% to 7\%, the community is on the threshold of old age, if above 7\% aged population. In 2019, 301 thousand (4.7\%) of Kyrgyzstani people were at the age of 65. According to the UN prediction, in Kyrgyzstan, this tendency will manifest itself by about 2030 when the proportion of older people aged 65 years and older will approach 7\%\(^{14}\).

To provide full assistance, a specialist is needed, who knows the theoretical concepts of the functioning of the body over the age of 65.

In our country, the development of geriatric services requires the integration of both medical and non-medical areas. In this case, the primary attention should be paid not only to the fight against ageing but to the prevention and treatment of multiple pathologies, to prevent the pathological and accelerated ageing process of the body. The activities of stationary social institutions in the Kyrgyz Republic can be an excellent example of integration work. But there are also enough issues: institutions are poorly responsive to reforms, and they do not particularly want highly qualified medical intervention.

We can confidently state that the demographic situation in the country today leaves no doubt that caring for people of older age groups is a requirement of the time and a substantial medical and social problem.

**Conclusion**

1. For further study of issues related to the ageing of the population and the development of approaches to organizing geriatric care for the people of the republic, it is necessary to create a coordinating body for gerontology and a network of geriatric centres in the country.

2. For the development of the gerontology service, the achievement of health indicators, the quality of life of older people, the development of cooperative scientific research and the improvement of specialized training in geriatrics are necessary.

3. Coordinated actions by the healthcare and social protection systems are needed to provide the older people and senile population of the country with the highly specialized medical and social assistance they need, affect the extension of their active longevity.

**Conflict of Interest:** The authors declare no conflict of interest.

**Source of Funding:** Nil.

**Ethical Clearance:** Taken from the Committee on Bioethics, I.K. Akhunbaev Kyrgyz State Medical Academy.

**References**

11. Order of the Ministry of Health of the Kyrgyz Republic No. 387 dated 05/30/2018 “On approval of the nomenclature of medical and pharmaceutical specialties, the nomenclature of posts and the list of compliance of medical and pharmaceutical specialties with posts in health organizations of the Kyrgyz Republic”.


Correlation between the Expression of Melanoma-Associated Antigen-A3 and Cytology Results on Bronchoalveolar Lavage on NSCLC

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Abstract

Background: Lung cancer is still considered an alarming health problem, causing a major cause of death in malignant disease. The incidence rate is likely to increase and most of it comes with an advanced stage of diagnosis. To improve the healing rate and life expectancy, the detection of lung cancer should be done early, when it is still small and localized. Bronchoalveolar lavage (BAL) cytology is a method of examination that can be used in lung cancer. The expression of Melanoma-Associated Antigen (MAGE) becomes the marker that is sensitive to certain types of cancer, including lung cancer.

Objective: To analyze the correlation between expression MAGE-A3 and cytology of BAL specimen on NSCLC.

Method: Bronchoscopy was performed on patients with NSCLC lung tumor at pulmonology unit of Dr. Soetomo Teaching Hospital Surabaya Indonesia to collect the BAL. Histologic examination for BAL and MAGE-A3 examination were conducted on patients. Statistical analysis used to determine the correlation between the expression of MAGE A3 and cytology of BAL specimens on NSCLC was fisher’s exact test.

Result: We found that there were 7.14% of subjects with BAL cytology had cancer cells (adenocarcinoma). MAGE-A3 expression was positive only in 28.60% of subjects diagnosed with NSCLC. The result of MAGE A3 expression analysis with cytology of BAL specimen showed p = 0.286.

Conclusion: There was no significant correlation between MAGE-A3 expression and histopathology type. The results of MAGE A3 RT PCR fluid expression examination showed that most of them were in the negative category.

Keywords: MAGE-A3, BAL, NSCLC

Introduction

Lung cancer is still an alarming health problem in the world and is considered the leading cause of death in malignant disease. Its incidence is likely to rise almost worldwide, in developed countries like the United States and in developing countries, including Indonesia. The increasing trend of this case is not only in male but also in female. Diagnosis of lung cancer is 14% of all types of cancer in the world, ranked second after prostate cancer in male and breast cancer in female. Lung cancer in Indonesia ranks the fourth most common of all cancers 1.

Lung cancer type non-small cell carcinoma (NSCLC) is the most common type of lung cancer, with the incidence of 75-80% of all lung cancer. To improve the healing rate and life expectancy, the detection of lung cancer should be done early, when it is still small
and localized. A lot number of research has been done to find the tool for early lung cancer detection; low-dose frequency computed tomography (CT) is able to detect lung cancer that is smaller (less than 1 cm) compared to chest x-ray with is 0.5 cm. However, this procedure has the disadvantage of providing a non-specific mass picture, causing a large false positive rate and increased deaths from unnecessary surgery. In addition, CT scan is costly and repeated CT evaluation scan might increase the risk of adverse side effects of radiation in the patients.

Developments in the field of biomolecular provide an alternative to find an early detection tool for cancer that is not invasive, one of them is tumor antigen. Tumor antigen is one of the tumor makers/biomarkers that provide useful information in patients with developing cancer. Tumor antigens has been widely developed for early detection of lung cancer, being the target of therapy (immunotherapy) and a promising field in the future. However, the specificity and sensitivity of tumor antigens in the diagnosis of cancer might vary.

The gene of melanoma associated antigen (MAGE) belongs to an important group of CT antigens and is grouped according to the expressing tissue and gene structure. It is suspected that the expression of the MAGE gene family can be a marker that is sensitive to certain types of cancer including lung cancer. Overexpression of MAGE gene can be used not only for early diagnosis and screening but also as a target of adjuvant treatment in lung cancer. A study suggests that there is a significant correlation between MAGE expression and histopathology of lung cancer as well as the stage of lung cancer.

Currently, there are already several modalities of molecular detection in determining genetic alterations. One of them is polymerase chain reaction (PCR) that is capable of detecting \(10^{-9} - 10^{-4}\) copies of gene mutation. In addition, PCR helps determine histopathologic classification and detection of specific tumor antigens despite the very few amount of sample. Compared to other molecular modalities, PCR has several advantages that are objective, fast, versatile and cost-effective when applied to small tissue samples. In the context of detecting tumor antigens, the CT antigen of the MAGE family can be detected by RTPCR.

Bronchoscopy is a medical procedure of inserting a pipe into the airway through the nose or mouth. Some types of specimens that can be obtained with bronchoscopy are sweeps, rinses, Bronchoalveolar lavage (BAL), forceps biopsy and transbronchial needle aspiration (TBNA). Fiber optic bronchoscopy (FOB) with BAL is a fairly practical action with moderate risk and is fast and reliable. BAL diagnostic results show a value of more than 50% and it is better than transbronchial biopsy for diagnosis of peripheral lesions that can not be seen through bronchoscopy. In the patients with bronchoalveolar cell carcinoma, the BAL examination has a high diagnostic value.

MAGE-related researchers are still not widely exposed and a previous research reported MAGE expression in lung cancer of 30-50%. In Dr. Soetomo General Hospital Surabaya, Indonesia, there has never been any research or data publication showing the benefits of MAGE expression especially MAGE A3. This study aims to analyze the correlation between the expression of MAGE A3 and the cytology results of BAL specimen on NSCLC.

**Method**

The subjects of the study were lung cancer patients who underwent treatment at Dr. Soetomo General Hospital Surabaya, Indonesia that met the inclusion and exclusion criteria. The inclusion criteria include patients aged 20-70 years with histopathologic results, including NSCLC. Subject exclusion criteria exclude patients with primary tumor in other organs and metastatic lung cancer from cancer of other organs. Subjects who were willing to be involved in this study filled the informed consent in advance.

This study used cross-sectional design and consecutive sampling method to obtain 14 subjects. This study was conducted in the pulmonology unit room of Dr. Soetomo General Hospital Surabaya, Indonesia. Tools and materials used include patients’ medical records, questionnaires containing patient baseline data, CT thoracic scan results, bronchoscopy device, MAGE reagents, real-time PCR, and BAL dosage tubes. Before conducting the research, the we initially underwent ethical test (445/Panke, KKE/VII/2017) at Dr. Soetomo General Hospital Surabaya, Indonesia.

The research procedure includes the diagnosis of lung cancer based on thoracic CT-scan with contrast and histopathology results including NSCLC (adenocarcinoma, squamous cell carcinoma and large cell carcinoma). We performed identification based on subject criteria, followed by examination of MAGE-A3
examination which was the result of BAL liquid sediment examination using primary MMRP-3 & MAGE-A3 with Reverse Transcription (RT) technique of PCR detected in 569 base pairs in the shape of intron ribbon F: 5'-GAAGCCGGCCCAGGCTCG- 3'. The examination performed was BAL fluid cytology as the result of bronchial tumor epithelial cells examination contained in the liquid BAL in the form of adenocarcinoma cells, squamous cell carcinoma and large cell carcinoma. The data used in this study were primary data from thoracic CT scan examination, histopathology result, cytology and MAGE expression examination result from BAL preparation.

The data of measurement results were processed using SPSS software version 20.0 (SPSS, Inc., Chicago, IL). The data were analyzed and presented in tables and descriptions. The data were grouped into two types: numerical and categorical data. The numerical data were presented as mean ± standard deviation and the categorical type data were presented in percentage form. The data on the correlation between MAGE-A3 correlation and cytology results of BAL specimen on NSCLC were analyzed using chi-square test (p < 0.05) if the requirements were met. Otherwise, chi-square test was to be replaced by fisher’s exact test (p < 0.05).

Result

Subjects’ Characteristics

Table 1. Subjects’ Characteristics

<table>
<thead>
<tr>
<th>variable</th>
<th>Category</th>
<th>%</th>
<th>Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>age (years)</td>
<td></td>
<td></td>
<td>60.07 ± 10.42</td>
</tr>
<tr>
<td>sex</td>
<td>Male</td>
<td>50.00</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>50.00</td>
<td></td>
</tr>
<tr>
<td>occupation</td>
<td>housewives</td>
<td>28.61</td>
<td></td>
</tr>
<tr>
<td></td>
<td>farmer</td>
<td>35.70</td>
<td></td>
</tr>
<tr>
<td></td>
<td>retired</td>
<td>14.30</td>
<td></td>
</tr>
<tr>
<td></td>
<td>teacher</td>
<td>7.13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>entrepreneur</td>
<td>7.13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>welding worker</td>
<td>7.13</td>
<td></td>
</tr>
<tr>
<td>the status of smokers</td>
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<tr>
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<td></td>
<td>50 year</td>
<td>20.00</td>
<td></td>
</tr>
<tr>
<td>histopathological results</td>
<td>pulmonary adeno ca</td>
<td>85.74</td>
<td></td>
</tr>
<tr>
<td></td>
<td>pulmonary squamous cell ca</td>
<td>7.13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>large cell</td>
<td>7.13</td>
<td></td>
</tr>
<tr>
<td>type of cytology</td>
<td>a malignant cell</td>
<td>7.13</td>
<td></td>
</tr>
<tr>
<td></td>
<td>no malignant cells</td>
<td>92.87</td>
<td></td>
</tr>
<tr>
<td>MAGE-A3 expression</td>
<td>positive</td>
<td>28.60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>negative</td>
<td>71.40</td>
<td></td>
</tr>
</tbody>
</table>
Table above shows BAL preparation was found only in 1 subject with malignant cell result (7.13%). The majority of subjects had BAL preparations in the category of no malignant cells (92.87%). There were BAL preparations with positive MAGE-A3 expression (28.60%) in all study subjects. Most subjects had MAGE-A3 expression in the negative category (71.40%). From the results of the examination, we found 7.14% of subjects who had MAGE-A3 expression with positive category and BAL cytology in the category of malignant cells. Most subjects had MAGE-A3 expression with negative category and BAL cytology in the category of no malignant cells (71.43%).

The samples in this study were all patients with NSCLC lung tumor who underwent bronchoscopy according to inclusion and exclusion criteria in Dr. Soetomo General Hospital Surabaya. The average age of the subjects undergoing bronchoscopy examination and MAGE-A3 RT PCR was 60.07 ± 10.42 years old. The number did not significantly differ between male and female. The subjects had diverse occupations, but most of them were farmers (35.70%), followed by housewives (28.61%). Most subjects were not active smokers and those who smoke had been smokers for 20-50 years. Most histopathologic results are adenocarcinoma lung (85.74%), squamous cell carcinoma lung (7.13%) and large cell ca (7.13%).

**Table 2. Correlation between MAGE-A3 expression and BAL cytology**

<table>
<thead>
<tr>
<th>MAGE-A3</th>
<th>BAL (n = 14)</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a malignant cell</td>
<td>no malignant cells</td>
</tr>
<tr>
<td>positive</td>
<td>7.14</td>
<td>21.43</td>
</tr>
<tr>
<td>negative</td>
<td>0.00</td>
<td>71.43</td>
</tr>
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</table>

* fisher exact test, unit percentage

The result of statistical analysis shows no significant correlation between MAGE-A3 expression with cytology of BAL (p = 0.286)

**Discussion**

BAL is a standard diagnostic procedure in patients including lung cancer patients, especially in peripheral tumor with a diagnostic value ranging from 33-69%. Cytology preparation with BAL is based on exfoliation cells of malignant lesions of the bronchial epithelium. This BAL fluid component shows inflammatory conditions as well as immune status of the lower airway and alveoli. Adequate cytological dose conditions depend on several factors: the rate of difference in cancer growth, cytological morphology preservation, and operator ability in fluid retention lavage of the bronchi 11. The results of BAL cytology in this study shows preparation with malignant cells, adenocarcinoma. There was no malignant cells found in the other thirteen preparations. This might be due to the number of cancer cells that are expected to collapse with the liquid bronchoalveolar lavage in a few number or none 12.

PCR RT examination is one of the methods used to distinguish different MAGE proteins. With this technique, transcripts of MAGE mRNA activation, expression and aberration are found in many types of cancer, one of which is lung cancer. Some literature mentioned that MAGE expression in lung cancer is 30-50%. The results of RT PCR examination for liquid bronchoalveolar lavage (BAL) shows 4 preparations (28.60%) expressed by positive MAGE-A3 of the 14 examined preparations. This may be caused by the number of cancer cells that fall along with the fluid of bronchoalveolar lavage, in a little amount or none, as well as other MAGE-A types that were not examined in this study. Other MAGE-A which are also expressed in primary lung cancer are MAGE A1, A4, A6 and A10. The type of cancer cells can also be a consideration on the cause of MAGE-A3 expression in this study from adenocarcinoma, large cell ca, squamous cell ca and some adenocarcinoma which indicate a positive MAGE-A3 expression. MAGE-A3 is more often expressed in
NSCLC, especially squamous cell ca. In the preparation study with squamous cell ca there is a preparation with negative MAGE A3 expression results\textsuperscript{13}. However, the result can not be considered inappropriate since there was only 1 preparation with squamous cell ca. More number of subjects with squamous cell ca is required to find out if MAGE A3 expressed more in the cell type of squamous cell ca compared to adenocarcinoma\textsuperscript{14}.

The correlation between MAGE-A3 expression and BAL cytology result showed no significant result. This may be due to the positively expressed MAGE-A3 along with BAL cytology where there was only 1 preparation with malignant cells, whereas the other BAL cytology in the preparation with positive MAGE-A3 expression showed no malignant cells.\textsuperscript{15} Detection of peripheral lung cancer with MAGE A1-6 on bronchial rinse preparations shows that MAGE A1-6 had higher peripheral lung cancer detection capability than conventional cytological examination. MAGE detection on sputum and BAL of lung cancer patients showed that from 23 patients with lung cancer examined by their BAL liquid there were 18 patients (78%) with positive MAGE expression, whereas the cytology result from 23 lung cancer patients showed only 8 patients (35%). BAL fluid cytology preparation and BAL fluid preparation for RT PCR were examined, but on cytological preparation there was only 1 preparation indicating cancer cell, i.e. adenocarcinoma\textsuperscript{2}.

Examination of MAGE expression on the case of lung malignancy was able to detect such malignancy. 70-85% of MAGE expressed in lung cancer tissue, tumor tissue preparations during surgery of patients with early-stage lung cancer. MAGE expressed positively in 59% cytology sputum and 70% in BAL fluid. Percutaneous needle aspiration biopsy was performed on patients suspected of lung cancer and we found MAGE sensitivity of 83% and specificity of 58%.

**Conclusion**

The results of BAL cytology examination showed that no malignant cells the majority of subjects were in the category of no malignant cells. The results of MAGE A3 RT PCR fluid expression examination showed that most of them were in the negative category. In this study there was no significant correlation between MAGE-A3 expression and BAL cytology result.

**Ethical Clearance:** This research involves participants in the process using a questionnaire that was accordant with the ethical research principle based on the regulation of research ethic regulation. The present study was carried out in accordance with the research principles. This study implemented the basic principle ethics of respect, beneficence, non-maleficence, and justice.

**Conflict of Interest:** The authors have not found any conflict of interest related to this research so far.

**Source of Funding:** All of the cost and fees related with this research are paid by the authors only with no sponsorship nor external funds.

**References**


Effect of Bosu Pilates on Primary Dysmenorrhea in Adolescent Girls

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Abstract

Background: Dysmenorrhea is a painful menstruation or a cramp labor like pain in the lower abdomen that radiates to upper abdomen, waist and thighs and sometimes accompanied by systemic symptoms like nausea, vomiting, diarrhea and dizziness. Dysmenorrhea can be treated by various pharmacological and non-pharmacological remedies. Incidence rate of dysmenorrhea among Indian girls is found to be 79.67%. It complicates the lives among adolescents females and affect the quality of life of many women. Pilates exercises is safe, non invasive treatment modality to relief pain of primary dysmenorrhea.

Objectives: To study the effect of Bosu Pilates on primary dysmenorrhea in adolescent girls.

Method: Ethical clearance was obtained from the institute committee. 25 women were screen from KARAD aged between 18 to 30 years. They were selected according to the inclusion and exclusion criteria. They were allowed to fill the form given which included the scale which rated the working, location, intensity, days of pain in dysmenorrhea. According to which conclusion was made.

Result: After analyzing the data there was significant effect of exercises like stretching and core strengthening exercises performed on bosu ball which helped to reduce pain status in primary dysmenorrheal adolescent girls seen on Wong Baker scale (p=<0.0001).

Conclusion: The study concludes that there was significant effect of bosu pilates on primary dysmenorrhea in adolescent girls.

Key Words: primary dysmenorrhea, adolescent girls, bosu pilates, menstruation pain.

Introduction

Dysmenorrhea is a painful menstruation or a cramp labor like pain in the lower abdomen that radiates to upper abdomen, waist and thighs and sometimes accompanied by systemic symptoms like nausea, vomiting, diarrhea and dizziness.¹ This disease affects 60% of females with systemic symptoms 60% suffer from headache, 80% from low back pain, nausea and vomiting ,50% from diarrhea ,30% from irritability and 45% dynamic.

Dysmenorrhea can be classified into 2 types:

1)primary dysmenorrhea
2)secondary dysmenorrhea

Primary dysmenorrhea: it’s a cramping like pain with menstruation and physical examination is completely normal.²

Physiological cause for dysmenorrhea include excessive production of uterine prostaglandin and overall production of vasopressin, a hormone which stimulate uterine muscular contraction. Primary dysmenorrhea usually presents during adolescence within 3years of menarche. It is usually for symptoms to start within the first 6months after menarche.³

Affected women experience sharp, intermittent spasms of pain, usually centered in the suprapubic area. Pain may have radiated to back of legs or lower back. Systemic symptoms of nausea, vomiting, diarrhea,
fatigue, fever, headache or light headedness are fairly common. Pain usually develops within hrs. to start of menstruation and peaks as the flow becomes heaviest during the first day or two days of the cycle.4

The pain experienced by adolescents with dysmenorrhea can be very disabling and consequently affect the person’s mood. Previous studies have demonstrated that young population affected by primary dysmenorrhea often is work or school because of discomfort which in turn can have an important social and economic impact.5 An excess of prostaglandins is liberated during menstruation. It is thought that this may be the cause of incapacitating pain, as an excess of prostaglandins may lead to excessive uterine contractions which, in turn, may result in hypoxia and ischemia of the uterus, and lead to the typical pain.6 Non-steroidal anti-inflammatory drugs (NSAIDs) are the pharmacological therapy of choice for patients with PD. However, most patients with PD do not seek medical help, or that of other health professionals.7 Instead, they self-medicate or seek alternative solutions. The continued use of such self-medication without a medical prescription or, at the very least, a professional assessment, can also result in secondary effects.8,9

Conventional therapy:

There has been a major demand for new, complementary or integrative therapies which coexist alongside traditional medicine.

Several studies have proven that different complementary therapies, such as yoga, acupressure or herbal medicine, among others, may contribute towards an improvement in the symptoms of PD and therefore lead to improvements in overall quality of life. 10

As Bosu Pilates is a technique aiming at working, strength, stretching, maintaining physiological body curves with abdomen as the strength center which constantly works during all Pilates exercise on bosu ball, which will help to reduce pain with challenge your stability, balance and core strength. Pilates can manage primary dysmenorrhea through stretching and core strengthening exercise.11,12

JOSEPH HUMBERTUS PILATES has developed a series of exercises based on progressive movements the body is able to make currently called PILATES. Pilates is beneficial for all ages and ability level because it’s a low impact exercise program aiming at core strength, stability, flexibility, and correct alignment of the pelvic and spine.11,12

Each exercise is designed to target a specific muscle and breathing pattern are used to effectively cue the abdominals to support each movement.

Its advantage circulation stimulation and fitness improvement which help to prevent any injuries and provide pain relief with best results.11,12

The effect of Pilates was due to increase in the blood flow and metabolism of uterus during exercises on bosu ball which may affect in reduction in symptoms. Pilates decreases this sympathetic activity and release endorphins substances produced by brain and that raise the pain threshold so symptoms are reduced. Contracted ligamentous is band in abdominal region were causative factor for physical compression of nerve pathway and their irritation and so stretching exercises increase core stability improve the symptoms of dysmenorrhea.11,12

Aim

To find the effect of Bosu Pilates on primary dysmenorrhea in adolescent girls.

Objectives

To determine the effect of Bosu Pilates on primary dysmenorrhea in adolescent girls.

Need For Study

Primary dysmenorrhea is common in adolescent girls as it can be treated by various pharmacological and non-pharmacology remedies. As Bosu Pilates is a technique aiming at working, strength, stretching, maintaining physiological body curves with abdomen as the strength center which constantly works during all Pilates exercise on bosu ball, which will help to reduce pain with challenge your stability, balance and core strength. Pilates can manage primary dysmenorrhea through stretching and core strengthening exercise. The effect of Pilates was due to increase in the blood flow and metabolism of uterus during exercises on bosu ball which may affect in reduction in symptoms. Pilates decreases this sympathetic activity and release endorphins substances produced by brain and that raise the pain threshold so symptoms are reduced. Contracted ligamentous is band in abdominal region were causative factor for physical compression of nerve pathway and their irritation and so stretching exercises increase core
stability improve the symptoms of dysmenorrhea.

Materials and Methods

Materials Required

- Pen
- Bosu ball
- Mat

Methodology

Type of study: - experimental study
Study design: - analytic
Type of Sampling Method: - Simple random method
Sample size: -
\[ n = \frac{4pq}{l^2} \]
\[ 4 \times 50 \times 50 / 20^2 \]
\[ 10000 / 400 = 25 \]

25 women to be screened from KARAD.

Study duration: - 3 months
Place of study: - Karad.

Inclusion Criteria

- Females in age group of 18 - 30 years diagnosed with primary dysmenorrhea.
- Irregular menstrual cycle.

Exclusion Criteria

- Females on medications.
- Performing other type of physical activity like swimming, runner etc.
- Other gynecology disorders.

Outcome Measures

- Wang-Baker scale

Procedure

The study was conducted among rural areas in and around Karad.

The targeted population was medical students; the focus of study was to find the effect of Bosu Pilates on primary dysmenorrhea in adolescent girls.

Subjects were selected for study according to inclusion and exclusion criteria

They were evaluated by using self-made evaluation from diagnosing dysmenorrhea. Selected subjects were trained to see the effect of the structured protocol exercises. Treatment duration was 3 times a day for 3 alternative days in a week for 3 weeks and menstrual days were skipped.

Exercises given were:

- One leg rocker:
  
  Sit up tall on your sit bone and extend your legs out about shoulder width apart. Inhale and stretch out through the side of your back. Exhale and reach forward about shoulder height or touch your toes curling your spine. Release and continue.

- Side leg lift:
  
  Lie down on your right side on bosu ball. Body should be in straight line with legs extended and feet stacked on top of each other. Place your arm straight on the ball or bend your elbows. Place your left hand out front for extra support and let it rest on your leg or hip. As you inhale gently raise your left off the lower leg. Stop raising your leg when you feel muscle flex in your lower back or oblique. Inhale and lower the leg back down to meet the right leg start your feet again.

- Supine leg lift:
  
  Lie supine on the bosu ball with hand resting aside. Bend one knee and ground foot on to the mat. Extend the alternate leg long. This is the start position. Lift the extended leg until it aligns with the bend knee and return back to the start position.

- Opposite arm leg reverse crunches
  
  Lie supine on the bosu ball. Place your hand behind your head supporting your neck with your fingers. Have your abs tucked in and the small of your back pushed against the floor. Lift your knee towards the chest while lifting your shoulder blade off the floor. Rotate to the right bring the left elbow towards the right knee as you extend the other leg in to the air.
Hold period: 1 to 2 sec, inhale and return to the starting position. At one time: 10 repetitions of each exercise was performed. The interpretation of the study was done on the basis of comparing pre and post assessment of Wong Baker scale. Thus statistical analysis was done.

**Statistics**

<table>
<thead>
<tr>
<th>PARAMETERS</th>
<th>PRE</th>
<th>POST</th>
<th>t value</th>
<th>p value</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wong-Baker Scale</td>
<td>7.84±2.95</td>
<td>5±2.55</td>
<td>11.08</td>
<td>&lt;0.0001</td>
<td>ES</td>
</tr>
</tbody>
</table>

**Table: parameter values**

Above table and graph shows pre and post comparison within the group. Post treatment there was significant improvement noted.

**Discussion**

This study “effect of bosu pilates on primary dysmenorrhea in adolescent girls” was conducted to see the effect of bosu pilates which included one leg rocker, side leg lift, supine leg lift, heel beats, single leg kicks, opposite arm leg reverse cruches in reducing pain symptom among primary dysmenorrhea girls. Primary dysmenorrhea is common in adolescent girls as it can be treated by various pharmacological and non-pharmacology remedies. As Bosu Pilates is a technique aiming at working, Strength, stretching, maintaining physiological body curves with abdomen as the strength center which constantly works during all Pilates exercise on bosu ball, which will help to reduce pain with challenge your stability and balance and core strength and can manage primary dysmenorrhea through stretching and core strengthening exercise. According to the gate control theory by stimulating large diameter sensory nerve fibres in a dermatomal segment, a blockage or gating affect is established at the dorsal horn level of the spinal cord inhibiting the transmission of pain related impulses. In this way the pain is reduced. So training on bosu ball will help to reduce pain of dysmenorrhea in adolescent girls.

The objectives were to determine the effect of Bosu Pilates on primary dysmenorrhea in adolescent girls. The study was conducted with 25 subjects. Subjects were selected according to the inclusion and exclusion criteria. Inclusion criteria was aged between 18 – 30 yrs, females and with Irregular menstrual cycle. Exclusion criteria was Females on medications and females Performing other type of physical activity like swimming, runner etc and Other gynecology disorders. Prior consent was taken from them. Pre assessment was taken for working ability, location, intensity, days of pain prior intervening with the treatment. The interventions were carried out for 3 days per week for 3 weeks along with 3 times per day.
The outcome measure was Wong-Baker Scale. After 3 weeks post assessment was taken. The results of this study indicate there was significant affect on pain status among primary dysmenorrhea girls. This was confirmed using statistical analysis by using ‘Paired t- test’. Pre and post training there was significant improvement noted with structured protocol for pain status among primary dysmenorrhea (p=<0.0001) on Wong-Baker scale.

Earlier studies was concluded by Shahr jerdy S, Hosseini RS (2012) titled “effect of stretching exercises on primary dysmenorrhea in adolescent girls”. They concluded that there was significant effect of stretching exercises on pain in intensity and duration and reduce the amount of pain killer used in primary dysmenorrhea in adolescent girls.

“A case series on effect of yoga on quality of life and flexibility in menopausal women” was conducted by Mastrangelo MA, Galantino ML, House L (2007) and concluded the effect of pilates was due to increase the blood flow and metabolism of uterus during exercises on bosu ball which made effective in reduction of symptoms. Pilates decreases this sympathetic activity and release androphin substances produced by brain and that raise the pain threshold so symptom are reduced.

“To compare the effect of stretching and core stability exercise in primary dysmenorrhea in young females” by Kaur S, Kaur P, SS, et al (2014) and concluded that contracted ligament is band in abdominal region was causative factor for physical of nerve pathway and their irritation so stretching exercise can increase core stability and improve the symptoms of dysmenorrhea.

RESULT

After analyzing the data there was significant effect of exercises like stretching and core strengthening exercises performed on bosu ball which helped to reduce pain status in primary dysmenorrheal adolescent girls seen on Wong Baker scale (p=<0.0001).

CONCLUSION

The study concludes that there was significant effect of bosu pilates on primary dysmenorrhea in adolescent girls.

CONFLICT OF INTEREST

The author declares that there is no conflict of interest concerning the content of the present study.

Source of Funding: This study is self-funded.

Ethical Clearance: The study was approved by the institutional ethics committee of Krishna Institute of medical sciences deemed to be university, Karad.

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Two-Years Corneal Collagen Cross-Linking Outcomes in Patients with Keratoconus

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and Infectious Ophthalmologic Research Center, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

Abstract

Aims: This study aimed to report refractive, topographic, and tomographic outcomes of 2-years corneal collagen cross-linking in patients with progressive keratoconus.

Materials and Method: This prospective study was conducted on 76 eyes of 40 patients with progressive keratoconus and a corneal thickness of at least 400μm. After the baseline examination, cross-linking was performed using riboflavin 0.1% and ultraviolet irradiation (370 nm, 3 mW/cm2) for 30 min. Uncorrected visual acuity (UCVA), best spectacle-corrected visual acuity (BSCVA), manifest refraction spherical equivalent (MRSE), cylinder, keratometric readings, and corneal thickness were evaluated at baseline, 6, 12, and 24 months after corneal collagen cross-linking.

Results: Results showed that at a 24-month follow-up, mean BSCVA and UCV A had significant improvements. Changes in MRSE and cylinder were not significant during the two years of follow-up. At a 2-years follow-up, the mean values of minimum keratometry, maximum keratometry, and average keratometry decreased significantly to 0.75, 0.97, and 0.52 D, respectively, compared to their baseline values. Anterior best fit sphere (BFS) also had significant difference at 24-month follow-up compared to base line evaluation. The central corneal thickness decreased significantly up to 38 μ after 2 years.

Conclusion: Corneal collagen cross-linking is an effective treatment to stop the progression of keratoconus as shown by reduced keratometry and improved vision.

Keywords: Collagen cross-linking, Keratoconus, Ultraviolet, Riboflavin

Introduction

Keratoconus is a bilateral, asymmetric corneal degeneration that causes steepening and thinning of the central corneal tissue, resulting in irregular astigmatism, myopic progression, and reduction of visual acuity.1

The incidence of this disease is usually at the age of puberty,2,3,4 and accordingly, it has a significant effect on the quality of life.5,6 The main causes of biomechanically weak corneas include alteration in the corneal collagen cross-links and higher pepsin activity than normal.7

Chemical and immune histochemical studies of the corneal tissue in normal and keratoconic eyes determined the increased expression of proteolytic and lysosomal enzymes,8,9 reduced the diameter of collagen fibers,8 and decreased the level of protease inhibitors concentration.10 Common options for vision correction in keratoconic eyes include spectacles, rigid contact lens, intra corneal ring segments, and lamellar keratoplasty. Keratoconus is the most frequent cause of keratoplasty in the past three decades.11

Collagen cross-linking was first introduced for the treatment of keratoconic eyes by Wollensak et al. in 2003.12 The purpose of treatment was not only the improvement of visual acuity but also the prevention of the underlying pathophysiologic mechanism of the
disease. The method of corneal collagen cross-linking (CXL) uses the photosensitizer riboflavin 0.1% and after corneal saturation exposes cornea to ultraviolet-A (UV-A) for approximately 30 min. The riboflavin creates new covalent bonds between collagen fibers and improves the biomechanical strength of the cornea.

Confocal microscopy studies indicate the apoptosis of keratocytes in anterior and intermediate corneal stroma and a gradual repopulation of the keratocytes. The stiffening effect of riboflavin and UV-A is approximately 200-300μ in the anterior cornea. Due to the possible increase of corneal endothelial cell damage, CXL is recommended in eyes with a corneal thickness of >400 μm. This study aimed to report refractive, topographic, and tomographic outcomes of 2-years corneal collagen cross-linking patients with progressive keratoconus.

Materials and Method

Population

This prospective, nonrandomized, single-center study was conducted on 76 eyes of 40 patients with progressive keratoconus and a corneal thickness of at least 400 μ. The patients referred to the cornea service of the Ophthalmology Department of Apadana Hospital, Ahvaz, Iran, from December 2013 to December 2015.

Patients who had an increase in maximum keratometry (K-max) of 1.00 diopter in one year, loss of more than 2 lines of best corrected visual acuity, and the need for new contact lens fitting more than once in 2 years were enrolled. The exclusion criteria included corneal thickness less than 400μ at the thinnest point, previous ocular surgery, herpetic keratitis, concomitant autoimmune diseases, pregnancy, breastfeeding, severe dry eye, central and paracentral opacities, and patient with poor compliance. All procedures were performed by a single surgeon.

Preoperative evaluation

Patients with hard lenses and those with soft lenses were required to stop wearing their contact lens at least 3 weeks and 3 days before the preoperative eye examination, respectively. Afterwards, all patients were subjected to the evaluation of slit-lamp and fundus examinations, as well as UCVA, BSCVA, manifest refraction, corneal topography, and corneal pachymetry.

Collagen Cross-linking procedure

The CXL was performed under sterile conditions in the surgical room. After topical anesthesia (tetracaine 0.5% ophthalmic drops, Sina Darou Co, Iran), the central 9mm corneal epithelium was abraded with a surgical blade. Riboflavin with dextran(0.1% riboflavin, 20% dextran, MedioCROSS D-Simovision BVBA, Belgium) was applied in the eye every 3 min for half an hour before the irradiation, which led to the sufficient saturation of the stroma. Using a slit-lamp with the blue filter, the surgeon ensured the penetration of riboflavin into the anterior chamber. Next, an 8 mm diameter of central cornea was exposed to UV-A light at a wavelength light (370 nm; PESCHKE CXL System, System Vision, Germany), and an irradiance of 3 mw/cm2 for 30 min. During the procedure, the riboflavin solution was instilled every 3 min.

Post operation regime

After the surgery, Levofloxacin Ophthalmic Solution 0.5% (Sina darou Co, Iran) was instilled and a soft bandage contact lens was applied until the completion of re-epithelialization. Topical Levofloxacin 0.5% and betamethasone 0.1% (Sina Darou Co, Iran) were administered 4 times a day for a weak. The patients were examined on 3 and 7 days after the surgery to evaluate epithelial healing. Follow-up examinations were performed at baseline, 6, 12, and 24 months after the procedure. At each visit, slit-lamp examination, cyclo refraction, BSCVA, UCVA, corneal topography (TMS-4N, TOMEY, USA) and pachymetry(Bausch & Lomb Orbscan2, Bausch & Lomb Co, USA) recorded.

Statistical Analysis

The analysis of data was performed using SPSS software 20 through paired t-test and repeated-measure ANOVA. P-value less than 0.05 was considered statistically significant.

Results

The mean age of patients was 22±3.54 and 42% of the participants were male.

Vision results

The UCVA and BSCVA data are summarized in Figure1 and Table1. The visual acuity results were reported through the logarithm of the minimum angle of resolution. The baseline mean values of UCVA and
BSCVA were 0.47±0.01 and 0.16±0.14 Log MAR, respectively. During the 24-month follow-up, post-CXL mean values of UCVA and BSCVA were 0.41±0.01 and 0.12±0.10 log MAR, respectively. These improvements in UCVA and BSCVA were statistically significant (P<0.05) after 2-years follow-up, compared to those at the baseline.

![Graph showing changes in visual acuity based on the logarithm of the minimum angle of resolution during the 2-year follow-up.](image)

**Figure 1. Changes in visual acuity based on the logarithm of the minimum angle of resolution during the 2-year follow-up**

BSCVA: best spectacle-corrected visual acuity

UCVA: uncorrected visual acuity.

**Table 1. Average measures during the 2-year follow-up**

<table>
<thead>
<tr>
<th>Indexes</th>
<th>Pre CXL</th>
<th>6 months</th>
<th>12 months</th>
<th>24 months</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>UCVA (logMAR)</td>
<td>0.47±0.01</td>
<td>0.39±0.01</td>
<td>0.41±0.1</td>
<td>0.41±0.01</td>
<td>0.035</td>
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<tr>
<td>BSCVA (logMAR)</td>
<td>0.16±0.14</td>
<td>0.11±0.07</td>
<td>0.1±0.08</td>
<td>0.12±0.10</td>
<td>0.001</td>
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<tr>
<td>MRSE (D)</td>
<td>-5.39±4.23</td>
<td>-4.86±3.65</td>
<td>-5.18±3.86</td>
<td>-5.22±3.80</td>
<td>0.426</td>
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<tr>
<td>Cylinder (D)</td>
<td>-4.95±2.67</td>
<td>-4.78±2.78</td>
<td>-4.74±2.62</td>
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<tr>
<td>Max-K (D)</td>
<td>51.1±4.94</td>
<td>50.36±4.66</td>
<td>50.4±4.80</td>
<td>50.13±4.8</td>
<td>0.000</td>
</tr>
<tr>
<td>Avg-K (D)</td>
<td>49.34±4.55</td>
<td>48.57±4.31</td>
<td>48.8±4.33</td>
<td>48.82±4.40</td>
<td>0.049</td>
</tr>
<tr>
<td>Min-K (D)</td>
<td>46.56±3.69</td>
<td>46.18±3.58</td>
<td>46.01±3.54</td>
<td>45.81±3.52</td>
<td>0.000</td>
</tr>
<tr>
<td>CCT (µm)</td>
<td>454±39</td>
<td>367±74</td>
<td>411±71</td>
<td>416±70</td>
<td>0.000</td>
</tr>
<tr>
<td>Anterior BFS (mm)</td>
<td>7.65±0.32</td>
<td>7.68±0.3</td>
<td>7.69±0.29</td>
<td>7.69±0.31</td>
<td>0.006</td>
</tr>
<tr>
<td>Posterior BFS (mm)</td>
<td>6.19±0.41</td>
<td>6.02±0.3</td>
<td>6.09±0.29</td>
<td>6.15±0.31</td>
<td>0.459</td>
</tr>
<tr>
<td>Irregularity5 mm (D)</td>
<td>5.42±2.08</td>
<td>5.26±2.04</td>
<td>4.92±1.88</td>
<td>4.75±1.78</td>
<td>0.000</td>
</tr>
<tr>
<td>Irregularity3 mm (D)</td>
<td>5.11±2.15</td>
<td>4.96±2.08</td>
<td>4.60±1.52</td>
<td>4.48±1.53</td>
<td>0.001</td>
</tr>
</tbody>
</table>

UCVA: uncorrected visual acuity; BSCVA: best spectacle-corrected visual acuity; logMAR: logarithm of the minimum angle of resolution; MRSE: manifest refraction spherical equivalent; K-max: maximum keratometry; K-min: minimum keratometry; K-avg: average keratometry; D: diopter; CCT: central corneal thickness; BFS: Best fit sphere.
Refractive results

The baseline mean values of MRSE and cylinder were 5.39±4.23 and 4.95±2.67 D, respectively. There was a mean reduction in MRSE of 0.17 D and a mean reduction in a cylinder of 0.28 D at the 2-year follow-up compared to baseline. There was no significant difference, 24 months after the procedure. The mean value of MRSE improved significantly 6 months after CXL and remained unchanged during 12 and 24 months (Figure 2 and Table 1).

![Figure 2: Changes in (A) keratometric reading based on diopter, (B) cylinder and manifest refraction spherical equivalent based on diopter, (C) central corneal thickness based on micrometer. K-Min: minimum keratometry, K-avg: Average keratometry, K-max: maximum keratometry, MRSE: manifest refraction spherical equivalent, CCT: central corneal thickness.](image)

Topographic results

Table 1 also shows the comparison of the difference between pre-CXL and post-CXL keratometric values, anterior and posterior best fit sphere (BFS) and changes in the irregularity of 3mm and 5mm zones of the cornea at baseline (Figure C), 6 months, 12 months and 24 months respectively. The improvements in the irregularity of 3mm and 5mm zones of the cornea were statistically significant throughout the entire postoperative period, compared to preoperative levels (P<0.05). The baseline mean values of the irregularity in 3mm and 5mm zones of the cornea were 5.11±2.15 and 5.42±2.08, respectively, which decreased to 4.48±1.53 and 4.75±1.78, respectively, after 24 months (Table 1).

The baseline mean values of the surface regularity index, irregular astigmatism index, surface asymmetry index, and keratoconus prediction index and post-CXL follow up (6, 12 and 24 months) changes in these indices were not statistically significant (Table 2).
Table 2. Changes in Klyce Indices

<table>
<thead>
<tr>
<th></th>
<th>Pre CXL</th>
<th>6 months</th>
<th>12 months</th>
<th>24 months</th>
<th>p-value</th>
</tr>
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<tbody>
<tr>
<td>Surface regularity index</td>
<td>0.92±0.47</td>
<td>0.90±0.50</td>
<td>0.84±0.51</td>
<td>0.89±0.50</td>
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<td>Surface asymmetry index</td>
<td>2.33±1.28</td>
<td>2.29±1.41</td>
<td>2.10±1.21</td>
<td>2.21±1.29</td>
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<tr>
<td>Irregular astigmatism index</td>
<td>0.43±0.09</td>
<td>0.43±0.10</td>
<td>0.44±0.10</td>
<td>0.49±0.27</td>
<td>0.107</td>
</tr>
<tr>
<td>Keratoconus prediction indexa</td>
<td>0.39±0.11</td>
<td>0.37±0.11</td>
<td>0.38±0.10</td>
<td>0.38±0.12</td>
<td>0.107</td>
</tr>
<tr>
<td>Keratoconus index</td>
<td>0.72±0.30</td>
<td>0.70±0.28</td>
<td>0.71±0.01</td>
<td>0.70±0.28</td>
<td>0.687</td>
</tr>
</tbody>
</table>

*A significant relationship between CCT, ANT DIFF, POST DIFF, K max, K min, K avg, Irregularity zone 3, and Irregularity zone 5 indexes was observed 24 months after operation (P<0.05)*

Table 3. Correlation of post-operative indices

<table>
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<tr>
<th></th>
<th>BCVA</th>
<th>ANT DIFF</th>
<th>POST DIFF</th>
<th>cct</th>
<th>Min.K</th>
<th>Max.K</th>
<th>Irreg. zone.3</th>
<th>Irreg. zone.5</th>
<th>Avg.K</th>
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<tr>
<td>UCVA (logMAR)</td>
<td></td>
<td></td>
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<td>-0.04</td>
<td>0.148</td>
<td>0.01</td>
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<td>-0.11</td>
<td>-0.19</td>
<td>-0.151</td>
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<td>P-value</td>
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<td>0.201</td>
<td>0.87</td>
<td>0.75</td>
<td>0.66</td>
<td>0.33</td>
<td>0.08</td>
<td>0.192</td>
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<td>BSCVA (logMAR)</td>
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<td>-0.15</td>
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<td>0.11</td>
<td>0.102</td>
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<td>P-value</td>
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<td>0.33</td>
<td>0.38</td>
<td>0.78</td>
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<td>0.33</td>
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<tr>
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<td>-0.05</td>
<td>1</td>
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<td>0.29</td>
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<td>-0.43</td>
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<td>0.01</td>
<td>&lt;0.005</td>
<td>&lt;0.005</td>
<td>0.001</td>
<td>&lt;0.005</td>
<td>&lt;0.005</td>
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<tr>
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<tr>
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<td>1</td>
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<td>&lt;0.005</td>
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<td>&lt;0.005</td>
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<tr>
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<td>0.001</td>
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<tr>
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<td>&lt;0.005</td>
<td>&lt;0.005</td>
<td>&lt;0.005</td>
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<td>&lt;0.005</td>
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<tr>
<td>K-max (D)</td>
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<tr>
<td>P-value</td>
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<td>&lt;0.005</td>
<td>0.001</td>
<td>&lt;0.005</td>
<td>&lt;0.005</td>
<td>&lt;0.005</td>
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<tr>
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<tr>
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<td>-0.361</td>
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</tr>
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<td>P-value</td>
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<td>&lt;0.005</td>
<td>&lt;0.005</td>
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<td>Correlation</td>
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<td>&lt;0.005</td>
<td>0.003</td>
<td>&lt;0.005</td>
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<td>&lt;0.005</td>
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<tr>
<td>K-avg(D)</td>
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<td></td>
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</tr>
<tr>
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<td>-0.43</td>
<td>-0.39</td>
<td>-0.34</td>
<td>0.81</td>
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<td>&lt;0.005</td>
<td>0.002</td>
<td>&lt;0.005</td>
<td>&lt;0.005</td>
<td>&lt;0.005</td>
<td>&lt;0.005</td>
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Discussion

In recent years, CXL has developed as an effective therapeutic modality for the treatment of corneal ectasia and progressive keratoconus. In the past few years, a small number of studies on animals demonstrated that collagen cross-linking significantly increased corneal rigidity in porcine and rabbits cornea. On the basis of the results, BSCVA and UCVA improved significantly to 0.04 log MAR and 0.06 log MAR, respectively, at the 2-years follow-up compared to baseline. Similar results were also reported by Hashemiet al. at a 2-year follow-up. The findings of the previous studies were indicative of a significant reduction in the manifest refraction spherical equivalent and cylinder after cross-linking. The results of the current study during the 24-month follow-up revealed that there was no significant change in the manifest refraction spherical equivalent and cylinder in the course of time. The same results were observed by Viswanathan with a mean of 14.38±9 months. Likewise, in two longitudinal studies performed by Hashemi and El-raggal, there was no significant change in the cylinder five years after the CXL. The reduced values of the corneal curvature and the K-max were important parameters indicating the success of collagen cross-linking. Previous studies have shown a decrease in max-K after the CXL.

Conclusion

According to present study, collagen cross-linking can be combine with procedures, such as rigid contact lenses, ring segments, and surface customized refractive surgery to correct vision partially in keratoconic eyes. In a long term, this therapeutic treatment seems to be much safer compared to corneal grafting with many complications, including infection, glaucoma, cataract, and graft rejection. In addition, cross-linking is a cost-effective and minimally invasive option to the treatment of ectasia compared keratoplasty. No major complications were observed in the current study.

Conflict of Interest: Authors have declared that no competing interests exist.

Ethical Clearance: Ethical clearance taken from ethical committee of Ahvaz Jundishapur University of Medical Sciences.

Funding: None

References

11. Maeno A, Naor J, Lee HM, Hunter WS, Rootman DS. Three decades of corneal transplantation:


Detection of Emerging Infectious Disease in *Cynopterus brachyotis* and *Rhinolopus boorneensis* as Reservoirs of Zoonotic Diseases in Indonesia

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Abstract

Bats are mammal species that have the highest diversity. During the last two decades, various types of infections caused by microorganisms have again become epidemic in many countries, this phenomenon is known as a new infectious disease that arises and re-emerges or Re-Emerging Infectious Diseases (EID/REID). The purpose of this study was to identify EID in bats in the karst area of South Malang. The research method of bat sampling is conducted in the karst area of South Malang, bats are identified by species, taken by blood, prepared and carried out by NGS (next generation sequencing). From the results of the research conducted, obtained 2 types of bats namely fruit-eating bats (*Chiroptera brachyotis*) and insect bats (*Rhinolopus boorneensis*). From the results of the NGS, we get specific viruses and bacteria in bats. The conclusion of this research is that bat in South Malang Karst has potential as a carrier of EID and zoonotic disease.

Keywords: bat, emerging infectious disease, South Malang karst, zoonotic diseases

Introduction

Bats or known as *Chiroptera* have order-level taxon namely Kingdom *Animalia*, Phylum *Chordata*, Mammalian Class, and Superordo *Laurasiatheria*. Bats or Chiroptera are divided into two sub-orders, namely Micro Chiroptera which are generally insectivorous or known as insect-eating bats and Mega Chiroptera which are generally frugivorous or known as fruit-eating bats[1]. In general, bats live in a colony but some live solitary[2,3]. In the world there are 18 families, 192 genera and more than 977 species of bats[4]. In Indonesia, there are 8 families and 72 species of members of the Suborder Megachiroptera and 133 species of members of the Micro Chiroptera Sub-order that more than 50% live in caves[3,5].

Bats carry many diseases that can infect humans, most of which are viruses. In Asia, the Nipah virus, SARS-corona virus, Ebola Reston virus, and the lyssa virus, some are zoonotic viruses that have very high fatality rates, for example 40-80% of humans infected with the Nipah virus have died. Bats infected by the Nipah virus are around 10-30% in each colony, showing signs of previous Nipah infection, and the virus can be excreted through infected bats’ saliva and urine. Research results on bats also found that Lyssa virus (a rabies-related virus) was excreted in saliva, transmitted by bite, and found in bats from Thailand. In addition, evidence of the Ebola Reston virus has been found in bats from the Philippines and Bangladesh, Corona virus related to SARS has also been found in Rhinophid and other bats in China to the rest of the world and many other viruses that have recently been found in bats, but the effect is unknown yet on human health[6]. The purpose of this study was to identify EID in bats in the karst area of South Malang, Indonesia.
Materials and Methods

GPS Garmin 64s SEA, Bat trap, Hanet to catch bats, Caliper, Scalpel blades, DSLR Camera Nikkon D3000, Flakon Bottle, as a preservation place for Syring, Calico bags, Canoe drums, Storage boxes, Formalin 10%, Alcohol 70%, chloroform, for bat anesthesia, DNA and RNA extraction reagents, PCR reagents, NGS (Next Generation Sequencing).

Sample Preparation

The study was conducted in the karst area of South Malang and the Integrated Lab of UIN Sunan Ampel Surabaya, Indonesia. The research period is 6 months from May 2019. 200 microliters of the original sample stored at -70 °C were thawed three times and then centrifuged for 10 minutes. OmniCleave Endonuclease (250U; Madison Epicenter Distributor, WI USA, OC7850K) was added to the supernatant and added 2.5 mM MgCl2, incubated for 1 hour at 37 °C. The genome was extracted from the sample using NucliSENS easy-MAG.

Preparation of NGS

Agilent RNA 6000 Nano Kit (Life Technologies, Waldbronn, Germany) was used to evaluate the total quality of RNA. RNA concentrations were measured using the BR Assay (Life Technologies) Qubit RNA kit. NGS data were processed for NGS sample preparation using the Stranded RNA-Seq Kits SMART (Clontech, Takara Bio Company, CA, USA), Construction for Transcriptom Analysis on the Illumina Platform. The Agilent 2100 Bioanalyzer DNA kit (Life Technologies, Waldbronn, Germany) is used to measure and control the quality of DNA sequencing. NGS was performed using the MiSeq v2 kit (500 cycles) (Illumina, San Diego, CA). After automated clustering in MiSeq, sequencing is processed and genomic sequence readings are obtained.

Computational Analysis of NGS Data

Bowtie 2.032 software is used to filter readings that map the genomes of viruses and bacteria from bats. Data compared to data in the NCBI bank, confirmed again using blastn and blastx, with default parameters.

Results

Table 1. NGS results in the Chiroptera brachjatis.

<table>
<thead>
<tr>
<th>Name</th>
<th>Sequence Read</th>
<th>Total Number of Reads</th>
<th>Average Lenght</th>
<th>Standart Deviation Lenght</th>
<th>Average Quality Score</th>
<th>Standart Deviation Quality Score</th>
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<tbody>
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<td>12.300</td>
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<td>10.850</td>
<td>18.234</td>
<td>741</td>
<td>120.6</td>
<td>32.9 %</td>
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<tr>
<td>Rabies Virus</td>
<td>9950</td>
<td>11.923</td>
<td>534</td>
<td>135.7</td>
<td>32.8 %</td>
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<td>Japanese Encephalitis</td>
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<td>1500</td>
<td>124.6</td>
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<td>4765</td>
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<tr>
<td>Bat Reovirus</td>
<td>3,131</td>
<td>1,054,029</td>
<td>418</td>
<td>121.7</td>
<td>30.8 %</td>
<td>8.1</td>
</tr>
<tr>
<td>Lagos Bat Virus</td>
<td>10,609</td>
<td>11,930</td>
<td>458</td>
<td>109.8</td>
<td>31.9 %</td>
<td>8.5</td>
</tr>
<tr>
<td>Duvenhage Virus</td>
<td>9,875</td>
<td>11,976</td>
<td>479</td>
<td>107.6</td>
<td>32.9 %</td>
<td>7.6</td>
</tr>
<tr>
<td>E. coli</td>
<td>3,550,675</td>
<td>4,614,635</td>
<td>363</td>
<td>130.3</td>
<td>33.1 %</td>
<td>8.0</td>
</tr>
</tbody>
</table>
### Table 1. NGS results in the *Chiroptera brachjatis.*

<table>
<thead>
<tr>
<th>Name</th>
<th>Sequence Read</th>
<th>Total Number of Reads</th>
<th>Average Lenght</th>
<th>Standart Deviation Lenght</th>
<th>Average Quality Score</th>
<th>Standart Deviation Quality Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nipah Virus</td>
<td>12.300</td>
<td>18.236</td>
<td>251</td>
<td>125.9</td>
<td>33.8 %</td>
<td>8.6</td>
</tr>
<tr>
<td>Hendra Virus</td>
<td>10.850</td>
<td>18.234</td>
<td>741</td>
<td>120.6</td>
<td>32.9 %</td>
<td>8.4</td>
</tr>
<tr>
<td>Rabies Virus</td>
<td>9950</td>
<td>11.923</td>
<td>534</td>
<td>135.7</td>
<td>32.8 %</td>
<td>8.2</td>
</tr>
<tr>
<td>Bat Coronavirus</td>
<td>20.500</td>
<td>27.164</td>
<td>422</td>
<td>123.5</td>
<td>32.7 %</td>
<td>8.0</td>
</tr>
<tr>
<td>E. coli</td>
<td>3.550.675</td>
<td>4,614,635</td>
<td>363</td>
<td>130.3</td>
<td>33.1 %</td>
<td>8.0</td>
</tr>
<tr>
<td>Salmonella spp</td>
<td>4.200.350</td>
<td>4,857,450</td>
<td>3921</td>
<td>129.5</td>
<td>32.8 %</td>
<td>7.7</td>
</tr>
<tr>
<td>Enterobacter spp</td>
<td>4.100.550</td>
<td>4,278,063</td>
<td>1635</td>
<td>101.9</td>
<td>30.5 %</td>
<td>7.9</td>
</tr>
<tr>
<td>Klebsiella spp</td>
<td>4.900.345</td>
<td>5,231,007</td>
<td>1331</td>
<td>106.8</td>
<td>30.7 %</td>
<td>7.8</td>
</tr>
<tr>
<td>Serratia spp</td>
<td>5.150.355</td>
<td>5,241,455</td>
<td>1815</td>
<td>109.4</td>
<td>30.5 %</td>
<td>7.8</td>
</tr>
<tr>
<td>Citrobacter spp</td>
<td>287.689</td>
<td>296,175</td>
<td>1880</td>
<td>124.8</td>
<td>30.6 %</td>
<td>8.1</td>
</tr>
<tr>
<td>Pseudomonas spp</td>
<td>5.500.457</td>
<td>6,518,993</td>
<td>770</td>
<td>132.0</td>
<td>30.4 %</td>
<td>8.2</td>
</tr>
<tr>
<td>Clostridium septicum</td>
<td>3,175,876</td>
<td>3,266,706</td>
<td>1263</td>
<td>131.6</td>
<td>30.8 %</td>
<td>8.3</td>
</tr>
<tr>
<td>Micrococcus spp</td>
<td>3,450,235</td>
<td>3,862,811</td>
<td>1525</td>
<td>130.9</td>
<td>30.9 %</td>
<td>8.4</td>
</tr>
<tr>
<td>Staphylococcus spp</td>
<td>2,767.675</td>
<td>2,831,587</td>
<td>804</td>
<td>127.8</td>
<td>30.7 %</td>
<td>8.2</td>
</tr>
</tbody>
</table>

### Table 2. NGS results in *Rhinolopus boorneensis.*

<table>
<thead>
<tr>
<th>Name</th>
<th>Sequence Read</th>
<th>Total Number of Reads</th>
<th>Average Lenght</th>
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</table>

Lenght: bp (base pair)
Discussion

Bat identification refers to the identification key Payne et al. and Suyanto. The first thing to do is catch bats with mistnet, handnet and hanet. Catching this bat is done when the bat returns from foraging. Some of the bats that are caught will be used as samples and the next steps will be taken, while some will be released again after the species has been identified, especially endemic species[2,3]. Bats used as samples were anesthetized with chloroform in a calico bag until dead for 5 minutes (Suhardjono, 1999). Morphometry identification is done based on body measurements. From the results of the study found Chiroptera brachjatis fruit-eating bats and insect-eating bats Rhinolopus boorneensis[7].

Rhinolophus borneensis or prok-bruk Kalimantan has rather small body characteristics with forearm length of 40-44 mm and there is antitragus. Species of the Rhinolophus Genus are characterized by complex nasal leaves, posterior nasal leaves which are triangular in shape, whereas intermediate and anterior nasal leaves are horseshoe shaped[3]. Rhinolophus borneensis has grayish brown hair color. Morphometric measurements on captured samples included Weight (6 gr), Head and Body (48.16 mm), Tail (24.11 mm), Ear (20.62 mm), Hind Foot (5.08 mm), Forearm (39.96 mm), Tibia (15.76 mm). Rhinolophus borneensis is distributed in Java, Kalimantan, Sarawak and Sabah, and Asia (Suyanto, 2001). IUCN status Rhinolophus borneensis is a bat species recorded at IUCN with a Least Concern or LC status[8]. In this study also used NGS (next generation sequencing) in analyzing the EID of the two bat species found. The results of the NGS analysis on Chiroptera brachjatis and Rhinolopus boorneensis can be seen in Tables 1 and 2.

Emerging and Re-Emerging Infectious Diseases (EID/REID) are complex interactions between disease-causing agents, humans, and the environment. In addition, genetic and biological factors from disease-causing agents and humans as hosts are the main contributors to the emergence of EID/REID. Social, political and economic factors also have a role in the process of the emergence of infectious diseases, more specifically, these factors are behavior, demographic status, technological and industrial progress, economic development, land use, trade, travel between countries, and declining quality of the public health system[9,10].

Some countries, especially in the Southeast Asia region are countries that are vulnerable to the emergence of EID/REID[6]. About 60-75% of EID/REID cases are zoonoses, which are diseases transmitted from animals to humans, both livestock or wild animals[5]. Wild animals are considered as a reservoir of several pathogens that were previously unknown to cause infection in humans, one of the wild animals that has the potential to cause zoonosis is bats[11].

Genetic analysis shows that the bat’s immune system evolved along with its flight ability. Bat body temperature when flying can reach temperatures of 41 °C, the same as experienced by mammals when a fever, which is 38-41 °C, conversely, hibernation in bats that live in areas with four seasons has been shown to inhibit the replication of pathogenic viruses and cause some viruses to participate in hibernation. Changes in body temperature is a natural selection of viruses that are thought to increase the diversity of viruses in bats[12]. This results in the co-evolution of viruses and bats which results in the virus being able to survive over a wide temperature range[13,14].

Based on several research results that the number of zoonotic viruses found per bat species is more than rodent[15]. Diversity of virus species in bats is also related to the tendency of different bat species to live in the same ecosystem (sympatry) thereby increasing interaction with each other[11,15]. More than 248 new viruses have been successfully isolated or detected in bats over the past 10 years and some of these viruses have considerable zoonotic potential. In addition, based on the results of research conducted by Sendow et al. found that Henipavirus in bats on Java and Sumatra[16], Wada et al. found gammaherpesvirus in fruit bats[17], Sasaki et al. found alphaherpesviruses[18]. In this study, found more than one virus in both bats using NGS (Next Generation Sequencing) (table 1 and table 2).

In the study also found bacteria in both bats namely Chiroptera brachjatis fruit-eating bats and Rhinolopus Boorneensis-eating bats. Bacteria found in Chiroptera brachjatis fruit-eating bats and insect-eating bats Rhinolopus boorneensis are more than 1 species and have properties that can be transmitted to humans (E. coli, Salmonella)[19]. Based on the results of research conducted by Aminollah found E. coli and Salmonella bacteria in the Pongangan cave in Gresik. Another data published that Sterptobacillus, Streptococcus, Staphylococcus, Shigella and Bacillus in the Menoreh Karst region. The results of this study, the detection of EID in bats in karst of South Malang, Indonesia is
a new discovery and is a source of information both in Indonesia and in the world.

**Conclusion**

In sum, *Chiroptera brachjatis* fruit-eating bats and insect-eating bats *Rhinolopus boorneensis* were obtained. In addition, EID is obtained in bats, so it needs further study, especially on EID in non-bat host (humans and other animals).

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Source of Funding:** This study funded by the Ministry of Religion of the Republic of Indonesia.

**Acknowledgement:** We thank Arif Nur Muhammad Ansori for editing the manuscript.

**Ethical Approval:** This study was approved by the Animal Care and Use Committee, Faculty of Veterinary Medicine, Universitas Airlangga, Surabaya, Indonesia.

**References**


Knowledge and Awareness of Bio-Medical Waste Management among Senior Undergraduate and Specialist Dental Students: Cross-Sectional Study

Mohammad Ahmed Qasim Aljunaid1, Aryo Dwipo Kusumo2

1Graduate Student of Dental Health Science, Department Dental Public Health, Faculty of Dental Medicine, Universitas Airlangga, 2Department of Dental Public Health, Faculty of Dental Medicine, Universitas Airlangga

Abstract

Background: There has been a universal rising in knowledge and awareness regarding the bio-medical waste management and the hazards related to it. Purpose: aims to determine and assess the knowledge as well as the awareness towards the management of bio-medical waste among senior undergraduate and specialist dental students in the Faculty of Dental Medicine, Universitas Airlangga, Surabaya - Indonesia. Materials and Method: The study was carried out by using a close-ended survey. The Population of the study consisted of 743 students. However, the taken sample was based on Lemeshow method that includes 130 senior undergraduate and 62 specialist students making a total of 192 participants. Statistical analysis was performed via descriptive statistical analysis and chi-square test. Results: This survey was shown that around 192 questionnaires were distributed of which (86%) returned and analyzed. It was seen that (58.7%) of senior undergraduate students and (87.1%) of specialist students, were having average knowledge of bio-medical waste management system in dental clinics. According to the Chi-square test analysis, it was seen there is a statistically significant P-value (p≤0.05). Conclusion: Within the limitation of this study, we affirmed that there is a good level of knowledge and awareness of bio-medical waste management. In this present study, highly needed for continuing education and training programs to be conducted in dental teaching curricula in the Faculty of Dental Medicine.

Keywords: awareness, dental students, knowledge, waste management.

Introduction

Nowadays, Bio-medical waste is a universal issue1. "Bio-medical waste means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or research activities pertaining thereto or in the production or testing of biological or in health camps"2. Healthcare waste (HCW) was defined by World Health Organization (WHO) as the materials that are not treated and discarded from activities health care on human being or animal, having the possibility of transmitting contagious agents to human3.

With the development of science and research work domain4,5, the amount of waste, with bio-hazardous products, is also rising at an alarming rate, leading to instability of the ecosystem6,7. To reduce health problems and eradicate potential risks to people’s health, the services of health care undoubtedly produce a massive amount of bio-medical waste, which creates elevated potentials for infection and injury8. Inconvenient and inappropriate treatment of this waste could have critical public health consequences and a noticeable impact on environment9,10. Due to the random disposal of health-care waste, it has been felt globally in concern about the bio-medical waste in conjunction with the high rise of fatal infections like Hepatitis-B, Acquired Immunodeficiency syndrome (AIDS). As it is not
managed properly, it has been taken into consideration that most of it is hazardous even though only 10–20% is contagious in nature11.

Waste generated in clinics and hospitals of dental teaching is analogous to that generated by other hospitals which include a large component of general waste and a junior proportion of hazardous waste12. Several hazardous wastes that are utilized in dental clinics and hospitals including used disposable items, sharps, mercury-containing wastes, contagious waste (gauze, blood-soaked cotton, etc.), lead-containing waste and chemical waste (spent film fixers, developers, and disinfectants) cause damage to the environment if not managed appropriately. The source of these metals come from the procedures of amalgam filling restoration or removal and the disposal of x-ray fixer solution13. Dental wastes that are generated from several clinical procedures have the possibility to be thrown into the sewage, whilst the majority of the solid type wastes are disposed into landfills and the local trashes sites without the recycling process and separation process14.

The bio-medical and health care waste management is not the same as household and industrial waste management15. Bio-medical waste management is one of the present considerable defies due to the relation to the health of human being16. Knowledge deficiency of information about bio-medical waste will lead the dental specialists to contribute to several environmental deteriorations17. Knowledge is the fundamental criterion that lets for one to allocate between the correct and incorrect, it is a combination of perception, trials, practice, acumen, and skills18,19. The aim of this present study was been to determine and asses the knowledge and awareness of senior undergraduate (BDS) and specialist dental students (SPDS) about bio-medical waste management.

**Materials and Methods**

**Study Type:** This study is cross-sectional20. It is based on a questionnaire survey performed at the Faculty of Dental Medicine, Universitas Airlangga, Surabaya - Indonesia. The self-administered questionnaire was a modification of the work done by Sanjeev et al 18 and Chopra et al21. These questions were categorized into two parts, the first category contained questions on personal and occupational data comprising gender, age, educational qualification, and experience. The second category consists of 13 close-ended questions regarding the assessment of the knowledge, awareness concerning bio-medical waste management. **Sample Size:** The population of our study consisted of 743 students in the Faculty of Dental Medicine, however, the taken sample was based on the Lemeshow method that includes 130 BDS and 62 SPDS making a total of 192 participants in the sample. **Sampling Methodology:** The selection of the sample was according to random sampling techniques (simple random). **Study Duration:** October 2019. The respondents were given sufficient time to fill in the questionnaire and return it on the same day or the next day. **Data Analysis:** All answered questionnaires were coded and descriptively analyzed. The results were displayed in forms of numbers and then each question results were analyzed in percentage forms by the chi-square test also utilized.

**Results**

A total of 192 questionnaires were distributed of which (86%) were received back. The details of participants based on the gender, age, educational qualification and years of experience are shown in. Out of the 166 students, (72.9%) were females and (27.1%) males. The findings show that most of the individuals were undergoing their undergraduate in dental medicine (62.7%) while the specialists were (37.3%). Most of the subjects fell under the group of age 19-23 years (51.2 %). Most of the subjects had 0-3 years of working experience (61.4%).

It had been seen many of the participants (69.3%) had good knowledge about the bio-medical waste management system in dental clinics. P-value were (0.004), (0.000) and (0.010) had been noticed statistically significant in this question within the age, educational qualification, and experience respectively but the gender variable had not statistically significant (0.490). The highest percentage from the whole statistical analysis has been related to the knowledge of important health care waste generation, hazards, and legislations with (98.8%) had been noticed, however, the P-values are not statistically significant in all variables, for instance (94.6%) of the students want the bio-medical waste management to be practiced in faculty dental clinic. However, P-value statistically significant in educational qualification variables (0.025). Also (94.6%) of dental students who need more to know about the management of bio-medical waste, nonetheless P-value had not statistically significant in all variables.
Regarding the answers of the participants, it was found that (94%) of the students know about the importance of dental charts in the dental clinic that helps in guiding disposal of the bio-medical waste, however, the P-value is not significant in all variables. It was noted that regarding the method of how bio-medical waste should be disposed of, (90.4%) of the students’ answers were to be delivered to a bio-medical waste management agency, while (7.8) was throw directly into garbage bins and (1.8%) don’t have the knowledge for waste disposal method. whereas the P-value is not statistically significant in all variables. Nearly, (71.7%) of the students had been aware of color-coding segregation of health care waste. However, the P-value (0.007), (0.050) was statistically significant in the educational qualification, and experience respectively.

P-values are not statistically significant in all variables in related questions that the inappropriate waste disposal can cause health hazards with the result that about (94.6%) of participants knew about it. The related question of the student’s knowledge of the use of puncture-proof Container to discard the needle is available with a percentage of (89.8%). The level of knowledge about destroying the needle before being collected was assessed concerning the qualification of participants, has been shown that (51.6%) in SPDS and (39.4%) in BDS, with no statistically significant P-value in all variable. The lowest percentage was related to the awareness of dental wastewater treatment in a dental clinic (40.4%). Whereas the p-value has been statistically significant (0.038), (0.000) and (0.000) in gender, age, and educational qualification respectively.

Discussion

This study aims to assess the knowledge and awareness of the management of bio-medical waste for BDS and SPDS (Faculty of Dental Medicine, University of Airlangga, Indonesia). The strength of this study is that it made use of a self-administered questionnaire, the coordination pattern of the formatting of the questions, the content of the questions, the analysis, and the response rate. The questions had been designed as close-ended, making the study questions very simple to analyze with quicker response rate, in order to avoid any recall bias. This was assisted by plenty of participants who were covered in a short time.

Interestingly, the participants involved in this study displayed that the knowledge and awareness about the management of bio-medical waste were satisfying. To illustrate, a high percentage of BDS and SPDS (69.3%) had the knowledge and awareness of bio-medical waste management. This supports Saini et al result which showed that the overall awareness of students was high as per the knowledge regarding information of the biomedical waste management and awareness toward its practice.

This study revealed that (92.8%) of the students were aware of regarding the method of segregation into different categories as compared to Charania and Ingle, Bansal et al, Bansal et al, and Sudhir, in which (89%), (86%), and (85%), of dental practitioners, respectively were also aware of the categories of the bio-medical waste.

In the present study, about (71.7%) of the students were aware of the correct color-coding segregation of health care waste. Similar studies conducted by Charania and Ingle, Bansal et al, and Sudhir, in which about (72%) of their participants had information about the color-coding systems.

It is a remarkable observation that about (98.8%) of the participants know the important health care waste generation, hazards, and legislation. These findings are similar to the study done by Pichika et al in which the percentage was (88.8%).

It was reassuring to note that in the present study about (94.6%) of the participants felt that they need the dental college to regulate lectures and a continuing education program to improve existent knowledge about the management of bio-medical waste. A similar study to this one regarded the need for methods to improve the existing knowledge of bio-medical waste management, observation of (97%) of the respondents felt the compulsory need for separate classes and lectures.

It is a significant challenge for deciding the utilization of the resource including methods for diminishing the waste at source and recycling. Consequently, the researchers recommend that there should be a suitable training and concentrated training programs concerning the awareness and practices of waste dumping for the whole staff of the health care and students (BDS and SPDS) with continuous supervision at regular periods. It is mandatory that subjects or lessons about Bio-medical waste management in the curriculum of the faculty of dental medicine should be applied.
Conclusion

Our study revealed that the knowledge and awareness level of bio-medical waste management was good and adequate among senior undergraduate and specialist dental students in the Faculty of Dental Medicine, Universitas Airlangga, Surabaya - Indonesia. Furthermore, the study indicated that there is a need for creating more awareness among dental students regarding bio-medical waste management. Thus, the topic should compulsorily be made as a part of the dental undergraduate curriculum in faculty.

Conflict of Interest: None

Source of Funding: Self-Funding

Ethical Clearance: Approved

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Correlating Schizophrenia with DRD3 Ser9Gly or HTR2 Receptor Gene Variants by using RFLP Method

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Abstract

Genetic polymorphism in many candidates associated with psychiatric disorder and Schizophrenia (SCZ). The current research is directed to see if the polymorphisms of Dopamine Receptor D3 (DRD3) or of the 5-Hydroxytryptamine Type 2A (HTR2A) genes is related to SCZ patients. From those admitted to Al-Rasheed Hospital, fifty patients with SCZ (half of them are males and the other half are females), in addition to control group (25 healthy individuals) were included in this study. Blood samples from each individual in both, healthy and control groups were collected, DNA was extracted. Specific primers for exon1 and another for exon 2 have been used to amplify the genes of DRD3 receptor and HTR2A. The data generated in this study indicated significant positive association between T102C polymorphism of HTR2A A1804G transition and DRD3 gene sequence, that resulted in the substitution of Ser9Gly amino acid Iraqi SCZ patients.

Keywords: T102C polymorphism; HTR2A; RFLP

Introduction

Schizophrenia (SCZ) is considered as a neuropsychiatric disease with different etiologies like genetics (1). It is linked to different risks during the life of the patients of about 1% (3). There are a lot of studies took in consideration the SCZ in the members of families, between twins and even those had been adopted, and the results confirmed that the is a strong relation between disease incidence and genetic factors (3).

It has been found that each of the silent mutation T-102C (Ser34Ser) and the A-206G transition (which brought about the substitution of a Ser9Gly amino-acid in the N-terminal of the receptor extracellular domain) in the genetic sequences of 5-HTR2A receptors and of DRD3 receptors; respectively, are genetic polymorphisms used to establish possibility of the psychological disorders (4,5). Furthermore, other studies approved that there is a strong relation between schizophrenia and the variants of C-102 in the polymorphism of the T-102C (6) and also with the increment of homozygosity of the DRD3 polymorphism alleles (7). Oppositely, some studied found there is no correlation, specifically with the Transition of DRD3 Ser9Gly (1,8). The current research examined the connection of HTR2 gene with the genetic susceptibility to SCZ, and the relationship between DRD3 receptor gene and phenotypic expression of SCZ disorder within the Iraqi people.

Material and Results

Sample collection

Approximately 50 blood samples were collected from SCZ patients of both genders (25 female and 25 males with mean age 50.3-39.1) hospitalized at Al-Rasheed Teaching Hospital in Baghdad province by the consultant medical staff. Fifty healthy individuals (25 male and 25 females with mean age 48.2-36.6 years) donated blood samples which served as control group. Samples were preserved at 4C◦ till working on it.

Genes amplification

From the whole blood, genomic DNA has been extracted by using (QIAamp DNA Blood Mini Kit, USA), the DNA concentration and purification were conducted by using the NanoDrop ND-1000 spectrophotometer (NanoDrop Technology) in the Medical and Molecular Biotechnology dept,
Biotechnology Research Center, Al-Nahrain University, Baghdad, Iraq. Conventional PCR was used to amplify the region including the polymorphisms. By using both of F 5’-GCTCTATCTCAACTCTCACA-3’ primer and R 5’-AAGTCTACTCACCCTCGAGTA-3’ primer, a 463 bp fragment of DRD3 exon 1 were amplified according to (Spurlock et al. 1998) (7). A 342 bp fragment of HTR2 of from exon 1, which carries the T102C polymorphic site was amplified with F 5’-TCTGCTACAAGTTCTGGCTT-3’, R 5’-CTGCAGCTTTTTCTCTAGGG-3’ according to (Williams et al. 1996) (6). The PCR amplification master mix /1 reaction was performed by using 25µl volume containing DNA (1.5 µl) ; Taq PCR PreMix (5 µl) (Bioneer, Korea); 10 Pmol (1µl) from each one the primers used; then, by using nuclease free water, the volume was completed to 25 µl. Regarding thermal cycling conditions of DRD3 and HTR2A, they were done as: Denaturation (94 °C ; 7min), then, 35 cycles of secondary denaturation (94 °C ; 35sec), annealing (62°C ; 45sec) & (54°C ; 35sec) respectively & (72 °C ; 35sec) with the final extension (72°C ; 10 min) by using the thermal Cycler (Gene Amp, PCR system 9700; Applied Biosystem).

After that, polyacrylamide gel (30%) were used for the electrophoreses of PCR products, the gel was already stained by using Ethidium bromide to enable the visualization of the product clearly under UV light.

**RFLP analysis**

The genotypes for the T-102C; and also, for A-206G transitions in the genes of 5-HTR2A and DRD3 receptor have been assessed according to (Spurlock et al.1998) (7). The digestion reactions were done (50 µl) volume; (5 µl of 10X CutSmart , 5 µl of 200 ng/ µl amplicons 342 bp, or 463 bp, 0.5 µl of 2.5 U MspI or MscI) (New England Biolabs, USA), incubated for (4hr : 37C). The MscI able to recognize, then to cleave the TGG↓CCA in blunt ends. MspI able to cleave the C↓CGG and leaves 5’ protruding ends. Cleavage of the PCR amplicon (342 bp) by MspI gives a (342 bp) product of the wild-type allele T/T (T-102), & (126 bp & 216 bp) products for the mutant allele T/C (C-102). The MscI digestion resulted in three different fragments size (47bp, 111bp & 305bp) as the products of the wild-type allele A/A Alanine to Alanine (A-206), and four different fragments size (47bp, 99bp, 111bp & 206bp) for mutant allele A/G (G-206). The polymorphisms of the different digested fragments of the DNA have been separated by using a 10% poly acrylamide and 2% Agarose stained with Ethidium Bromide.

Statistical analysis of the present study was achieved by using different statistical programs, X2 test was applied. The tests were considered significant when P value <0.01, compare between control and patients’ group in % of mutation, Chi-square –X2 test was also used to compare the significance between percentage as shown in table 1.

**Results and Discussion**

The HTR2 receptor gene polymorphism results in both healthy and schizophrenia patients

In recent study the conventional PCR amplification resulted two amplicons indicated the DRD3 partial gene (342 bp) and HTR2 (463bp) amplicons gene of SCZ patients, bands are shown in figure 1.

**Figure (1): Electrophoresis (agarose gel) of DRD3 amplicon (342 bp) and HTR2 (463bp) amplicon of SCZ.** The electrophoretic separation of different bands was achieved on a 2% agarose gel (2 h., 5 V / cm, 1X TBE) and then examined by U.V. light after been stained with ethidium bromide. Lane: 1 (M : 100 bp ladder), Lan1 and 2 DRD3 bands sized (342bp). Lan3, and 4 HTR2 bands sized (463bp)

The HTR2 receptor partial gene 342 bp fragments found on the chromosome-13 (long arm) was cleaved with MspI restriction endonuclease enzyme (RE) for detecting the frequencies of allele and their genotypes according to the transition of T-102C in the gene of HTR2. Out of 25 healthy participant 20 (80%) were showed two bands sized (216,126)bp respectively, indicated CC wild type homozygote genotype, and 5(20%) were showed three bands were sized (342,216,126)bp respectively,
indicated TC heterozygote genotype with significant relation between disorder and the allele T-102 (P<0.0001, odds ratio (OR 1.561>1), also the mutant TT genotypes was absent. (Figure 2) in compared with schizophrenia patient’s genotypes according to the digestion result that showed one band sized 342 indicated higher percentage of TT genotypes 36 (72%), in comparison with TC heterozygote genotype 14(28%) that showed three bands (342,216,126) with OR 1.175 and (P<0.0001) less than the control OR considered significant. The allele frequency of C allele in healthy group (0.90) is higher than it in SCZ patient (0.14) but the allele frequency of T allele was found to be more frequent in group of patients (0.86) compare to healthy group (0.10). Table 1 shows the percentages of the frequencies of genotype and alleles of the polymorphism of HTR2 (T-102C).

![Image: Polyacrylamide gel electrophoresis for amplified HTR2A gene (342 bp) of SCZ.](image)

**Figure (2):** Polyacrylamide gel electrophoresis for amplified HTR2A gene (342 bp) of SCZ. The electrophoretic separation of different bands was achieved on 10% gel (3 h., 5 V / cm, 1 X TBE) and then examined by U.V. light after been stained with ethidium bromide.

Lane: 1,7,9,(342,216,26 bp fragment represent T-102/C-102 Heterozygote); Lane: 3, 11, (216,and 126 bp fragment represent C - 102 / C - 102 mutant-type homozygote ); Lane : 2, 4, 5, 10(342 bp fragment represent T - 102 / T - 102 wild-type homozygote), Lane M (100bp ladder).

**Table1. Genotype and allele frequency of HTR gene between the patients’ group and control group.**

<table>
<thead>
<tr>
<th>Genotype of HTR</th>
<th>Control No.</th>
<th>Control %</th>
<th>Patients No.</th>
<th>Patients %</th>
<th>Chi-Square (P-value)</th>
<th>O.R</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC (Two band) 216, 126</td>
<td>20</td>
<td>80.00</td>
<td>0</td>
<td>0.00</td>
<td>13.055 ** (0.0001)</td>
<td>1.561</td>
</tr>
<tr>
<td>TC (three band), 342,216,126</td>
<td>5</td>
<td>20.00</td>
<td>14</td>
<td>28.00</td>
<td>4.007 * (0.0493)</td>
<td>0.628</td>
</tr>
<tr>
<td>TT (One band) 342</td>
<td>0</td>
<td>0.00</td>
<td>36</td>
<td>72.00</td>
<td>12.792 ** (0.0001)</td>
<td>1.175</td>
</tr>
<tr>
<td>Total No.</td>
<td>25</td>
<td>100%</td>
<td>50</td>
<td>100%</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Chi-Square (P-value)</td>
<td>13.627 ** (0.0001)</td>
<td></td>
<td>11.944 ** (0.0001)</td>
<td></td>
<td>----</td>
<td></td>
</tr>
</tbody>
</table>

**Allele frequency**

<table>
<thead>
<tr>
<th>Allele</th>
<th>Control</th>
<th>Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.90</td>
<td>0.14</td>
</tr>
<tr>
<td>T</td>
<td>0.10</td>
<td>0.86</td>
</tr>
</tbody>
</table>

* (P<0.05), ** (P<0.01).
The results of polymorphism of the gene of DRD3 receptor gene in both healthy & schizophrenia patients

The nucleotide polymorphism (SNP) A-206G transition, which appears in the exon1 of DRD3 receptor was detected by cleaving site of MscI RE of the 463bp amplicon Figure 3. The allele frequency and genotypes are shown in Table 2. It has been observed that; all the control group individuals; 25 subjects (100%), showed three bands (305, 111, 47) bp indicated the AA wild homozygote genotype in comparison with zero of the patient subjects (0%), in addition to that, the appearance of four band sized (206,111,99,47)bp in 35 patient subjects (70%) refers to the higher percentage of the G-206/G-206 mutant-type homozygote, as well as, A-206G genotype heterozygotes in 15 patient subjects (30%). So, all the current findings refer to that there is a strong statically significant association between the G-206/G-206 genotype and schizophrenia (P>0.0001, OR 1.326). Higher A allele frequency in healthy group in compare with patient subjects 0.15 .on the other hand the G allele frequency are rising 0.85 in patients subject study, all data shown in Table 2.

Table 2. Genotype and allele frequency of DRD3 gene between the patients’ group and control group.

<table>
<thead>
<tr>
<th>Genotype of DRD3</th>
<th>Control</th>
<th>Patients</th>
<th>Chi-Square (P-value)</th>
<th>O.R.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>AA (Three band)</td>
<td>305,111,47</td>
<td>25</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>AG (Five band), 305,206,111,99,47</td>
<td>0</td>
<td>0.00</td>
<td>15</td>
<td>30.00</td>
</tr>
<tr>
<td>GG (Four band) 206,111,99,47</td>
<td>0</td>
<td>0.00</td>
<td>35</td>
<td>70.00</td>
</tr>
<tr>
<td>Total No.</td>
<td>25</td>
<td>100%</td>
<td>50</td>
<td>100%</td>
</tr>
<tr>
<td>Chi-Square (P-value)</td>
<td>15.00 ** (0.0001)</td>
<td>11.250 ** (0.0001)</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>Allele frequency</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A</td>
<td>1 (100%)</td>
<td>0.15</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>0 (0.00%)</td>
<td>0.85</td>
<td>---</td>
<td></td>
</tr>
</tbody>
</table>

** (P<0.01).

Figure (3): Polyacrylamide gel electrophoresis pattern for amplified DRD3 gene (463 bp) digested with MscI of SCZ. The electrophoretic separation of different bands was achieved on 30% gel (2 h., 5 V / cm, 1 X TBE) and then examined by U.V. light after been stained with ethidium bromide. Lane: 1 and 5 (DNA band pattern of an A – 206 / G - 206 heterozygote); Lane: 2 (DNA band pattern of an A – 206 / A -206 wild - type homozygote). Lane 4 (DNA band pattern of a G - 206 / G-206 mutant - type homozygote).
Discussion

Many candidate genes in the brain, may interact with each other from the monoaminergic pathway, and are related to schizophrenia. Genus, et al., (2009) referred to that 1438 A / G, 102 T / C & His 452 Tyr polymorphisms of the gene of the HTR 2 A were liked with a different cellular change, which resulted in SCZ (9).

The present study indicated a significant positive connection between T102C polymorphism of HTR2A & SCZ. Zhang et al, (2004) found that there was a T102C polymorphism of HTR2A in two Chinese SCZ patients; but no significant positive correlation with all SCZ (10). Polymorphisms of genes of HTR2C and HTR2A are thought to be the result of abnormal metabolism in patients with SCZ who were on olanzapine or clozapine (9). Baritaki, et al, (2004) found that the T102C transitions in the 5HTR2A had a significant association with SCZ, and appeared as an increment in the risk of SCZ for those who carry the T102 allele (11). Najwa Sh, (2014) assumed that the T102C polymorphism of HTR2A is not significantly correlated with SCZ in Iraq patients (12). The findings of the current study conduct that the 1804 A/G SNP of the DRD3 gene is strongly related to the genetic tendency of the incidence SCZ in Iraqi people.

There are conflicting views in the DRD3 Ser9Gly polymorphism gene relationship with the appearance of symptoms of SCZ, as it has been shown in the case control studies which have been gave different results. Some of these results revealed a significant relation between them. Shi et al. (2008) conclude that the DRD3 gene was not nominated to the top seven candidates for predisposition to SCZ (13). Other population study in East Asian (Chinese, Japanese and Korean) suggested that the polymorphism of DRD3 Ser9Gly is not connected to SCZ and Tardive dyskinesia (14). Also, Tee et al. (2001) conducted in their results that DRD3 Ser9Gly polymorphisms and Catechol-O-methyl transferase (COMT) (rs16565) have no significant connection between with SCZ in Malays (15). Furthermore, a study done on Han Chinese population concluded that the polymorphism has no effects on the genetic involvement for SCZ but refers to that variation may play role in exacerbating the symptoms SCZ (16).

Moreover, Talkowski et al.(2006) suggested that the DRD3 Ser9Gly polymorphism has a significant relation with SCZ (17), and Siaz,(2010) reveled that the genetic interaction of SLC6A3 with DRD3, and the DRD2 genetic variations are definitely connected with SCZ (18). Also, Shaikh with his colleagues studied 133 schizophrenic Caucasians patients, and they found that the Ser9/Ser genotype is joined significantly with the allele of DRD3 Ser9 (19).

Conclusion

The present data indicated significant positive association between T102C polymorphism of HTR2A A1804G transition and the genetic sequence of the DRD3, which in turn causes the substitution of a Ser9Gly amino acid in the Iraqi SCZ patients.

Ethical Clearance: A lot of thanks and gratitude to Dr. Mushtaq Talib, a psychologist at Al-Rashad Hospital / Baghdad, for his support for our project and for helping us to obtain the original approvals from the hospital and to collect samples from schizophrenic patients.

Source of Funding: Self.

Conflict of Interest: Nil.

References


Attitude and Knowledge of Medical Negligence among General Population of Ahmedabad City, Gujarat

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¹Associate Professor, ²Assistant Professor, ³Tutor, ⁴Professor & Head, Department of Forensic Medicine, Dr. M. K Shah Medical College & Research Centre, Ahmedabad Gujarat, India

Abstract

This study explored perspective and knowledge on medical negligence among the general population of Ahmedabad city. 500 people voluntarily participated in the study. People were asked to respond anonymously to a structured questionnaire which dealt with their views, perception, knowledge and attitude towards medical negligence. In the present study, out of 500 participants, 69% were male, 58.4% were aged between 21-40 years & 56.8% were graduate & postgraduate. The majority of people have quite good knowledge about medical negligence, but less knowledge about legal proceedings regarding medical negligence. Educational seminar and awareness programs on this subject may be helpful for them and for medical professionals also.

Keywords: Attitude, Knowledge, Medical Negligence, General Population

Introduction

In ancient Egypt, practice of medicine was subject to legal restrictions. The right to practice was restricted to people of a certain class, and all doctors had to learn and follow the precepts laid down by their predecessors. Obviously, this was the way to protect the public from quackery. If unsatisfactory results followed a course of treatment that had departed from the orthodox, the responsible doctor would be liable to punishment, which could be very harsh. Similar legal restrictions on medical practice were also found in other early civilizations such as Babylon and India¹.

Medical Negligence is defined as absence of reasonable care and skill or willful negligence of medical practitioner in the treatment of patient which cause bodily injury or death of patient². Nowadays allegation & litigation regarding medical negligence is increasing day by day. Many of them may be false allegation & some may be true. But in current situation, attacks on doctors & hospitals in Indian cities are on the increase because of lack of knowledge about medical negligence & its legal proceedings. As medicine is a noble profession but there is also growing anxiety both within the medical profession and in the community regarding increasing trends of complaints and lawsuits against doctors³. Present study was carried out to know perspective and knowledge on medical negligence among general population.

Material and Method

This cross-sectional study was done from January to June 2019. General Population of Ahmedabad City was selected for the study. The study was done with the help of questionnaires specially prepared in vernacular language i.e. Gujarati for the study. After obtaining written informed consent of interested people, questionnaires were given to participants & responses were made anonymously. Incomplete filled forms were excluded from the study. After obtaining the response, some facts of medical negligence regarding the given questionnaires were acquainted and tried to clear their doubts, if any. A total of 500 people participated successfully in the study. The questionnaires consisted of perspective and knowledge of the Medical negligence and legal proceeding regarding medical negligence.
Observation

Questionnaires were distributed among a small group of the general population and obtained a response. A total of 500 respondents successfully participated & included in the study. The data regarding socio demographic characteristics of respondents, response to questionnaire about medical negligence & its legal proceedings obtained, was tabulated and analyzed. The data obtained are shown in Tables 1,2 &3.

**Table 1: Socio-demographic characteristics of the respondents**

<table>
<thead>
<tr>
<th>Characteristics of the Respondents</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>345</td>
<td>69%</td>
</tr>
<tr>
<td>Female</td>
<td>155</td>
<td>31%</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21-30</td>
<td>124</td>
<td>24.8%</td>
</tr>
<tr>
<td>31-40</td>
<td>168</td>
<td>33.6%</td>
</tr>
<tr>
<td>40-50</td>
<td>135</td>
<td>27%</td>
</tr>
<tr>
<td>50-60</td>
<td>69</td>
<td>13.8%</td>
</tr>
<tr>
<td>60-70</td>
<td>4</td>
<td>0.8%</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below 10 standard</td>
<td>71</td>
<td>14.2%</td>
</tr>
<tr>
<td>Higher Secondary</td>
<td>145</td>
<td>29%</td>
</tr>
<tr>
<td>Graduate</td>
<td>189</td>
<td>37.8%</td>
</tr>
<tr>
<td>Post Graduate</td>
<td>95</td>
<td>19%</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laborer</td>
<td>48</td>
<td>9.6%</td>
</tr>
<tr>
<td>Farmers</td>
<td>72</td>
<td>14.4%</td>
</tr>
<tr>
<td>Housewife</td>
<td>53</td>
<td>10.6%</td>
</tr>
<tr>
<td>Students</td>
<td>70</td>
<td>14%</td>
</tr>
<tr>
<td>Employee</td>
<td>157</td>
<td>31.4%</td>
</tr>
<tr>
<td>Business</td>
<td>86</td>
<td>17.2%</td>
</tr>
<tr>
<td>Lawyer</td>
<td>14</td>
<td>2.8%</td>
</tr>
<tr>
<td>Sr No</td>
<td>Questions / Statements</td>
<td>Response In Numbers &amp; (%)</td>
</tr>
<tr>
<td>-------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------</td>
</tr>
<tr>
<td>1</td>
<td>Doctor can liable for Professional Negligence</td>
<td>SD: 0(0%) D: 0(0%) NS: 8(1.6%) A: 335(67%) SA: 157(31.4%)</td>
</tr>
<tr>
<td>2</td>
<td>Other Hospital Staff can liable for Negligence</td>
<td>SD: 38(7.6%) D: 150(30%) NS: 17(3.4%) A: 234(46.8%) SA: 61(12.2%)</td>
</tr>
<tr>
<td>3</td>
<td>Refusal to admit patient requiring urgent hospitalization is Negligence</td>
<td>SD: 14(2.8%) D: 21(4.2%) NS: 24(4.8%) A: 204(40.8%) SA: 237(47.4%)</td>
</tr>
<tr>
<td>4</td>
<td>Not ordering proper investigation according to sign &amp; symptoms is negligence</td>
<td>SD: 5(1%) D: 15(3%) NS: 31(6.2%) A: 258(51.6%) SA: 191(38.2%)</td>
</tr>
<tr>
<td>5</td>
<td>Performing any procedure &amp; Operation without inform consent is Negligence</td>
<td>SD: 17(3.4%) D: 28(5.6%) NS: 15(3%) A: 345(69%) SA: 95(19%)</td>
</tr>
<tr>
<td>6</td>
<td>Performing operation on wrong limb is negligence</td>
<td>SD: 0(0%) D: 0(0%) NS: 0(0%) A: 88(17.6%) SA: 412(82.4%)</td>
</tr>
<tr>
<td>7</td>
<td>Doctor do not provide another doctor to admitted patient during his absence is negligence</td>
<td>SD: 25(5%) D: 97(19.4%) NS: 33(6.6%) A: 214(42.8%) SA: 131(26.2%)</td>
</tr>
<tr>
<td>8</td>
<td>Give premature discharge is negligence</td>
<td>SD: 36(7.2%) D: 89(17.8%) NS: 18(3.6%) A: 246(49.2%) SA: 111(22.2%)</td>
</tr>
<tr>
<td>9</td>
<td>Failure to inform patient of the risk of refusal treatment &amp; Discharge against medical advice is negligence</td>
<td>SD: 25(5%) D: 78(15.6%) NS: 19(3.8%) A: 250(50%) SA: 128(25.6%)</td>
</tr>
<tr>
<td>10</td>
<td>If disease is not cured after treatment, It is negligence</td>
<td>SD: 127(25.4%) D: 197(39.4%) NS: 13(2.6%) A: 148(29.6%) SA: 15(3%)</td>
</tr>
<tr>
<td>11</td>
<td>If patient has side effect of prescribed treatment, It is negligence.</td>
<td>SD: 184(36.8%) D: 165(33%) NS: 43(8.6%) A: 78(15.6%) SA: 30(6%)</td>
</tr>
<tr>
<td>12</td>
<td>Patient without serious Illness die during treatment is negligence</td>
<td>SD: 70(14%) D: 144(28.8%) NS: 28(5.6%) A: 193(38.6%) SA: 65(13%)</td>
</tr>
<tr>
<td>13</td>
<td>Patient die during Operation, It is always due to negligence.</td>
<td>SD: 61(12.2%) D: 186(37.2%) NS: 12(2.4%) A: 149(29.8%) SA: 92(18.4%)</td>
</tr>
</tbody>
</table>

(SD = Strongly Disagree, D = Disagree, NS = Not Sure, A = Agree, SA = Strongly Agree)
### Table 3: Questionnaire about Legal Proceeding regarding Medical Negligence

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Questions / Statements</th>
<th>Response In Numbers &amp; (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>In suspected case of negligence, you have to file complain in concerned police station.</td>
<td>SD  0 (0%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D  0 (0%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NS  5 (1%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A  126 (25.2%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SA  369 (73.8%)</td>
</tr>
<tr>
<td>2</td>
<td>In suspected case of negligence, you can file complain in State medical council.</td>
<td>SD  0 (0%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D  0 (0%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NS  418 (83.6%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A  46 (9.2%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SA  36 (7.2%)</td>
</tr>
<tr>
<td>3</td>
<td>Postmortem is necessary in case of death due to medical negligence</td>
<td>SD  76 (15.2%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D  108 (21.6%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NS  75 (15%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A  154 (30.8%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SA  87 (17.4%)</td>
</tr>
<tr>
<td>4</td>
<td>Primary report regarding medical negligence is given by Medical Board of Government Doctors in suspicious case of negligence on requisition of Police.</td>
<td>SD  5 (1%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D  23 (4.6%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NS  329 (65.8%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A  95 (19%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SA  48 (9.6%)</td>
</tr>
<tr>
<td>5</td>
<td>Police cannot arrest doctor or lodged FIR without report of medical negligence by medical board in suspicious case of negligence</td>
<td>SD  151 (30.2%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D  239 (47.8%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NS  100 (20%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A  5 (1%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SA  5 (1%)</td>
</tr>
<tr>
<td>6</td>
<td>Death due to negligence is punishable in court</td>
<td>SD  4 (0.8%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D  8 (1.6%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NS  15 (3%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A  179 (35.8%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SA  294 (58.8%)</td>
</tr>
<tr>
<td>7</td>
<td>Compensation may be given by consumer court for damage due to negligent act.</td>
<td>SD  30 (6%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D  78 (15.6%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NS  27 (5.4%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A  216 (43.2%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SA  149 (29.8%)</td>
</tr>
<tr>
<td>8</td>
<td>Threaten or attack on a doctor is punishable in court even if doctor is truly negligent.</td>
<td>SD  0 (0%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>D  0 (0%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NS  0 (0%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>A  286 (57.2%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SA  214 (42.8%)</td>
</tr>
</tbody>
</table>

(SD = Strongly Disagree, D = Disagree, NS = Not Sure, A = Agree, SA = Strongly Agree)

**Discussion**

There are good numbers of studies available about knowledge, awareness & attitude regarding medical negligence among health care professionals, but very few study available for general population. In the present study, a total of 500 peoples from Ahmedabad city participated, all were aged above 20 years with different educational levels and variable occupational status and quite capable of understanding the subject which we studied. We observed that the knowledge of medical negligence was found to be satisfactory, but the knowledge was poor about legal proceeding regarding medical negligence, our findings are consistent with Parmar P et al & Siddiqui M N.

(A) Knowledge about Medical Negligence

In the present study, 98.4% of respondents agreed upon that, Doctor can be liable for Professional Negligence. But only 59% of people agreed upon that, other hospital staff can also be liable for Negligence, 37.6% respondent disagreed with this.

We observed that 88.2% of people were agreed with that, refusal to admit patients requiring urgent hospitalization is Negligence. 89.8% of people were agreed upon that, if a doctor don’t order proper
investigation according to sign & symptoms is negligence. 88% respondents were agreed upon that Performing any procedure & operation without inform consent is Negligence. It means the general population has sufficient knowledge about the duties of doctors and consent.

All participants were agreed upon that, performing operation on wrong limb is negligence. 69% of respondents knew that, if a doctor does not provide another doctor to a hospitalized patient during his absence is negligence. 71.4% of respondents were of the agreement that giving a premature discharge to a patient who needs further treatment & care is negligence. 75.6% of respondents agreed upon that, failure to inform a patient of the risk of refusal treatment & discharge against medical advice is negligence. It means that peoples are quite aware that, gross absence of skill & absence of due care is negligence.

In present study, 64.8% of respondents were aware that, if disease is not cured after treatment, It is not negligence, but still 32% respondent agreed upon that, if the disease is not cured after treatment, It is negligence. Similarly, 69.8% of respondents knew that if a patient has side effect of prescribed treatment, It is not negligence, but 21.6% of respondents were still believed that if a patient has a side effect of prescribed treatment, it is negligence. The general population is aware of medical maloccurrence, and there is not a 100% guarantee for a cure. But still some people don’t think so; this type of attitude may be harmful to the medical profession.

We observed that 42.8% of respondents were disagreed upon that, a patient without serious Illness die during treatment is negligence, but 51.6% were agreed with this. 49.4% of respondents disagreed that, patient die during Operation, It is always due to negligence, but 48.2% were agreed with this. It means large numbers of people are not aware of the course of illness, risk of operation & anesthetic complications.

B) Knowledge of legal Proceeding regarding medical negligence

In the present study, 99% of respondents were aware that in suspected cases of negligence, you have to file complain in the concerned police station. But 83.6% of respondents were not sure about that, one can file complain in State medical council in a suspected case of negligence.

65.8% respondents were not sure that Medical Board of Government doctors gives a primary report regarding medical negligence, in suspicious case of negligence on requisition of Police.

We observed that 48.2% of participants were agreed upon that postmortem is necessary in case of death due to medical negligence, while 36.8% were disagreed.

78% of Respondents disagreed that Police cannot arrest doctor or lodged FIR without report of medical negligence by medical board in suspicious cases of negligence. We had 14 lawyers in our study, but only 10 participants were agreed on this statement.

Compensation may be given by consumer court for damage due to the negligent act, 73% of participants were agreed with this statement. Still, 27% had no awareness about the consumer protection act.

We observed that 94.6% of participants were agreed upon that death due to the negligence is punishable in court. All participants believed and agreed upon that threaten or attack on a doctor is punishable in court even if doctor is truly negligent.

Overall knowledge about legal proceedings regarding medical negligence was not satisfactory. We have to arrange training sessions & seminars for the general population, lawyers and police.

**Conclusion**

After analyzing the response of participants, we conclude that, the knowledge of medical negligence in context to duties of doctors, consent, gross absence of skill & due care is found to be satisfactory. However, still, there is a false belief about a guaranteed cure and medical malocurrence in some people. We also conclude that knowledge is poor about legal proceedings regarding medical negligence. Medical professionals must obtain informed consent before any procedure and sensitize their patients about medical malocurrence. We have to arrange seminars, awareness programs & training sessions regarding medical negligence & its legal proceedings for the general population, lawyers and police.

**Source of Funding:** Self

**Conflict of Interest:** Nil

**Ethical Clearance:** Taken from Institutional Ethical Committee of our Institute.
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A study on the relation between socio-economic characteristics and HIV/AIDS among the tribal women of Jaintia Hills, Meghalaya

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Abstract

The social fabric of a population is of utmost importance to know the scenario of HIV/AIDS in that population. This paper highlights vulnerability of women towards the disease based on their socio-economic characteristics. It is a cross-sectional study among the Jaintia tribal women of Meghalaya belonging to the reproductive and vulnerable age group (15-35years). The methods used for data collection are structured interview schedules, participant observation, focussed group discussions and in-depth interviews. The findings revealed that majority of the women are poor and uneducated and as a result, this has an impact on their role and ability to protect them from contracting the disease.

Keywords: social fabric, HIV/AIDS, tribal Jaintia Women, Meghalaya

Introduction

The tribal population is an integral part of India’s social fabric and has the second largest concentration after the African Continent. India accounts for 84 millions of Scheduled Tribes which contributes to about 8% of India’s population and they account for a quarter of the country’s poorest people. Although these groups have seen considerable progress over the years and poverty among tribal groups declined by more than a third between 1983 and 2003 - nearly half the country’s Scheduled Tribe population still remains in poverty, due to their low starting point. A sociological study demands an extensive analysis of the characteristics of the population to be studied. The socio-economic background of an individual plays an important role in acquiring the awareness and the knowledge of the events occurring in society. It also helps in the formation of attitudes, practices and behaviour. The knowledge about the socio-economic profile of the respondents is essential to arrive at the accurate conclusion. Women have different perspective on a particular social problem. Though not wholly and solely, yet responses of the respondents can be explained on the basis of the knowledge of their socio-economic background. It is believed that socio economic condition of any woman can lessen her bargaining power for a safe and healthy physical relation that makes her vulnerable to sexual exploitation. Hence, in order to have a deeper insight into perspective of HIV/AIDS among the tribal Jaintia women of Meghalaya, an attempt has been made to analyse certain important socio-economic variables like age, community, religion, income, occupation, etc.

Methodology

The present cross-sectional study was conducted amongst tribal women of Jaintia Hills, Meghalaya, India, covering East and West Jaintia Hills districts. There are five blocks in both the districts- Thadlaskein, Laskein, Amlarem, Saipung and Khlehriet (Figure 1). For the present study, a total of 20 villages were surveyed covering all five blocks (four villages from each block were randomly selected).
The sample size of 308 was calculated using online sample size calculator http://www.surveysystem.com/sscalc.htm, giving prevalence estimates with 95% confidence level and within 5% confidence interval for a total number of people living with HIV (PLHIV) in Meghalaya, which is 1,541. Structured interview schedules, participant observation and in-depth interviews were used to understand the socio-economic factors related to HIV infection. Data was collected by interacting with the women and building rapport by developing mutual trust with them. This was supplemented with living in the community, participating in their activities and constantly observing what the women actually do in specific situations.

Results

The present study concentrates on the women of Jaintia Hills, Meghalaya. The total number of women (15-35 years of age) under study in East and West Jaintia Hills is 320. Information on socio-demographic profile of the women under study was procured. The data gathered throws light on the background of the respondents.

Demographic Parameters of Women

Geographical Distribution

The geographical distribution of 320 women is represented in Figure 2 (a and b). The present study was conducted covering East and West Jaintia Hills district. There are five blocks in both districts- Thadlaskein, Laskein, Amlarem, Khliehriat and Saipung. From each block 50 women were interviewed except from Thadlaskien as it has a large area, so 120 women were selected from this block.
Community

Community is a group of people living in the same place or having a particular characteristic in common. The major communities under study in Jaintia Hills are Pnar, Biate, Wars and Garo. In the present study, it was observed that majority of the population studied was Pnar (61%) and a small portion belonged to Biate (19%), Wars (14%) and Garo (6%).

· Religion

The present study reveals the religion followed by the women in the study area. Majority of the women were Christian belonging to Scheduled Tribe. Some of the Pnars belong to a religion known as Niamtre. It is the traditional religion in local usage. The word ‘Niam’ means ‘religion’ and ‘tre’ means ‘origin’. Thus, the people who follow the original religion are called ‘Niamtre’. However, over the years a number of the respondents have adopted other religions like Hinduism (16%) and Christianity (49%). At the same time, a significant number of Niamtre (35%) remains and continue the practices of associated rituals and religious practices. The traditional religion does not have any written script, it is based mostly on oral tradition. (Fig. 3)

![Figure 3: Percentage distribution of the religion of the respondents](image)

Age of the respondents is one of the essential features in understanding their perspectives about the specific issue; by and large, age demonstrates the level of development of the people. The broad age group of 15-35 years has been classified into 4 age groups – 15-20 years, 21-25 years, 26-30 years and 31-35 years in order to maintain homogeneity in the age intervals. In view of high prevalence of HIV infection among the women in reproductive and sexual active group and availability of limited information on HIV particularly among the youth population, especially in women, the present study focused on the young women belonging to the age group 15-35 years. The percentage of women in the age group 15-20 years, 21-25 years, 26-30 years and 31-35 years is 16%, 22%, 25% and 37% respectively.

· Education

Education has been distinguished as a conventional social vaccine against contracting HIV, resulting in the more educated less likely to be infected i.e. higher education level is associated with lower level of HIV/AIDS. In the present study, the data shows that there are no respondents with secondary and higher secondary level of education. 33% of the respondents have primary education and 26% of them have middle school education.

![Figure 4: Percentage distribution of education of the respondents](image)

Occupation is an important variable that has direct relation with HIV/AIDS. It has been established that some occupations are called high risk occupations because individuals working in them are more vulnerable to HIV e.g. female sex work, wives of truck drivers, wives of IDUs, etc. The data shows that most of the respondents are engaged in agriculture for a living (66%). Out of 320 respondents, 20% are vendors, 7% are housewives and depend on their families, 5% are health service providers working in the civil hospital, Jowai and 2% are sex workers (Figure 5).
Economic status

Income of a person is an important variable to analyse the socio-economic status of a person. It enables a person to access to good education, maintain good health and provide good future to the children. Lack of income has been found to be related to poor health. The relation between HIV and income is very complex. A number of researcher reported that higher rates of infection are expected among poor. The figure 6 shows that the majority of the women under study belong to the low-income category, i.e., a monthly family income less than Rs. 5000 (n = 320; 56%). Out of the total 320 respondents, 115 respondents (36 %) belong to the category of monthly family income between Rs. 5000 – Rs. 10,000. Another 8 % (n=320) respondent belongs to the category with a monthly family income above Rs. 10,000.

Place of residence

Place of residence plays an important role in creating awareness regarding HIV/AIDS and with regard to treatment. The present findings show that 71% of the respondents belong to the rural areas and 29% belong to the urban areas (n=320). In the rural areas, HIV prevalence is low because of less risky sexual behaviour as compared to urban areas with availability of commercial sex, opportunities for casual sex, and less restriction with regard to sexual relationships. But the virus has moved from urban to rural areas and from high risk to general population, disproportionately affecting women and the youth.

Age at menarche

In both social and medical perspectives, age at menarche is considered as the central event of female puberty, as it signals the possibility of fertility. And with fertility, comes the vulnerability of the respondents towards HIV/AIDS. In the present study, the age at menarche of the women varies from 12 years of age to 15 years of age.

Marital Status

The Jaintias have a unique marriage system. A Jaintia house belongs to a woman and after marriage she stays in her house to be visited by her husband only at night time and this practice continues to remain so long the marriage bond exists. This system is called “Visit Marriage”. The mother has total control of her sons so much so that they belong to her even after their marriage. In the present study, it was noticed that in Jowai among the Niamtres, some of them still follow the traditional ‘night visit’ system, that is, the husbands stayed and ate in their mother’s house while they were sleeping in their wives’ house at night. However, the husbands were found not to share any of their earnings with their wives. The traditional night visit system of marriage was more frequent among the Hindus in Nartiang. It was observed that majority of the Hindus and the Niamtres, both in rural as well as in urban areas followed the night visit system of marriage.

The present study revealed that out of 320 Jaintia women, 19.7 percent married more than once. Higher percentage of women was found to get married more than once in the rural areas (26.2 percent) as compared to that of the urban area (13.0 percent). In the rural areas the percentage of women married more than once
was found to be the highest among the Niamtres (30.2 percent), followed by the Christians (24.4 percent) and the lowest among the Hindus (23.7 percent). However, there was a woman belonging to Hindu religion who was found to get married even seven times. The percentage of women getting married for four times was also found to be the highest among the Hindus. In the urban area women married more than once was found to be higher among the Niamtres (15.5 percent) as compared to that of the Christians (11.2 percent). The various reasons for women marrying more than once were (i) widowhood, (ii) divorce/separation. The reasons for divorce or separation were (a) the husband was drunkard, (b) no child from previous husband/s, (c) no female child from previous husband/s, (d) women fallen in love with another person, (e) husband not helping financially.

The focused group discussions (FGDs) carried out at community/village levels showed that poverty was the most important factor that had an impact on HIV/AIDS infection among the women of Jaintia Hills. Many of the poor young women in the study area were found to having multiple sexual partners as this was the only means of earning a livelihood and maintaining the family. In these situations they become vulnerable to HIV/AIDS not only because they had multiple sex partners but also because they were unable to bargain for safe sex with their partner. Some of the girls were being forced to have multiple sex partners in exchange for money by stepfather/stepmother. Some were sexually abused (more than one time) and then they started having multiple sex partners. There were no Antiretroviral treatment (ART) centre in Jaintia Hills, so, the patients need to go for the treatment to the Shillong Civil Hospital or NEIGRIHMS. The poor had less access to health care and therefore, most of the HIV cases remain unregistered at ART centre and untreated, resulting in further spread of infection. The perceived HIV/AIDS-related problems included malicious spread of HIV/AIDS by some infected people.

Discussion

Worldwide the large proportions of all new HIV infections occur in people under age 35 years. There are approximately four million young women aged 15 to 35 living with HIV globally. The multiple transitions (i.e., biological, psychological) and developmental tasks (e.g., establishing identity) in this period of lifespan of young adults could be the reason for increased risk for HIV. Similarly, in the present study it was found that females belonging to the age group 15-35 years are more likely to be infected with the disease. In a study in Sub-Saharan Africa, it was reported that young women aged 15-24 years have HIV rates higher than their male peers and they acquire HIV infection 5-7 years earlier than their male peers. This gender inequality among HIV prevalence has been reported from the beginning of the HIV epidemic, and partly correlated with biological differences and social inequalities. Their limited access to education and employment status force them to accept situations that put them at risk for contracting sexual infectious diseases especially HIV/AIDS. Other parameters known for contributing to the increased risk of HIV infection includes lack of knowledge and in the present study it can be indicated by rural locality, where young women are not much exposed to larger social networks which may not have led to greater exposure towards the information about sexual health and HIV prevention services, thereby increasing the HIV risk. Previous studies also show that people in rural areas are more susceptible to be affected with HIV. Although, statistically non-significant but most of the women were illiterate or low educated in the study. These findings are consistent with other studies that higher educated women are more knowledgeable yet there is still knowledge deficiencies among the females located in rural areas, however, sometimes the knowledge is not reflected in the sexual behaviors of educated women. Another study also highlighted high level of ignorance about important preventive measure in the sexually active young population in rural areas. A number of socio-economic problems and inequality to health care access are other factors that contribute to the infection among women. Several studies indicate that gaps exist between HIV knowledge and practices regardless of gender, place of residence, education level and socioeconomic status.

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Ethical Clearance: Taken from Ethical Clearance Committee of Amity University, Noida, U.P.

Conflict of Interest: Nil

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IQ Difference before and after Temporal Lobe Epilepsy Surgery: First report from Indonesia

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Abstract
Epilepsy is a serious disorder of the brain, affects almost fifty million people in the world. About 40% of the patients finally became refractory to epileptic drugs, especially those with temporal lobe epilepsy (TLE). This refractory condition may cause psychosocial decline, including patient’s intelligence. Surgical therapy has an important role in stopping further damage to brain cells caused by repeated seizures. The elimination of the seizure after surgery will hopefully results in better intelligence score. This study aims to find out the effect of surgical therapy in TLE patients after surgery. We were using a Quasi Experimental study with One Group Pre-test and Post-test design. The samples were taken with consecutive sampling method. Subjects were 15 TLE patients who underwent anterior temporal lobectomy and have passed at least one year postoperative period, and also had done an intelligence quotient (IQ) test before surgery. IQ before and after surgery were measured with WAIS and WISC-R method. The statistical tests used were paired t-test. We found the verbal IQ after surgery(98.8±9.88(76-119)) were significantly higher(p=0.01) compared with preoperative verbal IQ(92.7±9.60(77-113)). On the other hand, performance IQ after surgery (98.2±8.64(82-115)) were higher compared with preoperative performance IQ (96.0±9.39(75-116)) but it was not significant (p=0.5). Total IQ after surgery (97.8 ±7.69(81-107)) also higher compared with preoperative total IQ (93.9±9.28(75-115)) but also not significant (p=0.08). Postoperative verbal IQ improvement was found compared with preoperative verbal IQ.

Keywords: IQ, epilepsy, epilepsy surgery

Introduction
Epilepsy is the most frequent serious brain disorder that affects almost fifty million people all over the world. [1] Report from WHO shows the prevalence is 1% of total population in the world, equal value with breast cancer in woman and prostate cancer in man.[2] The incidence rate of epilepsy is still high, especially in developing country, reaching 114 cases in every 100,000 population each year.[3] With its known incidence rate, Indonesia with 220 million in total population has about 250,000 new epilepsy cases each year. Related to the age, the prevalence chart shows bimodal pattern, getting higher in pediatric then come down in early and middle adult, and then rising again in the elderly.[4,5]

Almost 30 to 40 percent of all epilepsy patients will become immune to anti-epilepsy drugs (AED) called refractory epilepsy.[6,7] Complex partial epilepsy is a bulk of this kind of refractory epilepsy.[8,9] In complex partial epilepsy, the epileptic focus mostly located in the side part of the brain. Precisely, it is located in hippocampus area and amygdala body which sometimes involving brain surface area of temporal lobe as well.[8,10]

In every single epileptic spell, brain cells injury or even death will occur. Therefore, when the spell frequently occurs, there will be weakening or death of brain cells, hence, will result in severe declining of intelligence ability.[10-12]

Intelligence has been defined by Wechsler as the aggregate or global capacity of the individual to act
purposefully, to think rationally and to deal effectively with his environment.\textsuperscript{[13]} In general, intelligence is divided into three categories, which are practical ability for problem solving, verbal ability and social competence. Whereas Intelligence Quotient (IQ) is an intelligence score derived from a comparison between mental age and chronology age then multiply by 100.\textsuperscript{[14]}

Since 1999 epilepsy surgery has been performed in Indonesia with terrific post-operative results of seizure attack rate. However, there is no research to date have been conducted that review about the improvement of intelligence ability in post epilepsy surgery patients in Indonesia. This research is conducted to know the possible effect of epilepsy surgery on their intelligence ability, by comparing on their IQ before and after epilepsy surgery.

\textbf{Material and Method}

This research was conducted during March and June 2012 in dr. Kariadi General Public Hospital, Semarang, Central Java of Indonesia. It is Quasi-experimental study one group pre-test and post-test design. The independent variable in this research is epilepsy surgery, whereas dependent variable is IQ.

The target population is the epilepsy patients who had had an epilepsy surgery and already passed a year-time period after operation. Inclusion criteria consist of: a) be declared as temporal lobe epilepsy patient based on preceding clinical examination (EEG, MRI and semiology), b) The patient has the result of IQ examination before surgery. The exclusion criteria: a) Patient who does not have IQ examination before surgery, b) Patient or family refuses to take part in this research, and c) Based on the medical record, there was another abnormality diagnosed which could affect the cognitive function, such as mental disorder. All procedures performed in studies involving human participants were in accordance with the ethical standards of the Medical Faculty, Diponegoro University and Kariadi Hospital ethical committee and with the 1964 Helsinki declaration standards.

Consecutive sampling was used as the sampling method and successfully obtained 15 patients who meet with the criteria. IQ before surgery was collected from medical report whereas IQ after surgery was obtained from the direct test. Paired t-test was used for statistical analysis.

IQ examination after surgery was supervised by the same psychologist who also supervised IQ examination before surgery. The examination was taken place in the installation of Medical Rehabilitation of dr. Kariadi General Public Hospital. IQ was measured by using WAIS method (Wechsler Adult Intelligence Scale) and WISC-R (Wechsler Intelligence Scale for Children) after informed consent was taken.

\textbf{Result}

\textbf{Table 1: Data of demography characteristic and factors that associate with epilepsy}

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mean ± (min-max)</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Male</td>
<td>-</td>
<td>10 (66.7%)</td>
</tr>
<tr>
<td>- Female</td>
<td>-</td>
<td>5 (33.3%)</td>
</tr>
<tr>
<td>Age of IQ examination (year)</td>
<td>24.3±7.17 (17-41)</td>
<td>-</td>
</tr>
<tr>
<td>Age of first seizure (year)</td>
<td>14.0±7.13 (2-30)</td>
<td>-</td>
</tr>
<tr>
<td>Duration of epilepsy (year)</td>
<td>7.7±4.70 (1-16)</td>
<td>-</td>
</tr>
<tr>
<td>Duration of IQ surgery-IQ examination</td>
<td>41.6±29.70 (12-93)</td>
<td>-</td>
</tr>
</tbody>
</table>
Table 2. Result of IQ examination before and after epilepsy surgery

<table>
<thead>
<tr>
<th>IQ</th>
<th>Before surgery</th>
<th>After Surgery</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Verbal IQ</td>
<td>92.7±9.60 (77-113)</td>
<td>98.8±9.88 (76-119)</td>
<td>0.01</td>
</tr>
<tr>
<td>Performance IQ</td>
<td>96.0±9.39 (75-116)</td>
<td>98.2±8.64 (82-115)</td>
<td>0.5</td>
</tr>
<tr>
<td>Total IQ</td>
<td>93.9±9.28 (75-115)</td>
<td>97.8±7.69 (81-107)</td>
<td>0.08</td>
</tr>
</tbody>
</table>

*Pairet-test: before and after surgery

From the table 1, more than half of sample is male (66.7%). The average age of IQ examination when was taken is 24.3±7.17 with the youngest age is 17 years old and the eldest one is 41 of age. Based on the age of the first experience of epilepsy seizure, the average is 14.0±7.13 years old with the youngest age is two years old and 30 years old is the eldest. Duration of having epilepsy is 7.7±4.70 years with the shortest period is one year and the longest one is 16 years. The time distance between surgery and post-surgery IQ examination is 41.6±29.7 months of average. The shortest is 12 months and 93 months for the longest one. Regarding the surgery side, mostly it is in the non-dominant side (66.7%). Almost in all samples became free of epilepsy seizure state (86.7%). IQ comparison between before and after epilepsy surgery shows in table 2.

From the table 2, verbal IQ after epilepsy surgery shows a better outcome than before surgery and it is statistically significant (p=0.01) (figure 1). The another component of IQ, the performance IQ also shows higher outcome after epilepsy surgery than performance IQ before surgery, however, it is not statistically significant (p=0.5) (figure 2). A better outcome is also found in total IQ after surgery than before surgery although it is not worth statistically (p=0.08) (figure 3).
We found all of IQ components after epilepsy surgery were higher than before surgery. However, it was merely one of IQ component, the verbal IQ that showed an escalation and had significant statistical value. This outcome can be related with part of the brain where the damages occurred. It is in the temporal lobe, part of the brain that has responsibility for language ability, therefore, any manipulation in this part will be affecting on verbal IQ.\cite{15} The performance IQ is slightly affected by the surgery even showing an increased outcome. Total IQ which was a merge result of both verbal and performance IQ showed an increased outcome although not statistically significant.

A research by Anderson, et al. studying the correlation between intelligentsia and brain structure concluded that there is a significant correlation between verbal IQ and total IQ with the volume of temporal lobe both in the right and left side, and also with hippocampus structure. However, no significant correlation found with performance IQ.\cite{15} Their result definitively supports our research and possibly underlies the mechanism of how the verbal IQ increases after epilepsy surgery.

The weakness of this research was not to consider the anti-epileptic drugs. There are some samples who still consume AEDs routinely. In the other hand, several samples have already stopped the AEDs completely. This weakness possibly could affect the IQ examination outcome because AEDs also could influence the cognitive function.

Our research also found a limitation of the total of sample. Not only caused by the time limit but also, our research was conducted only in one center. When the research is conducted multicenter by using cohort method, the obtained sample will be greater in quantity.

Allegedly, one of the factors that possibly affect the increase of IQ in post-surgery epilepsy patient was external stimulation, both by the family and closest friends even from medical practitioners. In the future, we expect the management of epilepsy patient not only stopped after the surgery but also involve proper stimulation therapy for helping stimulation of brain cells activity. Moreover, the doctor has to encourage their family members who have undergone surgery to frequently give stimulation to the patient for increasing the intelligentsia.

IQ of temporal lobe epilepsy patient is increased after epilepsy surgery. This outcome is pointed out from the escalation of verbal IQ after surgery that statistically significant, compared with verbal IQ before surgery. An increase of performance and total IQ are also found, however, they are not statistically significant.

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Ethical Clearance: Ethical clearance is taken from comitte which is grouped on KEPK FK UNDIP-RSUP DR Kariadi Semarang Indonesia Number 242/EC/FK/RSDK/2012

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Relationship Between Farmers Weaknesses About Knowledge of Formulation and Feed Technology on Feed Conversion in Alabio Ducks

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Abstract

The study aims to determine and analyze the relationship between breeders’ knowledge about feed formulations and the conversion value of duck feed. The subjects in this study were Alabio duck breeders in Hambuku Raya Village and Putat Atas Village, Hulu Sungai Utara, South Kalimantan Province, Indonesia with observed objects in the form of Alabio duck feed conversion and breeders’ knowledge of feed formulation knowledge and Alabio duck feed technology. The research method used was non-experimental explorative, the researcher did not give treatment to the group of Alabio ducks and conducted a survey by distributing questionnaires to farmers. Observation of feed conversion is carried out for 3 (three) months from February-April 2018 in each group. Observation of feed conversion is carried out starting from Alabio ducks to produce eggs, which are about 6 months old. Testing of feed conversion, normal data using analysis of variance (Anova), if significant continued with LSD. Survey research is the stage of analyzing using SWOT analysis to determine the level of weakness and strength in the framework of the development of Alabio ducks in the Hulu Sungai Utara Regency of South Kalimantan Province. The results of the analysis of feed conversion of the three groups were not significantly different, the group of Putat Atas Ducks for feed conversion an average of 4.51 ducks Hambuku Raya 1 group an average of feed conversion every month 5.30, the ducks of the Hambuku Raya 2 group the average conversion of feed every month 4.75. SWOT analysis value of weakness factor is 1,764, this factor includes one of them is knowledge of farmers about feed formulation. The results of this study are in line with the results of feed conversion in the first stage of research, the value of feed conversion obtained is still relatively high at 4.51-5.30. The conclusion is the SWOT analysis score of weakness factors one of which is the lack of knowledge of farmers about formulation and feed technology affect the high feed conversion.

Keywords: Alabio duck, feed conversion, SWOT analysis

Introduction

Animal husbandry is one of the agricultural sub-sectors that has great potential to be developed because it provides a large enough contribution to the Indonesian agricultural sector. Laying ducks are waterfowl raised specifically to produce eggs. Increased economy and public awareness about the need for animal protein has resulted in an increase in the need for eggs and meat. One effort to meet the needs of animal protein in the community is the livestock business[1]. Sulaiman and Rahmatullah states that in general Alabio duck eggs are very popular, especially for the people of South Kalimantan, who value duck eggs more than chicken eggs[2].

The maintenance of Alabio ducks has a bright prospect along with increasing population and increasing public awareness of the consumption of animal protein from livestock, supported by adequate human resource capabilities[1,2]. Efforts to develop Alabio ducks on an agribusiness scale have promising opportunities and prospects, this is shown by the results of egg sales in the Alabio duck, Hulu Sungai Utara Regency market and increasing consumer demand.
The success of the Alabio duck farm is one of them is the feed factor that meets the quality and quantity requirements. Farmers can use quality feed at a lower price, so the Duck business can provide more appropriate benefits for the business carried out. The high cost of feed is often an obstacle for breeders in fulfilling duck nutrition.

The nutritional needs of ducks that are maintained based on this need an effort to provide technology that is suitable to the needs of farmers at low prices through the utilization of the potential of local feed. Technology is generally defined as ways to carry out the process of activities that produce results or products. Technology is one of the main means to achieve the goals of effectiveness, efficiency and high productivity of business[3].

Feed technology does not only include preservation, but all technologies ranging from the provision of feed ingredients to rations given to livestock[3]. The study aims to determine and analyze the relationship between breeders’ knowledge about feed formulations and the conversion value of duck feed..

**Materials and Methods**

**Object of research**

Subjects in this study were Alabio ducks breeders from the Usaha Maju, Putat Atas Village group, and Maju Bersama, Hambuku Raya Village group, Hulu Sungai Utara, South Kalimantan Province with the object observed were conversion of Alabio duck feed and breeder knowledge about formulation knowledge Alabio ducks and feed technology.

**Research Methods**

The research method used was non-experimental explorative, the researcher did not give treatment to the group of Alabio ducks and conducted a survey by distributing questionnaires to farmers.

**Breeder Profile**

The group of ducks that assisted the research was a group of livestock fostered by the Plantation and Animal Husbandry Office of South Kalimantan Province, located in Hulu Sungai Utara Regency. The herd has been educated and experienced in the field, and has long maintained Alabio ducks.

**Population and Sample**

The population in this study are people who are aware of the development of Alabio ducks in Putat Atas, and Hambuku Raya, Sungai Pandan District, Hulu Sungai Utara Regency. The sampling technique uses Purposive Technique where the deliberate sampling is mainly in determining expert respondents at least 5 people consisting of practitioners namely breeders who have long been breeding the Alabio Duck.

**Research Location Determination Techniques**

The technique of determining the location of the study was determined intentionally, namely in Alabio Duck Farm, a member of the business group Advanced Village Putat Atas, and the Advanced group Together Hambuku Raya Village Sungai Pandan District, Hulu Sungai Utara Regency, South Kalimantan Province. For certain considerations, among others, herds in Sungai Pandan District are herds that are in the central nurseries of Alabio ducks and breeders in the location meet the criteria of the variable studied.

**Observation of Feed Conversion**

Observation of feed conversion is carried out for 3 (three) months from February-April 2018 in each group. Observation of feed conversion is carried out starting from Alabio ducks to produce eggs, which are about 6 months old. Observation of feed conversion is carried out in each flock and recorded every day how much leftover feed is left each day, and recorded every week and every month for 12 weeks.

Hidanah et al. stated that the remaining feed consumption of each treatment unit during the last week of the study was weighed to be calculated on average so that the average consumption data per day per duck was obtained in grams. Feed conversion ratio (FCR) is calculated by dividing the consumption of feed spent in one week (g) with egg production obtained during the week (g). Feed conversion starts from the fourth week after stable egg production[4].

**Data analysis**

Testing of feed conversion, normal data using analysis of variance (Anova), if significant continued with LSD. If the data are not normal then the Kruskal Wallis test is used, if significant it is continued with the Wilcoxon-man whitney test. The test results are significant if P values <0.05 are obtained.
The data obtained were processed and analyzed using the SWOT analysis method\[^5\]. There are three analysis stages namely data collection, analysis phase and decision making stage.

a. Data Collection Stages, namely the classification and pre-analysis stages. At this stage the Internal Strategic Factors Analysis Summary (IFAS) matrix and the External Strategic Factors Analysis Summary (EFAS) matrix are used.

b. The analysis phase (process), this stage, internal and external factors are included in the SWOT matrix model, space analysis matrix, internal-external matrix (IE), space analysis matrix and grand strategy matrix.

c. The decision making stage is determining the alternative priority list for duck development using the QSPM (Quantitative Strategic Planning Matrix) matrix.

**Results**

**Feed Conversion**

Duck group (Putat Atas) feed conversion an average of 4.51, duck group (Hambuku Raya 1) average feed conversion every month 5.30, duck group (Hambuku Raya 2) average feed conversion every month 4.75. p-value = 0.000 > 0.05 so that it can be concluded that there is a significant difference in the average conversion based on the three groups of ducks.

**SWOT Analysis**

The weighting of each internal and external factor is supported by Expert Choice 11 and Microsoft Excel programs, followed by an analysis of internal strategy factors (IFAS) and external strategy factors (EFAS), internal-external matrix analysis (IE), space matrix analysis and decision making stages refer to Yunia\[^6\].

In the preparation of the business plan for Alabio duck breeding in Hulu Sungai Utara Regency, South Kalimantan Province, the steps being referred to are the compilation of strengths, weaknesses, opportunities and threats, weighting and rating on each factor on a scale of four (very strong) up to one (very weak) and four (very strong) times the weights with ratings with values from one to four and scoring.

<table>
<thead>
<tr>
<th>SWOT Analysis</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total Score</td>
</tr>
<tr>
<td>IFAS</td>
<td>10.236</td>
</tr>
<tr>
<td>EFAS</td>
<td>12.198</td>
</tr>
</tbody>
</table>

**Information:**

1. Strengths include aspects of geographical conditions, availability of seeds, facilities and infrastructure, experienced breeders, farmers joining the livestock group under the guidance of the relevant Dinas, and availability of feed.

2. Weaknesses include aspects, namely limited capital and knowledge of farmers about the nutritional content of animal feed.

3. Opportunities include aspects, namely increasing the power consumption of eggs in the community, developing market demand, the existence of funding from banks.

4. Threats include fluctuations in the price of feed and products from outside entering the local market.

**Discussion**

The results of this study still have high feed conversion values, although these results are slightly lower compared to the opinions of Suswoyo and Rosidi, who reported that the conversion of laying duck feed production periods ranged from 5.84±1.55\[^7\]. When compared with the conversion of laying commercial chicken feed, the conversion of feed in ducks is much worse.

Feed conversion of laying hens between 2.11-2.90\[^8\]. Poor conversion of duck feed is caused by the
eating habits of ducks, including the habit of immediately looking for drinking water after eating. Generally the feed is always scattered/discarded when the duck is moved from the feed to the drinking place or also dissolved in the duck while drinking. Poor feed conversion may also be caused by the inability of ducks to control the amount of feed consumption that is regulated by the amount of energy consumption as can be done by chickens\textsuperscript{[7]}.

Strategy formulation based on the identification of internal and external environment, can be known strengths, weaknesses, opportunities and threats for the company. SWOT analysis can be used to find out what strategies should be implemented by Alabio duck breeding in SouthKalimantan in utilizing market opportunities through analysis of internal and external factors that affect the business of Alabio duck breeding in South Kalimantan.

After the SWOT analysis is carried out, a plan for developing the operational functions of the Alabio South Kalimantan duck business operations will be formulated based on the diagram and table above based on the SWOT calculation. Alabio South Kalimantan duck farms with a S < O score, which is a greater chance than the existing strength, where the direction of the Alabio duck breeding in South Kalimantan is in a stable growth strategy.

The SWOT analysis results obtained positive internal and external factors, meaning that the strength of the Alabio duck breeding in South Kalimantan is relatively superior compared to its weaknesses, while the environmental opportunities currently faced are greater than the threats. The results mentioned above can make, Alabio duck breeding in South Kalimantan have the ability to change the potential into a better yield. The right policy direction for Alabio duck farms in South Kalimantan Province is to increase and enlarge production activities in accordance with their capabilities while expanding their participation in order to take advantage of various opportunities.

SWOT analysis value of weakness factor is 1.764, this factor includes one of them is knowledge of farmers about formulation and feed technology which has a high effect on the high feed conversion.

**Conclusion**

Is sum, one of the SWOT analysis scores from the weakness factor is the lack of knowledge of breeders about formulation and feed technology which has a high effect on the high feed conversion.

**Conflict of Interest**: The authors declare that they have no conflict of interest.

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**Ethical Approval**: Ethical approval is not needed.

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Scores Consumption of Functional Foods based on Local Foods in Pregnant Women Buginese in the city of Makassar

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Abstract

Background Recent evidence is known that functional foods are foods that provide the latest prospects for preventing nutritional problems not only because of their macro and micro nutrient content but their bioactive components that have an effect on the methylation process at the cellular level.

Objective: the purpose of this study was to determine the consumption of functional foods based on local foods in pregnant women in Makassar City

Method: A cross sectional study design. The sample size was 647 pregnant women taken from 41 Puskesmas in Makassar City, except the Sangarrang Kepulauan Puskesmas. Functional food intake was collected using the FFQ method, Macro and micro nutrient intake with Food recall 2 x 24 hours. The data collection enumerators were 21 graduates from Nutrition III / IV graduates. Enumerators are trained for two days.

Results: showed that functional foods consumed by pregnant women based on local foods are sources of fiber, probiotics, Vitamin C, carotenoids, omega 3/9 and folifenol respectively (39.03 ± 36.78), (21.15 ± 7.74), (38.44 ± 30.9), (90.04 ± 50.53), (83.42 ± 60.42) and 166.57 ± 92.66). Conclusion: is that consumption of functional foods based on local foods in pregnant women is good.

Keywords: Score Consumption of Functional Foods, Pregnant Women

Introduction

The most serious nutritional problem in Indonesia is stunting. National stunting prevalence is 36% and South Sulawesi reaches 30.8%1. The impact caused by stunting is low academic potential, high risk of non-communicable diseases, high cost burden on health services and low productivity. Stunting problems must be prevented, because the incidence of stunting from birth is difficult to treat. Prevention of stunting starts from the preconception. This means that starting from pre-pregnancy and pregnancy2,3,4.

Prevention of stunting is most appropriate through the consumption of food with sufficient quality and quantity. Problems faced to meet the quality and quantity of food according to nutritional needs are income, preferences, availability and knowledge of nutrition5,6,7,8.

The fact of the income of the population of Indonesia, South Sulawesi, and Makassar City has an increasing tendency. The availability of local food varies considerably between regions and production centers both in villages and in cities. A change to the diversity of food from local food to fast food. There is a gap between supporting food potential and the emergence of serious nutritional problems in Indonesia, South Sulawesi and Makassar City. The clearest solution is to ensure that pregnant women consume enough food according to their nutritional needs.9,10 The most potential food to be developed is functional food based on local

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food, because this intervention is sustainable and has a real impact on improving the health status of mothers and fetuses.\textsuperscript{11,12} The research question is how much the potential for functional food on local food, for pregnant. The objective of this study is to identify scores consumption of functional foods based on local food, for pregnant in the city of Makassar, Indonesia

**Method**

The study design was a cross sectional study approach. The sample is pregnant women in the city of Makassar. Sample size was 647 people by random sampling selected. The sample frame was taken from a cohort of pregnant women available at data base on center of Public Health Offices Biringkanaya Subdistric of Makassar Indonesia. Data collectors by dietisien had been training during 16 hours. Instrument used to Food Frequency Questionaire (FFQ) had been standardized the reliability and validity based on Buginese Ethnicity.

Data of functional food consumption was collected used the FFQ method. The scores of functional foods based on local foods are analyzed for their antioxidant activities. Quality control of data collection by supervisor visiting for all enumerators. Data processing is done by SPSS application, and data analysed by frequency distribution. The study was approved by the Institution Review Board of Health Polytehnic of Makassar and South Sulawesi Province Licensing Service No:18414/s01/PTSP/2019. We obtained written inform consent from the subject.

**Results**

**Food Consumption Scores according to bioactive substances**

<table>
<thead>
<tr>
<th>Functional Food Consumption</th>
<th>n</th>
<th>mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiber</td>
<td>647</td>
<td>39.03</td>
<td>36.78</td>
</tr>
<tr>
<td>Prebiotics, Probiotics, and Symbiotics</td>
<td>647</td>
<td>21.15</td>
<td>7.74</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>647</td>
<td>38.44</td>
<td>30.96</td>
</tr>
<tr>
<td>Caratoid</td>
<td>647</td>
<td>90.04</td>
<td>50.34</td>
</tr>
<tr>
<td>Omega 3 and 9</td>
<td>645</td>
<td>83.42</td>
<td>60.56</td>
</tr>
<tr>
<td>Polyfenol</td>
<td>647</td>
<td>166.57</td>
<td>92.66</td>
</tr>
</tbody>
</table>

Based on the results of data analysis, it is known that the highest score of functional food consumption in pregnant women is the source material of polyphenols, carotenoids (90.04 ± 50.34) and Omega 3 + omega 9 (83.42 ± 60.56).

Based on the survey results it is known that the categories of micronutrient intake of Fe, Zinc, Vitamin C and Vitamin A are in the 57.34%, 92.27%, 92.27 and 93.5% categories respectively. This proves that there is still attention to the adequacy of iron sources.

**Discussion**

This survey is intended to describe the consumption of functional food in pregnant women in Makassar City. The results are known that pregnant women have consumed functional foods based on local foods appropriately and this is evidence that the potential of local foods can be increased to support the improvement of nutrition of pregnant women. Functional food has the advantage in containing a very rich source of non-nutritional substances as antioxidants. Consumption of probiotics, symbiotics and probiotics in pregnant women in Makassar is an average of 21.15 ± 7.71 point scores. This is equivalent to consumption of almost four days a week consuming sources of probiotics. A point score of 5 means consuming a source of probiotics once a week so with a score of 21 it is estimated to consume 4 days a week.

Consumption of fiber sources is reaching a value of 39.03 ± 36.78 is included in the category quite good, because every day must consume a source of fiber as a functional food based on local food. Consumption of Vitamin C sources is 38.44 ± 30.96 which means that every day pregnant women consume foods that contain vitamin C sources. Consumption of Omega 3 and Omega 9 sources is very high, reaching 83.42 ± 60.56 which means this that in a week already every day consume sources of omega 3 and omega 9. This generally comes from sea fish. Food consumption of polyphenol sources is the highest among all other food ingredients. This consumption reached 166.57 ± 92.66 point scores.

There is a gap between supporting food potential and the emergence of serious nutritional problems in Indonesia, South Sulawesi and Makassar City. Which way out most obvious is to ensure that pregnant women consume enough food according to nutritional needs and ensure consumption of baby food during the first 1000 days of life.\textsuperscript{8} The most potential food to be developed
is functional food based on local food, because this intervention is sustainable and has a real impact on improving the health status of mothers and children. The results of research on literature reviews conducted in America and Europe provide general guidelines about the causal relationship between food provided and health benefits. Nonetheless, they need to broaden the depth and scope of the guidelines given to companies that want to prove their claims and to provide precise information about functional foods.13

The fiber component consumed by each subject is multi-functional. In research it has been proven that pregnant women consume local food-based analytical functions, one of which is because it is a source of fiber. The emergence of a growing understanding of the structure and function of food fiber, discussed about the concept of resistance to the action of human digestive enzymes. He also said that it is not only carbohydrates (cellulose, hemicellulose, pectin etc.) which are the main components, but lignin which is a type of non-carbohydrate is also included in dietary fiber. The Canadian Ministry of Health (1988) published “Safety Guidelines and Physiological Effects of Fiber Sources and Food Products” and included non-starch polysaccharides from plants as a source of new fiber. Because it’s mentioned that novelty is a source of meaningful fiber. It was only in 2001 when the Institute of Medicine (IOM) expanded the scope of the definition to even isolate and synthesize carbohydrates by categorizing them into three parts namely food fiber, functional fiber and total food fiber (IOM, 2005). In 2009, Codex categorized the definition into three parts, firstly referring to naturally edible carbohydrates, secondly obtained from food raw materials with physical, chemical or enzymatic care and the third including those synthesized artificially.14

Probiotics have significant benefits in improving maternal health. Improving the health status of pregnant women significantly increases the quality of pregnancy and pregnancy output such as the baby’s lag weight and baby’s height status. This is certainly related to efforts to improve the nutritional status of mothers and children. Scientific evidence has been found that fiber and probiotics can prevent damage to epithelial cells during an infection. Improved digestive function and immune system. So it can be believed that mothers who have a source of fiber and probiotic consumption in this research have had direct benefits for themselves and their fetuses.15, used probiotics to prevent diarrhea in all age groups.16. Based on the great benefits of fiber and probiotics, in the food industry the value of probiotics and fiber have become items of concern to producers and consumers alike, including pregnant women.16

Conclusion

The highest consumption of functional foods based on local food is the source of polyphenols.

Ethical Clearance: This study approved ethical clearance from the Committee of Research Ethics of Health Polytechnic of Makassar, Indonesia. We followed guideline from Committee of Departement Research Ethics of Health Polytechnic of Makassar, Indonesia for ethical clearance and informed consent. The informed consent included the research title, purpose, participants’ right, confidentiality, and signature.

Source Funding: The source of this research costs from Health Polytechnic of Makassar.

Conflict of Interest: The authors declare that they have no conflict interests

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Activity of Ethyl Acetate Fraction of *Merremia mammosa* Hall as Anti-Influenza A (H1N1)

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Abstract

The outbreak of influenza A viruses (H1N1 and H5N1) has raised a global concern on the future risk of a pandemic. Oseltamivir, the current neuraminidase inhibitor, could not meet the demand if there is a major outbreak. Thus, there is a need to find alternative treatment for influenza A, especially from natural herbs. The objectives of this study were to determine antiviral influenza A activities of *Merremia mammosa* Hall against influenza A H1N1. People in Madura island, Indonesia used this rhizome to cure tuberculosis. In this research, *Merremia mammosa* Hall rhizome was extracted gradually using n-hexane to remove the non-polar compound. The residue was extracted using ethyl acetate to obtain semi-polar extract. The ethyl acetate fraction of *Merremia mammosa* Hall was subjected to *in vitro* antiviral assay against influenza A (H1N1) virus using Hemagglutinin Assay. This is a method for titering influenza viruses based their ability to attach molecules present on the surface of chicken red blood cell. The virus was incubated in embryonated chicken eggs and treated by ethyl acetate fraction of *M. mammosa* for 3 x 24 hours. Allantoic fluid was harvested and subjected on hemagglutinin assay to measure the titre of virus after treated with the fraction. The ethyl acetate extract of *Merremia mammosa* Hall can reduce the titer of hemagglutinin virus by 97.39% at concentration 1000 µg/mL. In conclusion, *Merremia mammosa* Hall has the potential to be developed as agent of antiinfluenza A infection.

**Keywords:** *Merremia mammosa* Hall, influenza A, H1N1.

Introduction

As 1st August 2010, there were over then 18,449 deaths in more than 214 countries that have reported laboratory confirmed cases of pandemic influenza H1N1 2009, for the period of April 2009 to August 2010. However, WHO stated that the total death (including unreported deaths) from the H1N1 strain was actually higher[¹]. In fact, Dawood reported that the estimate global deaths associated with H1N1 pandemic 2009 influenza were 15 times higher, which were 284,400 deaths[²].

The existed vaccines against seasonal influenza virus to control this disease have been ineffective due to its rapid variable mutation. In the period of pandemic, vaccine supplies would not be adequate[³]. Thus, the development of effective and safe anti-influenza becomes a matter of certainty in drug discovery[⁴]. People in Madura island, Indonesia used the tuber of *Merremia mammosa* (Convolvulaceae) to treat tuberculosis infection *Merremia mammosa* is one Indonesian folk medicine use as treatment of cough and sorethroat[⁵].

However, there is still limited of scientific data can be found about this plant. The chemical component of this plant are Mammoside A and B[⁶]. This plant also contain polyphenol, triterpenoid, terpenoid, and flavonoid[⁷]. It has reported that this plant has pharmacological activity as anti-HIV. *Merremia peltata*, another plant from the same family, has antimicrobial activity and anti-HIV activity by inhibiting HIV-1 reverse transcriptase and gp120-CD4 binding *in vitro*[⁸]. Thus, the objectives of this study were to determine the neuraminidase inhibition (curative) and hemagglutinin inhibition (preventive) influenza A antiviral activities of the tuber of *Merremia mammosa* Hall against influenza A H1N1.
Materials and Method

Chemicals and Reagents

In this study, the solvents used were methanol, n-hexane, n-butanol purchased from Merck (Germany), ethyl acetate and chloroform purchased JT Backer (USA), all the solvent used was analytical reagent grade. Phosphate Buffer Saline (PBS) from Nacalai Tesque (Japan), Penicilline-Streptomycin from Gibco (USA), sterile distilled or deionised H₂O, physiological saline (0.85% NaCl) from Otsuka (Japan). The dimethyl sulfoxide (DMSO) was purchased from Merck. The virus used in this experiment was A/Indonesia/Unair/2011 (H1N1) pandemic strain which was propagated in 11-days embryonated chicken eggs.

Plant Extraction

Merremia mammosa Hall tuber was obtained from Sumenep, Madura, Indonesia. The tuber was cut into slice, dried, and grinded into powder. Dried powder of Merremia mammosa Hall (1900 gr) was subjected on maceration in room temperature using methanol as the solvents (3×5 L). The supernatant was collected and subjected on rotary evaporator to obtain a thick crude extract. The methanol extract was added by deionised water in the same amount and added by non-polar solvent (n-hexane) to obtain non-polar fraction. The mixture of methanol-water and n-hexane was shaken vigorously for 10 minutes. This mixture was allowed to stand for some time to allow a complete separation and formed into two layers (water portion and n-hexane portion). The n-hexane portion was collected. This step was repeated for 3-5 times until the n-hexane layer was clear. The n-hexane portion was concentrated in vacuo, while the water portion was added by ethyl acetate to obtain the ethyl acetate fraction. The ethyl acetate fraction was subjected to in vitro antiinfluenza againsts H1N1 influenza virus.

Toxicity Assay

In order to obtain the MNTD (Minimum Non Toxic Dose), the toxicity test was carried out using the host which was embryonic chicken egg. This assay was aimed to determine the highest concentration of the sample which was not caused the death of chicken embryo. Ethyl acetate fraction was added to PBS solution with final concentration 1000, 500, and 62.5 µg/mL (High, moderate, low). DMSO was added in concentration 2.5% to improve the solubility. In this experiment, the solution of the samples were injected carefully to the broad pole of the 11-days-old embryonic chicken egg. This experiment was conducted in 72 hours, the death of the embryo was a checked every 24 hours. The highest concentration that not caused lethality of chicken embryo is proceed for the next assay. All the experiment were running in triplicate.

Treatment of the Virus

11-days-old embryonic chicken egg were injected with 0.01 MOI of H1N1 virus solution (50 µL). The solution of the sample were injected 30 minutes prior to the virus infection to give chance of the samples to spread to the protein of the egg. Zanamivir 10 µg/mL was used as a positive control and the H1N1 virus without treatment extract is used as a negative control. In each extract solution, 50 mL penicillin-streptomycin were added to avoid bacterial infection. The eggs were then incubated for 72 hours at 37 ºC. Embryo mortality observed every 24 hours. After an incubation period is complete, the eggs stored at 4 ºC for 12-24 hours and allantoic fluid was harvested to be subjected on hemagglutination inhibition activity.

Hemmaglutinin Assay

The first opportunity to prevent influenza virus replication is when the virus attaches to the host cell membrane. Influenza virus hemagglutinin oligosaccharides attached to the host cell membrane associated with sialic acid terminal position. The agents act to inhibit the viral replication by interfering the first attachment step of the virus to the host cell, resulting the reducing of HA titre in culture specimen[9]. Guinea Pig’s whole blood 5 mL+PBS 10 mL, was subjected on centrifuge 1200 rpm for 10 min. The supernatant was removed and this step was repeated until the PBS was clear. 0.75% of RBC was prepared by adding 37.5 μL of RBC+462.5 μL of PBS. To do this assay, U-shaped 96 well of micro-plates were taken. Using a micropipette, 50 µL of PBS (pH 7.2) was added to all wells except first well of each row. Harvested fluid from virus growth inhibition assay (100 µL) was added to the first two wells of each row. Twofold dilution was made by transferring 50 µL from the second well of each column A2-H2 to A3-H3 by using a multi-channel micropipette. This step was preceded until the 12th column and the remaining 50 µL was discarded after the 12th column. Last, 50 µL of 0.75% RBCs was added to all wells and incubated for 30 minutes at 4ºC. Control well was checked for
complete settling of the RBCs. Results were recorded in HA sheet. The dilution also can be done vertically, with the same principle of procedure[10]. The percentage inhibition was calculated by applying the equation below:

\[
\% \text{ HA titer reduction} = \frac{A - BA}{A} \times 100\%
\]

Note: A. Hemagglutinin titer without the treatment; and B. Hemagglutinin titer with the treatment.

### Results

**Table 1. Result of toxicity test.**

<table>
<thead>
<tr>
<th>Toxicity Test</th>
<th>Incubation Time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24 h</td>
</tr>
<tr>
<td>Concentration (µg/ml)</td>
<td>I</td>
</tr>
<tr>
<td>1000</td>
<td>+</td>
</tr>
<tr>
<td>500</td>
<td>+</td>
</tr>
<tr>
<td>62.5</td>
<td>+</td>
</tr>
</tbody>
</table>

(+) means there is no mortality of chicken embryo exposed by the sample. Note: I, II, III = a triplicate experiment.

From this assay, it can be concluded that in the highest concentration, there was no lethality of chicken embryo. Therefore, the next assay will be started at concentration 1000 µg/mL.

**Table 2. Result of hemagglutinin assay.**

<table>
<thead>
<tr>
<th>Hemagglutinin Assay</th>
<th>Grup concentration (µg/mL)</th>
<th>Mean of HA unit</th>
<th>Percentage of inhibition (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F.EtOAc 1000 µg/mL</td>
<td>10.67</td>
<td>93.75</td>
</tr>
<tr>
<td></td>
<td>F.EtOAc 500 µg/mL</td>
<td>9.3</td>
<td>92.73</td>
</tr>
<tr>
<td></td>
<td>F.EtOAc 62.5 µg/mL</td>
<td>32</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>Control (Zanamivir 10)</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Control (virus only)</td>
<td>128</td>
<td>-</td>
</tr>
</tbody>
</table>

### Discussion

*In vitro* antiviral assay was performed using A/Indonesia/Unair/2011 (H1N1) virus which was propagated in embryonated chicken egg. Ethyl acetate fraction was proved to have a specific interaction with HA protein. The reduction of HA titre and 93.75% of H1N1 infectious titre. From the result of the present study, it is possible to suggest that the treatment given was affecting the viral replication especially in the early stage of infection[11]. Ethyl acetate fraction reduced HA titer near to zero in allatoic fluid of embryonated chicken egg specimens and showed high protection against viral infection. Ethyl acetate fraction is rich in flavonoid and terpenoid compounds that has the possibility to inhibit the growth of the virus. In conclusion, ethyl acetate fraction of *Merremia mammosa* Hall is able to inhibit viral at early step of infection especially when giving before the infection.
Conclusion

In sum, *Merremia mammosa* Hall has the potential to be developed as antiviral agent of influenza A (H1N1) infection.

Conflict of Interest: The authors declare that they have no conflict of interest.

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Ethical Approval: This study was approved by the Animal Care and Use Committee, Faculty of Veterinary Medicine, Universitas Airlangga, Surabaya, Indonesia.

References

The Effect of Flavonoid Fraction from *Vitex trifolia* Leaves on Pandemic-2009 H1N1 Influenza A Virus Propagated in Embryonated Chicken Eggs

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**Abstract**

The aim of this study is to investigate antiviral activity of flavonoid fraction of *Vitex trifolia* leaves towards influenza A viruses H1N1 pandemic-2009 that were propagated in embryonated chicken eggs (ECEs). Fraction that rich of flavonoid compounds was isolated from the crude ethanolic extract using column chromatography, prior to be subjected to antiviral inhibition assay. The assay was evaluated by using hemagglutination (HA) test. The HA titre reduction of the virus was counted after being treated with the flavonoid fraction, compared to untreated one. The result showed that percentage of inhibition of this flavonoid fraction against pandemic-2009 H1N1 influenza A virus are 37.50%, 71.25%, 71.25% at concentration 125 μg/mL, 500 μg/mL, and 750 μg/mL, respectively. In conclusion, the flavonoid fraction of *Vitex trifolia* leaves showed effect to reduce viral hemagglutinine, the enzyme that has a crucial role in the initiating step of virus infection, without possessed any toxicity to ECEs.

**Keywords:** flavonoid, influenza A H1N1 pandemic 2009 virus, Vitex trifolia, hemagglutinin

**Introduction**

Influenza virus is a member of Orthomyxoviridae, one genera of Influenza A with a complex pathogenesis due to its genetic variability. One of the specific mutation of influenza virus is due to the antigenic drift and mutation[1]. The current influenza A subtype H1N1 is a combination from influenza virus gen from swine, bird and human, that has an ability to mutate by the mechanism of antigenic drift and antigenicshift to produce the new resistant influenza virus[2]. However, throughout the world until August 4, 2009, 168 countries reported cases of influenza A H1N1 with 162,388 positive cases, 1,154 of them died. And data on the cumulative number of H1N1 infections in Indonesia up to August 23, 2009 were 1,005 people with 5 of them died. FDA has recommend two types of drugs to cure and to prevent Influenza A, which are M2 inhibitors (Amantadine and Rimantadine) and Neuraminidase inhibitors (Oseltamivir and Zanamivir). Those drugs also can be use for prophilaxis and treatment for seasonal influenza.

The concern about this virus is emergent due to the resistance of the common influenza drug such as oseltamivir due to the mutation of H274T[3,4]. The resistance of adamantane derivatives is also detected due to the substitution of amino acid in the order 26 (LeuàPhe), 27 (ValàAla atau Thr), 30 (AlaàThr atau Val), 31 (SeràAsn atau Arg), and 34 (GàE) in the domain of M2 trans membrane[5]. Thus, the alternative treatment for influenza infection is strongly needed. One of the sources for searching a new potent drug is herbal medicine. One suggestion used for antiviral drugs is chemotaxonomy. In fellow genus *Vitex* studies, extracts and fractions rich in flavonoids from fruits and leaves of *Vitex polygama* Cham (Vebeńaceae) can increase dose-dependent antiviral activity against type 1 herpes simplex virus (ACV-HSV-1). Leaf extract shows...
antiviral activity while the fruit extract has a virucidal effect. Some fractions of ethyl acetate extract can inhibit the virus by blocking HEp-2 receptor cells\(^6\).

In this study, a fractionation method from the methanol extract of the leaves of *Vitex trifolia* was carried out to obtain sub-fractions which contained many flavonoids using ethyl acetate solvents. Ethyl acetate solvents are semi-polar solvents and can dissolve compounds such as flavonoids\(^7\). In addition, one of the flavonoid compounds that has the ability to inhibit viruses with the mechanism of neuraminidase inhibitors is vitexin. Vitexin compound is owned by *Vitex trifolia*\(^8\). Based on these facts it is possible that the sub flavonoid fraction of *Vitex trifolia* also has activity as an antiviral.

**Materials and Method**

The test material used was sub flavonoid fraction of *Vitex trifolia* leaves which was isolated by fractionation using vacuum column chromatography. The fraction that rich of flavonoid compounds was used to the assay.

**Virus and Testing Media**

The influenza virus used was influenza A virus pandemic H1N1 subtype 2009 strain A/Unair-367-2010 and provided by Avian Influenza Research Center (AIRC) Laboratory, Universitas Airlangga, Surabaya, Indonesia. The virus is grown in ECES obtained from Pusvetma, Surabaya, Indonesia. The hemagglutination test (HA) is carried out using guinea pig red blood cells.

**Chemicals and Reagents**

Silica gel GF254, silica gel 60G for thin-layer chromatography, Silica Gel 60, technical methanol (Brataco), Ethyl Acetate (Brataco), n-hexane (Brataco), Chloroform Pa (Fulltime), Phosphate Buffer Saline (PBS) (GIBCO), Dimethylsulfoxide (DMSO) (Merck), Sterile Water For Irrigation U.S.P. (Otsuka), red blood cell (RBC) guinea pig, an antibiotic solution of Penicillin-Streptomycin (Gibco).

**Tools**

Vacuum column chromatography, filter paper, separating funnel, UV scanner (CAMAAG), Analytical scales (Ohaus), Chamber, autoclave (HL-340), Biosafety cabinet (NuAire), incubator, micropipette (Eppendorf), glassware, 96 Centrifuge (Tommy) “U and V” plate, refrigerator 4 °C (Sanyo), -80 °C freezer, Vortex (Barstead Thermolyne), 1 mL injection syringe, Buchner (Schott) funnel, rotary evaporator (Buchi).

**Extraction Method**

The thick methanol extract of leaves of *Vitex trifolia* was weighed 143 g then added with water as much as put in a separating funnel. Prepare as much n-hexane with volume and put it in a separating funnel, shake until homogeneous after that separated between water fraction and n-hexane. The n-hexane fraction is present. This process is repeated until the n-hexane fraction is not dark in color. In this process, the n-hexane fraction is obtained. In the water fraction that is still in the separating funnel, ethyl acetate is added as much, and then shaken until homogeneous, and the ethyl acetate fraction is accommodated. This step is repeated until the ethyl acetate fraction is colorless. Then the ethyl acetate fraction was obtained, the ethyl acetate fraction was subjected to a rotary evaporator at 40 °C until thick ethyl acetate fraction was obtained. The fraction was subjected to vacuum column chromatography. Gradient volume of chloroform and ethyl acetate was used as mobile phase to separate the flavonoid compounds. The sub fraction was diluted in 5% of DMSO and phosphate buffer saline until reach the final concentration 1000 µg/mL, 500 µg/mL, 250 µg/mL, and 125 µg/mL.

**Toxicity test**

Toxicity test and determination of safe concentration of the tested samples on 11 days old ECEs. 15 ECEs then disinfected the outside of the eggs by using 70% of alcohol. Four concentrations of the fractions that have been made 1000 µg/mL, 500 µg/mL, 250 µg/mL and 125 µg/mL each concentration is taken as much as 100 µL+50 µL of penicillin streptomycin solution. Each concentration was injected into the ECEs, replicated 3 times. After entering the fraction+penicillin streptomycin solution, the hole in the egg is covered with tape until it is completely tight. ECEs was incubated at 37 °C incubator for 2 days. Every day the eggs are observed for the embryo. Embryos that die before two days, are removed from the incubator then stored in a refrigerator at 40 °C. After 2 days the non-dead ECE was transferred to the refrigerator at 40 °C for one night. From this process, it can be determined which concentration will be used for the activity test. The virus that will be used for the activity test has a 2\(^12\) titre.

**Control Groups**

a. Inject 100 µL of the pandemic-2009 H1N1
subtype influenza A virus + 100 µL Zanamivir 15 µM + 50 µL Penicillin-Streptomycin solution (10,000U/mL) (positive control; use 3 ECEs).

b. Inject 100 µL of pandemic H1N1 subtype A-2009 virus + 50 µL Penicillin-Streptomycin solution (10,000U/mL) (negative control; use 3 ECEs).

Treatment Group

Injecting 100 µL of pandemic H1N1 subtype A-2009 virus + 100 µL sub flavonoid fraction solution at non-toxic concentration + 50 µL Penicillin-Streptomycin solution (10,000U/mL). ECEs that have been treated are covered with plastic tape. ECEs is stored in an incubator at 37 °C for 3×24 hours. Every 1×24 hours the ECEs is observed using an egg candler. For dead embryos before the third day, they are separated and then stored in a 4 °C refrigerator for one night and harvested with allantoic fluid the next day. Harvested allantoic fluid then centrifuged 3000 rpm for 5 minutes. After being centrifuged, two parts will be formed, namely the part of the supernatant (clear liquid) and the pellet (sediment). Furthermore, the supernatant was taken using a micropipette and carried out the HA test. For the HA test using marmot red blood cells 0.75%, used the “U” shape plate. First, 50 µL PBS is needed in all wells, then 50 µL of allantoic fluid are added to be tested into wells A (1-12, 1 sample / well) and after that serial serial dilution is carried out by taking 50 µL from well A to B and so on until well H, the last one thrown away. Furthermore, each well was given 50 µl of 0.75% marmot red blood cells, shaken to be homogeneous, closed, and incubated in a 4 °C refrigerator for 60 minutes. The HA titre value is the highest dilution of the virus which still shows perfect hemagglutination. HA titers are the opposite of virus dilution.

Data Analysis

For the HA test, it was done to compare the HA titre of samples with controls. The decreasing in the HA titre percentage, showing the ability of the test sample to inhibit the virus. The percentage of antiviral inhibition is calculated by the following formula:

\[
\text{Untreated HA titer} - \text{treated HA titer} \times 100
\]

\[
\text{Untreated HA titer}
\]

Results

Separation of sub flavonoid compounds from 1 to 11 was carried out to obtain good stain separation with chloroform: ethyl acetate gradient volume, using Thin Layer Chromatography (TLC). The flavonoid test was conducted by contacting the TLC plate with ammonia vapor. The presence of yellow colour after ammonia vapor was applied, concluded that the sub fractions contained flavonoids[9]. Results fractions vacuum column chromatography which has been tested in TLC, collected the same stain pattern combined into large fraction.

\[\text{Fraction 5: Fraction from vacuum column chromatography with eluent chloroform: ethyl acetate 60:40}\]

\[\text{Fraction 6: Fraction from vacuum column chromatography with eluent chloroform: ethyl acetate 50:50}\]

The yellow spots were detected using amoniac vapour indicated the presence of flavonoid.

Figure 1. TLC of flavonoid fraction 5 and 6.

Table 1. Result of toxicity test on ECEs.

<table>
<thead>
<tr>
<th>Treatments (µg/mL)</th>
<th>Incubation time</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24 h</td>
</tr>
<tr>
<td></td>
<td>Replications</td>
</tr>
<tr>
<td>125</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>+</td>
</tr>
</tbody>
</table>

Figure 1. TLC of flavonoid fraction 5 and 6.
Note: (+) Embryo no died
(-) Embryo died

Table 2. Result of HA Assay.

<table>
<thead>
<tr>
<th>Concentration</th>
<th>Negative Control</th>
<th>Positive Control</th>
<th>125 μg/mL</th>
<th>250 μg/mL</th>
<th>500 μg/mL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean HA titer</td>
<td>28</td>
<td>25</td>
<td>25</td>
<td>22.3</td>
<td>22.3</td>
</tr>
<tr>
<td>2Log2 HA titer</td>
<td>8</td>
<td>5</td>
<td>5</td>
<td>2.3</td>
<td>2.3</td>
</tr>
<tr>
<td>% of titer reduction</td>
<td>0</td>
<td>37.5</td>
<td>37.5</td>
<td>71.25</td>
<td>71.25</td>
</tr>
</tbody>
</table>

Figure 3. Percentage of HA titer reduction.

Discussion

Treatment and prevention of influenza can be done through administration of antiviral and vaccination. At present there are 2 classes of influenza antiviral drugs, namely adamantane groups and neuraminidase inhibitors. However, infection control of influenza A virus using antivirals has begun to experience problems due to the emergence of new strains that are resistant to existing antiviral drugs[10]. This study used sub fraction of flavonoids from *Vitex trifolia* leaf with chemotaxonomic approach to determine the effect on the swine flu virus (H1N1 Pandemic 2009).

In previous studies it has been shown that the methanol extract of *Vitex trifolia* leaves can reduce H1N1 virus titers carried out by the hemagglutination (HA) test and in silico through Molegro Virtual Docker (MVD) software based on docking results can be known if vitexin compared to zanamivir have ties hydrogen on Arginine 152 (Arg 152), Arginine 292 (Arg 292), Arginine 371 (Arg 371), Aspartic Acid Asp 151, Tyrosine 406 (Tyr 406). Based on the rerank score, vitexin had a score of -95.6056 kcal/mol and zanamivir -111,423 kcal/mol. The lower (more negative) value of the rerank score, the more stable the receptor ligands interaction. Previous
research also proved that the methanol extract of *Vitex trifolia* leaves can reduce H5N1 virus titers carried out by the hemagglutination (HA) and neuraminidase inhibitor (NAI) tests\textsuperscript{[11]} . To determine the effect of sub-fraction on ECEs as a viral growth medium, a non-toxic dose of sub-fraction in ECEs was tested in several fraction concentrations which are, 125 µg/mL, 250 µg/mL, 500 µg/mL, 1000 µg/mL, 2000 µg/mL. There is no limit in the choice of these concentrations as long as the dose is safe in ECEs\textsuperscript{[12,13]} . ECEs used are free from antibody to fight viruses will be inoculated\textsuperscript{[10]} .

After 72 hours of inoculation, embryonic death was found in concentration 2000 µg/mL and 1000 µg/mL for two ECEs. This can be occured due to individual variations, different egg immunity systems and ECEs used in replication. So, in this study, only concentration of 125 µg/mL, 250 µg/mL, and 500 µg/mL that were used. To determine the growth of viruses in ECEs, can be determined in two ways, namely by observing the embryonic death and testing HA. Based on the results of the observation, embryonic death did not occur at the same time. Individual variations in ECEs greatly affect the ability of the embryo to survive so that hemagglutination tests are carried out to determine the virus titers in ECEs\textsuperscript{[14]} .

The data showed that at concentration of 250 µg/mL and 500 µg/mL, the inhibition oh HA titer is 71.25 %, and indicated a strong inhibition of HA titer. From the previous study, it was also proved that the extracts and fractions of several plants such as *Garcinia mangostana*, *Eurycoma longifolia*, *Tabernaemontana divaricata*, *Brueca javanica*, and *Momordica charantia* had good inhibition percentages at concentrations of 250 µg/mL\textsuperscript{[15]} . In this study, the compound which is suspected to give inhibition for the growth of H1N1 virus is vitexin, one of flavonoid compounds presence in *Vitex* genera. In a similar study, the use of embryonic chicken eggs as a learning model to determine the effect on influenza A H9N2 virus using oseltamivir carboxylate with ten ECEs per replication\textsuperscript{[13]} .

**Conclusion**

In conclusion, the flavonoid fraction of *Vitex trifolia* leaves showed effect to reduce viral hemagglutinin, the enzyme that has a crucial role in the initiating step of virus infection, without possessed any toxicity to ECEs.

**Conflict of Interest:** The authors declare that they have no conflict of interest.

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**Acknowledgement:** We would like to thank Prof. C. A. Nidom for providing the virus and equipment to handle the virus assay. We thank Arif Nur Muhammad Ansori for editing the manuscript.

**Ethical Approval:** This study was approved by the Animal Care and Use Committee, Faculty of Veterinary Medicine, Universitas Airlangga, Surabaya, Indonesia.

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Determinants of Teenage Pregnancy in Indonesia

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Abstract

The phenomenon of teenage pregnancy in Indonesia has increased annually, but only a few studies that indicate its predictors. The present research aimed at analyzing the determinants of teenage pregnancy in Indonesia. The study used secondary data obtained from the Indonesian Demography and Health Survey (IDHS) in 2017. The independent variables are as follows age, wealth status, education, occupation, and marital status. On the other hand, the dependent variable is teenage pregnancy. The data were analyzed using binary logistic regression. It was found that age is a significant determinant of teenage pregnancy. The richest teenager has 0.61 higher possibility of getting pregnant than the poorest. A teenager with higher education is 0.03 times more possible to get pregnant than one that has not gone to school before. Moreover, a working teenager has the possibility to get pregnant higher than that of not working teenager by 1.47 times. The present study empirically proves that marital status is not a determinant of teenage pregnancy. While the four other variables, such as age, lower wealth status, no education, and working have been proven as determinants of teenage pregnancy in Indonesia.

Keywords: teenage, pregnancy, determinants, Indonesia

Background

Teenage pregnancy happens when a young woman aged between 13-19 years old is having sexual intercourse which leads to pregnancy. The number of pregnant teenagers in Indonesia is 58.56%(¹). This evidence from other countries indicates high teenage pregnancy. Most women aged between 20-24 years old in Ethiopia (79.6%) were found pregnant. Every year, Indonesia also reports an increase to the number of pregnant teenagers. Such trend is also true in Malawi(²). The teenage pregnancy in Sub-Sahara Africa shows low utilization of antenatal(³). Moreover, female teenagers in the Midwest, US do not actively search for information related to teenage pregnancy(⁴). Meanwhile, only a few of female teenagers in the Imo Territory of Nigeria are aware of emergency contraception(⁵). A study conducted in South Africa found that women who are pregnant in their teenage period tend to receive negative stigma from their teachers, health service staff, and the community(⁶). Moreover, teenage pregnancy is related to anemia(⁷), low birthweight, premature birth, and hypertension(⁸).

Teenagers in majority have not finished their high school, unmarried, not worked, and financially dependant on their parents. The emotional development of teenagers are not yet stable, making it hard for them to become a young mother. The present study aimed at analyzing age, residence, wealth status, education, occupation, and marital status.

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Materials and Method

The research design of this study is correlation, with cross-sectional approach. The research employed secondary data obtained from the Indonesian Demographic and Health Survey in 2017. The research was conducted in 34 provinces of Indonesia. Meanwhile, the analysis unit being researched was women aged between 20-24 years old in Indonesia who has given birth in their < 20 years old. The sampling technique used was stratification and multistage random sampling, thereby obtained 3,350 samples. The 2017 IDHS obtained ethical approval from the National Institute for Health Research and Development of the Indonesian Ministry of Health. All respondents’ identities are unknown from the data, and the respondents gave written consent for their involvement in the research. Permission to use the 2017 IDHS in this study was obtained from ICF International on January 21, 2020, through its website: https://dhsprogram.com/Data/terms-of-use.cfm.

The dependent variable of the study is teenage pregnancy, while independent variables which were analyzed as supposedly predictors, such as: age, type of place of residence, wealth status, education level, currently working, and marital status. Teenage pregnancy in this study was defined as pregnant women aged less than 20 years old. The measurement to obtain the data used two categories, such as yes and no. The age variable was analyzed using the year unit starting from 20 years old to 24 years old in the form of continuous data. More, the definition of type of place of residence refers to the known categories defined by the Central Bureau of Statistics. The measurement was under two categories, such as urban and rural, and for the reference is urban. Wealth status is that of social wealth status of a person indicated by the wealth status. Wealth or wealth status is divided into five classes, such as poorer/lower, middle, richer/higher, richest, and poorest as reference. Education is the level of education of person that is classified into four categories, such as primary, secondary, higher education, and no education, and no education is the reference. Currently working is divided into two classes; working and not working, and not working is the reference. Marital status is categorized into three classifications, such as never in union/no longer living together/separated, married/living with partner, dan Widowed/divorced is the reference. The data analysis followed two steps. First, the study conducted relationship test using chi square for categorical data and t-test for the continuous data. In the final step, the study used binary logistic regression.

Findings

Table 1. Descriptive Statistics of Teenage Pregnancy in Indonesia (n=3350)

<table>
<thead>
<tr>
<th>CHARACTERISTICS</th>
<th>TEENAGE PREGNANCY</th>
<th>ALL</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td><strong>Age (mean)</strong></td>
<td>1388 (22.81%)</td>
<td>1962 (22.27%)</td>
<td>3350 (22.49%)</td>
</tr>
<tr>
<td>Type of Place of Residence*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban (ref.)</td>
<td>654 (47.1%)</td>
<td>714 (36.4%)</td>
<td>1368 (40.8%)</td>
</tr>
<tr>
<td>Rural</td>
<td>734 (52.9%)</td>
<td>1248 (63.6%)</td>
<td>1982 (59.2%)</td>
</tr>
<tr>
<td><strong>Wealth status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poorest (ref.)</td>
<td>354 (25.5%)</td>
<td>798 (40.7%)</td>
<td>1152 (34.4%)</td>
</tr>
<tr>
<td>Poorer</td>
<td>309 (22.3%)</td>
<td>477 (24.3%)</td>
<td>786 (23.5%)</td>
</tr>
<tr>
<td>Middle</td>
<td>304 (21.9%)</td>
<td>347 (17.7%)</td>
<td>651 (19.4%)</td>
</tr>
<tr>
<td>Richer</td>
<td>261 (18.8%)</td>
<td>217 (11.1%)</td>
<td>478 (14.3%)</td>
</tr>
<tr>
<td>Richest</td>
<td>160 (11.5%)</td>
<td>123 (6.3%)</td>
<td>283 (8.4%)</td>
</tr>
<tr>
<td>Education*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No education (ref.)</td>
<td>3 (0.2%)</td>
<td>42 (2.1%)</td>
<td>45 (1.3%)</td>
</tr>
</tbody>
</table>
Table 1. Descriptive Statistics of Teenage Pregnancy in Indonesia (n=3350)

<table>
<thead>
<tr>
<th>Determinant</th>
<th>TEENAGE PREGNANCY</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sig.</td>
<td>OR</td>
<td>Lower Bound</td>
</tr>
<tr>
<td>Age</td>
<td>0.000***</td>
<td>0.73</td>
<td>0.69</td>
</tr>
<tr>
<td>Type of Place of Recidence: Rural</td>
<td>0.062</td>
<td>1.17</td>
<td>0.99</td>
</tr>
<tr>
<td>Wealth status: Poorer</td>
<td>0.034*</td>
<td>0.80</td>
<td>0.65</td>
</tr>
<tr>
<td>Wealth status: Middle</td>
<td>0.000***</td>
<td>0.64</td>
<td>0.52</td>
</tr>
<tr>
<td>Wealth status: Richer</td>
<td>0.000***</td>
<td>0.53</td>
<td>0.41</td>
</tr>
<tr>
<td>Wealth status: Richest</td>
<td>0.001**</td>
<td>0.61</td>
<td>0.45</td>
</tr>
<tr>
<td>Education: Primary</td>
<td>0.050*</td>
<td>0.30</td>
<td>0.09</td>
</tr>
<tr>
<td>Education: Secondary</td>
<td>0.001**</td>
<td>0.13</td>
<td>0.04</td>
</tr>
<tr>
<td>Education: Higher</td>
<td>0.000***</td>
<td>0.04</td>
<td>0.01</td>
</tr>
<tr>
<td>Work status: work</td>
<td>0.000***</td>
<td>1.48</td>
<td>1.26</td>
</tr>
</tbody>
</table>

Note: *p < 0.05; **p < 0.01; ***p < 0.001.
Table 2 describes the results of binary logistic regression test of teenage pregnancy in Indonesia. The references of the present study is no occurrence of teenage pregnancy. The variable of age is one of the predictors of teenage pregnancy di Indonesia. This result is similar to a study conducted in Ethiopia which found that the chance of giving birth cases in teenagers occurs between the age of 18–19 years old, in which they tend to start having sexual intercourse since 18 years old. Differently, the result of a study in Michigan indicted that age does not affect teenage pregnancy, but the age of the sexual partner does significantly. Age is often correlated with physical maturity and thinking skill. Pregnancy in women younger than 20 years old tends to not develop physically and the pregnant women might not be capable of keeping their pregnancy and having safe birth. Pregnancy with hypertension and anemia, premature birth, and low birthweight are believed to be related with mother’s age when pregnant.

Table 2 also describes the teenage pregnancy seen from the wealth status. Compared with the poorest teenagers, the poorer teenagers have 0.802 times chance higher (OR=0.80; 95% CI 0.67-0.98); Teenagers with middle wealth status have 0.642 times higher chance to get pregnant (OR=0.64; 95% CI 0.52-0.78); while those with the richer wealth status has higher chance by 0.53 times (OR=0.53; 95% CI 0.41-0.67); moreover, teenagers with richest wealth status have 0.61 times higher chance of conceiving pregnancy (OR=0.61; 95% CI 0.45-0.82). This result indicates that the poorest teenagers have the highest chance of conceiving pregnancy. The poorer they are, the higher the possibility to get pregnant in their teenage time. This result is in line with those found in Ghana and Malawi which stated that female teenagers who belong to the lowest wealth status have the highest possibility to have early marriage which will lead to teenage pregnancy. Parents’ poverty is thought to be the underlying justification for their decision to marry their daughters to other people. The negative impact of poverty to teenage pregnancy is that they are more prone to unpleasant condition when being mothers. If their daughters are married, a part of their responsibility will move to their daughters’ husbands. The presence of a son in law within a poor family is also considered an extra help for earning the life. Such family fails to consider possible negative impacts of such early marriage and teenage pregnancy.

Moreover, Table 2 depicts the teenage pregnancy based on the educational level. If compared with teenagers with no education, those with primary education have 0.30 times chance higher (OR=0.30; 95% CI 0.09-0.99); Teenagers with secondary education show 0.13 times higher possibility (OR=0.13; 95% CI 0.04-0.43). Teenagers with higher education perform 0.04 higher chance of conceiving pregnancy (OR=0.04; 95% CI 0.01-0.12). These results show the biggest possibility of conceiving teenage pregnancy. This result confirms the findings of a study in Ghana which mentioned female teenagers who have never gone to school are more likely to get married in their teenage period than teenagers with certain educational level. Similarly, the study in Brazil revealed that daughters of low income family usually do not finish/complete their primary education. Lower length of study is also correlated with planned teenage pregnancy. Education is a process of learning knowledge, skills, and habits. Through education, one develops his/her potentials in order to obtain certain objectives in cognitive and good attitude. The length of study required to finish the secondary school is 18 years. One that has not completed his/her education at least until secondary level might have limited information and life skills. This may lead to the poor consideration on making the decision to get married and conceive pregnancy. The present study has empirically proven that most of teenage pregnancy occurs in marriage. Teenage marriage is therefore assumed to be a way out for female teenagers who do not pursue higher education.

Finally, Table 2 informs about working teenagers who have 1.48 times higher possibility to get pregnant than not working teenagers (OR=1.48; 95% CI 1.26-1.73). This finding indicates that working women are more possible to get pregnant than those who are not working. However, the finding is different from a study in Northern Ethiopia and Brazil who declare that lower monthly income is a predictor to teenage pregnancy. Working women earn their own living. The autonomy in managing one’s own expenses makes a woman more confident in deciding to conceive. They also have broader circles with other people, unlike the not working women. Getting pregnant is thought to be manifestation of self-actualization in a working teenager.

**Conclusions**

Based on the results of analysis, it can be briefly concluded that the four variables are empirically proven
as determinants of teenage pregnancy. The variables include age, wealth status, education level, and working status. These findings could be used as a guidance for the policy makers to lower the number of teenage pregnancy in Indonesia.

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The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References


Some Theoretical and Practical Issues of Medical Geographical Research

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Abstract

In the context of globalization of global economy and intense competition and steady increase in population, mortality rates among people with infectious and parasitic diseases are increasing. International organizations are also paying much attention to fighting these problems and their consequences. In particular, the UN Sustainable Development Program up to 2030 emphasizes “issues related to the elimination of immunodeficiency, tuberculosis and malaria epidemics in the period up to 2030, as well as measures to combat hepatitis and other waterborne infections”. Successful implementation of these tasks requires stabilization of nosocheological and nosogeographic situations in arid climates. Medical geographical situation in the regions is one of the most important factors determining the development of society and the way of life of the population. Addressing medical geographical problems and improving public health, reducing morbidity and increasing life expectancy are of vital scientific and practical importance.

Key words: population health, pathological processes, nosogeographic center, nosogeographic range, nosogeographic area.

Introduction

Issues related to medical geographical studies, including the geographical pathology and the territorial structure of diseases, were presented by P.N. Pavlovsky, A.P. Avtsin, K.I. Skryabin, et al.¹ O.B. Ata-Mirzaev, H.T. Tursunov, et al, with close links to the problems in our country, namely from the point of view of economic and social geography. The above research investigates the public health problems, but little has been done on the geographical aspects of this problem in our country. The main purpose of this work is to fill such gaps.²

Traditional zoning is also important in medical geography. Medical geographical zoning is an important result of comprehensive medical geographic research. In medical geographical zoning, nosogeographic centers and ranges are first identified.³ Nozogeographic Furnace – it is the place where the disease is born. From a natural geographical point of view, it is in line with E.N. Pavlovsky’s idea of natural foci of infectious and parasitic diseases.

As a result of medical geographic surveys, a set of thematic cards can be created. Such cards are made at the Institute of Geography of the Russian Academy of Sciences, the Department of Geography of the Academy of Sciences of the Republic of Uzbekistan. In the zoning of the population in terms of its health, the allocated territories differ from each other by the prevalence of various diseases. From this point of view, geography of the population is an important area of social geography as the theoretical and methodological basis of medical geography.

In the study of medical geography, as in other geographical studies, a comprehensive, integrated approach is essential. This implies two distinct meanings: first, the complex, comprehensive, interdisciplinary study of the research object; This is especially true in
the area of healthcare. It is well-known that regional complexes play an important role in economic and social geography and geography in general.4

Nosogeographic Complexes

Nosogeographic complexes are a combination of the spatial combination of various diseases that occur under their influence in a specific natural geographic and socio-economic, social environment (space). This theoretical idea is based on the ideas of Chicago medical scientists about the regional complexes and energy production cycles created in human ecology and socioeconomic geography.

The regional disease complexes are the basis of this, not the nosogeographical region. As the pathological processes are influenced by the landscape, environmental and social geographical factors of the regions, their study is theoretically important. Thus, it is possible to say that a regional set of diseases is a methodology for the analysis and forecasting of nosogeographic regions. Such complexes are usually associated with a specific sociogeographic environment with natural geographical and economic landscapes. In the study of nocogeocomplexes it is necessary to understand first and foremost the effects of their occurrence on each other. Therefore, the process of studying nosogeocomplexes requires extensive practical and theoretical research.

With the passage of time, some types of diseases will diminish, and some new forms will occur. Specifically, in recent years, lethal species of tuberculosis have disappeared. The incidence of infectious intestinal infections, especially amyobiosis and lambliosis, has increased significantly. Nonmaterials can be classified into the following groups: climate-related systems; hydrogen fluxes are recognized as the leading factors in the emergence and spread of diseases of surface water sources, including canals, swamps, rivers or lakes; gene-causing effects of ground water on hydrogeogenic nematodes play a major role, such as kidney and circulatory disorders, metabolic disorders; chemogenic nozzles; biogenic organisms.5

Diseases of the Source and their Spread

The nosogeographic source is the place where the disease is caused.6 The nosogeographic range is the direct spread of a particular disease or the area in which the disease is present, making it the basis of the nosogeographic area.7 If people spend too much time indoors during the winter, they can spread respiratory infections, while wearing warm clothes without personal hygiene will cause an increase in lice and typhoid fever.8

In our view, the nosogeographical condition or condition is characterized primarily by the mortality rate of a population in a particular area or region, including child mortality rates, the average life expectancy and overall morbidity, the presence or origin of certain groups of diseases. In our study, we found it necessary to study the prevalence of brucellosis in the Samarkand and Navoi regions, which is the most common among the livestock population. For the first time, the idea of natural sources of disease was highlighted in the works of D.K. Zabolotny8 in the late 9th and early 20th centuries. The theory of natural sources of disease, the origin and formation of infectious diseases is studied by many fields of science: epidemiology, parasitology, geography of medicine, biogeography, ecology.9 Parasitic systems that play an important role in the study of disease foci.10

It is well known that one of the most common diseases not only in our country, but also in the world today is brucellosis, which is a contagious disease, and is known as Malta, Mediterranean, Cyprus, Gibraltar fever, Traum, Bruce syndrome.11 In Uzbekistan, the incidence of this disease has increased significantly in recent years (Table 1).

Table 1. Incidence of brucellosis in the population of Uzbekistan (Per 100,000 people)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>The Republic of Uzbekistan</td>
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<td>1,4</td>
<td>1,2</td>
<td>1,9</td>
<td>2,3</td>
<td>2,8</td>
<td>2,7</td>
<td>1,8</td>
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<td>The Republic of Karakalpakstan</td>
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<td>0,3</td>
<td>0,1</td>
<td>0,1</td>
<td>-</td>
<td>0,2</td>
<td>0,2</td>
<td>1</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0,2</td>
<td>0,2</td>
<td>1</td>
</tr>
<tr>
<td>Bukhara</td>
<td>6,2</td>
<td>4,6</td>
<td>5,3</td>
<td>4,1</td>
<td>6,0</td>
<td>3,0</td>
<td>3,9</td>
<td>0,6</td>
</tr>
</tbody>
</table>
Brucellosis is a part of zoonoses, and the main source of the disease is agricultural animals: goats, cows, sheep, pigs, camels. Studies have been conducted mainly on farm animals. For humans, the source of this disease is pets. 70% of the population living in the outbreak is likely to be infected. Microbes enter the body through aerogenic pathways through the upper respiratory tract of wool, dust. Microbes in dust particles enter the body through a conventional mucosa. Professional factors also play an important role in the epidemiology of brucellosis. These activities include animal processing, animal processing and veterinarians, as well as laboratory workers. Seasonality is typical for brucellosis, especially during the spring and summer months.

Navoi region is unique in Uzbekistan on brucellosis incidence. It should be noted that the incidence of a particular disease is not the same in all provinces or in other territorial units (Table 2).

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>The city of Samarkand</td>
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<td>-</td>
<td>5</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>City Kattakurgan</td>
<td>8</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>Urgut</td>
<td>2</td>
<td>8</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>-</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td>6</td>
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<td>4.</td>
<td>Samarkand</td>
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<td>3</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>7</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5.</td>
<td>Toylok</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Bulungur</td>
<td>15</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>7.</td>
<td>Jomboy</td>
<td>4</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>8.</td>
<td>Okdaryo</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>Payariq</td>
<td>7</td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>3</td>
<td>1</td>
<td>6</td>
<td>7</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>10.</td>
<td>Ishtihon</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>
In recent years in the border areas of present-day Samarkand and Jizzakh regions nosogeographic centers of various infectious diseases have been formed, especially Bulungur, Gallaorol and Bakhmal districts. In recent years, great attention has been paid to the prevention of especially dangerous infectious diseases. In particular, anthrax is one such disease. An analysis of the morbidity rate among populations in Uzbekistan with natural fever and zooanthropososis shows a slight increase over the last decade. One of the first medical geographic zoning studies was A.A. Keller. In the 90s of the 20th century B.B. Prokhorov studied the geographical area of Russia and allocated 20 medical and ecological regions. V.Y. Podolyan argues that the essence of medical geographical zoning is a thorough study and evaluation of natural and socio-industrial conditions that have the same impact on the human body and have their own regional features.

Medical Geographical District of Karmana. Navoi Cement Plant, Electrochemical Plant, Navoi GRES, Navoi Mining and Metallurgical Complex and other enterprises have a great influence on the development of pathological processes in urban and suburban areas. The research has focused on diseases associated with air pollution in Samarkand and Navoi, with a slight increase in respiratory, cardiovascular, malignant neoplasms, and nervous systems (Table 3).

Table 3. Air pollution disorders in Samarkand and Navoi (per 100 000 people)

<table>
<thead>
<tr>
<th>No.</th>
<th>Diseases</th>
<th>Samarkand region</th>
<th>Navoi region</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Respiratory members</td>
<td>67009.1</td>
<td>79112.3</td>
</tr>
<tr>
<td>2</td>
<td>Cardiovascular</td>
<td>2462.3</td>
<td>5367.1</td>
</tr>
<tr>
<td>3</td>
<td>A malignant tumor</td>
<td>262.2</td>
<td>322.8</td>
</tr>
<tr>
<td>4</td>
<td>The nervous system</td>
<td>1327.1</td>
<td>1621.7</td>
</tr>
</tbody>
</table>

Source: Compiled by the author based on data from regional health departments.
Uchkuduk Medical Geographical Region. The main source of pathological processes in the region are dust particles in the form of aerosols rising from the frequent dust storms in the Kyzylkum desert and salt-dust particles from the dried Aral Sea. Changes in pathological processes in these areas are also influenced by air composition and climatic features (Table 4).

**Table 4. Anemia in cities and districts of Navoi region. Number of infected (per 100 000 people)**

<table>
<thead>
<tr>
<th>T/r</th>
<th>City and Districts</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Konimex</td>
<td>13867,2</td>
<td>14571,9</td>
<td>12134,1</td>
<td>11899,5</td>
<td>11519,5</td>
<td>9436,3</td>
</tr>
<tr>
<td>2</td>
<td>Tomdi</td>
<td>22335,3</td>
<td>22982,5</td>
<td>19288,4</td>
<td>12140,5</td>
<td>8514,9</td>
<td>4220,6</td>
</tr>
<tr>
<td>3</td>
<td>Uchkuduk</td>
<td>21629,7</td>
<td>24224,2</td>
<td>12227,0</td>
<td>8720,0</td>
<td>8669,1</td>
<td>12796,6</td>
</tr>
<tr>
<td>4</td>
<td>Zarafshan city</td>
<td>8026,7</td>
<td>4776,8</td>
<td>6958,4</td>
<td>5742,2</td>
<td>5294,7</td>
<td>3439,2</td>
</tr>
</tbody>
</table>

Source: Based on data from the Navoi Regional Health Administration.

In general, medical and geographic zoning of the territories of Samarkand and Navoi regions is of great importance in practical terms. However, this process is very complex and complex, along with natural and environmental factors, and their economic and social geographical aspects.

**Geographical Aspects of Pathological Processes Prediction**

We analyzed statistical data on some infectious diseases, including brucellosis in the Republic (Table 5), and developed a forecast for 2021-2031 using extrapolation linear method.

**Table 5. Incidence of brucellosis in the population of Uzbekistan. The forecast for 2031 (for 100 thousand people)**

<table>
<thead>
<tr>
<th>Regions</th>
<th>2010</th>
<th>2016</th>
<th>2021</th>
<th>2026</th>
<th>2031</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uzbekistan Resp.</td>
<td>1,5</td>
<td>2,7</td>
<td>3,70</td>
<td>4,70</td>
<td>5,70</td>
</tr>
<tr>
<td>Karakalpakstan Resp.</td>
<td>0,2</td>
<td>0,2</td>
<td>0,20</td>
<td>0,20</td>
<td>0,20</td>
</tr>
<tr>
<td>Andijan</td>
<td>0,2</td>
<td>0,2</td>
<td>0,37</td>
<td>0,53</td>
<td>0,70</td>
</tr>
<tr>
<td>Bukhara</td>
<td>6,2</td>
<td>3,9</td>
<td>1,98</td>
<td>0,07</td>
<td>-1,85</td>
</tr>
<tr>
<td>Jizzakh</td>
<td>7,2</td>
<td>8,5</td>
<td>9,58</td>
<td>10,67</td>
<td>11,75</td>
</tr>
<tr>
<td>Navoi</td>
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<td>11,1</td>
<td>17,68</td>
<td>24,27</td>
<td>30,85</td>
</tr>
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<td>Namangan</td>
<td>0,1</td>
<td>0,3</td>
<td>0,47</td>
<td>0,63</td>
<td>0,80</td>
</tr>
<tr>
<td>Samarkand</td>
<td>1,4</td>
<td>1,5</td>
<td>1,58</td>
<td>1,67</td>
<td>1,75</td>
</tr>
<tr>
<td>Syrdarya</td>
<td>3,1</td>
<td>6,5</td>
<td>9,33</td>
<td>12,17</td>
<td>15,00</td>
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<tr>
<td>Surkhandarya</td>
<td>0,8</td>
<td>10,7</td>
<td>18,95</td>
<td>27,20</td>
<td>35,45</td>
</tr>
<tr>
<td>Tashkent</td>
<td>1,1</td>
<td>0,9</td>
<td>0,73</td>
<td>0,57</td>
<td>0,40</td>
</tr>
<tr>
<td>Kashkadarya</td>
<td>3</td>
<td>4,4</td>
<td>5,57</td>
<td>6,73</td>
<td>7,90</td>
</tr>
<tr>
<td>Tashkent city</td>
<td>1,7</td>
<td>0,6</td>
<td>-0,32</td>
<td>-1,23</td>
<td>-2,15</td>
</tr>
</tbody>
</table>

Source: The table was developed by the author based on data from the Ministry of Health.
Figure 1. Kidney disease and water hardness functional connection between

Thus, using statistics from 2010-2017, we calculate the number of patients with gallbladder disease in Pastdargom district using the least squares method.

**Conclusions**

In the world geography and medicine, serious research is being conducted to study the main areas of correlation between pathological processes and geographical factors in the environment and human health, and to identify the mechanisms of this linkage, the emergence and optimization of nosochemical and nosogeographic situations. In particular, priority is given to the study of the pathological processes of medical geography and nosogeography as a separate category, to assess the factors influencing them, to determine the range, dynamics and prognosis of the spread of the...
incidence of urinary incidence.

Thus, according to the results of Method 1, we expect that by 2020, the number of cases of gallbladder disease in Pastadargom district will be 897.54. Using the above calculations, we predict and compare the number of cases of gallbladder disease by 2020. In general, medical geographical studies are of vital importance in the assessment of public health in the regions and in the prediction of diseases occurring in them.

**Ethical Clearance:** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study. A study was approved by National Ethics Committee of Uzbekistan, September 19, 2019, No 415-I.

**Conflict of Interest:** The authors have no conflict of interest.

**Source of Funding:** Self-funding.

**References**

Study of Nozogeographic Situation and Its Study on the Basis of Sociological Survey


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Abstract

Development of scientific and practical recommendations on improvement of nosogeographic situation by assessing the impact of nosogeographic situation on the territorial structure of diseases and pathological processes of population in Samarkand and Navoi regions. This includes an analysis of the pathological processes associated with the disease of the population of Samarkand, Navoi regions and their districts; Identification and evaluation of natural, socio-economic geographical factors and nosogeographic situation affecting the health of the population in the regions; medical geographical analysis of some infectious diseases occurring among the population of the regions and their specificity; Determine the main problems in the nosogeographical condition of the regions, the prognosis of the existing diseases among the population. The study identified groups and types of diseases that occur in the regions of the region such as Khatirchi, Qiziltepa, Bulungur. The nosocomial situation was assessed on the basis of a sociological survey method.

Keywords: focal diseases, tuberculosis, malaria, medical geoecological, carcinogenic substances.

Introduction

A number of measures are being taken in the Republic to further improve the health of the population, modernize the healthcare system, reduce the number of disease groups and types of disease, and protect maternal and child health. Item 4 of the Strategy of actions for the further development of the Republic of Uzbekistan in 2017-2021 states: “... decrease of morbidity and life expectancy among the population; health services, above all, aimed at improving accessibility and quality of medical and social services.”

In recent years, many areas of Uzbekistan, including Samarkand region, have been affected by anthropogenic and anthropogenic factors such as pollution of atmospheric air in large cities and villages, various social and environmental problems increase. Anemia, respiratory tract, gastrointestinal tract, kidney (stone), viral hepatitis and malignant neoplasms are among the leading diseases associated with household hygiene and lifestyle. In Samarkand, the pathology of respiratory diseases is mainly due to the pollution of the city’s air with gases emitted by various industrial plants and vehicles, and the polluted air stays in the city streets. Urgut district is the second most common respiratory tract. Like many diseases in the district, the pathology of this disease is mainly tobacco farming in the area. Urgut district provides about 90% of tobacco produced in the Republic. We aim to analyze the emergence and geographical distribution of various diseases within the Navoi region, which species play a leading role in the current environment, and the evolution of the disease, by city and district.
Characteristic of Geoeological Problems in Navoi Region

In our research we studied the geoeological problems and their impact on human health in the Navoi region. Navoi region is one of the most well-developed regions in the mining, chemical, electro-energy and animal industries. The growth of industrial enterprises and motor vehicles, the intensive use of arable land will lead to further environmental pollution in the area of agricultural chemicalization and so on. In most regions of Uzbekistan, including Navoi region, there is an increasing incidence of various diseases due to origin and other adverse events.

According to the Department of Ecology and Nature Protection of Navoi region, it can be seen that some of the chemical compounds released into the atmosphere from industrial enterprises in the city are higher than the permissible limits (REM). In particular, from the atmospheric air analyzes in Navoi, in January, source No. 3 of NIES reported that NOx nitrogen oxide was 14.89 g/s and was 0.11 times higher than REM. One of the most common diseases among the population of the region is malignant neoplasms. All the factors that cause tumors are classified into two types: exogenous and endogenous. These include: dietary habits and types of food, 35%, tobacco and nasvay 30%, sunshine 5%, alcohol consumption 3%, industrial waste 18%, and radiation 5%.

The survey was conducted by the author in two months in 2018 (January-February) in Samarkand (Nurabad and Bulungur) and Navoi (Khatirchi and Qiziltepa) regions. A total of 912 respondents from these areas differed in their natural, environmental conditions, demographics, geographical location, economy, and the daily rituals of the people in these districts. Bulungur, Nurabad, Samarkand and Khatirchi and Qiziltepa districts of Navoi region were selected for the study. The Bulungur district of Samarkand region is located on the large transport and highway in the area adjacent to Jizzakh region.

As it is known, Navoi city is one of the largest centers of chemical, mining and construction industries in the country. This city is distinguished not only in this region, but also in the country, in terms of maternal mortality rates, births with congenital malformations, and morbidity of the population with malignant neoplasms.

The main toxic chemicals of tobacco that have a negative impact on human health are the nicotine they contain. It often causes malignant tumors in the mouth, throat, bronchi, esophagus and lungs of the human body. For this reason, tonsils, allergic rhinitis are common in tonsils, chronic bronchitis, asthma, and allergic rehydration, which are allergic to respiratory diseases. In particular, the total incidence of respiratory diseases in Pakhtachi district was 8747.1 in 2005, 15,329.4 in 2010 and 18,652.0 in 2015. We compared the districts in the eastern and western parts of the province to this disease. The most common districts are those of Samarkand, Taylak, Kattakurgan and Akdarya districts.

Samarkand and Taylak districts are specialized in agriculture, horticulture and various pesticides are used in fruit and vegetable growing. They are mainly used by spraying. As a result, it causes inflammation of the upper respiratory system and the development of various allergic diseases. One of the most common diseases among the population of the region is diseases of the digestive system. The incidence of such diseases was 252.4 in 1997, it increased by 364.7 in 2000, in 1045.3 in 2005, and by 14,223.9 in 2010, and in 2015 it increased to 15,839.2.

Another common disease among the residents of Kushrabad district, which is rare in other districts, is the gastrointestinal tract. The prevalence of gallbladder disease is caused by the high levels of calcium, sodium, potassium in the drinking water sources and high water hardness. In Kushrabad district infectious parasitic diseases are among the lowest in other districts. In large cities, where there is a high density of public transport, crowded parks, theaters, and stadiums, the prevalence of infectious diseases (hepatitis A, and flu) is linked to human factors. In addition, migration has a significant impact on the incidence of infectious diseases.

Analysis of the Results of a Sociological Survey

The analysis shows that in recent years, though overall mortality rates, including infant and maternal mortality rates have been declining slightly, overall morbidity rates are increasing. Taking into account this process, the survey was conducted in the slightly ecologically unfavorable areas of these regions. In the present study, it was necessary to cover 15 questions directly related to the research topic from the 20 questions included in the sociological survey.
1. First of all, through the questionnaire, the respondents were defined as provincial and district citizens, their age and sex. The results of the table show that the respondents in each of the four provinces had different ages (Table 1). The study was conducted at the central district hospitals, as well as with the staff of sanitary-epidemiological centers and rural health centers located in these areas.

Table 1. Birth and sex of the respondents (as a percentage of total)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>male</td>
<td>female</td>
<td>male</td>
<td>female</td>
</tr>
<tr>
<td>1.</td>
<td>Bulungur</td>
<td>7.2</td>
<td>9.3</td>
<td>13.4</td>
<td>17.5</td>
</tr>
<tr>
<td>2.</td>
<td>Nurabad</td>
<td>5.8</td>
<td>14.1</td>
<td>12.8</td>
<td>18.9</td>
</tr>
<tr>
<td>3.</td>
<td>Khatirchi</td>
<td>6.6</td>
<td>8.3</td>
<td>8.1</td>
<td>19.7</td>
</tr>
<tr>
<td>4.</td>
<td>Kiziltepa</td>
<td>1.4</td>
<td>15.2</td>
<td>6.8</td>
<td>7.1</td>
</tr>
</tbody>
</table>

Source: the table is based on the results of a sociological survey.

2. “What diseases are most common in your area?”. In the Kiziltepa district, 61.3% of respondents noted that they are more likely to have allergies, gallbladder and kidney stones in their area, more frequent tuberculosis and infectious and parasitic diseases (Table 2).

Table 2. Territorial composition of diseases of the population (as a percentage of total)

<table>
<thead>
<tr>
<th>No.</th>
<th>Districts</th>
<th>Diseases common in the area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bulungur</td>
<td>67.8% of accidents and poisonings, gastrointestinal and bone diseases, 21.1% are anemia, endocrine disorders, vision organs, 11.1% decrease in immune system, digestive system, allergy</td>
</tr>
<tr>
<td>2</td>
<td>Nurabad</td>
<td>55.4% of the district has brucellosis, hepatitis, bull, 32.6%: skin, bone brucellosis, 12.0%: diabetes mellitus, scabies, rumen, and liver disease</td>
</tr>
<tr>
<td>3</td>
<td>Khatirchi</td>
<td>51.4%: hepatitis, foot, gastrointestinal tract, 41.0%: blood pressure, radiculitis, cirrhosis of the liver, infectious diseases, 5.3%: cancer, chronic cholecystitis, tuberculosis, etc. infectious diseases</td>
</tr>
<tr>
<td>4</td>
<td>Kiziltepa</td>
<td>61.3% of allergies, gallbladder and kidney stones, tuberculosis, infectious and parasitic diseases, About 32.1%: gastrointestinal and bone diseases, 6.6%: hepatitis, vomiting and other infectious diseases</td>
</tr>
</tbody>
</table>

Source: the table is based on the results of a sociological survey.
3. In the questionnaire, “What’s the biggest impact on the health of the population in your area?”, high levels of air pollution in the Kiziltepa district were taken into account as the main cause of illness. Also, 47.7% of respondents in the district stated that drinking water is the main source of many diseases.

4. The question “What infectious diseases are common in your area?” Most respondents in all three districts emphasized TB. In the Kiziltepa and Bulungur districts, response sheets show a relatively high TB rate of over fifty percent, in Khatirchi district 37.1 percent, and in Nurabad, about 31.0 percent.

5. Participants were also asked whether the air pollution in your area is harmful to human health. This question allows us to think more fully about the environmental situation of these areas. Kiziltepa district (59.2%) had the highest number of answers “Yes, it does”. This indicator is slightly lower in Bulungur (46.8), Nurabad (27.5) and Khatirchi districts (23.9). In the Khatirchi district, on the contrary, the “no” answers are common. There are also many who cannot comment on this question.

6. In four districts, the question “How are the people in your area provided with health facilities?” has received a very interesting answer. Kiziltepa district (22.3%) had the highest “negative” answers – 15.1% in Khatirchi district, 12.4% in Nurabad district and 9.7% in Bulungur district.

7. When respondents were asked: “What do you think is the main cause of maternal mortality in your area?”, most respondents mentioned anemia, childbirth, and death due to cervical and breast cancer. Especially in Kiziltepa district due to severe environmental conditions, the number of malignant tumors among mothers is growing. It should be noted that maternal mortality in 2017 was 93.5 per 100,000 live births, which is several times higher than the national average (Table 3).

<table>
<thead>
<tr>
<th>No.</th>
<th>Districts</th>
<th>Anemia</th>
<th>Birth processes</th>
<th>Cervical cancer</th>
<th>Infectious Diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bulungur</td>
<td>18.9</td>
<td>38.9</td>
<td>29.2</td>
<td>13.0</td>
</tr>
<tr>
<td>2.</td>
<td>Nurabad</td>
<td>21.4</td>
<td>41.4</td>
<td>33.7</td>
<td>3.5</td>
</tr>
<tr>
<td>3.</td>
<td>Khatirchi</td>
<td>20.9</td>
<td>48.2</td>
<td>28.0</td>
<td>2.9</td>
</tr>
<tr>
<td>4.</td>
<td>Kiziltepa</td>
<td>13.6</td>
<td>37.0</td>
<td>38.1</td>
<td>11.3</td>
</tr>
</tbody>
</table>

Source: the table is based on the results of a sociological survey.

8. The question “What illnesses are most common among children in your area?” has also given controversial results. It is well known that the most common group of children and their deaths are respiratory diseases. In all four districts surveyed, infant mortality rates are close to the national average, but the incidence and morbidity rates vary widely (Table 4).

<table>
<thead>
<tr>
<th>No.</th>
<th>Districts</th>
<th>Born defects</th>
<th>Anemia</th>
<th>Gastrointestinal diseases</th>
<th>Complications related to delivery (trauma)</th>
<th>Respiratory diseases</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bulungur</td>
<td>25.7</td>
<td>14.7</td>
<td>19.1</td>
<td>23.3</td>
<td>17.2</td>
</tr>
<tr>
<td>2.</td>
<td>Nurabad</td>
<td>23.3</td>
<td>10.1</td>
<td>16.9</td>
<td>30.1</td>
<td>11.4</td>
</tr>
<tr>
<td>3.</td>
<td>Khatirchi</td>
<td>17.0</td>
<td>17.4</td>
<td>11.8</td>
<td>27.7</td>
<td>26.1</td>
</tr>
<tr>
<td>4.</td>
<td>Kiziltepa</td>
<td>31.5</td>
<td>13.1</td>
<td>9.3</td>
<td>21.9</td>
<td>30.8</td>
</tr>
</tbody>
</table>

Source: the table is based on the results of a sociological survey.
9. The question “Where do you usually get drinking water from your household (from a well, from a river, canal or ditch, from other areas)?” is also included in the questionnaire. However, in many regions of the country, access to these sources remains one of the most pressing problems. As a result of the research, we have received the following answers: most of the wells used as the main water source came from Nurabad district, as well as the majority of river, canal or arable water users. The majority of household water users were identified by Khatirchi district respondents. But its share was only 9.8%. In Nurabad district, the indicators are the lowest (0.6 percent).

10. The question “How do you assess the medical, hygienic, and environmental quality of the population in your area?” was given by the respondents: The majority of the respondents rated this situation as “poor” (19.3%) (Table 5). It can be concluded that in each of the four districts surveyed, some negative results were reported in Kiziltepa district and in Bulungur district.

<table>
<thead>
<tr>
<th>No.</th>
<th>Districts</th>
<th>Bad</th>
<th>Medium</th>
<th>Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Bulungur</td>
<td>14.1</td>
<td>43.2</td>
<td>38.3</td>
<td>4.4</td>
</tr>
<tr>
<td>2.</td>
<td>Nurabad</td>
<td>17.2</td>
<td>52.4</td>
<td>28.0</td>
<td>2.4</td>
</tr>
<tr>
<td>3.</td>
<td>Khatirchi</td>
<td>10.9</td>
<td>53.8</td>
<td>31.8</td>
<td>3.5</td>
</tr>
<tr>
<td>4.</td>
<td>Kiziltepa</td>
<td>19.3</td>
<td>58.5</td>
<td>21.3</td>
<td>0.9</td>
</tr>
</tbody>
</table>

Source: the table is based on the results of a sociological survey.

In general, the results of such a survey of the population in the regions of medical geographical surveys provide reliable information on the nosogeographic situation of these regions and serve as the basis for the implementation of the necessary measures.

**Conclusions**

As a result of many years of research, based on the evaluation of natural, socio-economic factors influencing the nosogeographic situation in the regions, the public health problems and recommendations for their solution were developed; revealed that the epidemiological source of some infectious diseases is associated with economic specialization and epizootic situation, i.e. the range of brucellosis and other diseases is related to livestock.

The results of the research show that the types and types of diseases that occur in the population differ sharply in urban and rural areas. In fact, Samarkand and Navoi, the largest cities, have a high incidence of respiratory diseases and malignant neoplasms, nervous system, allergic diseases. The main reason for this is that the cities, in particular, have some negative aspects of the nosocomial situation in Navoi. Most of the industrial facilities in the city are not equipped with modern technical equipment and require repair and high level of modernization. At the same time, the incidence of the outbreak is very high in the regions.

**Ethical Clearance:** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study. A study was approved by National Ethics Committee of Uzbekistan, October 4, 2019, No 415-I.

**Conflict of Interest:** The authors have no conflict of interest.

**Source of Funding:** Self-funding.

**References**

1. Decree of the President of the Republic of Uzbekistan No. P-4947 “On the Strategy of Action for the Further Development of the Republic of


Title Page
Cutaneous Adverse Drug Reaction in Morocco – Evaluating the Knowledge of Pharmacists

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Abstract

Background. Pharmacy professionals, as the most available members of medical team, have an important role in educating patients about Cutaneous Adverse Drug Reaction (CADR). Our aim was to evaluate pharmacists’ knowledge of the cutaneous drug reaction, and their recommendations under hypothetical situations, through a written questionnaire. Methods. Based cross-sectional study was conducted among community pharmacists working at the private sector of the rabat-salé-zemmour-zaer region using a structured interviewing questionnaire. Results. Ninety-eight pharmacists completed the questionnaire (response rate 48%). The mean overall score was 52.87 ± 23.19% correct answers. The majority of pharmacists (66.32%) estimated that they view more than a Patient with CADR each month, and only forty-seven pharmacists underwent CADR related training during the year preceding the survey. Pharmacists obtained the highest correct scores on the true/false statements inquiring about Cutaneous reaction due to drugs definition, classification and the most common medication classes implicated in Cutaneous reaction due to drugs. Overall, the true/false questions were relatively easier to address, compared with the multiple choice questions (63.60 ± 13.15% vs. 51.18 ± 24.12%, respectively; p < 0.01). Only 14 pharmacists were familiar with Cutaneous reaction due to drugs such as (Drug Reaction With Eosinophilia, contact dermatitis, Nail Disorders, bullous pemphigoid). Longer time since training completion was associated with a lower total score (38,77 ± 9% vs. 61,22 ± 11% for the pharmacists who were in practice 5 years or less and those with longer time in practice, respectively; p < 0.05). Conclusion. Pharmacists were knowledgeable regarding some aspects of CADR. However, our study, as in previous studies among health care professionals, identified some gaps in knowledge. These findings indicate the need for better education of pharmacists regarding CADR and its supported.

Keywords: Cutaneous Adverse Drug Reaction, Pharmacists, Knowledge, Questionnaires

Introduction

Any unintended harmful reaction to a medicine or drug is known as an adverse drug reaction (ADR) according to the definition by the World Health Organization. The term Cutaneous Adverse Drug Reaction (CADR) is used for dermatoses with involvement of the skin, mucosas, and/or skin appendages, caused by the effect of a substance, usually a drug, which comes into contact with the organism by a range of pathways. Serious cutaneous drug reactions are immunemediated events that are classed as unexpected ADR.

They are the cause of hospitalization in dermatology services for about 1.5% of patients in France, 4.11% in Tunisia, 27% in Togo, 10.40% patients in
Guinea [6] and have a high degree of semiological variability. Two per cent of these can be severe, with severe sequelae or life threatening [7]. They can occur in all individuals without distinction of age; however, they are less frequent in children with an incidence of 0.9% in the Thiesen et al series in England [8].

Nowadays, consumers’ demand on CADR information is very high and pharmacists, if knowledgeable, are in an ideal position to address this demand. They are the third largest regulated healthcare professional groups in the world [9]. A 2012 report conducted in 90 countries stated that 55% of pharmacists were working in community pharmacies [10].

To our knowledge, few studies have been published on diseases pharmacists’ knowledge, in particular in the past few decades [11,12]. This study was therefore intended to assess the knowledge regarding CADR in a low-income country setting. The findings will support the design of educational programs and objectives by pharmacy schools and professional organizations.

**Materials and Method**

§ Study Design

This was a cross-sectional study conducted from January 2018 to March 2018, among community pharmacists in the private sector of the rabat-salé-zemmour-zaer region. Data were collected by the authors during the day time working hours and mostly in the morning.

§ Study Tool

A questionnaire was developed by three clinical pharmacists from the coauthors.

The questionnaire consisted of four sections.

The first section collected demographic data of the respondents such as gender, age, the number of years practicing as pharmacist, highest qualification related to pharmacy, Country of academic studies, Estimated number of Patient with CADR /month view in the pharmacy and CADR training over the past year.

In the second section, respondents were questioned about definition of ADRs and CADR, the different categories of CADR and the most medication classes implicated in CADR. The answer in this section was from true/false reponse.

In the third section, respondents were questioned about the pharmacists’ possible actions in theoretical situations involving the different types of Cutaneous adverse drug reaction such as Definition, Pathogenesis, Clinical Manifestations: (Onset, Symptoms, Signs), Diagnosis: (Clinical Diagnosis, Differential Diagnosis), Prognosis, Treatment: (Definitive, Symptomatic, Prevention).

In the last section entitled “comments” respondents are invited to add comments about Cutaneous adverse drug reaction.

Then, a pilot survey of the questionnaire was carried out with pharmacy department staff. Finally, necessary modifications were made based on the comments received from the pilot survey.

§ Data collection

The questionnaire was presented to pharmacists in the private sector of the rabat-salé-zemmour-zaer region. Fifteen minutes were allotted to complete the questionnaire. Pharmacists were not supposed to consult any information resources when they were taking the quiz. We could not validate that the other pharmacists did not use information resources. No financial incentives were offered to encourage participation. However, a document containing detailed answers to the study questions was prepared and distributed among members of the organizations participating in the study.

§ Data analysis

The final score was expressed as the percentage of correct answers of each pharmacist. The option “I don’t know” was considered a separate category, and included in the estimation of the score per question as a wrong answer. Responders were grouped into one of two categories of duration since graduation from training (five years or less and longer than five years) and of countries in which the Pharm degree was obtained (Morocco, other). Descriptive statistics were obtained for the various variables. Response patterns were evaluated using the two-tailed Mann–Whitney test, the Kruskal–Wallis test, and the Pearson correlation (SPSS software. 10 at the Laboratory of Biostatistics and Clinical Research of the Faculty of Medicine and Pharmacy of Rabat), as appropriate. The results are reported as mean ± standard deviation (SD), unless otherwise indicated. A p-value ≤ 0.05 was considered significant.
Results

A total of 98 pharmacists completed the questionnaire. The response rate was 48%. The compiled demographic data are presented in **Table 1**.

**Table 1** Characteristics of study participants.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total participants</strong></td>
<td>98</td>
</tr>
<tr>
<td>Age (years) [mean ± SD, (range)]</td>
<td>48.5 ± 8.1 (30–64)</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>22 (22.45%)</td>
</tr>
<tr>
<td>Women</td>
<td>76 (77.55%)</td>
</tr>
<tr>
<td>Country of academic studies</td>
<td></td>
</tr>
<tr>
<td>Morocco</td>
<td>72 (73.46%)</td>
</tr>
<tr>
<td>Other</td>
<td>26 (26.53%)</td>
</tr>
<tr>
<td><strong>Highest academic degree</strong></td>
<td></td>
</tr>
<tr>
<td>PharmD</td>
<td>98 (100 %)</td>
</tr>
<tr>
<td>Other</td>
<td>00 (0 %)</td>
</tr>
<tr>
<td>Duration since graduation (years)</td>
<td></td>
</tr>
<tr>
<td>0-2</td>
<td>08 (8.16 %)</td>
</tr>
<tr>
<td>3-5</td>
<td>30 (30.61 %)</td>
</tr>
<tr>
<td>6-10</td>
<td>25 (25.51 %)</td>
</tr>
<tr>
<td>11-20</td>
<td>19 (19.38%)</td>
</tr>
<tr>
<td>&gt;20</td>
<td>16 (16.32%)</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
</tr>
<tr>
<td>Community/retail pharmacy, full time</td>
<td>92 (93.88 %)</td>
</tr>
<tr>
<td>Community/retail pharmacy, part time</td>
<td>06 (6.12 %)</td>
</tr>
<tr>
<td>Other</td>
<td>00 (0 %)</td>
</tr>
<tr>
<td>Estimated number of Patient with CADR view/month</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>27 (27.55 %)</td>
</tr>
<tr>
<td>1-5</td>
<td>30 (30.61%)</td>
</tr>
<tr>
<td>6-10</td>
<td>25 (25.51%)</td>
</tr>
<tr>
<td>11-20</td>
<td>07 (7.14%)</td>
</tr>
<tr>
<td>&gt;20</td>
<td>03 (3.06%)</td>
</tr>
<tr>
<td>Not indicated</td>
<td>06 (6.12%)</td>
</tr>
<tr>
<td><strong>CADR training over the past year</strong></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>49 (50 %)</td>
</tr>
<tr>
<td>Academic</td>
<td>43 (43.88 %)</td>
</tr>
<tr>
<td>Other</td>
<td>04 (4.08 %)</td>
</tr>
<tr>
<td>Not indicated</td>
<td>02 (2.04 %)</td>
</tr>
</tbody>
</table>
Most responders were women (77.55%). The majority of pharmacists (66.32%) estimated that they view more than a Patient with CADR each month, and only forty-seven pharmacists underwent CADR related training during the year preceding the survey. The mean score was $52.87 \pm 23.19\%$ (Table 2). Overall, the true/false questions were relatively easier to address, compared with the multiple choice questions ($63.60 \pm 13.15\%$ vs. $51.18 \pm 24.12\%$, respectively; $p < 0.01$).

**Table 2 Total scores across all responders.**

<table>
<thead>
<tr>
<th>Selected variables</th>
<th>n = 98, (n [%])</th>
</tr>
</thead>
<tbody>
<tr>
<td>Definition of ADRs and CADR</td>
<td>76 [77.55]</td>
</tr>
<tr>
<td>Categories of CADR</td>
<td>43 [43.87]</td>
</tr>
<tr>
<td>The medication classes implicated in CADR</td>
<td>68 [69.38]</td>
</tr>
<tr>
<td>urticaria</td>
<td>72 [73.46]</td>
</tr>
<tr>
<td>angioedema</td>
<td>45 [45.91]</td>
</tr>
<tr>
<td>Anaphylaxis</td>
<td>65 [66.32]</td>
</tr>
<tr>
<td>bullous pemphigoid</td>
<td>14 [14.28]</td>
</tr>
<tr>
<td>pemphigus vulgaris</td>
<td>12 [12.24]</td>
</tr>
<tr>
<td>vasculitis</td>
<td>76 [77.55]</td>
</tr>
<tr>
<td>Fixed Drug Eruption</td>
<td>92 [93.87]</td>
</tr>
<tr>
<td>Pigmentary Disorders</td>
<td>85 [86.73]</td>
</tr>
<tr>
<td>Nail Disorders</td>
<td>11 [11.22]</td>
</tr>
<tr>
<td>Noncicatricial Alopecia</td>
<td>48 [48.97]</td>
</tr>
<tr>
<td>Pruritus Without Rash</td>
<td>78 [79.59]</td>
</tr>
<tr>
<td>morbilliform rash</td>
<td>45 [45.91]</td>
</tr>
<tr>
<td>contact dermatitis,</td>
<td>18 [18.36]</td>
</tr>
<tr>
<td>photosensitivity dermatitis</td>
<td>68 [69.38]</td>
</tr>
<tr>
<td>Erythema Multiforme</td>
<td>68 [69.38]</td>
</tr>
<tr>
<td>Stevens-Johnson syndrome</td>
<td>35 [35.71]</td>
</tr>
<tr>
<td>toxic epidermal necrolysis</td>
<td>34 [34.69]</td>
</tr>
<tr>
<td>Drug Reaction With Eosinophilia</td>
<td>15 [15.30]</td>
</tr>
<tr>
<td>Acute Generalized Exanthematous Pustulosis</td>
<td>72 [73.46]</td>
</tr>
</tbody>
</table>
Pharmacists obtained the highest correct scores on the true/false statements inquiring about CADR definition, classification and the most common medication classes implicated in CADR. Only 14 pharmacists were familiar with CADR such as (Drug Reaction With Eosinophilia, contact dermatitis, Nail Disorders, bullous pemphigoid). Across all questions and all study participants, the option “I don’t know” was selected in 5.0% of cases. Across all questions and all study participants, the option “I don’t know” was selected in 2.04% of cases.

Longer time since training completion was associated with a lower total score (38.77 ± 9% vs. 61.22 ± 11% for the pharmacists who were in practice 5 years or less and those with longer time in practice, respectively; p < 0.05). In contrast, the total score was not affected by the setting in which the questionnaire was distributed, gender, the country in which the Pharm degree was obtained (Morocco vs. others); whether they underwent some form of training about CADR over the year prior to the survey (p > 0.05; data not shown). In addition, the total score was not associated with the number of Patient with CADR seen monthly by the pharmacist (p > 0.05) and did not correlate with the responders’ age (r =-0.1596, p > 0.05).

Nineteen of the pharmacists included in this study added comments under the “Comments” sections of the questionnaires. Four comments related to lack of the responder’s knowledge, two stated the need for more extensive education, six referred to the availability of data sources, and the remainder of comments were related to the wording of the statements or the answers.

**Discussion**

Pharmacists constitute a valuable source of information for patients and prescribers. As such, they should be familiar with various aspects of CADR, including actions taken in theoretical situations involving CADR therapy, and be able to consult patients.

Unfortunately, CADR patients’ knowledge regarding their illness and its treatment is unsatisfactory. Furthermore, pharmacists can be the first to recognize conditions in which the physician should be contacted as soon as possible. Yet, our study found significant knowledge gaps among pharmacists, including those who see Patient with CADR frequently; the mean score of surveyed pharmacists was only 52.87%. Several responders checked the “I don’t know” option or commented that they don’t know the answer, implying that they were able to admit that they have gaps of knowledge.

Pharmacists obtained the highest correct scores on the true/false statements, in fact pharmacists in this study had good baseline knowledge of definition of ADRs and CADR, the different categories of CADR and the most medication classes implicated in CADR. These elements are very interesting because they facilitate the pharmaceutical management of CADR afterwards.

The duration since professional training completion and a PharmD degree were the only predictors associated with overall score. Longer duration since graduation could be associated with the absence of updated knowledge about CADR. In addition, there was a partial overlap between shorter duration since graduation and a PharmD degree.

The majority of Moroccan pharmacists with a PharmD degree graduated over the past four years from a single Faculty of pharmacy, in which personalized medicine has been an important component of the curriculum. Thus, for both comparisons, the greatest gaps were detected in questions related to Drug Reaction With Eosinophilia, contact dermatitis, Nail Disorders, and bullous pemphigoid. Interestingly, there was no relationship between larger numbers of Patient with CADR seen each month and scores. This is may be explained by reliance on computerized resources and minimal time for interacting with patients and actually consulting them. The setting in which the questionnaire was presented, and therefore the time allowed for their completion and the percentage of practicing pharmacists among the participants, did not affect the scores. Intriguingly, recent training about CADR was not shown to increase performance in completing the questionnaire, although the type of training was not detailed. It is necessary to consider the optimal type of education that may efficiently improve pharmacists’ knowledge and actions. The major limitations of our study are related to potential selection bias, to the partial validation of the questionnaire. The majority of our participants were pharmacists who attend meetings and training courses, who may be more knowledgeable than other pharmacists. Among those who attended the university diploma in pharmacovigilance at the poison center of Morocco, low response rate may further increase the bias towards those who may be willing to answer the questionnaire because they felt more comfortable with
their degree of knowledge. Yet, participants pointed out that the questionnaire was difficult, and that the given options in the situation-related multiple choice questions did not fully reflect the possible options the pharmacist encounters at work as described above. The limited response range also reflects another limitation of the study: asking a clinical question via a multiple choice question.

However, no significant differences were found between the scores of participants in the various settings of the study. Therefore, our work may be of wider relevance to the healthcare professionals involved in the management of Patient with CADR.

**Conclusion**

Pharmacists were knowledgeable regarding some aspects of CADR. However, our study, as in previous studies among health care professionals, identified some gaps in knowledge. These findings indicate the need for better education of pharmacists regarding CADR and its supported.

**Ethical Clearance:** Compliance with Ethical Standards

**Source of Funding:** Self

**Conflict of Interest:** We declare that we have no conflict of interest.

**References**


Improved Oral Hygiene as A Result of Successful Toothbrushing Intervention in a Restricted Community Islamic Boarding School

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Abstract

Introduction: Brushing teeth is an important thing to do since it is one of the factors that affect oral hygiene, especially to remove plaque on the teeth.¹ The ability to brush teeth properly and correctly is a fairly important factor in maintaining dental and oral health, especially in adolescence.⁵ The purpose of study to explain the differences in plaque scores before and after toothbrushing training using Bass technique in adolescents

Method: The sample were 100 students aged 12-15 years old in grades 7, 8 and 9. This study design was experimental quasi and using a pre-test and post-test after 7 days to determine the difference in plaque scores before and after the training. The plaque index method that used to examine oral hygiene was Patient Hygiene Performance (PHP). Comparison between plaque scores before and after training evaluated using Wilcoxon test. Result: Examination of PHP index before training shows 81 samples (81%) in poor criteria, then most subjects undergoes improvement after training. There were 94 samples (94%) experienced decrease or improvement in plaque score whilst 6 samples (6%) did not show improvement after training. Median of plaque score before training was 4.3 (0.2-5 (SD=0.502)) afterwards improved to 2.2 (0-4.8 (SD=0.496)). Wilcoxon test obtained a value of p<0.05 which was 0.000. Conclusion: There were significant differences in plaque scores before and after toothbrushing training using Bass technique.

Keywords: dental plaque, toothbrush, bass technique, oral hygiene

Introduction

Brushing teeth is an important thing to do since it is one of the factors that affect oral hygiene, especially to remove plaque on the teeth. Dental plaque is a bacterial biofilm with highly variable structural entity consisting of micro-organisms and their products concurrently resides in their environment.¹ The soft layer of plaque consists of 80 percent water, and the remaining of 20 percent are other components, such as proteins, lipids and minerals, calcium and phosphorus.² Bacterial deposits on uncalcified plaques accumulate above the surface of the teeth and other objects in the oral cavity, such as restorations, dentures and dental calculus that are firmly attached to this surface. Dental plaque can only be removed by mechanical cleansing, one of which is by brushing teeth.³

The right knowledge about brushing teeth in the community includes the frequency of brushing teeth, the method of brushing teeth, and the shape of a toothbrush. Brushing teeth can be a preventive measure for dental caries and periodontal disease, especially in adolescence.⁴

The ability to brush teeth properly and correctly is a fairly important factor in maintaining dental and oral health, especially in adolescence. The skill of brushing teeth must be taught to children of all ages, especially school children because at that age it is easy to accept
Based on the results of national basic health research (riset kesehatan dasar/Riskesdas) in 2007 and 2013, oral health problems increased from 23.2 percent to 25.9 percent. The prevalence of oral health problems based on the 10-14 years age group in 2007 was 20.6 percent, increasing in 2013 to 25.2 percent, and in the 15-24 years age group it increased from 21.5 percent to 24.3 percent. There was also an increase in the proportion of provincial oral health problems in DKI Jakarta province of 6.1 percent, from a value of 23 percent in 2007 to 29.1 percent in 2013. Whereas, the national percentage of toothbrushing every day was 94.2 percent in 15 provinces below national prevalence. There was a decline in correct toothbrushing behavior from 7.3 percent in 2007 and decreased to 2.3 percent in 2013.6,7

The purpose of this study was to explain that there were differences in plaque scores before and after toothbrushing training in adolescents aged 12-15 years at An-Nuqthah Islamic Boarding School, Cipete, Tangerang.

Material and Method

The independent variable was toothbrushing training and dependent variables was the score of plaque. This study was conducted at An-Nuqthah Islamic Boarding School, Cipete, Tangerang, Banten, Indonesia in 2018. The population in this study were adolescents in the An-Nuqthah Islamic Boarding School, Cipete, Tangerang and the sample in this study were 100 students aged 12-15 years old in grades 7, 8 and 9 in An-Nuqthah Islamic Boarding School.

The type and design of the study used was experimental quasi, which is an experimental study that controls the research situation using non-random methods that have a function to determine the impact of interventions. This study used a pre-test and post-test design to determine the difference in plaque scores before and after the training of toothbrushing using Bass technique.

Data collection was done using interviews, questionnaires and examination of plaque scores with disclosing agent solution. The plaque index method used was Patient Hygiene Performance (PHP). Data processing was carried out after the data was collected from school. Furthermore, data processing stage was carried out as follows: editing data, encoding data, and data entry (computerization). Data that had been collected and processed using the SPSS 17 computer program were then tested for its hypothesis using Wilcoxon test.

Research Results

1. Plaque Score Before Toothbrushing Training Using Bass Technique (Pre-Test Plaque Score)

Distribution of PHP index criteria on 100 samples before toothbrushing training using Bass technique shows very good criteria in 0 sample (0%), good criteria in 1 sample (1 %), moderate criteria in 18 samples (18%), and poor criteria in 81 samples (81%).

Table 1. Distribution of PHP Index Criteria before Toothbrushing Training using Bass technique (Pre-Test Plaque Score)

<table>
<thead>
<tr>
<th>PHP Index Criteria</th>
<th>Plaque Score</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very good</td>
<td>0</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Good</td>
<td>0.1-1.7</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Moderate</td>
<td>1.8-3.4</td>
<td>18</td>
<td>18%</td>
</tr>
<tr>
<td>Poor</td>
<td>3.5-5</td>
<td>81</td>
<td>81%</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>

The assessment of plaque score in 100 samples prior to toothbrushing training using Bass technique shows that 47 persons (47%) less than the median value (4.3) while the ones with more than or equal to median value were 53 persons (53%).

Table 2. Distribution of Median Value of Pre-Test Plaque Score

<table>
<thead>
<tr>
<th>Plaque Score before Toothbrushing Training Using Bass Technique</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than Median (&lt; 4.3)</td>
<td>47</td>
<td>47%</td>
</tr>
<tr>
<td>More than or equal to Median (≥ 4.3)</td>
<td>53</td>
<td>53%</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100%</td>
</tr>
</tbody>
</table>
2. Plaque Score after Toothbrushing Training Using Bass technique (Post-Test Plaque Score)

Distribution of PHP index criteria on 100 samples after toothbrushing training using Bass technique shows very good PHP index criteria in 1 sample (1%), good criteria in 37 samples (37%), moderate criteria in 48 samples (48%), and poor criteria in 14 samples (14%).

Table 3. Distribution of PHP Index Criteria after Toothbrushing Training using Bass Technique (Post-Test Plaque Score)

<table>
<thead>
<tr>
<th>Plaque Index Criteria</th>
<th>Plaque Score</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very good</td>
<td>0</td>
<td>1</td>
<td>1%</td>
</tr>
<tr>
<td>Good</td>
<td>0.1-1.7</td>
<td>37</td>
<td>37%</td>
</tr>
<tr>
<td>Moderate</td>
<td>1.8-3.4</td>
<td>48</td>
<td>48%</td>
</tr>
<tr>
<td>Poor</td>
<td>3.5-5</td>
<td>14</td>
<td>14%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100</strong></td>
<td><strong>100%</strong></td>
<td></td>
</tr>
</tbody>
</table>

The distribution of plaque score in 100 samples after toothbrushing training using Bass technique showed that 42 samples (42%) less than the median value (2.2) while the ones with more than or equal to median value were 53 persons (53%).

Table 4. Distribution of Median Value of Post-Test Plaque Score Measurement

<table>
<thead>
<tr>
<th>Plaque Score after Toothbrushing Training Using Bass Technique</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than median (&lt; 2.2)</td>
<td>42</td>
<td>42%</td>
</tr>
<tr>
<td>More than or equal to median (≥ 2.2)</td>
<td>58</td>
<td>58%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

3. Comparison of Plaque Scores before and after Toothbrushing Training using Bass Technique

There was plaque score improvement in 100 sample after toothbrushing training using Bass technique, in which 94 samples (94%) experienced a decrease in plaque score after training. Whereas, 6 samples (6%) did not experience plaque score changes.

Table 5. The Percentage of Samples that Decreasing Plaque Score after Toothbrushing Training using Bass Technique

<table>
<thead>
<tr>
<th>Plaque Score Indicator</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Decrease in plaque score after training</td>
<td>94</td>
<td>94%</td>
</tr>
<tr>
<td>No change in plaque score after training</td>
<td>6</td>
<td>6%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

The median, minimum, maximum, and standard deviation values of the plaque score after toothbrushing training using Bass technique were lower than before training. Wilcoxon test obtained a value of p<0.05 which was 0.000. It can be concluded that there were differences in plaque scores before and after toothbrushing training using Bass technique in adolescents.
Table 6. Wilcoxon Test Results of PHP Index before and after Performing Toothbrushing Training in An-Nuqthah Islamic Boarding School, Cipete, Tangerang (n = 100)

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Median (minimum-maximum)</th>
<th>S.D</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plaque score before toothbrushing training</td>
<td>100</td>
<td>4.3 (0-2.5)</td>
<td>0.502</td>
<td>0.000</td>
</tr>
<tr>
<td>Plaque score after toothbrushing training</td>
<td></td>
<td>2.2 (0-4.8)</td>
<td>0.496</td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

This study was conducted to determine and explain the differences in plaque scores before and after toothbrushing training using Bass technique of adolescents aged 12-15 years. This study was conducted on 64 female and 36 male students taken randomly of grade 7, 8 and 9 in junior high school students at An-Nuqthah Islamic Boarding School, Cipete, Tangerang who had fulfilled the inclusion and exclusion criteria. The measurement of plaque scores was carried out before and after toothbrushing training using Bass technique.

Bass technique is sulcular (or crevicular) technique that aims to clean the crevicular part or gingival sulcus. If this technique is used correctly, cleaning the gingival sulcus area can be very effective.\(^3\),\(^8\),\(^11\) The time taken by researchers to measure plaque scores before and after toothbrushing training was 7 days, same as in the study conducted by Choirunnisa \(^5\),\(^8\) et al and Sari \(^2\).

The distribution of samples based on gender can be seen from total sample (n = 100). The number of female samples was more (64) compared to the number of males (36). This was in accordance with previous study conducted by Sari \(^2\) et al at At-Taufiq Lakarsantri Islamic School in Surabaya in June 2012, with a sample of 34 people, in which the number of female samples was more (24) compared to the number of males (10).

There was decrease of plaque score in most samples after training. Found 94 samples (94%) experienced improvement or decrease in plaque score and 6 samples (6%) did not show improvement (Table 3.1). The distribution was as follows: 60 samples (63.8%) were female and 34 samples (36.2%) were male who experienced improvement in plaque scores. Whereas, as many as 4 female samples (66.7%) and 2 male samples (33.3%) did not experience changes in plaque scores. This was in line with a study conducted by Sari \(^2\) et al. In 34 samples, 33 samples (97.1%) experienced improvement in plaque scores and 1 sample (2.9%) did not experience changes in plaque scores. The distribution was as follows: 23 samples (95.8%) were female and 10 samples (100%) were male who experienced improvement in plaque scores. Whereas, as many as 1 female sample (4.2%) and 0 male sample (0%) did not experience changes in plaque scores.\(^5\)

The habit of brushing teeth twice or more in one day was quite high, which was equal to 91%. However, the plaque score was still high as evidenced by 81% of total samples having poor criteria (value 3.5-5) before training (Table 1.1). This can be caused by toothbrushing technique being used is not correct. This was stated in a study conducted by Park S, Cho S and Han J in Department of Peridontology, Hanyang Medical Center, Seoul, South Korea in 2018, conducted on 124 samples also used the intervention of toothbrushing method using Bass technique. Park \(^9\),\(^15\),\(^16\) et al suggested that the effectiveness of toothbrushing techniques could be a solution for removing plaque on teeth.\(^9\),\(^15\),\(^16\)

Based on the research that has been done with Wilcoxon test (p<0.05), the value was 0.000. It means there was significant difference before and after toothbrushing training using Bass technique (Table 3.1). This study is in line with a study conducted by Rizkika \(^14\) et al which showed that plaque scores decreased after toothbrushing training using Bass technique with mean plaque score was 4.1 before training and 2.2 after training. The difference of mean value before and after toothbrushing training using Bass technique was 1.8.

These results also consistent with a study conducted by Rizkika N, Baehaqi M and Putranto RR in Purwosari Kudus Special Elementary School in 2014 which
examined the effectiveness of toothbrushing with Bass technique on changes in plaque scores in mentally retarded children. In their research, Rizkika et al found that brushing teeth with Bass technique could reduce plaque scores, from the mean value of plaque score as much as 3.88 before intervention to 3.03.17,20

From the results of the study (Table 1.2) it can be seen there was a decrease in plaque scores after toothbrushing training using Bass technique. This proves if this technique is done correctly, cleaning the gingival sulcus area can be very effective.15,17,22 In addition, toothbrushing is one of the ways to control plaque mechanically which is quite effective in removing plaque attachment on the surface of the tooth. Plaque control is a basic procedure for maintaining oral hygiene.3,21,23

Brushing teeth is important to do since it is one of the factors that affect dental and oral hygiene, especially in removing plaque on the teeth. Plaque on the teeth can cause a reduction in the quality of oral and dental health. Plaque is one of the etiological factors in caries and periodontal disease. Plaque will form a smooth, strong surface in the form of a deposit on the surface of the tooth. Therefore, plaque on the tooth surface must be removed by brushing teeth.5,10,24

**Conclusion**

There were significant differences in plaque scores before and after toothbrushing training using Bass technique. Bass brushing technique is quite effective in removing plaque deposits on the tooth surface, and is quite easy to apply in daily life.

**Conflict of Interest**: There is no conflict of interest.

**Source of Funding**: This research use independent funding sources

**Ethical Clearance**: This research has received ethical approval from Etichal Clearance of Health Experiment Committee, Faculty of Dentistry, Universitas Prof. Dr. Moestopo (Beragama), South Jakarta, Indonesia with registered number 065/loloskajietik/ FKGUPDM(B)/IV/2018.

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Family Background and Parenting Characteristics of Young People with Methamphetamine Use Disorder in Northeastern Region of Thailand

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Abstract

Background: Drug abuse is an important medical problem which affects both the patient and society. This problem is rather common among young people in Thailand which family upbringing is one of the risk factors especially in the Northeastern region where prevalence of parental migration is the highest.

Objective: The objective of this study was to examine family background and parenting characteristics of young people with methamphetamine use disorder as well as the association between factors related to family upbringing and the onset of substance use in these young people.

Materials and Method: This cross-sectional descriptive study of young people between 18 and 24 years of age with methamphetamine use disorder who visited outpatient clinics in Thanyarak Udon Thani Hospital and Thanyarak Khon Kaen Hospital. 145 subjects were included to complete self-answer questionnaire that included demographic information, details on substance uses, family background and parenting characteristics.

Results: The results showed 88.3% were male and the mean age of 21.22 years. The prevalence of parental migration during childhood was 30.34% (95%CI: 23.14, 38.61) while parental absence was 16.6%. Primary caregivers during childhood were either father or mother in 70.34% of the subjects. Data analysis found that having neither of parents as primary caregivers was associated with the onset of methamphetamine use before age of 18 years (p<0.5).

Conclusion: Having one or both parents as childhood primary caregivers could reduce the risk of methamphetamine abuse among adolescents.

Keywords: parental migration, family, methamphetamine use, young people, youth

Introduction

Drug abuse is recognized as a major public health problem in many countries¹, since it affects not just the users but also the society². Amphetamine-type stimulant use was first reported in Thailand during 1980s³. According to the national household survey, 3.5 million individuals between age of 12 and 65 years had ever used illicit drugs and 590,000 people had been using the drugs within 12 months⁴. The problem is becoming rather common and is still rising in young people⁴-⁷, while studies had shown its associated with inappropriate parenting and family backgrounds⁸-⁹.

Thailand has been facing with concentrated industrialization which results in mass migration of working population into these industrialized areas. Consequently, rural areas are left with children and...
elderly, obliging the grandparents to look after their grandchildren instead of the migrating parents. Children living apart from parents due to this pattern of internal migration is very common particularly in the Northern and Northeastern regions of Thailand, due to poverty and misconception; believing that it is better for the children to be raised by their grandparents\(^{10}\). Even thought, internal migration seems financially essential for the families, many studies had shown that children who experienced parental migration had higher risk of delayed development\(^{11}\), negative mental health\(^{12-14}\), poor academic outcomes, low living condition satisfaction, and alcohol use\(^{15}\). Still, the association between parental migration and substance abuse has not been well examined especially in Thailand. We assessed family background and parenting characteristics that might associate with early age onset of substance abuse among young people who lived in Northeastern region of Thailand.

**Material and Method**

This cross-sectional descriptive study assessed patients with methamphetamine use disorder who visited outpatient clinics in Thanyarak Udon Thani Hospital and Thanyarak Khon Kaen Hospital from September to November 2019. The patients aged from 18 to 24 years, had no communication and reading difficulties, were not intoxicated from any substances, had negative urine drug tests, and were not in a medical emergency. The subjects were asked to fill in a self-answer questionnaire that included demographic information, information on substance use, family background and parenting characteristics.

Statistical analyses were performed using IBM SPSS 19; nominal variables using frequency and percentage, numerical variables using mean and standard deviation. All statistics were two-sided and a p-value of 0.05 was considered statistically significant.

In this study, “parental migration” was defined by subjects reported migration for employment of father and mother during childhood but not time-specific, whereas “parental absence” was when the migration lasted at least 1 year. Young people were usually referred to the subjects, aged 18 – 24 years, of this study.

**Results**

1. **Demographics**

The study included 145 subjects, 88.3% of the subjects were male, with the mean age of 21.22 years (S.D. = 2.06 years), 64.1% graduated from junior high school or lower, 69% were unemployed and 74.5% were unmarried.

2. **Information about substance use**

The earliest age onset of methamphetamine use was 11 years and the mean age onset was 15.86 years (S.D. = 2.01 years). The most common place where subjects used the substance was their home (61.1%) and the rate of multiple substance use, other than methamphetamine, was 93.79%; with smoking as the most co-occurring substance (66.2%).

3. **Family background and parenting characteristics**

Parental migration rate was 30.34% (95%CI: 23.14, 38.61) which mostly lasted longer than 2 years (43.18%). 60 subjects (41.38%) reported of either paternal or maternal migration, with higher rate of paternal migration. It was found that all subjects who reported of maternal migration longer than 2 years also reported of paternal migration longer than 2 years (Table 1). Parental absence was reported in 24 subjects (16.6%).

Primary caregivers during childhood were mostly either father or mother in 102 subjects (70.34%); with more on the mother side. In 45 subjects (31%) both father and mother were the primary caregivers. There were 43 subjects (29.66%), whose primary caregivers were neither father nor mother, who were left in care of mostly maternal grandparents (Table 2).

Subjects reported rate of past family conflict was 24.8% and domestic violence was 18.6%. As for the present family conflict was 15.9% and domestic violence was 12.4%.

4. **Factors from family background and parenting characteristics that might associate with age onset of methamphetamine use**

The study found that subjects with neither parents as primary caregivers were associated with the age onset of methamphetamine abuse before 18 years old, while having both parents as the primary caregivers, parental migration, and parental absence were not associated with the early age onset (table 3).
Table 1: Duration and types of parental migration

<table>
<thead>
<tr>
<th>Types of migration (N)</th>
<th>Maternal migration (%)</th>
<th>Paternal migration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental migration (44)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 1 year</td>
<td>19 (43.18)</td>
<td>15 (34.10)</td>
</tr>
<tr>
<td>Between 1 – 2 years</td>
<td>6 (13.64)</td>
<td>5 (11.36)</td>
</tr>
<tr>
<td>Longer than 2 years</td>
<td>19 (43.18)</td>
<td>24 (54.55)</td>
</tr>
<tr>
<td>Maternal migration (46)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 1 year</td>
<td>20 (43.48)</td>
<td>15 (32.61)</td>
</tr>
<tr>
<td>Between 1 – 2 years</td>
<td>6 (13.04)</td>
<td>5 (10.87)</td>
</tr>
<tr>
<td>Longer than 2 years</td>
<td>20 (43.48)</td>
<td>24 (52.17)</td>
</tr>
<tr>
<td>Paternal migration (58)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 1 year</td>
<td>19 (32.76)</td>
<td>20 (34.48)</td>
</tr>
<tr>
<td>Between 1 – 2 years</td>
<td>6 (10.34)</td>
<td>8 (13.79)</td>
</tr>
<tr>
<td>Longer than 2 years</td>
<td>19 (32.76)</td>
<td>30 (51.72)</td>
</tr>
</tbody>
</table>

Table 2: Primary caregiver during childhood

<table>
<thead>
<tr>
<th>Primary caregiver</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Father or Mother</td>
<td>102</td>
<td>70.3</td>
</tr>
<tr>
<td>Both parents</td>
<td>45</td>
<td>31</td>
</tr>
<tr>
<td>Father only</td>
<td>17</td>
<td>11.72</td>
</tr>
<tr>
<td>Mother only</td>
<td>40</td>
<td>27.59</td>
</tr>
<tr>
<td>Neither father nor mother</td>
<td>43</td>
<td>29.66</td>
</tr>
<tr>
<td>Paternal grandfather</td>
<td>3</td>
<td>2.07</td>
</tr>
<tr>
<td>Paternal grandmother</td>
<td>6</td>
<td>4.14</td>
</tr>
<tr>
<td>Maternal grandfather</td>
<td>8</td>
<td>5.52</td>
</tr>
<tr>
<td>Maternal grandmother</td>
<td>28</td>
<td>19.31</td>
</tr>
<tr>
<td>Others</td>
<td>4</td>
<td>2.76</td>
</tr>
</tbody>
</table>
Table 3 The relationship between family background and parenting characteristics and age onset of methamphetamine use.

<table>
<thead>
<tr>
<th>Family background and parenting characteristics</th>
<th>Age onset of methamphetamine use</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Less than 18 years (n = 106) n (%)</td>
<td>18 years and above (n = 39) n (%)</td>
</tr>
<tr>
<td>One or both parents as primary caregivers</td>
<td>No 37 (86.0)</td>
<td>6 (14.0)</td>
</tr>
<tr>
<td></td>
<td>Yes 69 (67.6)</td>
<td>33 (32.4)</td>
</tr>
<tr>
<td>Both parents as primary caregivers</td>
<td>No 74 (74.0)</td>
<td>26 (26.0)</td>
</tr>
<tr>
<td></td>
<td>Yes 32 (71.1)</td>
<td>13 (28.9)</td>
</tr>
<tr>
<td>Parental migration</td>
<td>No 71 (70.3)</td>
<td>30 (29.7)</td>
</tr>
<tr>
<td></td>
<td>Yes 35 (79.5)</td>
<td>9 (20.5)</td>
</tr>
<tr>
<td>Parental absence</td>
<td>No 86 (71.1)</td>
<td>35 (28.9)</td>
</tr>
<tr>
<td></td>
<td>Yes 20 (83.3)</td>
<td>4 (16.7)</td>
</tr>
</tbody>
</table>

* P < 0.05 level of significance

**Discussion**

The study found that the rate of parental migration was 30.34% among young people with methamphetamine abuse in Northeastern region of Thailand. When compared with the earlier study of parental migration in 2012, among Thai children age between 0 and 4 years, the rate of parental migration was lower at 21%\(^{(16)}\). Bear in mind that our study was done in Northeastern region, where the rate of parental migration was the highest, as well as the subject age group of 18 to 24 years, when parental migration could occur after 4 years of age. Our study was done in subjects or families who, without court-mandated, sought treatment for methamphetamine abuse which might imply that these subjects were more attentive and taken care by their family members. The attentiveness could obscure the real number of parental migration/absence among young people with methamphetamine abuse who might had never sought medical care or been recognized by their family members. Paternal migration was more common than maternal migration which was consistent with earlier studies\(^{(16,17)}\). Maternal migration had been shown to negatively impact the children\(^{(18,19)}\) as consistent with our study showing any maternal migration lasted longer than 2 years would always co-exist with paternal migration also lasted longer than 2 years.

The earliest age onset of methamphetamine use was 11 years which was reported by two subjects. Similarly, the two subjects did not have their parents as primary caregivers while one subject reported of parental absence. In Thailand, 18 is the age of majority and when taking this into account we found that the age onset of methamphetamine abuse before 18 was associated with having neither of parents as primary caregivers. This could assume that by having neither of parents as primary caregivers could problematically affect the children as consistent with the study that showed negative impacts on children from maternal migration\(^{(18,19)}\) as well as...
from paternal migration in the other study\(^{20}\).

This was the first study ever assessed the issue of parental migration on young people with methamphetamine use disorder in Northeastern region as well as in Thailand. Interestingly, we found that maternal migration that lasted longer than 2 years would always occur with paternal migration that also lasted longer than 2 years. In terms of substance abuse, this study suggested that adolescents would be better off under the care of either one or both parents, since unavailability was associated with the age onset of methamphetamine abuse before 18. However, the subjects from this study were those who voluntarily sought medical care rather than subjected to compulsory treatment order and the hospital settings were specialized drug addiction treatment centers that could not represent patients from general hospitals. Other limitation was that this study was based on a self-answer questionnaire; being a retrospective study, the results might not be as impactful as prospective studies.

**Conclusion**

Young people with methamphetamine use disorder who sought medical care, without compulsory treatment order, in the drug addiction treatment hospitals in Northeastern region of Thailand were found that the rate of childhood parental migration was 30.34% and the rate of parental absence was 16.6%. In every case of maternal migration that lasted longer than 2 years, paternal migration would always co-exist and also lasted longer than 2 years. Family conflict and domestic violence, either in the past or present, were reported in one out of four or five subjects. Primary caregivers during childhood were either father or mother in 70.34% of the subjects; mother was the majority. By having neither of parents as primary caregivers was associated with the age onset of methamphetamine abuse before 18.

**Conflict of Interest:** The authors declare no conflict of interest.

**Source of Funding:** Self

**Ethical Clearance:** This study was classified as an exempt research as reviewed by the Institutional Review Board, Office of Human Research Ethics, Khon Kaen University (HE621186).

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Heatstroke due to Vehicular Entrapment: An Autopsy Case Report

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Abstract

Heatstroke is defined as severe heat illness with elevated body temperature greater than 40.6°C associated with central nervous system dysfunction. In children, heatstroke as a result of vehicular entrapment is commonly encountered. We report a case of a six-year-old boy who was accidentally left in a school van under scorching hot afternoon for several hours. Upon discovery, he was rushed to a hospital where he was pronounced dead. His body temperature taken at the Emergency Department was 40.3°C. The body felt warm in spite of apparent presence of post mortem changes such as rigor and livor mortis. His clothes were drenched in sweat. A medico-legal autopsy was performed. On general examination, his body was pale and the lips were also parched and pale. Internally, there was subdural haemorrhage and petechial haemorrhages on the lungs and the epicardial surface of the heart. The cause of death was given as heatstroke as a result of vehicular entrapment. We wish to emphasize and appeal to the public that this tragic incident is preventable. Public and private sectors should help creating awareness of dangers in leaving a child unattended in a car.

Keywords: Heatstroke; Hyperthermia; Automobile; Paediatric; Autopsy

Introduction

Heatstroke is a life-threatening condition which is characterized by an elevated core body temperature above 40.6°C accompanied by central nervous system dysfunction, multi-organ failure and potentially result in death.1,2 Hyperthermia causing heatstroke as a result of excessive metabolic heat production usually during exercise is known as exertional heatstroke.3 Another type of heatstroke which is known as classical heatstroke is a result of poor heat dissipation which occurs in the event of heat waves or entrapped in a vehicle.4,5

In young children, heat related deaths are mostly caused by vehicular entrapment, intentionally or unintentionally.6,7 The National Highway Traffic Safety Administration (NHTSA) of the United States recorded 793 deaths of entrapped children between 1990 and 2016, with an average of 37 deaths per year.8,9 In Malaysia, data of vehicular entrapment cases were obtained from local newspaper reports, showing much lesser incidence of approximately one case per year. In many instances, the events include caretaker forgotten about the child in a vehicle or the child gaining access to the vehicle without the parents or guardians knowledge. In short, lack of adult supervision was determined as the most common contributing factor worldwide.

The diagnosis of heatstroke relies heavily on the history of circumstances of death. At autopsy, findings of heatstroke may be subtle and non-specific. Internal examination may demonstrate cerebral oedema, pulmonary oedema and internal organs congestion.2,6,10 Typical autopsy findings in adult or children with heatstroke include diffuse petechiae and haemorrhages as well as pulmonary involvement.4 Therefore, in the absence of good anamnesis, heatstroke as a cause of death could have been inadvertently missed.

We report a case of a child who was accidentally left in a school van on a scorching hot afternoon for a
few hours. He was found unconscious and immediately rushed to a hospital where resuscitation efforts were commenced, to no avail. The aim of this case report is to describe the pathology findings of an autopsy performed on a child who died of heatstroke as a result of vehicular entrapment. We also wish to highlight that this tragic incident is entirely preventable.

Case Report

In mid-August 2017, a six-year-old boy was found unconscious and unresponsive in a school van. He was picked up from home to attend a preschool in a hot sunny afternoon. After dropping off the children, the van driver proceeded to a restaurant nearby for lunch. About two and a half hours later, he returned to the van in order to pick up the children from school and send them back to their homes. This was when he realized that one child never actually alighted off the van. He immediately rushed the child to a nearby clinic which subsequently referred him to a hospital.

At the Emergency Department (ED), the child was noted to be warm and the rectal temperature measured was 40.3°C. Rigor mortis was present as evidenced from the fixed flexion of both arms and legs. Cardiorespiratory resuscitation (CPR) was commenced while the patient was in an ambulance en route to the hospital and continued for several minutes upon arrival. He was eventually pronounced dead and a police order for medico-legal autopsy was issued.

Autopsy examination showed a well-nourished and appropriately built male child measuring 107 cm in length and 39 kg in weight. The clothes were drenched in sweat. The lips were parched and pale. Bluish discolouration was noted on the nail beds, indicating cyanosis. Rigor mortis was present in spite of the relatively warm body. Internal examination of the head and neck revealed cerebral oedema, minimal subdural haemorrhages and markedly congested cerebral blood vessels. Examination of the lungs revealed subpleural petechial haemorrhages, pulmonary oedema and blood vessels congestion. Froth was also present on the trachea, in keeping with pulmonary oedema. Petechial haemorrhages were also observed on the epicardial surface of the heart. Sago-spleen like appearance was observed.

Tissue samples from the brain, heart, lungs, liver, kidneys and adrenal glands were obtained for microscopy examination. On histology, the organs showed dilated and congested blood vessels. The cause of death was concluded as heatstroke as a result of vehicular entrapment. The mechanism of death was hyperthermia leading to neurological dysfunction and cardio-circulatory failure.

Discussion

Children are vulnerable to heatstroke due to their under-developed thermoregulatory system, hence impairing the body’s ability to dissipate heat effectively. Their small body size also contributes to large surface area, resulting in high rate of heat absorption. On top of that, their small blood volume restricts the potential for heat conductance, thus resulting in higher heat accumulation. Eventually, their small physique also means smaller sweat glands, lower metabolic capacity and lower sensitivity of sweating mechanism to thermal stimuli.

Autopsy findings in fatal hyperthermia include widespread haemorrhages, pulmonary congestion and oedema. In both children and adults, the features of heatstroke are relatively similar, regardless of the circumstances leading to it. Essentially, these findings are non-specific and could be attributed to other causes such as sepsis, burn injuries, barotrauma and electrocution. Therefore, history of the case which includes detailed police investigation and relevant witness statement will be of ultimate key evidence leading to heatstroke diagnosis.

In children, vehicular entrapment is the most common cause of fatal heatstroke. Studies have shown that the interior of a closed vehicle heats up very quickly. Within 15 minutes, the interior of a parked vehicle may reach the maximum temperature of 51-67°C, from the ambient temperature of 36.8°C. Within 5 minutes of closing the doors, 75% of the maximal value could be reached.

In our case, the child has most probably fallen asleep during the short journey to school causing him to fail to alight from the van. When he was discovered two and a half hours later, he was already deceased as rigor mortis had already set in. Meteorological report showed that on the fateful day, the sunny afternoon temperature fetched 33°C. As the school van was parked in an open area and under direct sunlight, it is hypothesized that the interior temperature of the van could have gone up to almost 70°C in less than 15 minutes. Hyperthermia may cause death when the body temperature reaches 41.7°C. As
the temperature inside the van reached more than 60°C in short period of time, heatstroke and death could have occurred in short period of time too. A study by Walter and Carrareto has found that hyperthermia with body temperature of 38.8°C, cognitive impairment may occur in one to two hours after insult. In a case of vehicular entrapment, the excessive high temperature in the vehicle will remain until the doors are opened. Therefore, the core body temperature will also rise within the relatively similar time frame. We postulated that death occurred in less than one hour of entrapment, in keeping with acute and extreme temperature elevation inside the school van. At the early stage, heat-regulating mechanisms such as excessive sweating, rapid breathing and fast, weak pulse were in place, as evidenced by his sweat-drenched clothes. Eventually, the body’s thermoregulation became overwhelmed, the blood pressure dropped as the heart attempted to maintain adequate circulation to the vital organs. Decrease in blood pressure and vasoconstriction resulted in pale appearance of the body. At the ED, the body was pale and warm despite presence of rigor mortis. Another key finding in this case is rigor mortis, as it is not only an indication of death, but also, a sign of death associated with hyperthermia.

A study by A Guard found that almost three quarters of the cases were actually children who were left by adults. More than 50% of these cases resulted from adults who forgot or unaware that they were leaving the children inside the vehicle. About 13% of these cases involved childcare providers and drivers. In our case, the van driver was a replacement driver who happened to be on his first day at work. While he himself was a youth, inexperience and lack of proper guidance imparted to him about the job have resulted in a lifetime of regret.

**Conclusion**

Heatstroke fatality resulted from vehicular entrapment is an entirely preventable tragedy. Parents, caregivers including school van drivers should be regularly reminded to take heed of important tips such as looking at the backseat before exiting and checking the vehicle before locking the doors. Increased public awareness could help averting the tragic incident from claiming life of another child.

**Declaration**

**Consent for Publication**

Not applicable.

**Availability of data and material**

Not applicable.

**Conflict of Interest:** The authors declare that they have no competing interests.

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Cardiac Haemorrhage: An Extreme Presentation of Leptospirosis

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Abstract

Introduction: Leptospirosis is a worldwide disease with significant morbidity and mortality. The severe form of the disease may present with cardiac and pulmonary involvements resulting in multi-organ failure. Cardiac manifestations of leptospirosis include arrhythmia, cardiomegaly, petechial haemorrhages, pericarditis and myocarditis. Case report: We report a case of a 10-year-old boy who was having shortness of breath and collapsed at home. At the emergency department, he was having refractory hypotension with electrocardiogram (ECG) showing sinus tachycardia. The liver and cardiac enzymes were markedly raised. The full blood count showed leukocytosis. It was concluded that he was in septicaemic state with acute multi-organ failure of unknown cause. He succumbed to the illness approximately 8 hours after the hospital admission. At autopsy, the lungs, liver and spleen were markedly congested. Pericardial effusion was noted. The heart showed extensive areas of petechial and confluent haemorrhages involving almost the entire epicardial surface of the right and left ventricles. Massive subendocardial haemorrhage was also observed upon sectioning of the left ventricular chamber. Histopathology examination corroborated that haemorrhages were present in the heart, lungs and the liver. Laboratory investigations revealed positive Leptospira IgM antibody, confirmed by positive Leptospira PCR. The cause of death was concluded as cardiac and pulmonary haemorrhages secondary to leptospirosis. Conclusion: Cardiovascular involvement in leptospirosis may manifest as rapidly deteriorating illness with clinical evidence demonstrable from the ECG changes and raised cardiac enzymes. Recognizing these signs early may help to improve outcomes.

Keywords: Leptospirosis; Myocarditis; Pulmonary haemorrhage; Autopsy; Cardiac haemorrhage

Introduction

Leptospirosis is a worldwide zoonotic disease caused by pathogenic spirochetes of the genus Leptospira.1,2 Transmission primarily occurs from direct contact with infected animals, or water contaminated with urine of infected animals, commonly rodents.3,4 The clinical manifestations include simple febrile episodes, classified as self-limiting anicteric febrile disease to complex clinical features known as Weil’s disease.2,5 A severe and fatal form of this illness may present with cardiac and pulmonary involvement, renal failure, liver failure or a combination of multi-organ involvement with haemorrhagic diathesis.3,6

Cardiac manifestations of leptospirosis include arrhythmia, cardiomegaly, petechial haemorrhages, pericarditis and myocarditis.2,7,8 Studies have shown that cardiac involvement occurred in 20% to 93% of the cases.7,9 At autopsy, petechial haemorrhages and myocarditis are the most common presentations indicating cardiovascular involvement in leptospirosis.2,7,9

We report a case of a 10-year-old boy who appeared to be slightly unwell, collapsed at home and passed away approximately 8 hours after the hospital admission. He was diagnosed with acute multi-organ failure and sepsis of an unknown cause. At autopsy, massive cardiac

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haemorrhages were observed. *Leptospira* IgM antibody and polymerase chain reaction (PCR) were positive. In this case report, we wish to highlight that fatal leptospirosis may have very minimum presentations, thus, high index of suspicion is needed in order to improve outcomes. We also wish to describe an extreme cardiac presentation associated with leptospirosis.

**Case Report**

A 10-year-old boy was brought to a hospital after he was found collapsed in a bathroom at home. According to the parents, he appeared slightly unwell and less active for two days. At the emergency department, he was unresponsive with Glasgow Coma Scale (GCS) of 3/15. His heart rate was 180/min, blood pressure of 110/40, SpO2 99%, and temperature was 38.4°C. The electrocardiogram (ECG) showed sinus tachycardia. He also had cool peripheries. Blood investigations revealed normal haemoglobin (15.5 g/dL), high total white cell count (38 x 10⁹/ L) and mild thrombocytopenia (149 x 10⁹/ L). Cardiac enzymes such as troponin I, creatine kinase (CK), aspartate aminotransferase (AST) and lactate dehydrogenase (LDH) were all raised, at 15439 ng/ml, >42670 mml/L, 995 U/L and 2904 U/L respectively. The creatinine level was 309.7 mg/dl, indicating acute renal failure. The liver function test showed increased alanine aminotransferase (232 U/L).

Computed tomography for the brain was performed, showing no evidence of intracranial bleed or space occupying lesion. The working diagnoses at this point were severe sepsis with acute multi-organ failure. He was promptly intubated and resuscitated. Shortly after the admission, his blood pressure began to show a downward trend. Systolic pressured ranging from 50-60 mmHg and diastolic pressure 30-40 mmHg. His blood pressure remained low despite maximum inotropic supports and multiple fluid boluses given. Eventually, he succumbed to the illness approximately 8 hours after the admission. A medico-legal autopsy was performed to ascertain the cause of death.

Autopsy examination showed an obese and appropriately built male child measuring 146 cm in length and 85 kg in weight. The lungs, liver and spleen were markedly congested. Detailed gross examination of the cardiovascular system showed pericardial effusion amounting to 55 ml. The heart showed extensive areas of petechial and confluent haemorrhages involving almost the entire epicardial surface of the right and left ventricles. Massive subendocardial haemorrhage was also noted upon sectioning of the left ventricular chamber (Fig. 1). The serial cut sections showed softening of the cardiac parenchyma associated with transmural petechial haemorrhages, mostly prominent at the antero-septal region of the left ventricle. ‘Shock’ kidneys appearance was observed, exhibiting pale cortex with dark medulla. The spleen was also congested, soft and friable.

![Fig. 1](image.png)
Representative tissue samples from the heart, lungs, liver, spleen and kidneys were obtained for microscopy examination. On histology, the heart shows extensive transmural haemorrhages involving both the right and left ventricles. Occasional acute inflammatory cells are present and contraction band necrosis is also observed, in keeping with ischaemic changes (Fig. 2 a&b). Haemorrhages are also present on the liver and lungs sections. The spleen shows massive neutrophilic infiltration and central necrosis of the white pulps. These features are in keeping with septicaemia. The kidneys show features of acute tubular necrosis, corroborating the high creatinine level from the blood investigation. Myoglobin globules are observed in the kidneys, which, in combination with the markedly raised creatine kinase, confirming presence of rhabdomyolysis in this case (Fig. 2d). The lungs show oedema, congestion and massive intra-alveolar haemorrhages (Fig. 2c). An area showing pulmonary infarction is also observed. In summary, the histology examination confirmed that the deceased was having an acute multiple organ failure, cardiac and pulmonary haemorrhages, as well as severe rhabdomyolysis.

In view of the physical examination, laboratory investigations results and autopsy findings, a diagnosis of leptospirosis was suspected. Several post mortem blood samples were obtained for infectious disease screening. Serological analysis revealed a positive *Leptospira* IgM antibody. A subsequent confirmatory test by PCR was performed, the result was positive. Therefore, the cause of death was concluded as cardiac and pulmonary haemorrhages secondary to leptospirosis. The mechanism of death was septicaemia in combination with multiple organ failure.

Fig. 2 (a) The myocardium showing multiple foci of haemorrhages (arrows). (b) Scattered intraparenchymal haemorrhages and contraction band necrosis of the myocardium (arrows). There is no inflammatory cell infiltrate observed. (c) The lung section shows thickened alveolar walls with red blood cells in the alveoli sacs. (d) Masson’s trichrome stain of the kidney, showing myoglobin globules in the distal convoluted tubules (arrows).
Discussion

Cardiovascular involvement in leptospirosis has variable degrees and potentially life threatening. Presentations such as arhythmia, pericarditis, myocarditis, congestive heart failure and cardiogenic shock are well documented in studies before. Clinical evidence is frequently demonstrable from cardiac enzymes assays, ECG and echocardiography (ECHO). Manifestations such as refractory hypotension, AV conduction block and sinus tachycardia are the most common ECG findings in leptospirosis. Raised cardiac enzymes may be an indication of myocarditis and an important prognostic marker. In our case, the child presented with refractory hypotension and sinus tachycardia on ECG. All the cardiac enzymes were markedly raised. We hypothesized that the child was having cardiogenic shock when he was admitted to the hospital.

At autopsy, cardiac manifestations in leptospirosis include cardiomegaly, petechial haemorrhages, inflammation of the cardiac muscles and complications such as congestive cardiac failure. Microscopically, interstitial myocarditis with predominant lymphocytes and macrophages infiltrations with some degree of myocardial injuries such as degeneration or necrosis are commonly observed. In our case, massive haemorrhages were observed affecting almost the entire epicardial surface and all layers of the heart. On microscopy, the cardiac parenchyma generally showed evidence of haemorrhages with minimum inflammation. Therefore, our case illustrates an extreme and unusual form of cardiac presentation where the heart was essentially having severe bleeding, instead of inflammation as commonly observed in leptospirosis.

Another highlight of the case is rapid deterioration of a patient with cardiovascular involvement. Retrospectively, the parents only noticed his reduced activity for two days, as he was lying down and taking nap a little longer than usual. Still, he did not complain of feeling ill or appear very sick. However, the fact that paracetamol and salicylate were present in the blood suggested that the child did have fever and myalgia. According to the parents, the boy was quite independent and most probably had taken the medications by himself. As he came in with acute multi-organ failure with sepsis, the rapid worsening of his conditions baffled the attending clinicians. Unfortunately, leptospirosis was not suspected to be the cause.

Contact tracing revealed that he was most probably infected during a recreational activity at a waterfall. Two weeks prior to his death, the family went to a waterfall for picnic and swimming. A week later, he probably began to have fever as further checks showed that he bought some fever medications at a convenient store near his home. However, all this while, he appeared well and was able to carry out his daily activities including going to school and playing football in the afternoon. A day prior to his demise, he appeared slightly unwell, as he spent longer nap in the afternoon and did not go out to play football. His final symptom was difficulty in breathing amid the high fever. Observing the sequence of events, we hypothesized that after a week of contracting the disease, he began to have fever as a manifestation of the first phase of leptospirosis. The first phase is usually associated with high fever, headache, myalgia, abdominal pain, nausea and vomiting. Subsequently, the child went into the second phase which is characterized by jaundice, renal and liver failures and pulmonary haemorrhages. When he was brought to the hospital, two weeks after contracting leptospirosis, he was having cardiogenic shock, multiple organ failure and septicaemia.

Conclusion

Cardiovascular involvement in leptospirosis may manifest as rapidly deteriorating illness with clinical evidence demonstrable from the ECG changes and raised cardiac enzymes. Despite a vague medical history, leptospirosis should always be kept in mind as early identification and appropriate treatments may help to improve outcomes.

Conflict of Interest: None.

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Ethical Clearance: None.

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References


Children’s Nutrition Status Based on Streetism, Mobility, and Social Cohesion Perspective in Makassar (Study Epidemiology Analytic)

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Abstract

Background. Changes in community structure from argument to industry and lifestyle changes, socio-economic societies are suspected as a backdrop to the increasing prevalence of non-communicable diseases, so that the incidence of non-communicable diseases varies greatly in epidemiological transitions. One of the epidemiological problems that often arises is the problem of child nutrition. Street children nutrition is very concern in Makassar City. Street children in Makassar city are increasing every year. This was seen in 2014 the number of street children was 220, in 2015 there were 250 children, while in 2016 it increased to 305 street children. Street children are at risk of suffering from nutritional disorders. The nutritional status of street children is very dependent on mobility, streetism, mobility, and social cohesion. The study was conducted with the aim of analyzing the nutritional status of street children based on the perspective of streetism, mobility and social cohesion in Makassar. The benefits of this research are expected to be able to develop theories and concepts regarding the nutritional status of street children based on epidemiological studies. Material and Methods The type of research used was an observational method in a cross-sectional study design. The sampling method uses simple random sampling. The study was conducted in September-January 2020. The number of sampling was 90 people. The population and research sample are street children in Makassar City. The data analysis technique used in this study is Chi-square. Results. There is an influence of streetism and social cohesion on street children in Makassar. The results of the analysis of the relationship between streetism, mobility and social cohesion with the nutritional status of street children found that streetism p (0,000) < p (0.05), mobility p (0,075) p > (0,05), kohesi social p (0,075) p > (0,05). Conclusion. Streetism has a very significant influence on the status of street children in Makassar. It is recommended that the social service and health office work together with halfway houses to provide information on nutrition to street children so that they understand about nutritious food, healthy eating patterns.

Keywords: Street children, nutritional status, mobility, streetism, social cohesion, epidemiology.

Introduction

Changes in community structure from argument to industry and lifestyle changes, socio-economic societies are suspected as a backdrop to the increasing prevalence of non-communicable diseases, so that the incidence of non-communicable diseases varies greatly in epidemiological transitions. One of the epidemiological problems that often arises is the problem of child nutrition. Street children nutrition is very concern in Makassar City. Street children in Makassar city are increasing every year. This was seen in 2014 the number of street children was 220, in 2015 there were 250 children, while in 2016 it increased to 305 street children. Street children are at risk of suffering from nutritional disorders.

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The nutritional status of street children is very dependent on mobility, streetism, mobility, and social cohesion. The study was conducted with the aim of analyzing the nutritional status of street children based on the perspective of streetism, mobility and social cohesion in Makassar City. The benefits of this research are expected to be able to develop theories and concepts regarding the nutritional status of street children based on epidemiological studies.

Street children who leave home, either voluntarily or because they are forced to live on the streets, become a risk for street children. Their living and living conditions are faced with risks related to nutrition, health, deviant sexual behavior, drug and alcohol abuse, threats of physical and psychological violence. Determination of the health status and nutritional status of street children is closely related to the mobility of street children, social cohesion, streetism in solving problems faced. Streetism contains an understanding of how street children live their lives on the road.

**Material and Method**

**Material and Methods** The type of research used was an observational method in a cross-sectional study design. The sampling method uses simple random sampling. The study was conducted in September-January 2020. The number of sampling was 90 people. The population and research sample are street children in Makassar City. The data analysis technique used in this study is Chi-square.

**Results**

Data on street children collected as many as 90 people spread across all roads in the Makassar City area were then measured for nutritional status. The results of these measurements can be seen in the following table.

**Table 1** Effects of Streetism on the Nutritional Status of Street Children

<table>
<thead>
<tr>
<th>Streetism</th>
<th>Nutritional Status of Street Children</th>
<th>Wasting</th>
<th>Normal</th>
<th>Overweight</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Freqenci</td>
<td>Percent</td>
<td>Freqenci</td>
<td>Percent</td>
</tr>
<tr>
<td>High</td>
<td></td>
<td>45</td>
<td>90,0</td>
<td>3</td>
<td>6,0</td>
</tr>
<tr>
<td>Medium</td>
<td></td>
<td>17</td>
<td>56,6</td>
<td>11</td>
<td>37,9</td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td>3</td>
<td>27,3</td>
<td>5</td>
<td>45,5</td>
</tr>
<tr>
<td>Amount</td>
<td></td>
<td>65</td>
<td>72,2</td>
<td>19</td>
<td>21,1</td>
</tr>
</tbody>
</table>

Table 1 explains that the variable streetism is obtained p(0.000) p < (0.05), giving an influence on the nutritional status of street children.

**Table 2** Effects of Social Mobility on the Nutritional Status of Street Children

<table>
<thead>
<tr>
<th>Social Mobility</th>
<th>Nutritional Status of Street Children</th>
<th>Wasting</th>
<th>Normal</th>
<th>Overweight</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Freqenci</td>
<td>Percent</td>
<td>Freqenci</td>
<td>Percent</td>
</tr>
<tr>
<td>High</td>
<td></td>
<td>20</td>
<td>90,9</td>
<td>1</td>
<td>4,5</td>
</tr>
<tr>
<td>Medium</td>
<td></td>
<td>27</td>
<td>90,0</td>
<td>2</td>
<td>6,7</td>
</tr>
<tr>
<td>Low</td>
<td></td>
<td>25</td>
<td>65,8</td>
<td>9</td>
<td>23,7</td>
</tr>
<tr>
<td>Amount</td>
<td></td>
<td>72</td>
<td>80,0</td>
<td>12</td>
<td>13,3</td>
</tr>
</tbody>
</table>

Table 2 explains that the variable social mobility is obtained p(0.075) p < (0.05), giving an influence on the nutritional status of street children.
Table 2 explains that the variable social morbidity obtained p (0.075) p > (0.05) did not influence the nutritional status of street children.

### Table 3 Effects of Social Cohesion on the Nutritional Status of Street Children

<table>
<thead>
<tr>
<th>Social Cohesion</th>
<th>Nutritional Status of Street Children</th>
<th></th>
<th></th>
<th>Amount</th>
<th></th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Wasting</td>
<td>Normal</td>
<td>Overweight</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frequenci</td>
<td>Percent</td>
<td>Frequenci</td>
<td>Percent</td>
<td>Frequenci</td>
<td>Percent</td>
</tr>
<tr>
<td>High</td>
<td>40</td>
<td>85.1</td>
<td>4</td>
<td>8.5</td>
<td>3</td>
<td>6.4</td>
</tr>
<tr>
<td>Medium</td>
<td>30</td>
<td>81.1</td>
<td>5</td>
<td>13.5</td>
<td>2</td>
<td>5.4</td>
</tr>
<tr>
<td>Low</td>
<td>2</td>
<td>33.3</td>
<td>3</td>
<td>50.0</td>
<td>1</td>
<td>16.7</td>
</tr>
<tr>
<td>Amount</td>
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<td>80.0</td>
<td>19</td>
<td>13.3</td>
<td>6</td>
<td>6.7</td>
</tr>
</tbody>
</table>

Table 3 explains that the social cohesion variable obtained p (0.047) p > (0.05), does not have an effect on the nutritional status of street children

### Discussion

Table 1 explains that the variable streetism is obtained p (0.000) p < (0.05), giving an influence on the nutritional status of street children. This is related to several factors such as income, choice of food, free lifestyle and others. Street children are children who spend most of their time doing daily life activities on the streets such as making a living and or wandering, in other public places. Street children have their own characteristics such as age between 5-10 years, carrying out activities on the streets, mostly dull appearance, neglected clothing, and high mobility. [3]

Streetism is a term that describes the desperate situation of children, who are forced to spend most of their time outside the home, often sleeping on the street and engaging in activities to generate low income. [3], [4]

Streetism arises in urban areas such as Makassar, where children who come from suburbs or slums in the city, who do not get attention and are not taken care of by their parents, are on the road forcefully or with their own awareness to fulfill their basic needs, especially food sufficiency. Streetism is related to freedom of life on the streets, freedom of family problems, work to fulfill basic life needs, not bound by regulations, limited housing and home facilities as well as physical and non-physical violence.

Streetism conditions have an impact on the nutritional status of street children. Adequate nutrition of street children is related to their daily food consumption. Healthy and nutritious food can be fulfilled by buying processed foods or food ingredients that are processed into food. Street children buy food from the work of begging, busking, parkers, porters or laborers, and various other jobs.

Freedom as a sign of streetism has an impact on the nutritional status of street children. Street children who are bigger and have a higher income, will spend their money on non-food needs. As part of street children buying cigarettes and smoking to show freedom and non-attachment to rules. Some of them have even begun to try coplo pills or alcoholic drinks, which are widely available on the streets and easy for them to access.

Isbach et al. reported as many as 63.2% of street children who spent 4-8 hours per day on the road with very thin nutritional status. The energy used to work on the streets is not proportional to the food they consume. The same was reported by Hakim et al., 66.67% of street children underweight and 33.33% of normal body weight who worked on the streets of Bangladesh. [5], [6]

Patriasih, et al. in Lembang City, Bandung, West Java, found that from 324 street children samples, 80.4% had underweight and were obstructed. Common diseases suffered by street children are diarrhea as much as 22.7% and diseases as much as 18.4%. Research conducted by Nur’aini in the city of Bandung, shows that most street children work as singers, spending 4-8 hours a day and...
4-6 days a week. The average level of energy and protein adequacy of children is in the category of mild deficits, iron and vitamin C in the low category and vitamin A in the sufficient category. [7], [8]

Rathod et al reported that a survey of children in Mumbai, India, where 56 of them were women. About 77 percent of the total children are malnourished. Of the total number of malnourished children, 43 percent of children are obstructed, 38 percent are underweight and 19 percent are wasted. About 36 percent had a fever and 17 percent had diarrhea in the past year. [9]

Sehra, RN., Conducted a nutritional status assessment and identified general health problems among street children in Bikaner, Rajasthan, India, stating that 41.5% of children have normal nutritional status, while 59.5 suffer from lack of energy protein (KRP). Likewise, Meshram et al. Reported on the nutritional status of street children in India, that the prevalence of anemia was still high in street children. [10], [11]

Table 2 explains that the variable social morbility obtained $p (0.075) > (0.05)$ did not influence the nutritional status of street children. This can be due to the mobility of the area or migration of the population, which is the driving factor that makes the community leave the region of origin and the pull factor that makes the community come to the area, will not immediately change its economic capacity.

Regional mobility occurs around Makassar City such as Kab. Gowa, Kab. Maros, Kab. Takalar and Kab. Jenneponto or other regions in South Sulawesi and influenced by four important factors, namely factors that can drive the migration process, which are issued by the area of origin and are likely to be negative, migration process, factors that are in the migration channel area, individual factors of the population migrating. [12], [13]

People who come to Makassar for economic and employment reasons, but do not have sufficient education, skills and abilities to work, will eventually live in slums with work as laborers, coolies, or other informal sectors. The work is not enough to provide a living to finance the needs of his family. The child from the family then becomes a street child, a child who spends most of his time on the road working as a beggar, buskers, scavengers, parking attendants, coolies or laborers.

Mobility in the Makassar City itself also does not have an impact on nutritional status, because mobility does not directly improve consumption patterns and fulfill the food needs of families and street children. Street children who work as scavengers, have high mobility, but instead become thinner because of the large amount of energy used to carry out physical activities on foot or pedal the garbage collection wheels.

Research conducted by Goodmana et al., Assessing household and maternal factors associated with child street migration in Kenya, shows no significant relationship between increasing maternal childhood difficulties and child street migration. [14]

Literature study mainly from three continents (Africa, Asia, and Latin America) and observing economic, political, social, and environmental versions, carried out by Alem et al., Informs that the majority of road occupants are categorized as children working on the street in Africa, while in Asia some of them are left from their homes. Children who come to the streets may be driven by factors such as coercion by families, lack of access to education, and the existence of an unpleasant life in Africa. Children in Asia are encouraged by families to work as laborers and street vendors, as a source of family livelihood. [15]

Table 3 explains that the social cohesion variable obtained $p (0.047) > (0.05)$, does not have an effect on the nutritional status of street children. This can be due to several factors such as high integrity and quality of life as part of the results of social cohesion. Social cohesion is an order that has shared values and interpretations, which reduces wealth and income disparities, and generally enables people to have a sense of involvement in a community, face shared challenges, and have a perception of shared community. [16]

Social cohesion occurs because the values held in common and then build a community to face common challenges, and have a perception of community similarity. Social cohesion is based on quality of life, scope of life and integrity. integrity as a part of forming community social cohesion has not been able to improve the nutritional status of street children. Although there is a sense of unity and harmony and solidarity among street children, but what will be distributed or assisted to other street children is still limited.

Quality of life is still low, especially in food availability and food consumption patterns. Even
though the availability of sufficient food will provide an opportunity for every family member to meet their food needs. Likewise, the level of education as a determinant of quality of life, will cause the families of street children, namely mothers and fathers, lack adequate knowledge about healthy and balanced food, so that street children who still go home will get food that is not nutritious enough.

Hakim, RL, conducted research on energy intake and infectious diseases with the nutritional status of street children in the city of Semarang. The research sample of 90 street children with cross-sectional study design. The results of the study concluded that there is a relationship between energy intake and infectious disease with the nutritional status of street children. [17]

Cumber et al. Stated that street children are at risk of carrying a greater burden of disease. The lifestyle of street children is more vulnerable to risk and health problems than children who live at home, when street children roam the streets looking for food and money. The street child sleeps in half-destroyed houses, abandoned basements, under bridges and in the open air. Street children usually work in poor conditions, are dangerous to their health, and starve for several days. [18]

**Conclusion**

Streetism has a very significant influence on the status of street children in Makassar. It is recommended that the Social Service and Health Office work together with halfway houses to provide information on nutrition to street children so that they understand about nutritious food, healthy eating patterns

**Financial support and sponsorship:** Own cost

**Ethical Considerations:** Ethical clearance was obtained from Institute of Health Science “Maluku Husada”, Ambon, Indonesia; with number “RK.09/KEPK/STIK/IX/2019. Just before the interview, written (or thumb impression) consent was obtained from each participant in Institute of Health Science Ambon guidelines.

**Conflicts of Interest:** The authors alone are responsible for the views expressed in this article and they do not necessarily represent the views, decisions, or policies of the institutions with which they are affiliated.

**References**


Changes in ARB Sputum Positivity, BMI and TNF-α Levels of Pulmonary TB Patients with ARB Positive During One-month Intensive Treatment

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Abstract

Background: TNF-α plays a role in the occurrence of anorexia and weight loss in pulmonary tuberculosis (TB) patients. Evaluation of treatment response can be done with clinical, microbiological and radiological evaluation. In patients without cough, Body Mass Index (BMI) and TNF-α levels can be used to evaluate clinical treatment response.

Objectives: The aim of the study is to measure the Acid Resistant Bacteria (ARB) sputum positivity decrease, TNF-α levels and increased BMI after 2 weeks and 4 weeks intensive treatment of pulmonary TB patients with new case of ARB positive.

Methods: The sample size was 14 people with ARB positive pulmonary TB cases, consisting of 9 men and 5 women. It was done sputum smear, BMI and TNF-α examination before treatment, at week 2 and week 4 of intensive phase treatment

Result: At the end of the second week, TNF-α levels decreased significantly compared to baseline TNF-α levels with p = 0.015. There was a non significant increase of BMI at the end of the second and fourth week with p = 0.309 and p = 0.270 respectively. The decrease in ARB sputum smear positivity at the end of the second week compared to the fourth week was not statistically significant with p = 0.157. There was a strong correlation between TNF-α and IMT levels before treatment with negative correlation, r = -0.702 and p = 0.005.

Conclusion: Levels of TNF-α at the end of the second week decreased significantly compared to baseline TNF-α levels. There was a strong correlation between TNF-α levels and BMI prior to treatment.

Keywords: Acid Resistant Bacteria Sputum, Body Mass Index, TNF-α levels, pulmonary Tuberculosis, new cases, intensive phase

Introduction

Tuberculosis (TB) is an important public health problem worldwide. It is estimated that about one-third of the world’s population has been infected by the Mycobacterium tuberculosis. The WHO data 2012 stated that Indonesia takes the fourth place in the world with the number of 0.40-0.50 million people with tuberculosis after India (2.0-2.5 million sufferers), China (0.9-1.1 million sufferers) and South Africa (0.40-0.60 million sufferers)¹.

Body weight loss due to TB is caused by pro-inflammatory cytokines TNF-α produced by dendritic cells and macrophages. TNF-α is known as cachectin that works in the hypothalamus by suppressing the eating desire center causing anorexia and cachexia. At the onset of OAT treatment, there was an increase in TNF-α levels, whereas longitudinal studies concluded that TNF-α levels fluctuated during OAT treatment. Other studies reported an increase in TNF-α levels in TB patients although not significant ².

Body Mass Index (BMI) is the result of weight (kg) divided by height (m) squared. BMI is a simple method to monitor adult nutritional status. BMI is very sensitive to sudden changes in the body for example due to
infectious diseases or decreased appetite. Evaluation of weight gain can be used to assess the clinical treatment progress of TB patients.

The number of ARB germs declines rapidly after OAT treatment begins, 80-85% of pulmonary TB patients become non-infectious after about 2 weeks of treatment. It is estimated that more than 50% of TB sufferers remain infectious after 2 weeks of treatment. The best assessment of the OAT therapy response is the TB bacilli eradication of sputum. Some researchers have found ARB decreased after receiving OAT therapy for approximately 2 weeks.

Surgery, OBG, ENT Eye Disease Sciences are not rare getting a case with surgical indications in a patient who simultaneously suffers from ARB positive pulmonary TB. The Pulmonology and Respiratory Medicine is often consulted in such cases. Should the operation be delayed and wait until the intensive phase is complete (sputum conversion has occurred)? And the answers given are often different. From the description above, it is necessary to examine the decrease of ARB sputum positivity, TNF-α level and BMI increase after 2 weeks and 4 weeks of intensive treatment to determine the relationship between the sputum positivity level of BTA and BMI, as well as the relationship between decrease in ARB sputum positivity and TNF-α after 2 weeks and 4 weeks of intensive phases.

**Method**

The subjects were pulmonary TB patients who met the inclusion and exclusion criteria. Inclusion criteria were male and female, aged 15-60 years, positive new case of pulmonary TB, and willing to seek treatment at DOTS Unit of Pulmonology Department, Dr. Soetomo General Hospital Surabaya, Indonesia. Exclusion criteria were DM, malignant and AIDS / HIV disease, patients could not excrete sputum spontaneously, did not get standard OAT 4 FDC, there are major side effects of OAT.

This was analytical observational study. The study procedure included interview, physical examination, TNF-α level examination, and ARB smear sputum examination. Interviews included anamnesis about Diabetes Mellitus (DM) symptoms, malignancy and HIV/AIDS risk factors. Physical examination included general examination, weight, height, tension, pulse, breath frequency. Physical examination was also intended to look for signs of malignancy and HIV/AIDS more specifically.

Examination of TNF-α levels was performed by taking venous blood with a syringe of 5 cc, then centrifuged for several minutes. The serum was taken, then put into the tube and stored in the refrigerator with a temperature of -70°C. Measurements of TNF-α levels were performed by ELISA. The steps of TNF-α examination were as follows (1). Reagents preparation, samples and standard solutions as controls (2). Add 100 μl standard solution or sample, incubate for 2.5 hours at room temperature (3). Add 100 μl biotin antibody, incubate for 1 hour at room temperature (4). Add 100 μl of Streptavidin solution, incubate for 45 minutes at room temperature (5). Add 100 μl of One-Step Substrate TMB reagent, incubated for 30 minutes at room temperature (6). Add 50 μl Stop Solution and read immediately on 450 nm wave.

Sputum smear of ARB examination was done by taking spontaneous sputum of patients into 2 sputum pots. Sputum taken for examination was spontaneous sputum and morning sputum. Spontaneous sputum was labeled with name, age, register number, date of specimen taking then sent to Microbiology Unit for sputum painting examination by Ziehl Nielsen method. Ziehl Nielsen painting results were read on an IUALTLD scale.

The data were recorded and collected, then analyzed using the SPSS computer statistical program (SPSS, Inc., Chicago, IL). Sputum positivity rate of ARB, BMI and TNF-α levels were presented in tables. The correlation between sputum positivity level of ARB and BMI, between sputum positivity of ARB and TNF-α level was tested using Pearson correlation test with p <0.05.

**Result**

Respondents Characteristics

Smear sputum results of ARB according to IUALTLD score at the time of pulmonary TB diagnosis were 2 ARB scanty sputum (14.28%), 6 ARB sputum 1+ (42.86%), 4 ARB sputum 2+ (28.57%) and 2 ARB sputum 3+ (14.28%). At the end of second week of treatment, 9 patients (64.29%) converted to negative, 4 patients (28.57%) with ARB smear sputum 1+ and 1 patient (7.14%) with ARB smear sputum 2+. At the end of the fourth week of treatment, there were 11 patients (78.57%) converted to negative, 2 patients (14.28%) with ARB smear sputum 1+ and 1 patient (7.14%) with...
ARB smear sputum 2+ (Table 1).

**Analysis Results**

Paired sample t test was used to determine the significant difference of BMI in the fourth week and preliminary condition, second week and preliminary condition, fourth week and second week of treatment. The result of paired sample t test of BMI was $p = 0.309$, 0.107 and 0.270. TNF-α in the fourth week compared to preliminary TNF-α was $p = 0.015$ while second week compared to preliminary TNF-α was $p = 0.026$. The TNF-α in fourth week compared to second week was $p = 0.990$ (Table 2). The Wilcoxon statistical test was used to compare the decrease in the ARB sputum positivity in the fourth week and second week. The result was $p = 0.157$ (Table 3).

Before conducting a correlation test, there should be a significance test among decreased ARB sputum positivity, BMI and TNF-α levels at the end of the second and fourth week (table 4). The significant test of TNF-α and initial BMI obtained $p = 0.005$, thus it could be concluded that there was a significant difference. Pearson correlation was performed to determine the correlation between TNF-α and initial BMI (table 5). The correlation between TNF-α and initial BMI obtained $r = -0.702$ (table 6).

**Table 1. ARB sputum examination**

<table>
<thead>
<tr>
<th>ARB sputum (IUATLD)</th>
<th>Preliminary</th>
<th>Second week</th>
<th>Forth week</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>%</td>
<td>Total</td>
</tr>
<tr>
<td>Negative</td>
<td>0</td>
<td>0.00</td>
<td>9</td>
</tr>
<tr>
<td>Scanty</td>
<td>2</td>
<td>14.28</td>
<td>0</td>
</tr>
<tr>
<td>1+</td>
<td>6</td>
<td>42.86</td>
<td>4</td>
</tr>
<tr>
<td>2+</td>
<td>4</td>
<td>28.57</td>
<td>1</td>
</tr>
<tr>
<td>3+</td>
<td>2</td>
<td>14.28</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>n=14</td>
<td>100</td>
<td>n=14</td>
</tr>
</tbody>
</table>

**Table 2. Paired sample t test on BMI and TNF-α**

<table>
<thead>
<tr>
<th>Variable</th>
<th>4th week and preliminary</th>
<th>2nd week and preliminary</th>
<th>4th week and 2nd week</th>
<th>p</th>
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<tbody>
<tr>
<td>BMI</td>
<td></td>
<td></td>
<td></td>
<td>0.309</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.107</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.270</td>
</tr>
<tr>
<td>TNF-α</td>
<td></td>
<td></td>
<td></td>
<td>0.015</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.026</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.990</td>
</tr>
</tbody>
</table>
Table 3. Wilcoxon test between decreased ARB sputum positivity at 4th and 2nd week

<table>
<thead>
<tr>
<th>Variable</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARB sputum</td>
<td>0.157</td>
</tr>
</tbody>
</table>

Table 4. Significant test between decreased ARB positivity with BMI and TNF-α at 2nd and 4th week

<table>
<thead>
<tr>
<th>Week</th>
<th>Variable</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd</td>
<td>Decrease ARB sputum positivity and BMI</td>
<td>0.446</td>
</tr>
<tr>
<td></td>
<td>Decrease ARB sputum positivity and TNF-α</td>
<td>0.855</td>
</tr>
<tr>
<td>4th</td>
<td>Decrease ARB sputum positivity and IMT</td>
<td>0.975</td>
</tr>
<tr>
<td></td>
<td>Decrease ARB sputum positivity and TNF-α</td>
<td>0.386</td>
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</table>

Table 5. Significant test between TNF-α and BMI at 2nd and 4th week

<table>
<thead>
<tr>
<th>Week</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preliminary</td>
<td>0.005</td>
</tr>
<tr>
<td>2nd</td>
<td>0.184</td>
</tr>
<tr>
<td>4th</td>
<td>0.095</td>
</tr>
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</table>

Table 6. Pearson correlation test between TNF-α and BMI

<table>
<thead>
<tr>
<th>Week</th>
<th>Pearson correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preliminary</td>
<td>-0.702</td>
</tr>
</tbody>
</table>

Discussion

Nutritional status is one of the factors that determine the body system function including the immune system. The immune system is needed by humans to protect the body against infection. When the immune system is weak, *M. tuberculosis* germs easily enter the lungs, multiply and spread throughout the body through blood vessels or lymph nodes. People infected by *M. tuberculosis* germs does not always suffer from tuberculosis, depending on the immune system. When the immune system is strong then the germ remains asleep in the body (dormant) and will not develop into a disease. When the immune system is weak, germs will develop and cause tuberculosis.

Body Mass Index (BMI) can be used to assess the patient’s nutritional status. BMI is a simple and sensitive way to determine adult nutritional status. BMI is defined as body weight (kg) divided by height (m) squared. There are several levels of nutritional status based on BMI that is very thin (<17 kg/m²), thin (17.0-18.4 kg/m), normal (18.5-24.9 kg/m²), overweight (25.0-26.9 kg/m²), fat (27-28.9 kg/m²) and obese/very fat (≥29 kg/m²). A person is said to be malnourished if BMI <18.5 kg/m².

In this study, 9 (64.29%) of 14 patients had been converted at the end of second week of OAT treatment.
This was due to many died M. tuberculosis germs because of OAT. The conversion rate in the second week was 50%. Tuberculosis is an infectious disease that is often accompanied by nutritional and metabolic disorders. Response to infection is associated with increased energy expenditures and tissue damage levels.

Energy expenditures needed to fight through M. tuberculosis infection. Characteristics of patients characterized by loss of appetite and weight loss. Complex changes occur in macronutrient metabolism such as proteins, carbohydrates and fats. Increased protein breakdown leads to reduced muscle mass in patients with tuberculosis. Tuberculosis patients also experience loss of protein (nitrogen), which is the result of impaired absorption of diarrhea, fluid loss, electrolytes and other nutrient reserves.

Sputum of ARB is an important thing that should be evaluated in pulmonary tuberculosis patients. According to the Health Department, ARB sputum evaluation is done at the end of the second month, fifth month and sixth month of treatment. This study reported decreased ARB sputum quantitatively and qualitatively at the end of the second week and the fourth week of treatment. Quantitatively, 4 (28.57%) patients still had ARB positive at the end of second week and 3 (21.43%) at the end of the fourth week. At the end of the fourth week, there was a conversion of ARB sputum as much as 11 (78.58%) from 14 patients. ARB declined rapidly after starting OAT treatment, 80-85% of pulmonary tuberculosis patients became non-infectious after 2 weeks. The sputum conversion after four weeks was 52%. This study obtained the conversion rate at the end of second week by 64.29% and the fourth week of 78.58%.

In the intensive phase, mycobacterium was killed quickly within 2 weeks thus the infectious patients became non-infectious and had clinical improvement. The result of patient’s sputum is influenced by various things such as the ability of the sufferer for adequate cough, small sputum volume (ideally 5-10 ml), sputum consistency (mucoid or purulent). The ARB sputum conversion is strongly influenced by appropriate drug, appropriate dosage, regular drug taking, nutritional status and immune status.

Weight loss due to tuberculosis caused by TNF-α produced by dendritic cells, T lymphocytes and macrophages. TNF-α is known as cachectin that works in the hypothalamus by suppressing the appetite center causing anorexia. Increased TNF-α can be detected in the MN-cell supernatant of peripheral blood of pulmonary tuberculosis patients. Immune response pulmonary tuberculosis patients is active before and after treatment, and reporting an increase of TNF-α levels during treatment although not significant. Recent studies reported significant increases in TNF-α levels after recognition of the muramyl dipeptide bond (MDP). Alveolar macrophage activity was significantly associated with TNF-α.

At the onset of OAT treatment there was an increase of TNF-α. Longitudinal studies reported that TNF-α levels fluctuated during treatment. The TNF-α in tuberculosis patients before treatment were significantly higher than in healthy controls (23.19 ± 12.78 vs 14.22 ± 7.17 pg/mL, with p <0.05). After standard OAT treatment for 6 months, TNF-α levels in both groups were similar. It could be concluded that there was correlation between TNF-α and weight.

**Conclusion**

It could be concluded that TNF-α levels at the end of the second week decreased significantly compared to baseline TNF-α levels. There was an increase BMI by the end of the second week and the fourth week. There was no significant different of ARB sputum positivity at the end of the second week compared to the fourth week. There was a strong correlation between TNF-α levels and BMI prior to treatment with negative direction.

**Ethical Clearance:** The study has been approved by ethical committee in Dr.Soetomo General Hospital Surabaya, Indonesia.

**Conflict of Interest:** The author reports no conflict of interest of this work.

**Source of Funding:** This study is done with individual funding

**References**


The Relationship between Frequency of Prayer and Death Anxiety in Cancer Patients

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Abstract

Introduction: Cancer is a chronic and fatal disease. In advanced stages of cancer when patients notice their impending death, they become increasingly afraid of death. Meanwhile, having faith and resorting to prayer act as non-medical treatment and palliative care. This study aimed to investigate the relationship between praying and anxiety of death in cancer patients.

Method: This descriptive-correlation study was conducted on 96 cancer patients who had been referred to the Food and Drug Administration of Golestan province in Iran to receive agonist drugs. Templar and Marioliga’s standard questionnaire was used as data collection tool. Data were analyzed by logistic regression test.

Results: Pearson’s correlation test showed a significant but reverse relationship between prayer and death anxiety (P<0.2, r=-0.24), so that with increase in prayer, death anxiety reduced.

Conclusion: According to chronic nature of cancer and prolong treatment that it acquires, non-pharmacological methods such as religion can be effective in improving mental health and reducing anxiety of dying patients.

Key words: Prayer frequency, Death anxiety, Cancer.

Introduction

Cancer is one of the major health problems in the world with high mortality. Cancer is the second leading cause of death in developed countries and the fourth one in developing countries. Research and observations indicate that cancer diagnosis creates many psychosocial problems, And also requires the types of vascular access. In the advanced stages of cancer, when the cancer patients are informed about their imminent death, they will become overwhelmed by the fear of death. Thinking about death is scary, and most people prefer not to think about it, because anxiety and fear of death are unpleasant and common in humans. The closer a cancer patient gets to death, the greater level of fear, anxiety and suffering she/he will experience. Therefore, it can be stated that one of the problems of cancer patients is the fear and anxiety of death.

Death anxiety is a multidimensional concept and difficult to define. It is often defined as the fear of dying, because patient is concerned about pain, treatment and what happens after death. In other words, anxiety of death involves predicting own death and fear of dying. Death anxiety is more common in patients with advanced cancer or conditions, which often cause psychosocial problems in them.

Religious is one of the most important and effective factors in health. Spirituality plays an important role in the acceptance of illness along with religious
practices such as prayer[^5^, ^13^]. Many psychologists and psychiatrists have found that remembering, praying to, and paying close attention to God wholeheartedly assist people in dealing with life’s problems and negative thoughts, reduce anxiety and fear, and create calmness and relaxed state of mind[^14^]. It is also believed that in religion, calling divine names and religious words can reduce anxiety and increase mental health[^15^], because prayer is human’s communication with God, who is capable of all things and is closer to man than his neck vein. God delivers if being asked, so the best way to reduce anxiety and concern is to pray to God almighty[^16^]. On the other hand, some other studies have shown that religious people have more emotional distress than non-religious people, and this causes high level of death anxiety in them[^17^]. Religious therapies can have both negative and positive effects on patients[^18^, ^24^]. For instance, prayer and spiritual attitude can have positive effects on heart diseases[^19^]. Accordingly, this study was conducted to investigate the relationship between prayer frequency and death anxiety in cancer patients, with the assumption that prayer frequency has a link with death anxiety.

**Method**

To collect data, after approval of project by the Research Council of Aliabad Katoo branch of Azad University and obtaining necessary permission from the Food and Drug Administration of Golestan University of Medical Sciences, the researchers attended the desired cancer center on the days when cancer patients were coming to collect their agonist drugs. The research team explained the objectives of study to the potential participants and assured them about confidentiality of their information. The participants were also informed that, participation in the study is voluntarily and they can withdraw from the study at any time with any reason without any consequences. Then, oral informed consent was obtained from them. It took 15 to 20 minutes to complete the questionnaire during which, the researchers were present and answered potential questions in case of ambiguity.

Templer Death Anxiety Scale (TDAS) designed by Professor Donald Templer in 1970 has been used for about 40 years as a valid questionnaire to measure death anxiety, and its validity and reliability have been confirmed in many countries and articles. TDAS has been analyzed and validated in Iran, and translated in Farsi. It consists of 15 questions with the correct and incorrect answers. In this questionnaire, 9 items out of 15 items with the correct answer are given the score of 1, and 6 items with the wrong answers are given the score of one. Total score of the questionnaire ranges from 0 to 15, with higher scores indicating higher level of death anxiety.

**Validity and reliability of the tool:**

Reliability assessment: The TDAS is a standard questionnaire and has been used repeatedly in various studies around the world to measure death anxiety. Aghajani and Valiei (2010) used the internal reliability method to measure the reliability of TADS and calculated its correlation coefficient to be 0.86 using Richardson’s code formula[^8^]. Masoudzadeh, Sattar Mohammadpour and Kurdi (2008) also reported a correlation coefficient of 0.95 for this questionnaire[^17^]. The scoring system of TDAS is as follow: It consists of 15 items from which, 9 items with the correct answer are given the score of 1, and 6 items with the wrong answer are given the score of one. In other words, patient gives the score of 0 or 1 to each item, depending on the answer being correct or wrong (score of 1 if the patient’s response indicates death anxiety and score of 0 if the patient’s response indicates lack of death anxiety).

After collecting data and removing incomplete questionnaires, data were entered into SPSS-16 statistical software to be analyzed using descriptive statistics (table, mean, standard deviation) and inferential statistics (independent t-test, analysis of variance, Schiffer’s post-hoc test) at the significant level of 0.05. The data normality was determined by Kolmogorov–Smirnov test.

**Findings**

Results of this study showed that, the mean age of subjects was 54.6 ± 14 years and they had been diagnosed with cancer for an average of 5 years. Most of the participants 59% (n=57) were male and 41% of them (n=39) were female. Also, 80% of the samples (n=77) were married and 20% of them (n=19) were single. In terms of occupation, 31.2% of the participants (n=30) were housewives, and 6.4% of them (n=6) were shopkeepers. Also, 65.6% of the participants (n=66 =) had a history of chemotherapy and 34.4% of them (n=34) were currently receiving chemotherapy.

In this study, the frequency of prayer with the
mean and standard deviation of 171.0 ± 32.0 was above average. Also, level of death anxiety with the mean and standard deviation of 8.3 ± 2.4 was above average. Pearson’s correlation test showed a significant but reverse relationship between prayer and death anxiety (P<0.2, r=-0.24), so that with increase in prayer, the death anxiety was reduced. No relationship was found between the frequency of prayer and demographic characteristics such as sex (p<0.09), age (p<0.17), education (p<0.68), marital status (p<0.15), occupation (p<0.06) and diagnosis time (p<0.82).

There was also no relationship between the frequency of prayer and demographic characteristics such as sex (p<0.49), age (p<0.67), education (p<0.16), marital status (p<0.13), occupation (p<0.66) and diagnosis time (p<0.69).

Table 1: The relationship between death anxiety and demographic characteristics of cancer patients treated with antagonists

<table>
<thead>
<tr>
<th>Demography Frequency of prayer</th>
<th>Number</th>
<th>Mean + SD</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>39</td>
<td>164.3±3.3</td>
<td>0.09</td>
</tr>
<tr>
<td>Man</td>
<td>56</td>
<td>175.4±32.2</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30-39</td>
<td>15</td>
<td>176.3±24.7</td>
<td>0.17</td>
</tr>
<tr>
<td>40-49</td>
<td>24</td>
<td>178.5±22.7</td>
<td></td>
</tr>
<tr>
<td>50-59</td>
<td>20</td>
<td>174.3±29.6</td>
<td></td>
</tr>
<tr>
<td>Over 60</td>
<td>36</td>
<td>161.6±39.7</td>
<td></td>
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<tr>
<td>Education</td>
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<tr>
<td>Illiterate</td>
<td>30</td>
<td>167.1±37</td>
<td>0.68</td>
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<tr>
<td>Primary</td>
<td>24</td>
<td>168.8±33.1</td>
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<tr>
<td>Secondary</td>
<td>20</td>
<td>178.9±19.1</td>
<td></td>
</tr>
<tr>
<td>Diploma</td>
<td>16</td>
<td>168.2±37.7</td>
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<tr>
<td>University</td>
<td>5</td>
<td>180±15.8</td>
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<tr>
<td>Marital status</td>
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<tr>
<td>Single</td>
<td>15</td>
<td>159±33.2</td>
<td>0.15</td>
</tr>
<tr>
<td>Married</td>
<td>76</td>
<td>171.9±3.7</td>
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<tr>
<td>Occupation</td>
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<tr>
<td>Farmer</td>
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<td>184.2±27.6</td>
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</tr>
<tr>
<td>Housewife</td>
<td>21</td>
<td>162.3±3</td>
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<tr>
<td>Office worker</td>
<td>9</td>
<td>177±24.8</td>
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<tr>
<td>Self-employed</td>
<td>14</td>
<td>188.5±22.5</td>
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<td>Shopkeeper</td>
<td>6</td>
<td>182±17</td>
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<tr>
<td>Unemployed</td>
<td>18</td>
<td>156.3±44</td>
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<tr>
<td>Other</td>
<td>12</td>
<td>176±24.3</td>
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<tr>
<td>Time since diagnosis</td>
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<tr>
<td>Under 5 years</td>
<td>67</td>
<td>169.7±35</td>
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</tr>
<tr>
<td>5-10 years</td>
<td>17</td>
<td>175.1±20.3</td>
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</tr>
<tr>
<td>Over 10 years</td>
<td>22</td>
<td>171.4±29.3</td>
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</tr>
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</table>
Discussion

Results of present study showed that frequency of prayer reduced death anxiety. Religious belief becomes more important at the time of illness than at any other time, and helps people to understand the life events, especially those that are painful and create anxiety. It also brings about heartwarming joy and happiness in people’s life\[20\]. Various studies have shown that patients who suffer physical injuries tend to turn to religious beliefs, because religion helps them to endure the suffering and pain caused by their illness\[21\]. Positive thoughts and tolerance are both components of prayer therapy and are related to health and stress resistance. Religious psychology refers to the remembrance of God as the main therapy for underlying psychiatric disorders, including anxiety and stress. It brings peace and reassurance to people throughout their ups and downs and during the time of pain and suffering\[22\].

Many people, even those who are not familiar with the Arabic language and do not understand the meaning of Quran, find comfort in hearing it. This is due to the physiological effect of prayer on the nervous system\[23\].

In the religious book it is said that, when a human being is harmed, he calls upon his Lord and returns to him. At the same time, performing religious practices such as prayer as a defense mechanism can lead to better adaptation, self-worth and hopefulness\[20\].

Conclusion

Considering the attitude of Iranian people who believe in the effectiveness of prayer, prayer therapy should be used as a complimentary therapy along with other therapies. However, in Iran, this treatment is still unknown to some. Also, to implement any new approach, it should be tested first and its effectiveness should be institutionalized in the health care delivery system. Thus, further studies on the effectiveness of prayer are recommended, especially in chronic patients such as cancer, hemodialysis, thalassemic and cardiac patients. Considering the high costs, side effects, and stress of treatments such as surgery, chemotherapy, and injections, prayer therapy can be used as a low-cost, natural, and stress-free approach or a complementary treatment. One of the limitations of present study was that, the researcher had no control over recent events in the patient’s life. It is hoped that these limitations will be mitigated in future studies.

Conflict of Interest: There is no conflict of interest between authors.

Acknowledgement: We would like to thank the colleagues at Golestan University of Medical Sciences and Food and Drug Administration, Ms. Fatemeh Kalangi and Robabeh Memar, who assisted us in this research. This project was approved in 2013 by the Research and Ethics Council of Aliabad Katool, Azad University with No: 5/2753.

Source of Funding: This study was approved by Islamic Azad University of Aliabad Katoul. We thank the Deputy of Research and Technology of the University for Financial Support.

Ethical Clearance: IR.GOMUS.REC1397.092 approved by Golestan University of Medical Sciences

Reference

Comparative Evaluation of Microscopy and Loop-Mediated Isothermal Amplification (LAMP) Assay for the Diagnosis of Tuberculosis

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Abstract

Tuberculosis (TB) is one of the major global health problem which affects millions of people each year. For the routine diagnosis of TB, microscopic technique is used but it has lower sensitivity and specificity. This study was carried out to evaluate the efficacy of loop mediated isothermal amplification (LAMP) over smear microscopy to detect *Mycobacterium tuberculosis*. Out of 84 processed samples processed in this study, the diagnostic tests showed varying results. Using smear microscopy, 16(19.05%) and with the LAMP assay, 17(20.24%) cases were found positive for *M. tuberculosis*. The sensitivity of the LAMP assay (87.5%) was greater than that of microscopy (82.35%) while the specificity of both methods was comparable (>95%). Being more sensitive than microscopy, LAMP assay is more likely to show the positive result and solve the errors in diagnosis of the TB cases. Thus, LAMP assay can be an important and cost-effective tool for appropriate and timely diagnosis of TB patients. This can further assist to implement intervention programs against TB.

Key words: Tuberculosis, Global health problem, LAMP, Diagnostic tool, Microscopy

Background

Tuberculosis (TB) is an age old disease and one of the major global health problems. Deterioration of public health programs aimed at preventing tuberculosis and encouraging completion of drug therapy for treatment of the disease is cited as a reason for the increasing rate of TB. Globally, approximately 10 million people are affected by this disease each year. As per the report from the last five years, the causative agent of this disease has been a leading cause of death from a single infectious agent, ranking above HIV/AIDS. This is despite the fact that, with a timely diagnosis and correct treatment, most people who develop TB disease can be cured. More than 95% of deaths due to TB occurred in developing countries out of which 50% were recorded from India, China, Indonesia, Pakistan, and the Philippines. In Nepal, about 45% of the total population is expected to have TB infection and the number of deaths due to tuberculosis is 5,000 to 7,000 people every year.

In most developing countries, microscopic examination of sputum is the widely available tool for routine diagnosis of TB. But the reliability of this method has been challenged because of lower sensitivity and specificity. The lack of standardized procedures and trained microscopists on reading acid-fast bacilli (AFB) sputum smears present further drawbacks to finding cases in such countries. Culture, the gold standard diagnostic method, is highly sensitive but the slow multiplication and difficulty of selective cultivation often limits the culture based diagnosis. Thus, new technologies with higher sensitivity and specificity are urgently needed to confirm the clinical diagnosis and help reduce TB transmission.
The loop-mediated isothermal amplification (LAMP) assay – a nucleic acid amplification technology – was first proposed by Notomi\(^6\). Under isothermal condition, LAMP can amplify DNA with high specificity and efficiency using six sets of primers that recognize eight distinct regions on the target sequence. Unlike PCR, LAMP reaction does not require a denatured DNA template and relies on auto cycling strand displacement DNA synthesis by a \textit{Bst} DNA polymerase\(^7\). LAMP produces extremely large amounts of amplified products which enables simple visual detection and thus eliminates the need for electrophoresis.

Although bacterial culture is the gold standard for TB diagnosis, it is an expensive and slow technique and so, cannot be used for routine diagnosis. The LAMP assay, however, can be a simple, inexpensive and reliable choice for the TB diagnosis as this test combines rapidity of microscopy and sensitivity of bacterial cultural methods\(^9\). In the context of Nepal, the purpose of this study is to assess whether the LAMP assay can be a better and efficient method than microscopy. Additionally, the findings of this research can provide us a greater understanding of the prevalence rate of TB in terms of sex and age.

**Material and Method**

**Sample collection and evaluation**

In this study, a total of 84 samples were collected from the participants (February 2017 to October 2017) who were referred for a LAMP test and processed at Healthy Nepal, Balkhu. Informed consents were taken from the participants prior to the study. The study was approved by the Institutional Ethical Committee.

Sputum and different extra-pulmonary samples (urine, abscess, pleural fluid, peritoneal fluid, CSF and pericardial fluid) were the target samples of choice in this study. A series of at least three single specimens were collected initially (preferably on different days) from TB patients. First one on the spot, second early morning and third once again on the spot in which patients were instructed to take a deep breath and coughed deeply and vigorously\(^10\). Specimens were clearly labeled with patient’s information and date of collection in a sterile plastic container.

**Digestion, Decontamination and Concentration of Specimen**

All other samples, except cerebrospinal fluid (CSF), pleural, peritoneal and pericardial fluid were decontaminated and homogenized with NALC-NaOH solution. Furthermore, for the purpose of digestion, decontamination and concentration of specimens, the protocols of Chatterjee et al were followed\(^11\).

**Acid-fast microscopy**

The smear was heat fixed by placing the slide over flame three or four times with the smear on upper position and allowed to cool before staining. Further, smears were stained with Ziehl-Neelsen (Z-N) stain and examined for acid-fast bacilli (AFB) by microscopy. The positive organisms appeared as bright red against blue background.

**DNA Extraction**

DNA was extracted from the concentrated samples by alternate boiling and freezing method. Samples were heated at 95\(^\circ\)C for 10 minutes and freezed at -20\(^\circ\)C for 30 minutes for three times\(^13\). Thus, extracted DNA was stored in deep freeze until analysis.

**LAMP Reaction**

Altogether, six primers i.e. outer primer (F\(_3\) and B\(_3\)), a forward inner primer (FIP), a backward inner primer (BIP) and loop primers (loop F and loop B) were used. They recognize eight distinct regions on 16S rRNA gene of the target DNA. LAMP was performed in a total volume of 25 \(\mu\)l reaction containing LAMP buffer, Betaine, MgSO\(_4\), Primer mix (F\(_3\), B\(_3\), BIP, FIP, loop F, loop B), dNTPs (2.5 mM each), Bst DNA polymerase (8 units/ml), 0.1% methyl green dye, DNA samples and distilled water. Constituents of master mixture (25\(\mu\)l/tube) were 16.5\(\mu\)l LAMP premix (LAMP buffer, Betaine, MgSO\(_4\), primer mix), 1.5\(\mu\)l dNTPs (25mM), 1.0\(\mu\)l 0.1% Methyl green, 1.0\(\mu\)l Bst DNA polymerase and 5\(\mu\)l sample DNA. The whole reaction was performed at isothermal temperature (64\(^\circ\)C for one hour)\(^14\). A positive and negative control was included in each reaction. All the reagents, primers, and solutions required for LAMP were provided by Eiken Chemical Co. Ltd, Japan.

**LAMP result**

LAMP amplicons of positive organisms in the reaction tube were directly detected with the naked eye by observing the change in color of the solution containing reaction mixture with methyl green which stains DNA and in large amount of amplicons give
distinguished blue green color.

**Disposal and Decontamination**

The waste materials were first treated with 0.5% Sodium hypochloride and then autoclaved at 121°C temperature for 15 minutes before disposal.

**Statistical Analysis**

All data obtained was statistically analyzed by using statistical package for social science version 20 software. Sensitivity and specificity were compared using Chi-square test.

**Results**

**Distribution of infection by microscopy and LAMP**

Out of 84 clinical specimens processed, 19.05% (16/84) were microscopy positive, however, the same specimens were 20.24% (17/84) positive with the LAMP assay.

![Fig: Distribution of infection by microscopy and LAMP](image)

**Sex-wise distribution of cases**

In the sex-wise distribution of cases, 52 were male participants while 32 were female participants. Under microscopy and LAMP methods, male participants showed varying results while female participants had similar incidence of TB. With microscopy, 19.2% (10/52) male cases had positive infection while the rate was 21.1% (11/52) using LAMP. Similarly in the case of female participants, the incidence rate was 18.7% (6/32) for both microscopy and LAMP.

**Table 1: Sex-wise distribution of cases**

<table>
<thead>
<tr>
<th>Gender</th>
<th>Total cases (%)</th>
<th>Microscopy</th>
<th>LAMP</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Positive (%)</td>
<td>Negative (%)</td>
</tr>
<tr>
<td>Male</td>
<td>52 (100)</td>
<td>10 (19.2)</td>
<td>42 (80.8)</td>
</tr>
<tr>
<td>Female</td>
<td>32 (100)</td>
<td>6 (18.7)</td>
<td>26 (81.2)</td>
</tr>
</tbody>
</table>

**Age wise distribution of positive cases as detected by Microscopy and LAMP**

The age-wise microscopic results shows that the infection was highest in the age-group 31-40 years 31.25% (5/16), while lowest in the age-group <10 years (0%). With the LAMP assay, age-wise infection rate was highest in the age-group 31-40 years (29.4% (5/17)) and lowest in <10 years (0%).
Evaluation of LAMP with reference to microscopy

This showed 14 samples were positive by both microscopy and LAMP. With the LAMP assay, three microscopically negative cases were positive. Also with microscopy test, two LAMP assay negative cases were positive and 65 cases were negative by both tests. Sensitivity and specificity of the LAMP assay was 87.50% and 95.59% respectively. The predictive values of both of the tests were under the confidence interval.

Table 2: Evaluation of LAMP assay with microscopy (n = 84) at 95% CI

<table>
<thead>
<tr>
<th>LAMP (2)</th>
<th>Microscopy (1)</th>
<th>Total</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>Positive Predictive value</th>
<th>Negative Predictive value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>14</td>
<td>3</td>
<td>17</td>
<td>1=82.35% (64.2%-100%)</td>
<td>1=97.01% (92.9%-100%)</td>
<td>1=87.5% (71.3%-100%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2=87.5% (71.3%-100%)</td>
<td>2=95.6% (90.7%-100%)</td>
<td>2=82.35% (64.2%-100%)</td>
</tr>
<tr>
<td>Negative</td>
<td>2</td>
<td>65</td>
<td>67</td>
<td>1=95.6% (90.7%-100%)</td>
<td>2=97.01% (92.9%-100%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>68</td>
<td>84</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

The main finding of this study shows that the LAMP assay can be a better and efficient method for tuberculosis diagnosis in Nepal. In this study, sensitivity of LAMP (87.5%) and microscopy (82.35%) are within in confidence interval. Similarly, specificity of LAMP (95.6%) and microscopy (97.01%) are also within the confidence interval. The sensitivity of the LAMP assay is consistent with other studies, but the lower specificity in contrast to microscopy (95.59% < 97.01%) might be due to human error during the laboratory process as most of the previous studies had recorded higher specificity of the LAMP assay16,17,18. In a similar study in Nepal, the sensitivity of MTB-LAMP in culture-positive samples was 100% (96/96)19. In some other studies, the LAMP assay had lower sensitivity but high specificity19,20. The limitation of this study is lower sample size. This is because the subjects who were referred for a LAMP test (over a period of six months) were not many in number.

In our study, we found 20.24% (17/84) of the cases had positive infection. In Nepal, previous studies have also reported high prevalence of infection i.e. 27.98% (585/2091) in thirteen districts21. Also, studies in Western Nepal22 showed a positive rate of TB around 10%. From these studies, we can infer that TB prevalence differs in Nepal depending on places and also sample size. Again, our study does not show a significant difference (not shown) in sex-wise prevalence (male=21.1% and female=18.7%). This means that both males and females may be equally exposed to the risk factors. Age-wise study showed people above 10 years are at higher risk of TB infection. In a similar study by Jaiswal et al24 conducted in Western Nepal, they found 37.9% of TB infection in the age-group 15-35 years. Use of tobacco products25 and extensive travelling by people (age>10 years) may expose them to TB infection.

According to the finding of our study, the LAMP assay provides a reliable and accurate choice for TB diagnostic testing in resource limited settings or where advanced PCR or cultural methods are not available. Being a rapid, inexpensive and technically not demanding diagnostic tool, this method can be used as a routine diagnostic tool. Furthermore, this can bring down the costs of diagnosis with complicated cases. This can also pave the way for clinicians in Nepal to prescribe
the right TB cases for DOTS program. Additionally, researches using this diagnostic test would increase the credibility and relevance in the context of Nepal.

When we compare the values of sensitivity, specificity, positive and negative predictive values of either test, it indicates microscopy can still be appropriate as a primary test. But the results of microscopy cannot be always relied upon. In this condition, application of the LAMP assay would greatly assist in the detection and confirmation of positive cases. In recent years, Nepal has been facing a lot of challenges to bring down the TB infection rate. The emergence of new cases often threatens the anti-TB program. The records of national tuberculosis programme also shows increasing incidences of TB in the country. One challenge for this may be inefficiency of the diagnostic methods being used. NTP has adopted END TB Strategy and aims to make TB control program accessible to people who need timely diagnosis and treatment for TB so that the epidemic condition of TB can be ended by 2030.

Appropriate and timely diagnosis of TB victims is a must to implement intervention programs against TB.

**Conclusion**

In conclusion, this study showed that the LAMP assay could be better tool than microscopy for the diagnosis of tuberculosis. Microscopy can diagnose TB cases but cannot be a confirmatory test. The LAMP assay, however, could be a sensitive, fast and reliable tool and can be a confirmatory test for most of the cases. Thus this would help clinicians and health officers to prescribe the right TB cases for anti-tuberculosis drugs.

**Competing Interest:** The authors declare that they have no any competing interests. This research paper study been through original data without any third party interest. This paper targeted for related journal.

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**References**


Characteristics Nanoparticle of Propolis Ethanol Extracts with Variations of Chitosan-Sodium Alginat

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Abstract

Nanoencapsulation technology has many advantages, which include important roles in drug delivery and protection of bioactive components that have perishable stability, one of which is polyphenol compounds. Propolis which contains high levels of polyphenol compounds has been used as an antioxidant for various diseases. By making nanoparticles from propolis, it can maintain the stability of polyphenol compounds from propolis and increase the effect of treatment through optimal delivery. Nanoformulations containing ethanol extract of propolis were absorbed by chitosan-sodium alginate using an ionotropic pre-gelation method. Optimization is carried out at various concentrations of chitosan, namely 0.05%; 0.075%; 0.1% and 0.125%, with the use of the same sodium alginate concentration which is 0.0063%. Testing of nanoparticle characteristics includes particle size and morphology and adsorption efficiency (EE) consisting of total flavonoid and total polyphenol values. The increase in chitosan polymer is directly proportional to the increase in particle size, but does not occur in the absorption efficiency value. The 0.05% chitosan formula showed the absorption of polyphenol compounds at 99.41% with particle sizes of 259.12 nm.

Key words: Propolis, Nanoparticles, Chitosan-Sodium Alginate, Absorption Efficiency

Introduction

Nature has prepared ingredients that contain substances that have the potential as antioxidant agents. One of them is propolis. Propolis is a resin material collected by bees mixed with saliva. Propolis is used by bees as a defense for survival. Propolis contains many secondary metabolites that can be used as antioxidants including polyphenols (flavonoids, phenolic acids and esters), terpenoids, amino acids and steroids. This polyphenol content can inhibit specific enzymes, stimulate several hormones and neurotransmitters, fight free radicals and prevent the growth of microorganisms.

In drug delivery systems, nanoencapsulation acts as a carrier by absorbing, encapsulating, or attaching the drug in the matrix to protect bioactive components (polyphenols, micronutrients, enzymes, and antioxidants). Through the encapsulation of these molecules in nano carriers, the solubility and stability of the drug can be increased and can control the release of the drug in the workplace. Small-sized nano-encapsulation materials, which are around 50-500 nm, can overcome biological barriers that help permeate and diffuse in achieving cellular recapture.

Several studies have been conducted on nanoencapsulation technology including who conducted tests on mice and reported increased effectiveness and reduced toxicity from cancer treatment of the head and neck when using nanoencapsulation as a drug carrier. Radovic et al. (2012) reported that nanoencapsulation containing antibiotics can kill bacteria because of high doses in the workplace and sustained release.

One ingredient in making nanoencapsulation is chitosan and sodium alginate. Chitosan, a polysaccharide consisting of glucosamine units and acetylglucosamine...
units. Chitosan is biocompatible, biodegradable and non-toxic when used as a drug carrier orally. In addition, chitosan also prolongs the contact time of active substances with epithelial tissue and expands absorption by opening the tight junction of the epithelium. Chitosan here acts as a polycation polymer. While sodium alginate will act as a crosslinked polyanion polymer, which will eventually form nanoparticles.

Based on the background above, the problem that arises is how does the effect of chitosan concentration with sodium alginate in the formation of nanoencapsulation of ethanol extract of propolis

**Materials and Materials**

The tools used are a set of maceration tools, analytical scales, rotary evaporators, water baths, sonicators, a set of freeze drying tools, homogenizer, centrifuges, scanning electron microscopy (SEM) 10 MA EVO, UV-Vis spectrophotometer, and Particle Size Analyzer (PSA) While the ingredients used are propolis, n-hexane, acetic acid, 70% ethanol, aqua destillata, Folin reagent - Ciocalteau, 96% pa alcohol, Na₂CO₃, Quercetin, AlCl₃, gallic acid, Sodium acetate, chitosan, sodium alginate, CaCl₂.

**Sample 1**

Raw material of propolis is put into the freezer until it freezes. After freezing, propolis is cut into small pieces and pollinated, then extracted by multilevel maceration. The pollinated propolis was weighed as much as 300 g and then extracted by maceration with one liter of n-hexane for 10 x 24 hours with the help of a magnetic stirrer. The filtrate is then evaporated with a rotary evaporator until a thick n-hexane extract is obtained and dried in a desiccator vacuum. The residue from n-hexane extraction was macerated with 70% ethanol as much as 500 ml for 6 x 24 hours with the help of a magnetic stirrer. The filtrate is then evaporated with a rotary evaporator and then dried in the freeze dryer to obtain a thick extract.

**Sample 2**

Determination of total polyphenols was carried out by weighing 0.25 g of ethanol extract of propolis and dissolved with 50 ml of 80% ethanol (5000 µg / ml). 0.3 mL was taken from the dilution of the extract, then put in a 10 ml volumetric flask, added 96% pa ethanol as much as 1 mL and added Folin - Ciocalteau reagent (1: 1) as much as 100 µL and stirred. After that Na₂CO₃ solution is added 7.5% and homogeneous stirring, then each volume is up to 5 mL. The mixture is left for 3 minutes and the solution is measured absorbance at a wavelength of 641.5 nm. The concentration is calculated from the regression equation for standard gallic acid solutions.

**Sample 3**

Total Flavonoid Test where e ethanol extract of propolis was weighed 0.25 g then dissolved in a flask measuring 50 ml with 80% ethanol. From the stock solution carefully piped 0.3 ml then added 1 ml of 96% ethanol and added 100 µl of AlCl₃ 10% and 100 µl Sodium acetate 1. The final volume is sufficient to 10 ml in a flask. After incubation for 25 minutes at room temperature, absorbance was measured at a wavelength of 422.5 nm. Concentration was calculated from the regression equation for standard quercetin solutions.

**Sample 4**

**Nanoencapsulation testing**

1. Observation of Size and Shape of Vesicles

The particle size was analyzed using the Particle...
Size Analizer (PSA) tool and the surface morphology was measured using scanning electron microscopy (SEM).

2. Determination of Absorption Efficiency (EE)

Determination of Concentration

1. Total Flavonoid Levels

Piped 5 ml of the supernatant solution resulting from centrifugation then added 1 ml of ethanol p.a, 100 µL of AlCl₃ 10% and 100 µL of sodium acetate 1 M. The volume was sufficient to 10 mL and left for 25 minutes. After being allowed to stand, the absorbance is measured at a wavelength of 422.5 nm.

2. Total Polyphenol Levels

Piped 5 ml of the supernatant solution resulting from centrifugation then added 1 ml of ethanol p.a, 100 µL of Folin-Ciocalteau (1: 1) and 100 µL of Na₂CO₃ solution 7.5% . The volume is sufficient to 10 mL and left for 3 minutes. After being immobilized, the absorbance is measured at a wave length of 641.5 nm.

b. Calculation of Absorption Effectiveness (EE)

The percentage of gallic acid absorption is calculated from the following formula:

\[ EE = \frac{Qt - Qs}{Qt} \times 100\% \]

Qt is the amount of gallic acid in the ethanol extract of propolis added, Qs is the amount of gallic acid detected in the supernatant.

Findings

In this study the active substances contained in propolis are withdrawn by means of multilevel maceration, where propolis is macerated with n-hexane several days until it is clear to attract non-polar substances such as fat and tannins which are mostly found in propolis. After that, the residue was first released from n-hexane, then macerated with 70% ethanol to attract polar compounds in the form of flavonoids and phenolic compounds.

<table>
<thead>
<tr>
<th>Tabel 1. Nanoencapsulation formula</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Formula</strong></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>I</td>
</tr>
<tr>
<td>II</td>
</tr>
<tr>
<td>III</td>
</tr>
<tr>
<td>IV</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tabel 2. The rendament value and total flavonoid and total polyphenols</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Extract</strong></td>
</tr>
<tr>
<td>n-heksan</td>
</tr>
<tr>
<td>Etanol 70%</td>
</tr>
</tbody>
</table>
Tabel 3. Results of testing of propolis ethanol extract nanoparticles powder

<table>
<thead>
<tr>
<th>Chitosan Concentration (%)</th>
<th>% EE</th>
<th>Particle Size (nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05</td>
<td>99.47</td>
<td>259.12</td>
</tr>
<tr>
<td>0.075</td>
<td>97.66</td>
<td>270.34</td>
</tr>
<tr>
<td>0.1</td>
<td>98.04</td>
<td>301.03</td>
</tr>
<tr>
<td>0.125</td>
<td>98.71</td>
<td>327.45</td>
</tr>
</tbody>
</table>

The results of extraction in the form of rendamen and total flavonoid test and total polyphenols can be seen in table 2. From table 2, the data obtained for the weight of n-hexane extract as much as 145.80 grams, with a rendition of 48.6% and 70% ethanol extract as much as 45.06 grams with a rendition of 15.02%. The ethanol extract obtained is brown and has a distinctive odor.

Discussion

The method of making nanoparticles used in this study is the ionotropic gelation method (polyelectrolyte coaservation or complexation method). In the ionic gelation method, polysaccharides (chitosan) are dissolved in a weak acid medium, then added dropwise with constant stirring in solutions containing other counterions. The basis of this method is the nature of chitosan which experiences a liquid-gel transition due to ionic interactions with polyanion. This interaction occurs between positively charged chitosan ammonium groups with a crosslinker. Nanoparticles are formed by constant stirring at room temperature.

Electrostatic interactions between crossing anions and chitosan determine the nature of the nanoparticles produced. This interaction depends on the molecular structure of anions, surface charge and molecular concentration, pH of chitosan solution, and physical properties of chitosan. The physical properties of chitosan include molecular weight and degree of deacetylation.

The advantage of the ionic gelation method is that it can be carried out under mild conditions, does not require organic solvents, can increase drug loading capacity, and form nanoparticles with a hydrophilic environment. Chitosan used in this study is medium chain chitosan (200-800 cps) because it has the best encapsulation efficiency.

Sodium alginate is a negative anion used to stabilize the formed nanoparticles. Before sodium alginate is reacted with chitosan, sodium alginate is first mixed with calcium chloride solution. Calcium ions from calcium chloride will react with guluronic acid units from alginate to form an ‘egg-box’ structure. This shows that nanoparticles can be formed by wrapping negatively charged calcium alginate complexes in a pre-gel state with cationic polymers such as chitosan, and it is the pre-gel state that is very important to allow ionic interactions between alginate, calcium, and cationic polymers such as chitosan to form nanoparticles.

The results of making nanoenkapulsiation powder from chitosan-alginate can be seen in Figure 1. Figure 1 shows brown chitosan-alginate nanoparticles powder with fine and light powder. This brown color comes from the color of propolis ethanol extract.
The results of testing nanop powder in the form of particle size and adsorption efficiency can be seen in table 3.

While the results of nanoenkapulation particle morphology can be seen in Figure 2. From the results of nanoparticles with differences in the concentration of chitosan to sodium alginate 0.0063 mg and measurements obtained data that the smallest particle size of the four is formed by chitosan with a concentration of 0.05% with 99 absorption efficiency, 47% with a size of 259.12 nm. This is supported by the results of SEM measurements that show the morphology of nanoparticle powder with a symmetrical sphere shape. The resulting morphology of powder is not significantly different from the morphology of nifedipin chitosan- sodium alginate powder which is also in the form of sperm. The location of the difference is in the particle size produced, where the particle size of nifedipin chitosan-alginate ranges from 20-50 nm, while the particle size in this study is around 200-500 nm. This is due to differences in the tools used in making nanoparticles. However, this result is not much different when compared with the results of research from Chopra et al. (2012) which produced particle size of streptomycin-chitosan-alginate ranging from 300-700 nm.

From the particle size data, it can be seen that the greater the concentration of chitosan, the greater the size of the particles produced. This is because more chitosan wraps the polyphenol compounds of propolis so that the particle size gets thicker and bigger.

There are two data in obtaining absorption efficiency that is based on the total content of flavonoids which is equivalent to quasarsetin and the total content of polyphenols which is equivalent to gallic acid. The measurement of absorption efficiency obtained total flavonoid data with negative absorbance values so that the absorption efficiency cannot be calculated. This shows that 100% quasaretin equivalent flavonoids are absorbed in chitosan-alginate nanoparticles. While the absorption efficiency for the total polyphenols on the four formulations obtained chitosan data 0.05% with EE value = 99.47%, chitosan 0.075% with EE value = 97.66%, chitosan 0.1% with EE value = 98.04% and chitosan 0.125% with EE value = 98.71%. These results indicate that 0.05% chitosan has the best EE among the four formulas. Because the total polyphenol data can be calculated, the total polyphenols are then used in the next calculation.

**Conclusion**

Chitosan at a concentration of 0.05% has a particle size of 259.12 nm with adsorption efficiency of 99.47%.

**Conflict of Interest:** There is no conflict between researchers and subjects in this study.

**Source of Funding:** The study was independently funded by each researcher.

**Ethical Clearance:** Research ethics were obtained from the Makassar Health Polytechnic Health Research Ethics Committee by No. 292/KEPK-PTKMKSVII/2019.

**References**


The Profiles of Blood Pressure and Blood glucose Level among the Elderly in “Y” Village, Gresik, Indonesia

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Abstract

Elderly people is someone who has the age of 60 years or more. In old age physiological functions decrease due to degenerative processes (aging), resulting in many non-communicable diseases. Non-communicable diseases in the elderly include hypertension, stroke, diabetes mellitus and arthritis or rheumatism. The prevalence of hypertension and diabetes in the district of Gresik is quite high. The aims of this community service was to find out the profile of blood pressure and blood glucose levels of the elderly in “Y” Village, Gresik District. This study was a descriptive study with a cross-sectional design. The sampling method uses accidental sampling technique, which is 60 elderly people who come at the health examination. Sixty elderly people measured blood pressure and blood glucose level. The measurement results showed that the elderly blood pressure in Y village had 50% blood pressure in the hypertension stage 1 and 2, 23% in the pre-hypertension category, and 27% had normal blood pressure. While the results of measuring 22% of blood glucose levels had blood glucose level in the Diabetes Melitus category which is ≥200 mg / dl, 58% have blood glucose levels in the category of 90-199 mg / dl and 20% had normal blood glucose levels. This study concludes that most of the elderly in Y Village are suffering from hypertension and having non-DM blood glucose level. Conclusion of this research is elderly people in Y Village has hypertension and blood glucose level in the category of not yet diabetes.

Keywords: blood glucose level, diabetes, elderly people, hypertension

Introduction

Elderly people are individuals with the age of 60 years and above. The rise of life expectancy in Indonesia is an indicator of successful country development in several aspects, including health. The rise of life expectancy is linear with the rising number of elderly people. Indonesia should be aware of the possibility of triple burden: the rise of birth rate, disease burden (infectious or non-infectious) and burden of productive age group towards the non-productive age group. Most of the elders are belonged to non-productive group and have experienced degradation in physical, social, and psychological qualities. Age development causes decrease in physiological function due to degenerative process which triggers non-infectious disease among the elderly. The common infectious diseases among the elderly include hypertension, stroke, diabetes mellitus, and rheumatism. The prevalence of hypertension and diabetes among the elderly in Gresik is quite high. Based
on the health profile of East Java in 2017, the percentage of hypertension patient in Gresik reached 35.36%. In addition, according to Basic Health Research in 2018, Gresik ranked in the 5th position with highest patient of diabetes in East Java1.

World Health Organization (WHO) classified elderly into several age groups. Middle age: 45–59 years old; elderly: 60–74 years old; old: 75–90 years old; and very old: >90 years old. Physiological changes in the cell rate, organ, and organ system are experienced by the elderly2. Based on the results of Basic Health Research in 2013, the most common disease in old age is non-communicable diseases which include hypertension, arthritis, stroke, Chronic Obstructive Pulmonary Disease (COPD) and Diabetes Mellitus (DM)3, 4.

Alteration in cardiovascular system is one of the causes which increase the hypertension risk among the elderly. Old-age group tends to have higher blood pressure. Aging process caused changes in the connective tissues of artery, vein, and myocardium and caused degradation in elasticity. Aging process also increase nerve enhancement and norephinephrin rate, thus increasing the risk of arteriolar constriction and blood vessel resistance5. Hypertension is the increase of systolic blood pressure higher than 140 mmHg and diastolic blood pressure higher than 90 mmHg in rest condition. Increase in blood pressure for long period and uncontrollable manner may lead to liver failure, heart coronary disease, and stroke without early detection and sufficient treatment6, 7.

Age is one of the risk factors for diabetes mellitus. Metabolism disturbance in blood glucose is caused by the damage in insulin secretion by beta cell and the increase of insulin resistance. It resulted in the increase of blood glucose5. Hyperglu Hyperglycemia is the increase of blood glucose above the normal limit. The normal range of blood glucose level is 80-200 mg/dl. Hyperglycemia is a common sign of DM besides other typical symptoms such as polyuria, polydipsia, and polyphagia6.

Hypertension and diabetes are untreatable diseases which can be controlled. Therefore, examination of blood pressure and blood glucose level should be done regularly. In general, people will ask for health examination only when they experience health disturbances. In addition, the health workers have little knowledge on the prevalence of diabetes in Y Village. The activity of blood pressure and blood glucose level examination is conducted to obtain the data about the blood pressure and blood glucose level for early detection of hypertension and diabetes among the elderly in Y Village, Gresik. The examination did not require payment to attract more people to check their health. The examination data is then given to the village health workers to let them know the condition of the blood pressure and blood glucose level among the elderly in that village.

Y Village is one of the villages in Gresik with 31 Neighborhood Association and 8 Citizen Association and divided into three hamlets. Based on the Data of Village Profile of 2014, the number of elderly inhabitants in Y village made up 9% of the total 3,000 population9.

Based on the background, this research is aimed at discovering the profiles of blood pressure and blood glucose level among the elderly in Y Village, Gresik. The result of this research will provide information about blood pressure and blood glucose status to the subjects to increase their awareness on the importance of checking their health regularly. In addition, the examination results given to the health workers in Y Village can be followed up by the regional government to design a promotive, preventive, and curative program for hypertension and diabetes especially for the elderly people in Y Village, Gresik.

**Method**

This study is a descriptive research with cross-sectional design. Sample is taken using accidental sampling technique by involving 60 elderly people who check their health at the examination program. The research is conducted in Y Village Community Building, Gresik on July 2019.

Blood pressure is measured using aneroid tensimeter and stethoscope. The data of blood pressure examination is classified using JNC VII criteria10. On-time blood sugar level is measured using glucometer (smart check blood glucose meter) in capillary blood. The data of on-time blood sugar examination is classified using the criteria issued by Perkeni8. The collected data is processed using Microsoft Excel. The data is analyzed with descriptive approach to explain or describe the characteristic of each research variable. The analysis produce frequency distribution and percentage of each variable.
Results And Discussion

Respondents’ Characteristics

Table 1. The Distribution of Respondents’ Age and Sex in Y Village in 2019

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Number</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>45-59</td>
<td>27</td>
<td>45</td>
</tr>
<tr>
<td>60-74</td>
<td>31</td>
<td>52</td>
</tr>
<tr>
<td>75-99</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>8</td>
<td>13</td>
</tr>
<tr>
<td>Female</td>
<td>52</td>
<td>87</td>
</tr>
</tbody>
</table>

The observation produced the data of blood pressure and blood sugar examination of 60 elders. Samples’ characteristics based on age and sex are described in Table 1. Based on Table 1, most respondents belonged to the 60–74 age group, with the number of 52%. The number indicated that the elderly population in Y Village is generally healthy because they were still able to attend the health examination program. 45–59 years old people is counted for 45%. This group is classified as productive-age group. The members of this group in Y Village are still active and productive, so they still pursuing their career. Lastly, there were 3% belonged to the 75-90 years of age.

Based on the sex classification, most of the respondents were female, counted for 87%. The number of male elders is counted for 13%. The proportion is in corresponds with the data issued by The Ministry of Health of the Republic of Indonesia in 2015 that there are more female elders than male which indicate higher life-expectancy among female elders.

Blood Pressure Profile

Normal blood pressure is indicated by systolic pressure of <120 mmHg and diastolic pressure of <80 mmHg. Blood pressure is categorized as pre-hypertension with systolic pressure of 120-139 mmHg or diastolic pressure of 80-89 mmHg. Meanwhile, first-degree hypertension is shown by systolic pressure of 140-159 mmHg or diastolic pressure of 90-99 mmHg. Second-degree blood pressure is indicated by systolic pressure of ≥160 mmHg or diastolic pressure of ≥100 mmHg.

Table 2. Distribution of Respondents’ Blood Pressure in Y Village in 2019

<table>
<thead>
<tr>
<th>Systolic/Diastolic Blood Pressure (mmHg)</th>
<th>Number</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;120 /&lt;80</td>
<td>16</td>
<td>27</td>
</tr>
<tr>
<td>120-139 /80-89</td>
<td>14</td>
<td>23</td>
</tr>
<tr>
<td>140-159 /90-99</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>≥160/≥100</td>
<td>18</td>
<td>30</td>
</tr>
</tbody>
</table>

Table 2 shows that 50% elders are suffered from hypertension, 20% with first-degree hypertension and 30% with second-degree hypertension. Meanwhile, 23% of the elderly were having pre-hypertension; and 27% others have normal blood pressure. The diagnosis of hypertension can be stated if the measurement shows systolic blood pressure of ≥ 140 mmHg and/or diastolic blood pressure of ≥ 90 mmHg in the repeating examination. Systolic blood pressure is the main indicator in deciding the diagnosis of hypertension.

Table 3. The Distribution of Blood Pressure based on Respondents’ Age in Y Village in 2019

<table>
<thead>
<tr>
<th>Blood Pressure</th>
<th>45-59 (years)</th>
<th>60-74 (years)</th>
<th>75-99 (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
</tr>
<tr>
<td>&lt;120 /&lt;80</td>
<td>4</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>120-139 /80-89</td>
<td>6</td>
<td>22</td>
<td>6</td>
</tr>
<tr>
<td>140-159 /90-99</td>
<td>11</td>
<td>41</td>
<td>3</td>
</tr>
<tr>
<td>≥160/≥100</td>
<td>6</td>
<td>22</td>
<td>10</td>
</tr>
</tbody>
</table>
Based on Table 3, the number of patients with first-degree and second-degree hypertension in 45–59 age group is 41% and 22%, respectively. Meanwhile, the number of patients with first-degree and second-degree hypertension 60–74 age group is 41% and 22%, respectively. In 75-95 age group, 50% were suffering from first-degree hypertension and 50% were suffering from second-degree hypertension. Age is one factor which influence blood pressure. Older the age, higher the risk of hypertension.

The mean of systolic blood pressure and diastolic blood pressure in 45–59 age group is 127 mmHg and 83 mmHg, respectively. The mean of systolic blood pressure and diastolic blood pressure in 60–74 is 128 mmHg dan 83 mmHg, respectively. The mean of systolic blood pressure and diastolic blood pressure in 75–90 age group is 135 mmHg dan 90 mmHg, respectively.

The above results are in corresponds with Basic Health Research published in 2013, the prevalence of hypertension among the elderly is rising along with the increase in age. In age group of 55–64, the prevalence of hypertension is 45.9%; 65–74 is 57.6%; and among 75 years above, the prevalence is 63.8%.

The grouping of blood glucose level is based on the criteria issued by Perkeni. The criteria are used to measure on-time blood glucose level in capillary blood. 20% of the respondents showed blood glucose level less than 90 mg/dl or normal level as long as the subject does not experience hypoglycemia. 58% of the respondents showed blood glucose level of 90–199 mg/dl. The blood glucose level is categorized as DM. The group needs further identification for symptoms and risk factors to prevent increase in blood glucose level, known as hyperglycemia. Blood glucose level above 200 mg/dl fulfills the criteria of DM diagnosis. Research results showed that 22% of the elders belonged to DM criteria. It is due to the fact that 50% of elderly people experience increase in blood glucose level caused by disturbance of glucose metabolism.

**The Profile of Blood Glucose Level**

**Table 4. The Distribution of Blood Glucose Level among Respondents in Y Village in 2019**

<table>
<thead>
<tr>
<th>Blood Glucose (mg/dl)</th>
<th>Number</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;90</td>
<td>12</td>
<td>20</td>
</tr>
<tr>
<td>90-199</td>
<td>35</td>
<td>58</td>
</tr>
<tr>
<td>≥200</td>
<td>13</td>
<td>22</td>
</tr>
</tbody>
</table>

**Tabel 5. The Distribution of Blood glucose Level based on Age among the Respondents in Y Village in 2019**

<table>
<thead>
<tr>
<th>Blood glucose (mg/dl)</th>
<th>45-59 (years)</th>
<th>60-74 (years)</th>
<th>75-90 (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>(%)</td>
<td>Number</td>
<td>(%)</td>
</tr>
<tr>
<td>&lt;90</td>
<td>6</td>
<td>22</td>
<td>5</td>
</tr>
<tr>
<td>90-199</td>
<td>13</td>
<td>48</td>
<td>22</td>
</tr>
<tr>
<td>≥200</td>
<td>8</td>
<td>29</td>
<td>4</td>
</tr>
</tbody>
</table>
Based on Table 5, from 27 individuals belonged to age group of 45–59, 22% respondents showed non-DM blood glucose level; 48% showed uncertain-of-DM blood glucose level; and 29% showed DM blood glucose level. From 31 individuals belonged to age group of 60–74, 16% respondents showed non-DM blood glucose level; 70% showed uncertain-of-DM blood glucose level; and 12% showed DM blood glucose level. Meanwhile, among 31 respondents belonged to 75–90 age group, 50% respondents showed non-DM blood glucose level and 50% respondent showed DM blood glucose level.

The mean of blood glucose level in 45–59 age-group is 160 mg/dl with the lowest level of 53 mg/dl and highest level of 453 mg/dl. The mean of blood glucose level in 60–74 age-group is 136 mg/dl, with the lowest level of 62 mg/dl and highest level of 337 mg/dl. The mean of blood glucose level in 75–90 age-group is 163 mg/dl, with the lowest level of 73 mg/dl and highest level of 253 mg/dl.

Diagnosis of diabetes can be stated if the measurement of on-time plasma glucose showed the level of ≥200 mg/dl with common symptoms such as polydipsia, polyphagia, and decrease in body weight with unknown reason. Diabetes patients are mostly belonged to the age-group of 55–64 years and 65–74 years. The data is in correspond with the research result as most of the DM-categorized blood glucose level found in the range of 45–59 years and 60–74 years. There is a differnt in the age category. Age is one of the risk factors which increase the rise of blood glucose in infodatin diabetes in 2018. The prevalence of diabetes is increased as the age developed. Disturbance in blood glucose setting is due to homeostasis disorders or disruption in the production of beta cell in the pancreas and the rise of insulin resistance. Insulin resistance can be caused by changes in fat composition in elderly body in the form of low muscle mass and high fat tissue due to bad diet.

CONCLUSION AND SUGGESTION

This study concludes that the profile of blood pressure among the elderly in Y Village is 50% showed blood pressure categorized as first-degree and second-degree hypertension, 23% categorized as pre-hypertension, and 27% showed normal blood pressure. The profile of blood glucose level among the elderly in Y Village is 22% showed blood glucose level categorized as DM, 58% categorized as non-DM, and 20% showed normal blood glucose level. The data indicates increase in blood glucose level for most of the elders and specific intervention is needed to control diabetes mellitus in Y Village.

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Conflicts of Interes: The authors declare that there was no conflict of interest with respect to the research, authorship, and/or publication of this article.

Ethical Clearance: Ethical clearance was obtained from the ethics committee of Universitas Airlangga, Surabaya, Indonesia.

References


Is Parity a Predictor of Neonatal Death in Indonesia? Analysis of the 2017 Indonesia Demographic and Health Survey

Ratna Dwi Wulandari¹, Agung Dwi Laksono²


Abstract

One factor that is thought to have a close relationship with neonatal deaths is parity. This is a problem for Indonesia which has the cultural characteristics of a large number of children is something positive. The study used the 2017 IDHS data. With stratification and multistage random sampling, 36,548 women aged 15-49 years with live births in the last 5 years were sampled. The final analyzed using a Binary Logistic Regression test. Multiparous women in Indonesia have a higher percentage of neonatal deaths than multiparous women. But the difference in parity between primiparous and multiparous was found not to be a predictor of neonatal death in Indonesia. Three other variables were found to be proven, predictors. Women who were not employed were 0.576 times more likely than women employed for neonatal death (OR 0.576; 95% CI 0.407-0.814). Women who did antenatal care ≥4 times were 2.332 times more likely than women who had ANC <4 times to experience neonatal death (OR 2.332; 95% CI 1.519-3.578). Women who did not experience a complication during delivery were 0.457 times more likely than women who had a complication during delivery for neonatal death (OR 0.457; 95% CI 0.317-0.659). The study concluded that parity was not a predictor of neonatal death in Indonesia. Other variables that were proven to be predictors are employment status, antenatal care, and complications during pregnancy.

Keywords: neonatal death, mother and child health, parity.

Background

The neonatal period, or the first twenty-eight days of life, is the most vulnerable time for a child’s survival. Data collected by WHO from various countries found that in 2018, 47% of all under-five deaths occurred in the neonatal period¹. Unicef 2018 data recorded a global average of neonatal mortality of 18 deaths per 1,000 live births².

Neonatal mortality is an important indicator that reflects the quality of newborn, prenatal, intrapartum and neonatal care. Early neonatal mortality is more closely related to factors related to pregnancy and maternal health, whereas late neonatal mortality is more related to factors in the newborn environment².

The majority of neonatal deaths are concentrated on the first day and week, with around 1 million dying on the first day and almost one million dying within the next six days. Current trends, more than 60 countries will lose the opportunity to achieve the SDG target to reduce neonatal deaths to as low as 12 deaths per 1000 live births by 2030. About half of them will still not reach the target until 2050. These countries carry about 80% of the neonatal mortality burden in 2016¹.

Neonatal mortality in Indonesia is still high. The results of the 2017 Indonesia Demographic and Health Survey report show 15 neonatal per 1000 live births. This figure is higher than the figures achieved by the countries in the region³.

One factor that is thought to have a close relationship with neonatal deaths is parity⁴. Such a situation is a problem for a country like Indonesia, which has a culture with a large number of children with cultural characteristics which is positive⁵. It is important to prove

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Statistically, parity is a predictor of neonatal deaths in Indonesia, to focus more on efforts to prevent neonatal deaths based on parity. Based on the background, this study is aimed at analyzing parity as a predictor of neonatal death in Indonesia.

**Materials and Method**

This study used data from the 2017 Indonesian Demographic Data Survey (IDHS) as analysis material. The 2017 IDHS sample was determined through stratification and multistage random sampling. The unit of analysis in this study was women in childbearing aged, 15-49 years old, who had given birth in the last 5 years. A number of 36,548 women were sampled.

The 2017 IDHS has passed ethical tests from the National Institute for Health Research and Development of the Indonesian Ministry of Health. The respondents’ identities have all been deleted from the dataset. Respondents have provided written approval for their involvement in the study. The use of the 2017 IDHS data for this study has received permission from ICF International through its website: https://dhsprogram.com/data/new-user-registration.cfm.

Parity is the number of living children whose births are born to a woman. In this study parity was divided into two, namely primiparous (<2 children), and multiparous (≥2 children). Socioeconomic was the wealth status of respondents compiled based on the index of goods ownership quintile stated by the respondent. The five categories were the poorest (quintile 1), poorer (quintile 2), middle (quintile 3), richer (quintile 4), and richest (quintile 5). Complications during pregnancy were the respondent’s acknowledgment of complications experienced during pregnancy until delivery. These problems consist of: prolonged labor, vaginal bleeding, fever, convulsions, baby in the wrong position, swollen limbs, faint, breathlessness, tiredness, and others. Problems during delivery were the respondent’s acknowledgment of problems experienced during childbirth.

Variables analyzed included: parity, age groups, educational level, wealth status, employment status, place of residence, antenatal care, complication during pregnancy, a problem during delivery, childbirth assistance, and place of delivery. Statistical analysis using chi-square was carried out to select the variables. Estimates were performed using Binary Logistic Regression because of the nature of the dependent variable. All statistical analyses were carried out using SPSS 19 software.

**Findings**

Table 1 was a descriptive statistic of neonatal death and related variables in Indonesia. Table 1 showed that multiparous women have higher neonatal deaths than primiparous women.

<table>
<thead>
<tr>
<th>Variables</th>
<th>The Parity</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primiparous</td>
<td>Multiparous</td>
</tr>
<tr>
<td>------------------</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Neonatal Death</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>4715</td>
<td>99.14%</td>
</tr>
<tr>
<td>Yes</td>
<td>41</td>
<td>0.86%</td>
</tr>
<tr>
<td>Age groups</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-19 yo.</td>
<td>390</td>
<td>8.20%</td>
</tr>
<tr>
<td>20-24 yo.</td>
<td>1820</td>
<td>38.27%</td>
</tr>
<tr>
<td>25-29 yo</td>
<td>1668</td>
<td>35.07%</td>
</tr>
<tr>
<td>30-34 yo.</td>
<td>605</td>
<td>12.72%</td>
</tr>
<tr>
<td>35-39 yo.</td>
<td>189</td>
<td>3.97%</td>
</tr>
<tr>
<td>40-44 yo.</td>
<td>71</td>
<td>1.49%</td>
</tr>
<tr>
<td>45-49 yo. (ref.)</td>
<td>13</td>
<td>0.27%</td>
</tr>
</tbody>
</table>
### Table 1. Descriptive Statistics of Neonatal Death in Indonesia (n=36,548)

<table>
<thead>
<tr>
<th>Educational level</th>
<th>No education (ref.)</th>
<th>Primary</th>
<th>Secondary</th>
<th>Higher</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>19</td>
<td>717</td>
<td>2933</td>
<td>1087</td>
</tr>
<tr>
<td></td>
<td>0.40%</td>
<td>15.08%</td>
<td>61.67%</td>
<td>22.86%</td>
</tr>
<tr>
<td></td>
<td>809</td>
<td>10605</td>
<td>16276</td>
<td>4102</td>
</tr>
<tr>
<td></td>
<td>2.54%</td>
<td>33.36%</td>
<td>51.20%</td>
<td>12.90%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wealth status</th>
<th>Poorest (ref.)</th>
<th>Poorer</th>
<th>Middle</th>
<th>Richer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1115</td>
<td>966</td>
<td>958</td>
<td>904</td>
</tr>
<tr>
<td></td>
<td>23.44%</td>
<td>20.31%</td>
<td>20.14%</td>
<td>19.01%</td>
</tr>
<tr>
<td></td>
<td>10177</td>
<td>6149</td>
<td>5462</td>
<td>5062</td>
</tr>
<tr>
<td></td>
<td>32.01%</td>
<td>19.34%</td>
<td>17.18%</td>
<td>15.92%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Employment status</th>
<th>No employed</th>
<th>Employed (ref.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2645</td>
<td>2108</td>
</tr>
<tr>
<td></td>
<td>55.65%</td>
<td>44.35%</td>
</tr>
<tr>
<td></td>
<td>15815</td>
<td>15953</td>
</tr>
<tr>
<td></td>
<td>49.78%</td>
<td>50.22%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Place of Residence</th>
<th>Urban</th>
<th>Rural (ref.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2399</td>
<td>2357</td>
</tr>
<tr>
<td></td>
<td>50.44%</td>
<td>49.56%</td>
</tr>
<tr>
<td></td>
<td>14866</td>
<td>16926</td>
</tr>
<tr>
<td></td>
<td>46.76%</td>
<td>53.24%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Antenatal care</th>
<th>≥ 4 times</th>
<th>&lt; 4 times (ref.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>459</td>
<td>4297</td>
</tr>
<tr>
<td></td>
<td>9.65%</td>
<td>90.35%</td>
</tr>
<tr>
<td></td>
<td>22552</td>
<td>9240</td>
</tr>
<tr>
<td></td>
<td>70.94%</td>
<td>29.06%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Complication during pregnancy</th>
<th>No</th>
<th>Yes (ref.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3803</td>
<td>858</td>
</tr>
<tr>
<td></td>
<td>81.59%</td>
<td>18.41%</td>
</tr>
<tr>
<td></td>
<td>3803</td>
<td>858</td>
</tr>
<tr>
<td></td>
<td>83.09%</td>
<td>16.91%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Problems during delivery</th>
<th>No</th>
<th>Yes (ref.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3</td>
<td>4753</td>
</tr>
<tr>
<td></td>
<td>0.06%</td>
<td>99.94%</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>31790</td>
</tr>
<tr>
<td></td>
<td>0.01%</td>
<td>99.99%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Childbirth assistance</th>
<th>Non health worker (ref.)</th>
<th>Health worker</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>312</td>
<td>4444</td>
</tr>
<tr>
<td></td>
<td>6.56%</td>
<td>93.44%</td>
</tr>
<tr>
<td></td>
<td>20342</td>
<td>11450</td>
</tr>
<tr>
<td></td>
<td>63.98%</td>
<td>36.02%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Place of delivery</th>
<th>Non Healthcare facility (ref.)</th>
<th>Healthcare facility</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>935</td>
<td>3821</td>
</tr>
<tr>
<td></td>
<td>19.66%</td>
<td>80.34%</td>
</tr>
<tr>
<td></td>
<td>22509</td>
<td>9283</td>
</tr>
<tr>
<td></td>
<td>70.80%</td>
<td>29.20%</td>
</tr>
</tbody>
</table>

Note: *significant at level 95%

Table 1 shows that multiparous women have a higher neonatal death than multiparous women. Statistical test results show that there are significant differences between the two. Table 1 shows that all variables to be tested as predictors proved to be significant, and could be continued to the next stage.

Table 2 describes the results of the binary logistic regression test for neonatal death in Indonesia. The results of his analysis show that although primiparous women have lower odds ratios than multiparous women, the difference in parity between primiparous and multiparous is not a predictor of neonatal death in
Indonesia. The results of this study are different from other studies, which found that parity is one of the determinants of neonatal mortality\textsuperscript{6,7,8}.

<table>
<thead>
<tr>
<th>The Predictors</th>
<th>The Neonatal Death</th>
<th>OR</th>
<th>CI (95%)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sig.</td>
<td></td>
<td>The Lower Bound</td>
<td>The Upper Bound</td>
</tr>
<tr>
<td>Parity: Primipara</td>
<td>0.067</td>
<td>0.621</td>
<td>0.374</td>
<td>1.033</td>
</tr>
<tr>
<td>Age group: 15-19 yo.</td>
<td>0.165</td>
<td>2.529</td>
<td>0.683</td>
<td>9.367</td>
</tr>
<tr>
<td>Age group: 20-24 yo.</td>
<td>0.766</td>
<td>0.839</td>
<td>0.265</td>
<td>2.659</td>
</tr>
<tr>
<td>Age group: 25-29 yo</td>
<td>0.582</td>
<td>0.740</td>
<td>0.253</td>
<td>2.162</td>
</tr>
<tr>
<td>Age group: 30-34 yo.</td>
<td>0.522</td>
<td>0.708</td>
<td>0.247</td>
<td>2.036</td>
</tr>
<tr>
<td>Age group: 35-39 yo.</td>
<td>0.622</td>
<td>0.766</td>
<td>0.266</td>
<td>2.206</td>
</tr>
<tr>
<td>Age group: 40-44 yo.</td>
<td>0.595</td>
<td>1.338</td>
<td>0.457</td>
<td>3.915</td>
</tr>
<tr>
<td>Educational level: Primary</td>
<td>0.488</td>
<td>0.688</td>
<td>0.239</td>
<td>1.979</td>
</tr>
<tr>
<td>Educational level: Secondary</td>
<td>0.416</td>
<td>0.641</td>
<td>0.220</td>
<td>1.871</td>
</tr>
<tr>
<td>Educational level: Higher</td>
<td>0.203</td>
<td>0.465</td>
<td>0.143</td>
<td>1.510</td>
</tr>
<tr>
<td>Wealth status: Poorer</td>
<td>0.073</td>
<td>0.614</td>
<td>0.360</td>
<td>1.046</td>
</tr>
<tr>
<td>Wealth status: Middle</td>
<td>0.109</td>
<td>0.629</td>
<td>0.356</td>
<td>1.109</td>
</tr>
<tr>
<td>Wealth status: Richer</td>
<td>0.822</td>
<td>1.063</td>
<td>0.624</td>
<td>1.812</td>
</tr>
<tr>
<td>Wealth status: Richest</td>
<td>0.317</td>
<td>0.719</td>
<td>0.377</td>
<td>1.372</td>
</tr>
<tr>
<td>Employment status: No employed</td>
<td>*0.002</td>
<td>0.576</td>
<td>0.407</td>
<td>0.814</td>
</tr>
<tr>
<td>Type of Residence: Urban</td>
<td>0.427</td>
<td>1.170</td>
<td>0.794</td>
<td>1.724</td>
</tr>
<tr>
<td>Antenatal care: ≥ 4 times</td>
<td>*0.000</td>
<td>2.332</td>
<td>1.519</td>
<td>3.578</td>
</tr>
<tr>
<td>Complication during pregnancy: No</td>
<td>*0.000</td>
<td>0.457</td>
<td>0.317</td>
<td>0.659</td>
</tr>
<tr>
<td>Problems during delivery: No</td>
<td>0.999</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Childbirth assistance: Health worker</td>
<td>0.113</td>
<td>0.608</td>
<td>0.329</td>
<td>1.126</td>
</tr>
<tr>
<td>Place of delivery: Healthcare facility</td>
<td>0.685</td>
<td>1.110</td>
<td>0.671</td>
<td>1.837</td>
</tr>
</tbody>
</table>

Note: *Significant at level 95%
Table 2 shows that there are three significant variables as predictors of neonatal death in Indonesia. The three variables are employment status, antenatal care, and complication during pregnancy.

Table 2 shows that women who were not employed had a probability of 0.576 times compared to women employed for neonatal death (OR 0.576; 95% CI 0.407-0.814). This means that employed women have a higher chance of having neonatal death than those who are not employed. A study in Ethiopia found similar results. Employment status was found along with other demographic factors that contributed to neonatal mortality. Paradoxically, it was found that women who did antenatal care ≥4 times were 2.332 times more likely than women who did ANC <4 times to experience neonatal death (OR 2.332; 95% CI 1.519-3.578). Research in Nigeria and Southern Ethiopia shows different results. Verbal/social autopsy results show that lack of antenatal care has proven to be a factor affecting mortality in both countries. The analysis results in this study also contradict the results of research in Brazil which found that an early diagnosis during pregnancy that was performed during antenatal care can prevent infant mortality. It is predicted that 35.3% of infant deaths can be prevented by early diagnosis.

The paradoxical research results as in this study were also found in a study in Ethiopia. Analysis in Ethiopia found that childbirth performed at home actually has a better chance and protects the infant from death. Table 2 shows that women who did not experience a complication during delivery were 0.457 times more likely than women who had a complication during delivery for neonatal death (OR 0.457; 95% CI 0.317-0.659). This means that women who have a complication during delivery have a higher chance of having neonatal death than those who do not have a complication during delivery. This result is in line with research in China and the United States. Several studies recommend strengthening early identification of obstetric complications and immediate interventions to prevent neonatal death.

The results of this analysis indicate the possibility that although women in Indonesia perform antenatal care more frequently, experience complications during pregnancy, they may have a higher chance of experiencing neonatal death. Another possibility is the availability of health services which are still uneven in some parts of Indonesia. The geographical condition of Indonesia, which has more than 16 thousand, could also be another factor affecting neonatal death, including the still thick local cultural customs that make Indonesian women choose to give birth at a traditional birth attendant.

Conclusions

Based on the results of the study it can be concluded that parity was not a predictor of neonatal death in Indonesia. Other variables that were proven to be predictors were employment status, antenatal care, and complications during pregnancy.

Acknowledgment: The author would like to thank the ICF International, who has agreed to allow the 2017 IDHS data to be analyzed in this article.

Source of Funding: Self-funding

Conflict of Interests: Nil

References


Subchronic Toxicity and Hepatoprotector Potential of Miana Leaf Extract on White Rat Which Indicated by Anti Tuberculosis Drugs

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Abstract

Damage to liver function is the most common cause of patients or doctors stopping treatment. Anti-tuberculosis (OAT) drug-induced hepatotoxicity is mainly caused by oxidative stress caused by drugs and metabolites. Subchronic toxicity is one of the conditions for testing long-term used drugs such as OAT. The research aims to determine the potential of miana leaf extract (EDM) as a hepatoprotector and prevent toxicity due to OAT administration. The study used 5 groups of Wistar rat test animals namely K1 (normal mice given placebo); K2 (OAT-induced mice given placebo); K3 (OAT-induced mice given Makassar EDM); K4 (OAT-induced mice given EDM Kupang); K5 (OAT-induced mice given Silymarin). Tests on mice were carried out after 30 days of treatment with parameters SGOT, SGPT, total bilirubin, creatinine and liver histopathology. The results showed that EDM has the potential as a hepatoprotector by preventing an increase in SGOT, SGPT and total bilirubin so as to avoid liver damage due to OAT induction. EDM has the potential to prevent toxicity due to the administration of OAT with creatinine parameters.

Keywords: miana leaf extract, OAT, hepatoprotector, toxicity

Introduction

The first-line treatment of tuberculosis according to tuberculosis prevention guidelines (6) is the use of anti-tuberculosis (OAT) drugs such as isoniazid, rifampicin, pyrazinamide, streptomycin and ethambutol. The most common factor in the treatment of tuberculosis is the side effects of OAT against damage to liver function such as hepatitis, hypersensitivity reactions, nausea, and vomiting (Gautam, 2012). Drug-induced hepatotoxicity and metabolites such as OAT are mainly caused by oxidative stress (18).

Prevention of drug induced liver injury (DILI) has been carried out using chemical compounds or natural ingredients. The effect of n-acetylsysteine hepatoprotector in preventing damage to liver function due to administration of OAT (4). Singh (18) have compared the effects of hepatoprotector n-acetylsysteine, silymarin and curcumin. The results can reduce hepotoxic HepG2 cells during OAT administration with parameters of survival, morphology, mitochondrial respiration and cell cycle. Krisnansari (11) proved the hepatoprotective potential of propolis against white mice induced by CCl4 (carbon tetra chloride). Propolis is proven to provide a significant difference in IL-6, superoxide dismutase, body weight and histopathology of rat liver. Huda proved the formulation of polyberbal sharbat chylosin as a hepatoprotector against total bilirubin, ALT, AST, ALP and rat liver histopathology (8).

Research assumes that the hepatoprotective effect is related to the antioxidant properties of plant extracts. Shehab investigated the antioxidant capacity of Fagonia indica Burn extract, Calotropis procera RBr and Salsola imbricate Forssk as potential hepatoprotectors for CCl4-induced mice, because they can reduce ALT, AST and
serum bilirubin levels (17). Phenolic compounds from plants such as quercetin and rosmarinic acid have the potential as antioxidants that can counteract oxidative stress as a pathophysiological mechanism of DILI (21).

Plants that have potential as antioxidants and hepatoprotectors become therapeutic mechanisms so that it is important to be given as a complementary in the treatment of tuberculosis such as: meniran, miana, mangosteen, temulawak, rosella, kencur, kedondong forest, garlic, brotowali (13,14). Al-Snafi has identified 45 medicinal plants in Iraq that contain secondary metabolites that are antioxidants (3). In India found 4167 species of medicinal plants that have been used for the treatment of liver disorders, filariasis and diabetes mellitus (16). Verma has reviewed 15 plants as hepatoprotective in Iranian folk medicine (19). Kumar identified the antioxidant properties of herbs as a hepatoprotector with oxidative mechanisms against toxic chemicals (10).

The use of plants even as hepatoprotectors need to consider the subchronic toxicity caused. Especially for long-term use such as complementary tuberculosis treatment. Rachmawati and Ulfa examined the toxicity of yellow wood extract to the liver and kidneys with parameters of SGOT, SGPT, histopathology of the liver and kidney (15).

This study aims to determine the toxicity and hepatoprotective potential of EDM in OAT-induced white rats. The hepatoprotector function was tested based on the parameters AST / SGOT, ALT / SGPT, histopathological features of white rat liver. Toxicity prevention function based on white rat bilirubin and creatinine.

**Material and Method**

**Test material** are EDM originating from Makassar City and Kupang City, OAT, Sylimarin and Sodium CMC as placebo. The extract was prepared based on maceration method. The dosage of the test material consisted of Rifampicin 25 mg / kg BW rat / day; INH 25 mg / kg BW rat / day; Placebo Na CMC 1%; EDM from Makassar 250 mg / kg rat / day; EDM from Kupang 250 mg / kg body weight / day; Sylimarin 25 mg / kg BW rat / day.

**Test sample** is white rat (*Rattus norvegicus*) Wistar strain; male, healthy, 2-3 months old, body weight 150-200g.

**Procedure for testing.** White rats were grouped in 5 groups with 7 rats for each treatment group. Every day the rats were fed and drank ad libitum. Every day rats get different treatment for each group. K1 (control group animals were given placebo (sodium CMC) orally once a day for 30 days). K2 (negative control group was given OAT and Placebo orally once a day for 30 days). K3 (treatment group given OAT and EDM from Makassar orally once a day for 30 days). K4 (treatment group given OAT and EDM from Kupang orally once a day for 30 days). K5 (positive control group given OAT and silymarin orally once a day for 30 days). OAT given is a combination drug of rifampicin and INH. Administration of OAT and EDM or Silymarin is done 1 hour apart to prevent drug interactions. After the end of treatment the dieuthanasia rats were then dissected to take specimens for testing. Specimens taken were rat blood for AST / SGOT, ALT / SGPT testing, total bilirubin, creatinine and complete blood. Mouse liver organ specimens for histopathological testing of the liver. Maintenance and treatment of samples was carried out in the animal laboratory of the Faculty of Medicine, Airlangga University (FKUA). Blood sample testing is carried out in the Dr. Chemistry clinical laboratory laboratory. Soetomo Surabaya. Histopathological testing was performed with HE staining preparations in the anatomic pathology laboratory FKUA Surabaya.

**Finding and Discussion**

**Finding**

The potential of EDM as a hepatoprotector for tuberculosis treatment is based on the results of rat blood sample testing according to the following table
Table 1. Test results on the number of SGPT, SGOT, Bilirubin and Creatinine in white rat test animals after OAT induction and treated with test material

<table>
<thead>
<tr>
<th>Treatment Group</th>
<th>n</th>
<th>Results of rat blood measurements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SGOT</td>
</tr>
<tr>
<td>K1</td>
<td>7</td>
<td>118.28</td>
</tr>
<tr>
<td>K2</td>
<td>7</td>
<td>144.4</td>
</tr>
<tr>
<td>K3</td>
<td>7</td>
<td>115</td>
</tr>
<tr>
<td>K4</td>
<td>5</td>
<td>112</td>
</tr>
<tr>
<td>K5</td>
<td>5</td>
<td>98</td>
</tr>
</tbody>
</table>

White rat test liver was prepared until histopathological preparations were made. After staining hematosycline eosin (HE) and observed with a microscope with the results according to figure 1.

<table>
<thead>
<tr>
<th>Preparat Of Rat Liver</th>
<th>Vena Centralis</th>
<th>Portal Triad</th>
<th>Nekrosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>K 1</td>
<td>Congestion looks</td>
<td>Lymphocyte infiltration forms bridging and bleeding</td>
<td>There is no necrosis</td>
</tr>
<tr>
<td>K 2</td>
<td>Congestion and hyalinization appear</td>
<td>Lymphocyte infiltration, bleeding and hyalinization</td>
<td>Necrosis occurs (picnosis, karyorrhexis, karyolysis)</td>
</tr>
<tr>
<td>K 3</td>
<td>Some congestions appear</td>
<td>Lymphocyte infiltration and some bleeding</td>
<td>There is no necrosis</td>
</tr>
<tr>
<td>K 4</td>
<td>Some congestions appear</td>
<td>Lymphocyte infiltration forms bridging</td>
<td>There is no necrosis</td>
</tr>
</tbody>
</table>
Some congestions appear
Multiple lymphocyte infiltration and bleeding
There is no necrosis

Information:
K1 (normal rat given a placebo);
K2 (OAT-induced rat given placebo);
K3 (OAT-induced rat given Miana Makassar);
K4 (OAT-induced rat given Miana Kupang);
K5 (OAT-induced rat given Silymarin)

Discussion

The results of phytochemical screening from EDM and antioxidant testing proved that EDM contains flavonoid compounds that have potential as antioxidants (13). Liver damage is also caused by free radicals released by cells that are induced by OAT so that the antioxidant function of EDM in this case can prevent malfunctioning and liver damage. In this case Airaodion have proven the hepatoprotective effect of Parkia biglobosa in rats induced by oxidative stress with parameters AST, ALT, LDH, LPO, CAT, SOD and GSH. Then it can be stated that EDM which contains antioxidants has the potential to be a hepatoprotector with its antioxidant mechanism (2). In accordance with research Shehab which shows the relationship of phenolic content in several herbal medicines as antioxidants and hepatoprotectors with the parameters of reducing the amount of ALT, AST, CAT, GSH, SOD and TBARS and proving that the flavonol content of quercitrin and rosmarinic acid play a role in reducing DPPH free radicals (17). Airaodion have proven the hepatoprotective effect of Parkia biglobosa in rats induced by oxidative stress with the same parameters (2).

Symptoms of hepatotoxicity in patients receiving tuberculosis treatment are based on an increase in serum alanine aminotransaminase in both ALT / SGPT and AST / SGOT amounts that appear after OAT administration such as rifampicin and INH. Increased serum 3-5 times the normal value accompanied by symptoms of hepatitis (5). Grouping of test animals was done to compare the effect of Na CMC (K2) test material; EDM from Makassar (K3); EDM from Kupang (K4) and silymarin (K5). The hepatotoxic parameters tested after administration of OAT are: an increase in the normal value of AST and / or ALT; an increase in total serum bilirubin and an improvement in liver function after stopping OAT. While creatinine testing is done to prevent toxicity. The parameters tested are in line with studies that test kidney toxicity including creatinine and BUN, while liver function includes SGOT, SGPT, HDL, LDL, total cholesterol, total protein, albumin, and triglycerides (5,7).

The test results showed an increase in SGOT and SGPT in K2 compared to K1 by (22%) and (128%). Based on the analysis there was a decrease in the number of SGOT and SGPT towards K2, namely in K3 (25%) and (86%); K4 (27%) and (41%); K5 (39%) and (41%). The Mann Whitney test showed that K3 and K4 were not significantly different from K1 for the SGOT and K3 parameters because they gave the largest and significant decrease in SGPT with other treatments for the SGPT parameter. Based on the results of research on the effect of giving EDM as a hepatoprotector with parameters of the amount of SGOT, SGPT, total bilirubin and histopathological features of the liver, the relationship between these variables is the mechanism of hepatoprotector that occurs in OAT induced rats. In the study, it was proven that mice induced by OAT on K2 showed an increase in the amount of SGOT, SGPT and total bilirubin compared to K1, which means that there has been impaired liver function due to OAT administration. Other studies have shown an increase in SGPT due to 7.5-fold OAT-induced hepatotoxicity in patients with HIV / AIDS and 100% of subjects given 600mg rifampicin experienced hepatotoxicity due to increased SGOT and SGPT (12).

The test results showed an increase in total bilirubin and creatinine from K2 to K1 (31.57%) and (24.94%). However, there was a decrease in K2 from K3 (17.56%)}
and (11.2%); K4 (6.63%) and (22.53%); K5 (14%) and (29.97%). Mann Whitney analysis shows the amount of creatinine K3, K4 and K5 is not significantly different from one another. Total bilirubin can be used to detect hepatobiliners, hepatitis, cirrhosis and other liver diseases. Likewise, Huda and Mosaddik have proven the hepatoprotector effect of herbal medicine formulas by comparing silymarin based on decreasing the amount of ALT / SGPT, AST / SGOT, ALP and total bilirubin(8).

Histopathological picture of liver showed damage occurred in K2 rat’s liver compared to other groups, because necrosis had occurred with the characteristics of the discovery of picnosis, karyoreksis and karyolysis. Although in general in all samples congestion occurs in the central vein but in K2 congestion is accompanied by hyalinization. Whereas in K3, K4 and K5 only found a few congestions in the observation of the entire microscopic field of view. In the triad portal lymphocyte infiltration and bleeding occurred in all treatment groups. But in K2 it turns out to be hyalinized, so it can be stated that K3 and K4 have potential as hepatoprotectors based on the rat liver damage picture. According to Zachary and McGavin in the case of acute cell damage, the process is that at first the cell nucleus undergoes picnosis (damage to the cell nucleus so that the cell contents thicken) and then chromatin in the cell nucleus will dissolve (karyolysis) followed by a breakdown of the cell nucleus (karyoreksis)(21). The hepatoprotective function of herbal medicines such as propolis, yellow wood and 15 other types of herbs has been proven based on histopathological features (11,15,19). In line with the results of the study of the potential of EDM as a hepatoprotector Ahsan also proved the potential of herbs as hepatoprotector with the results of reducing SGOT, SGPT and total bilirubin and showing differences in the histopathological picture of CCl4 induced rat liver(1). Yani and Singh also reported the hepatoprotective effect of N-Acetylcysteine in preventing DILI due to OAT so it was recommended to use hepatoprotector in OAT treatment to avoid the occurrence of hepatotoxic in patients who were given rifampicin and INH treatment(20). The results of this study support the function of EDM not only as a preventive, complementary curative tuberculosis (14) but also functions as a hepatoprotector and prevents toxicity due to treatment.

Conclusion

1. EDM has potential as a hepatoprotector by reducing the number of AST / SGOT and ALT / SGPT OAT induced white mice

2. EDM has the potential to prevent OAT toxicity based on improved histopathology of the liver and is able to maintain the amount of OAT induced white rat bilirubin and creatinine

Acknowledgement: Thank you to the Poltekkes Kemenkes Makassar for funding this research and all those who have helped carry out the research

Ethical Clearance: Use of test animals based on ethical approval research permit number 422 / KEPK-PTKMK / V / 2019 from the Ethics Commission of the Polytechnic of the Ministry of Health Makassar (Politeknik Kesehatan Makassar Kementerian Kesehatan Republik Indonesia)

Conflict of Interest: There are not a conflict of interest with another

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The Performance of Elastographic Diagnostic of Breast Tumor in Dr. Soetomo Teaching Hospital Surabaya

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Abstract

**Background:** Elastography in breast cancer cases has not become a routine examination that is conducted in the radiodiagnostic unit in Dr. Soetomo Teaching Hospital Surabaya. These last few years, elastography has been an addition examination modality which is promising to assess breast lesions that are detected by an ultrasound. **Objective:** The aim of the present study is to observe the performance of elastography in breast tumor cases. **Method:** This cross-sectional study was conducted in Dr. Soetomo Teaching Hospital Surabaya. The elastography is applied in 65 females (the average age is 49.1 years old) and it was found 66 lesions with a definitive diagnosis (34 benign tumors, 32 malignant tumors) which was proved through a fine-needle aspiration biopsy. The grayscale result is classified into benign and malignant categorizations with examining five descriptors including shape, margin, orientation, echo pattern, and posterior features. **Results:** The elastography score showed that the sensitivity is 87.5%, the specificity is 94.1%, and the accuracy is 90.9%. The strain ratio showed 93.8%, 94.1%, 90.9% in sequence. On the other hand, the grayscale result showed 96.9%, 91.2%, and 95.5%. The combination of elastography and grayscale showed a better performance with the 97.1% of sensitivity, 94.1% of specificity, and 93.8% of accuracy. There was a significant correlation between the lesion size and the quality of elastography result (P = .034) while there was no correlation with the lesion depth (P = .624). **Conclusion:** The combination of elastography and grayscale have a better diagnostic performance in distinguishing benign breast tumor with malignant breast tumor.

**Keywords:** Breast Tumor, Elastography Score, Strain

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**Background**

Elastography is a non-invasive imaging technique that can be applied to describe the strain of a tissue as a response to a given mechanical power. The basic of elastography is still developed, so the implementation in the clinical practice has become a debate in the scientific community and its functions remain unknown1. This technique is initially addressed to differentiate between the benign lesions and malignant lesions. However, it is implemented to assess ‘probably benign lesion’.

Several studies reported that the elastography did not give any additional information to the ultrasonografi (USG) diagnosis of breast cancer, in which the accuracy of the diagnostic is similar to the USG of grayscale3. However, other studies revealed that this method can only be applied to the lesions which are no more than 2 cm4. On the other hand, several other studies asserted that elastography could give additional information regarding the elasticity (strain) that cannot be achieved through the routine imaging modalities. It can also increase the specificity in the (USG) of grayscale so that it can decrease the biopsy number in benign lesion cases through the dubious grayscale USG and it can be postponed for one year5,6,7,8.

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The elastography application in the imaging elastographic properties of tissues was proposed in one study. A conducted study categorized in a static method and based on the facts that a hard tissue has a small strain\(^1\). On the other hand, one of the conducted study referred to the dynamic method and based on the fact that a hard tissue has a high velocity of propagation\(^9\). There was a scoring system called Tsukuba Elasticity Score (TES) based on the diagnosis of more than 100 breast tumor cases in 2006. This scoring system categorizes the color scheme of the breast tumor elasticity into five classes, from benign (score 1-3), to malignant (score 4-5), and BGR score for cystic lesions\(^5\).

Thus, this method is not applied to replace the conventional USG to diagnose a breast tumor but as a complementary by giving information about the strain of a tissue which is not obtained in other imaging modalities. So far, there has been no data related to the use of elastography in breast tumor cases in radiodiagnostic unit Dr. Soetomo Teaching Hospital. Therefore, the present study aims to understand the elastography functions in diagnosing a breast tumor in radiodiagnostic unit of Dr. Soetomo Teaching Hospital. In addition, it also aims to recognize the elastography variations in breast tumors and explore the factors that can affect the elastography result.

**Method**

The independent variable was used for the elastography result and the related variable was used for the FNAB result. The present study conducted an examination hosted by the radiology residents that has been through an ultrasound stage for 5 months and supervised by the technical appliance and used Hitachi machine type Hi-Vision Avius with probe EUP-L74M 5-13 MHz.

All notes were submitted next to do a tabulation of data and statistic analysis. The present study also used a statistic analysis by calculating the sensitivity, specificity, and accuracy of the Chi-Square method. The trust limit that was used is 95% (95% CI) with the value of p is considered significant if it is <0.05. The statistic calculation was conducted with the assistance of SPSS software. Ethically, the researcher has received ethical clearance permission from Medical Research Ethics Commission Dr. Soetomo Teaching Hospital Surabaya.

**Results**

**The Subject Characteristic of the Study**

In this study, 66 samples are obtained aged between 32-80 years old with the mean 49.1 ± 8, 94 years old in which the most age group are 40-49 years old. The age average in the group with the benign cytology is 45.94 ± 7.32. However, the age average in the group with the malignant cytology is 52.41 ± 9.29.

**The Sample Distribution Based On The Result Of Elastography And Cytology**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>In general</th>
<th>Benign</th>
<th>Malignant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
<td>%</td>
<td>f</td>
</tr>
<tr>
<td>Elastography score</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 (BGR)</td>
<td>17</td>
<td>25.8</td>
<td>17</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>7.6</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td>12.1</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>8</td>
<td>12.1</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>18</td>
<td>27.3</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>10</td>
<td>15.2</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
<td>100.0</td>
<td>34</td>
</tr>
<tr>
<td>Strain Ratio</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 4,5</td>
<td>34</td>
<td>51.5</td>
<td>32</td>
</tr>
<tr>
<td>≥ 4,5</td>
<td>32</td>
<td>48.5</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>66</td>
<td>100.0</td>
<td>34</td>
</tr>
</tbody>
</table>
From the first elastography examination, it is found that SE means in the group with benign cytology is 2. On the other hand, the SE mean in the malignant cytology group are 4. Secondly, from the SR assessment is found the SR mean in the benign cytology group is 3.03 ± 1.28. The elastography score is range from 0 until 5. In score 0, it is obtained 17 persons (25.8%) with benign tumors. In score 1, it is found 5 persons (7.6%) with benign tumors. Score 3 found 8 patients (12.1%) with benign tumors. Score 4 obtained 18 patients (27.3%) with malignant tumors. In score 5, there are 10 patients (15.2%) with malignant tumors. The strain ration ≤ 4.5 are 34 patients (51.5%) with benign tumors and 2 persons (3%) are the malignant tumor patients. On the other hand, the strain ratio ≥ 4.5 are 32 persons with 2 patients with benign tumors (3%) and 30 patients with malignant tumors (45.5%).

The Sample Distribution Based on The Result of Cytology

Table 2. The Sample Distribution Based on The Result of Cytology

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
<th>Percentage(%)</th>
<th>SE</th>
<th>Mean SR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benign</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benign cystic lesion</td>
<td>17</td>
<td>25.8</td>
<td>BGR,2</td>
<td>2.41</td>
</tr>
<tr>
<td>FAM</td>
<td>10</td>
<td>15.1</td>
<td>1-4</td>
<td>3.78</td>
</tr>
<tr>
<td>BEH</td>
<td>4</td>
<td>6.1</td>
<td>2-3</td>
<td>3.67</td>
</tr>
<tr>
<td>FCC</td>
<td>2</td>
<td>3.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phylloides</td>
<td>1</td>
<td>1.5</td>
<td>1</td>
<td>3.31</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
<td>51.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malignant</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Invasive ductal ca</td>
<td>22</td>
<td>33.3</td>
<td>2.4-5</td>
<td>7.85</td>
</tr>
<tr>
<td>Mucinous ca</td>
<td>3</td>
<td>4.5</td>
<td>4-5</td>
<td>6.74</td>
</tr>
<tr>
<td>Invasive lobular ca</td>
<td>2</td>
<td>3.0</td>
<td>3.5</td>
<td>6.85</td>
</tr>
<tr>
<td>Invasive ca of NST</td>
<td>2</td>
<td>3.0</td>
<td>3-4</td>
<td>6.58</td>
</tr>
<tr>
<td>Susp. malignant</td>
<td>2</td>
<td>3.0</td>
<td>4</td>
<td>6.87</td>
</tr>
<tr>
<td>Malignant round cell ca</td>
<td>1</td>
<td>1.5</td>
<td>3</td>
<td>3.46</td>
</tr>
<tr>
<td>Total</td>
<td>32</td>
<td>48.5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From 66 samples, 26 samples have been confirmed with the histopathology result. The benign tumor category includes 34 persons (51.5%) which the benign cystic lesion are 17 patients (25.8%) and FAM are 10 patients (15.1%). There are 32 subjects (48.5%), which are included in the malignant category, and invasive ductal Caare included 22 patients (33.3%) (Table 3).
The Diagnostic Performance of The SE and SR combination

Table 3. The diagnostic performance of the combination of SE and SR

<table>
<thead>
<tr>
<th>SE + SR</th>
<th>FNAB</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Benign</td>
<td>Malignant</td>
</tr>
<tr>
<td>Benign</td>
<td>32</td>
<td>2</td>
</tr>
<tr>
<td>Malignant</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
<td>32</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>93,8 %</td>
<td>PPV = 93,8 %</td>
</tr>
<tr>
<td>Specificity</td>
<td>94,1 %</td>
<td>FP = 6,3 %</td>
</tr>
<tr>
<td>Accuracy</td>
<td>93,9 %</td>
<td></td>
</tr>
</tbody>
</table>

The results of the examination of SE and SR benign tumor elastography score and benign tumor FNAB are 32 patients while the malignant tumor examinations are 2 patients. The results of elastography score in malignant tumor and FNAB in benign tumors are 2 patients while the results of the examination in the malignant tumor are 30 patients. The sensitivity result of the diagnostic performance of SE is 93,8%, the specificity is 94,1%, the accuracy is 93,9%, PPV is 93,8%, FP is 6,3%, NPV is 94,1%, and FN is 5,9%.(Table 3).

The Diagnostic Performance of the Combination of Elastography And Grayscale

Table 4. The diagnostic performance of the combination of elastography and grayscale

<table>
<thead>
<tr>
<th>Elasto &amp; FNAB</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gray Scale</td>
<td>Benign</td>
</tr>
<tr>
<td>Benign</td>
<td>33</td>
</tr>
<tr>
<td>Malignant</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
</tr>
<tr>
<td>Sensitivity</td>
<td>90,6 %</td>
</tr>
<tr>
<td>Specificity</td>
<td>91,2 %</td>
</tr>
<tr>
<td>Accuracy</td>
<td>90,9 %</td>
</tr>
</tbody>
</table>

The results of the gray scale in benign tumor and FNAB in the benign tumor are 33 persons and the score of elastography in benign tumor and FNAB in the malignant tumor are 3 persons. The results of the gray scale in malignant tumor and FNAB in the benign tumor are 1 persons and the score of elastography in malignant tumor and FNAB in the malignant tumor are 29 persons. The sensitivity result of the diagnostic performance of SE is 90,6%, the specificity is 97,1%, the accuracy is 93,9%, PPV is 96,7%, FP is 3,3%, NPV is 91,7%, and FN is 8,3%.
Discussion

This study revealed that there are 2 lesions with FNAB-FCC result. Theoretically, FCC must result in the benign elastography. However, this study is obtained 1 case with malignant elastography (SE = 4; SR = 4.61). After analyzing it, it is indeed found that the lesion location, in this case, is deep (depth +/-1,1 cm) compared to the other FCC that has been diagnosed accurately. As Thomas et al stated, the depth of lesion location which is more than 1 cm cannot be evaluated adequately with elastography. However, from the data analysis of the study, it is obtained that there is no false positive/negative in the lesion with 1,5 cm deep.

This study revealed that 3 lesions with FNAB-BEH result and all of them have atendency to benign elastography. However, two of them have the grayscale result that tends to be malignant. In accordance with the study conducted by Barr et al., the BEH case had a grayscale result and malignant elastography.

This study found 22 cases with FNAB-IDC and two cases with FNAB-ILC result. There are 3 cases such as (2 IDC, 1 ILC) with the benign elastography result (SE = 2.3; SR = 3.20), but the grayscale result tends to be malignant. The false negative is also reported in the two conducted5,10. IDC and ILC are categorized as “hard carcinoma” compared to other malignant tumors11. IDC/ILC low grade and intermediate usually related to the intensified esmoplastic process. So it will appear as a hard lesion. On the other hand, IDC high grade is related to the high rate of mitosis and necrosis area so that it appears to be a mild lesion. Thus, it causes the false negative result.

This study found 3 cases with FNAB mucinous ca and 2 cases with NST result. Mucinous ca and NST are categorized as “soft carcinoma”11. It is usually related to thecystic component or a collection of mucin so that it appears to be soft. Based on the result of this study. It is found mean SE and SR for lower mucinous compared to IDC/ILC. This study revealed that one case with malignant round cellca result (referred to NHL). The result of elastography and grayscale tend to be benign (SE = 3, SR = 3,46. Similar to the previous studies conducted by Thomas et al. dan Barr et al., there are 2 cases of false negative which are lymphoma.

On the other hand, the result of this study tends to be benign. It referred to the facts that the discovery of conventional radiography does not usually assist in distinguishing the primary lesion with metastatic. We found that the cutoff value is SR 5.1. As a comparison, a conducted study found that the SR value in breast cancer diagnosis was 3.0812. In addition, a study found that the SR value is 4.5 as it is used to be the standard in this study13. However, previous conducted study found that the SR value is 2.814.

In this study, SE possesses the sensitivity of 87.5 %, 94.1 % of specificity, the accuracy is 90.9 %, the false positive is 6.7 %, the false negative is 11.1 %. While, SR possesses 93.8 % sensitivity, 94.1 % of specificity, 93.9 % of accuracy, 6.3 % of false positives, and 5.9 % of afalse negative. While grayscale has 90.6 % sensitivity, 91.2 % specificity and 90.9 % accuracy. If it is all combined with the grayscale sensitivity, specificity, and accuracy, it obtains 90.6 %, 97.1 %, 93.9 %. From the results above, it can be concluded that the elastography can increase the specificity of grayscale. It is in accordance with the results of some studies5. Some previous studies found that asserted that elastography could increase the specificity in breast tumor diagnosis12.

There is a significant correlation between the tumor size and the result of elastography (P = .034. The result of this study is in accordance with the two related previous studies (Itoh, et al. 2014), (Rizzatto 2001). However, there is no significant correlation between the depth of tumor and the result of Elastography (P = .624). It Is Not In Accordance With The Two Conducted Studies 15,14.

However, there is no significant correlation between the depth of tumor and the result of elastography. The breast tumor with 3 scores are not considered as the benign one but it is considered as indeterminate and suggested to do biopsy.. All tumors with 3 scores underwent a biopsy to minimalize the findings of a false negative, because it would increase the sensitivity in 2007. However, this study still suggests that biopsy must be undergone by considering the result of gray scale USG first.

Conclusion

Ethical Clearance: This study protocol was approved by ethical clearance Dr.Soetomo Surabaya, Indonesia teaching hospital research.

Conflict of Interest: This study protocol was approved by ethical clearance Dr.Soetomo Surabaya, Indonesia teaching hospital research.

Source of Funding: This study is done with
individual funding.

References


Relationship between Social Capital and Mental Health among the Older Adults in Aceh, Indonesia

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Abstract

Background: It is recognized that social capital plays an important role in health, including mental health. However, there are only a few studies that explain the role of social capital in the mental health of older adults in Aceh, Indonesia. This study aims to assess the relationship between social capital and the mental health of older adults.

Method: This study used cross-sectional design by involving 483 respondents aged 60 or above, which are retrieved by using multistage random sampling in Aceh Barat District. Data collection was conducted for four months in 2019. SPSS Version 21 was used to analyze the data through a logistic regression test.

Result: The result shows that the average age of respondents is 69.76 years and female respondents are 68.9%. The result of logistic regression analysis to conclude the relationship between social capital and mental health resulted in confidence level (p=0.044), social cohesion (p=0.021), social network (p=0.001), and social participation (p=0.119).

Conclusion: The result indicates that social capital includes a social network, social cohesion, and trust are significantly relevant to the mental health of older adults.

Keywords: mental health, social capital and older adults.

Introduction

Mental health is crucial to overall health and prosperity. Mental health is also recognized to be equally important to physical health, including the older adults⁴. They are recognized as a group that has a higher risk of experiencing mental health problems⁵. There are several plausible reasons that older people have a higher risk of experiencing mental health problems, including illness, lack of independence, weakness, isolation, separation, and their age ⁶.

The proportion of older adults who experience mental health problems may increase as the growth of the aging population continues to happen in this era.

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Globally, it is estimated that adults aged 60 years or more suffer from mental and neurological disorders by 20% ⁷. In developed countries like America, it is estimated that in 2017 there were 46.6 million adults who experienced mental, behavioral, or emotional disorders, and 13.8% occurred in adults aged 50 years or more⁴. While in Indonesia, it was found that among 2,929 people aged 60 years or above, there was 16.14% who experienced symptoms of moderate and severe depression⁵.

Mental health problems harm sufferers, families, and the government. In patients with, for example, disruption of mental health impacts on the decrease of productivity, decrease of life quality, social problems, and additional health problems. Families who have members with mental health problems can experience economic problems such as a decrease in household income because they cannot work optimally due to caring for family members who suffer from mental
health problems. These conditions can increase the risk of household poverty. More broadly, the adverse effects of mental health problems are experienced by the government, where the national economic burden increases, and globally this can hamper international public health efforts. WHO states that higher disability and death rates are found in people with mental disorders. For example, the chance of dying prematurely in people with major depression and schizophrenia is 40% -60% compared to the general population².

As with other aspects of health, mental health can be influenced by various factors, including individual attributes, social, cultural, economic, political, and environmental factors². In this study, we only highlight the important role of social capital in mental health, which is part of social factors. As a construct, social capital has been popular for the last decade⁷. Most researchers divide social capital into two complementary forms, structural social capital, and cognitive social capital. Structural social capital are social contact, the compactness of social networks and social participation, while the cognitive social capital are trust, social cohesion and perceived social support⁸,⁹.

Social capital has been used in recent years to explain health disparities⁹, including mental health. The positive significant relationship between social capital and mental health has been proven through several studies conducted in developing countries¹⁰ and developed countries, such as Japan¹¹ and Finland⁸.

Although the study of social capital relationship with mental health has been conducted, according to the WHO, knowledge which specifically highlights the process of aging and mental health is still limited². Such conditions also occurred in Indonesia, and this is a challenge that needs to be answered with more research efforts. This study was conducted to examine the relationship between social capital and mental health of older adults in Aceh, Indonesia.

Materials and Method

Design and sample

The study design used was cross-sectional. Data collection was conducted from June to October 2019 through a survey of 483 respondents. Respondents in this study were people who were 60 years of age or above. Sampling was carried out by using multistage random sampling in the Aceh Barat District, Aceh, Indonesia. 6 out of 12 sub-districts in Aceh Barat District are randomly selected. Then, each of the three sub-districts was chosen randomly as a sampling place. Samples taken are respondents who meet the following criteria: 1) can be invited to communicate; 2) willing to become a respondent by signing a statement of consent to be a respondent; and 3) respondent is not in a condition of serious illness or treated in the health services unit during the data collection period. During data collection, researchers were assisted by several trained enumerators.

Mental health measurement

The instrument used to measure mental health is the geriatric depression scale (GDS) developed by Yesavage and Sheikh with 15 question items. The 15 questions were translated into Indonesian. The answer to each question item has two choices, “yes” or “no”. A zero score (0) is given for each answer, indicating low mental health, and a score of one (1) is given for each answer indicating good mental health. The higher the composite score obtained by the respondent, the better the mental health of the respondent.

Social capital measurement

Social capital is assessed through four variables, including trust, social participation, social cohesion, and social networks. Cronbach’s alpha scores for trust (0.9), participation (0.8), social cohesion (0.8) and social networks (0.9). All question items are in positive form using a Likert scale (four choices of the answer) includes strongly disagree (score 1); disagree (score 2); agree (score 3), and; strongly agree (score 4). The higher composite score shows better social capital.

Statistic Analysis

Logistic regression using IBM SPSS v.21 was conducted to determine the relationship between several variables of social capital and mental health.

Results

The results of the descriptive analysis in Table 1 about the demographic characteristics of the respondents showed that the average age of respondents was 69.76 years (standard deviation: 8.41) or more than half were aged 60-69 years (56.5%), more women (68.9%), unemployed (58.2%), no income (41.0%). An overview of mental health showed that there are more healthy older adults (65.8%) than the unhealthy ones (34.2%). While several social capital variables are known that
trust, social cohesion, social participation, and social networks are more in the medium category with the percentage of each is trust (67.7%), social cohesion (59.4%), social participation (58.0%) and social networks (67.7%).

Table 1. Descriptions of respondents’ demographic characteristics and study variables.

<table>
<thead>
<tr>
<th>Characteristics of respondents (n = 483)</th>
<th>n</th>
<th>Mean /%</th>
<th>Elementary school</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td>69.76/8.41</td>
<td></td>
</tr>
<tr>
<td>60-69 years old</td>
<td>273</td>
<td>56.5</td>
<td></td>
</tr>
<tr>
<td>≥ 70 years old)</td>
<td>210</td>
<td>43.5</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>150</td>
<td>31.1</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>333</td>
<td>68.9</td>
<td></td>
</tr>
<tr>
<td>Profession</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>281</td>
<td>58.2</td>
<td></td>
</tr>
<tr>
<td>Farmers / Laborers / Fishermen</td>
<td>133</td>
<td>27.5</td>
<td></td>
</tr>
<tr>
<td>Pensioners</td>
<td>24</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>Private workers</td>
<td>45</td>
<td>9.3</td>
<td></td>
</tr>
<tr>
<td>Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No income</td>
<td>198</td>
<td>41.0</td>
<td></td>
</tr>
<tr>
<td>Rp. &lt;1,000,000</td>
<td>184</td>
<td>38.1</td>
<td></td>
</tr>
<tr>
<td>Rp. 1,000,000 up to 2,000,000</td>
<td>50</td>
<td>12.4</td>
<td></td>
</tr>
<tr>
<td>Rp. ≥ 2,000,000</td>
<td>41</td>
<td>8.5</td>
<td></td>
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<tr>
<td>Mental health</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not healthy</td>
<td>163</td>
<td>34.2</td>
<td></td>
</tr>
<tr>
<td>Healthy</td>
<td>318</td>
<td>65.8</td>
<td></td>
</tr>
<tr>
<td>Social capital</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trust</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>19</td>
<td>3.9</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>327</td>
<td>67.7</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>137</td>
<td>28.4</td>
<td></td>
</tr>
<tr>
<td>Social cohesion</td>
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<td></td>
</tr>
<tr>
<td>Low</td>
<td>16</td>
<td>3.3</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>287</td>
<td>59.4</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>180</td>
<td>37.3</td>
<td></td>
</tr>
<tr>
<td>Social participation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>11</td>
<td>2.3</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>280</td>
<td>58.0</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>192</td>
<td>39.8</td>
<td></td>
</tr>
<tr>
<td>Social network</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>7</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>327</td>
<td>67.7</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>149</td>
<td>30.8</td>
<td></td>
</tr>
</tbody>
</table>
Table 2. Logistic regression analysis of social capital and mental health variables stage 1

<table>
<thead>
<tr>
<th>Social capital</th>
<th>B</th>
<th>SE</th>
<th>Wald</th>
<th>p-value</th>
<th>Adj. OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>Trust</td>
<td>0.590</td>
<td>0.294</td>
<td>4.038</td>
<td>0.044 *</td>
<td>1.804</td>
<td>1.015</td>
</tr>
<tr>
<td>Social cohesion</td>
<td>0.685</td>
<td>0.296</td>
<td>5.355</td>
<td>0.021 *</td>
<td>1.984</td>
<td>1.111</td>
</tr>
<tr>
<td>Participation</td>
<td>0.495</td>
<td>0.317</td>
<td>2.436</td>
<td>0.119</td>
<td>1.641</td>
<td>0.881</td>
</tr>
<tr>
<td>Social network</td>
<td>1.122</td>
<td>0.343</td>
<td>10.733</td>
<td>0.001 *</td>
<td>3.070</td>
<td>1.569</td>
</tr>
<tr>
<td>Constant</td>
<td>-8.238</td>
<td>1.103</td>
<td>55.744</td>
<td>&lt; 0.001</td>
<td>0.000</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: B = Beta coefficient, SE = Standard Error, CI = Confidence Interval, Adj OR = Adjusted odds ratio, * = significant p-value

The results of logistic regression test stage 1 (Table. 2) between social capital and mental health variables show that trust is significantly related to mental health of older adults (p=0.044), social cohesion is significantly related to the mental health of older adults (p=0.021), social network is significantly relevant to the mental health of older adults (p=0.001). Social participation is the only variable that is not related to mental health (p=0.119). Since social participation has a value of > 0.05, it was taken out of the model, and logistic regression stage 2 was conducted.

Table 3. Logistic regression analysis of social capital and mental health variables stage 2.

<table>
<thead>
<tr>
<th>Social capital</th>
<th>B</th>
<th>SE</th>
<th>Wald</th>
<th>p-value</th>
<th>Adj. OR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>Trust</td>
<td>0.718</td>
<td>0.281</td>
<td>6.531</td>
<td>0.011 *</td>
<td>2.050</td>
<td>1.182</td>
</tr>
<tr>
<td>Social cohesion</td>
<td>0.864</td>
<td>0.274</td>
<td>9.946</td>
<td>0.002 *</td>
<td>2.373</td>
<td>1.387</td>
</tr>
<tr>
<td>Social network</td>
<td>1.205</td>
<td>0.337</td>
<td>12.793</td>
<td>&lt;0.001 *</td>
<td>3.336</td>
<td>1.724</td>
</tr>
<tr>
<td>Constant</td>
<td>-7.879</td>
<td>1.075</td>
<td>53.711</td>
<td>&lt;0.001</td>
<td>0.000</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: B = Beta coefficient, SE = Standard Error, CI = Confidence Interval, Adj OR = Adjusted odds ratio, * = significant p-value

In the logistic regression test stage 2 (Table. 3), it was found that trust, social cohesion, and social networks significantly related to the mental health of older adults with a p-value of each is p = 0.011, p = 0.002, and p = <0.001 respectively. The relationship between the three variables with mental health is positive, and social networks have the strongest relationship with mental health.

Discussion

The result of our study shows that trust and social cohesion as forms of cognitive social capital have a significant and positive relationship with the mental health of older adults. This finding indicates that older adults with a high sense of trust in their community have better mental health than older adults with a lower sense of trust. Likewise, social cohesion, where older adults with high social cohesion have better mental health compared to older adults with low social cohesion.

Previous studies have proven the link between cognitive social capital and mental health in older adults. Formans et al. reported from the results of their study that cognitive social capital through mistrust was significantly related to psychological distress among older adults in Finland\(^8\). A study in China found a correlation between trust and depression in older adults\(^7\). In Indonesia, the results of the Tampubolon and Hanandita study also prove that social trust is positively related to mental health in people aged 15-65 years\(^10\). Although the study does not specifically address the older adult population, it could support the result of our study in proving the relationship of trust with mental health. The study of social cohesion was carried out in older adults in the Czech Republic, Russia, and Poland with
a prospective approach. The results of the study showed that the symptoms of depression increased among older adults with lower levels of social cohesion\textsuperscript{12}.

In addition, the results of our study found that social networking as a form of structural social capital was positively related to the mental health of older adults. It means that older adults with good social networking have better mental health compared to older adults with bad social networking. The social network is the variable of social capital that has the most significant relationship with mental health compared to the other two variables (trust and social cohesion). For social networks, we focus more on the close relationships of older adults with family or other relatives, their close relationships with friends and neighbors, and the close relationships of older adults with village officials where they live. This is important to assess as a part of an individual’s social capital because one of the essential mental health resources is the social individual capital of older adults\textsuperscript{8}. Older adults who feel close to family members, relatives, friends, neighbors, or the community around their residence may feel more calm and comfortable in living than those who have a less close relationship. If they have a problem, some close people can be invited to share and find solutions to the problems encountered. The condition is likely to have a positive influence on the psychology or mental of older adults so that they are mentally healthier. This finding is supported by the results of previous studies on the relationship between social networks and mental health of older adults\textsuperscript{7}.

Of the four social capital variables examined, we do not find any relationship between social participation and mental health in older adults. A study conducted in China by Cao et al. in people aged 60 years or above found the same result, in which social participation is not correlated with geriatric depression\textsuperscript{7}.

From the previous description, it can be concluded that mental health problems in older adults cannot be underestimated, as the notion of some people who consider the problem as an inevitable part of the aging process\textsuperscript{13}. Whereas mental health problem is a critical aspect of health problems, especially in older adults\textsuperscript{3} and social capital is one factor that plays an important role. The results of this study can be one of the evidence that proves positive social capital can improve and maintain the mental health of older adults. The increase of knowledge and awareness about social capital can be considered as one of the health promotion program strategies to increase and maintain the mental health of older adults. Health promotion of the importance of social networks is the first thing that needs to be done by public health practitioners. Finally, because this study is only cross-sectional, the results of this study cannot be concluded as a causal relationship. For this reason, further longitudinal studies need to be conducted by future researchers.

**Conclusion**

The conclusion that can be drawn from the results of this study is that three social capital variables are positively related to the mental health of older adults, including trust, social cohesion, and social networking. Social participation is not positively related to health. The social network is the variable that has the strongest relationship with mental health compared to the other variables.

**Conflicts of Interest** – Nil

**Source of Funding** – LPDP

**Ethical Clearance:** The ethical clearance was taken for the present study from the institute ethical committee.

**References**


Analysis the Role of Management for Achieving of Public Health Coverage Programs at Public Health Care in Bengkulu

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Abstract

Background: Public Health Care is a primary public health service center. It is also as a promotive and preventive service provider with a target group and community to maintain and improve health and prevent disease. In the implementation of the health program the management function in the public health center is called planning (P), Mobilizing implementation (MI), Supervision Control Assessment (SCA). The purpose of conducting a public health care management analysis is Planning (P), Mobilizing Implementation (MI), and Supervision Control Assessment (SCA) on the achievement of public health care performance indicators in Bengkulu City.

Study Design: The research design used is exploratory or non-experimental research for qualitative methods and analytic research designs are cross sectional observational approaches for quantitative methods with hypothesis testing. Informants in this qualitative study were carried out by means of purposive sampling, namely by conducting interviews with all the Head of Public Health Center. The sample in this study amounted to 80 samples consisting of the head of the Public Health Center, the person in charge of the program and the implementer of the Public health care program/activity.

Results: There is a relationship between Management functions (planning, mobilizing implementation, controlling assessment control) to the achievement of the performance of the Environmental Health, Nutrition, Prevention and Disease Control program at Bengkulu City Health Center;

Conclusion: The implementation of management functions (Planning, Mobilizing Implementation, Supervision Control Assessment) influences the Environmental Health, Nutrition, Disease Prevention and Control program in Bengkulu City Health center.

Keywords: Planning function, Mobilizing Implementation, Supervision Control Assessment and indicator program.

Introduction

Public health care can be divided into two categories, namely: first, as a primary public health service center as a promotive and preventive service provider with a target group and community to maintain and improve health and prevent disease. Second, the public health care as the center for primary individual health services. Public health care can provide comprehensive health services namely preventive, promotive, curative and rehabilitative.

Public health approach that focuses on population and risk factors for personal symptom or diseases is important for achieving the goals of promoting health and preventing disease, overcoming underlying factors, determining health and increasing the effectiveness and efficiency of the health system. The purpose of conducting a Public health care management analysis is (P), (MI), (SPA) on the achievement of Public health care performance indicators in Bengkulu City.
Material and Methods

The research design used is exploratory or non-experimental research for qualitative methods and analytic research designs are cross sectional observational approaches for quantitative methods with hypothesis testing. Quantitative methods determine the role of Public health care management in achieving performance indicators.

Informants in this qualitative study were conducted by means of purposive sampling, namely by conducting interviews with all the Head of Public health center Bengkulu City. Based on interviews were conducted by the Head of the Health Center, the person in charge of individual health efforts and those responsible for public health efforts in all Bengkulu City Health Centers. Samples for management hypotheses (planning, mobilizing implementation, controlling assessment controls), Community Health Efforts (CHE) and Individual Health Efforts (CHE) towards the achievement of performance indicators and program indicators are the Head of the Public health center and IHE and IHE Program Holders in the Public health center. Sampling uses purposive sampling.

Result

Planning

Public health care managers carry out their duties and functions in an integrated manner in all promotive, preventive and curative programs. Public health center as a first-level health facility (CFLHF), has the function of increasing the degree of public health through promotive and preventive services. The results of interviews with the head of the Public health center, all informants said the planning was prepared based on an analysis of the situation, national targets and local policies, prepared integrated with the IHA-FG and indicators of performance commitment, as said by the informants can be concluded based on the results of the interview:

.... Public health center compiles plans based on situation analysis, national programs, local and most diseases and the participation of the community will produce an effective and efficient planning of activities to be able to reduce the illnesses suffered and improve public health. Planning based on situation analysis and community participation is an initial concept that can guarantee the implementation of activities according to their needs and goals. Good planning will produce maximum objectives and can be used as a model for Public health center planning.

Mobilizing Implementation

The implementation of the management function of the implementation in the form of a meeting forum is known as Mini Workshop. The general objective of the Mini public health center workshop is to improve the function of public health center through the promotion of cross-program and cross-sectoral teamwork and the activities of the Public health center in accordance with planning.

Based on the interview results with those responsible for public health efforts in all public health center, it can be concluded that the public health center has been driving the implementation of It’s activities. In accordance with the results of an interview with the person in charge said:

In the mini-workshop, socialization of activities, problems based on evaluation results, identification of solutions with all staff, to develop a specific plan (Specific) to achieve targets that have not been achieved based on the results of the evaluation; move across sectors so that city is healthy, in mobilizing the community, if it has not been achieved yet do a home visit (Informant F2)

The management function of the planned program / activity implementation can be carried out according to the schedule, goals and objectives of each activity. Activator through mini public health center’s workshops and cross-sector workshops to carry out activities planned as a management model by optimizing the mobilization and implementation management functions.

Supervision Control Assessment (P3)

Targets that have not been achieved at the set time, the Public health center makes special efforts, or re-planning, are discussed at the monthly mini workshop, according to the results of interviews with informants:

.... Supervision Control Assessment is carried out routinely during monthly mini workshops, indicators
that have not yet been reached are formulated, evaluated, corrected and followed up with Plan, Do, Check, Action (PDCA) prepared together with officers and relevant stakeholders (Informant A1). ...

Improving the results of activities by redesigning, re-implementing, supervising and following up on the re-implementation of an activity. The Plan, Do, Check, Action (PDCA) process of the Plan, Execute, Check and Follow-up activities are a problem-solving process with four creative steps commonly used in quality control for the continuous improvement of all activities in the Public health center.

Supervision is carried out by the head of the Public health center and the person in charge of the activities including administrative aspects, resources, achievement of program performance and technical services. If any discrepancies are found based on plans, standards, and various obligations that must be applied, coaching is carried out in accordance with the guidelines for implementing activities.

Management function with the Achievement Program

Results of Planning Relations, mobilizing Implementation (MI), Supervision of assessment Control (SCA) with the Achievement of the Environmental Health Program in Table 1.

<table>
<thead>
<tr>
<th>P, MI, SCA</th>
<th>Environmental Health Program</th>
<th>Total</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Medium</td>
<td>%</td>
<td>Good</td>
</tr>
<tr>
<td>Low</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Medium</td>
<td>18</td>
<td>90</td>
<td>33</td>
</tr>
<tr>
<td>Good</td>
<td>2</td>
<td>10</td>
<td>23</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>100</td>
<td>60</td>
</tr>
</tbody>
</table>

Source: result of data analysis

The results of the analysis of the relationship between P, MI, SCA with the achievements of the Public health center environmental health program can be seen from the achievements of the target. The analysis shows the relationship between P, MI, SCA with the achievement of the environmental health program in the City of Bengkulu partly good with the achievement of a good environmental health program.

Relationship of P1, MI, SCA with Nutrition Program Achievement in Table 2.

<table>
<thead>
<tr>
<th>P, MI, SCA</th>
<th>Nutrition program</th>
<th>Total</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Medium</td>
<td>%</td>
<td>Good</td>
</tr>
<tr>
<td>Low</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Medium</td>
<td>15</td>
<td>93.8</td>
<td>36</td>
</tr>
<tr>
<td>Good</td>
<td>1</td>
<td>6.3</td>
<td>24</td>
</tr>
<tr>
<td>Total</td>
<td>16</td>
<td>100</td>
<td>64</td>
</tr>
</tbody>
</table>

Source: result of data analysis
The results of the analysis of the relationship between P, MI, SCA (obtained from numerical data (ratio) of answers to questions then categorized in ordinal form) with the achievement of the Public health center nutrition program seen from the target and program achievements if the achievements of more than 80% of the targets are categorized as good, 50-79% of the moderate targets and less than 49% are categorized as less. The analysis shows the relationship between P, MI, SCA with the achievement of the nutrition program in the City Health Center in Bengkulu is partly good with the achievement of the good nutrition program. So there is a relationship between P1, P2 and P3 with the achievement of the Public health care nutrition program in Bengkulu City.

Relationship of P, MI, SCA with the Achievement of Disease Prevention and Control Program (PCP) in Table 3

<table>
<thead>
<tr>
<th>P, MI, SCA</th>
<th>P2P Program</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Medium</td>
<td>%</td>
</tr>
<tr>
<td>Low</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Medium</td>
<td>18</td>
<td>90</td>
</tr>
<tr>
<td>Good</td>
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<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Analysis data (2018)

The results of the analysis of the relationship between P, MI, SCA (obtained from numerical data (ratio) of answers to questions then categorized in ordinal form) with the achievement of the prevention and control of public health center disease programs seen from the target and program achievements if the achievements of more than 80% of the targets are categorized as good, 50-79% of the moderate target and less than 49% are categorized as less. The analysis shows the relationship between P, MI, SCA with the achievement of prevention and control program of Public health center disease in Bengkulu City is partly being with the achievement of prevention and control program of disease. So there is a relationship between P, MI, SCA with the achievement of the prevention and control program of Public health care in Bengkulu City.

Discussion

Planning (P)

Program and performance commitment indicators. The management of the Public health center shows a systematic sequence which is implemented to optimize management functions which are carried out in an interrelated and continuous manner. The planning function can improve the achievement of Public health center performance. The leadership of the Public health center has developed a plan that involves human resources and optimizes available resources, this is in line with several studies. De Waal and Heijden’s research (2015) states that planning affects employee performance. Employee performance is also influenced by coordination between leaders and leaders and employees so that optimal performance is realized.

Management recommends reviewing regulations at the service level at the Public health center, capacity building, supervision and quality assurance, redefinition and strengthening the role of gatekeepers, availability of regulations and strengthening of patient referral policies, staff motivation in customer service.

According to Ashton (2015) compiling a framework of performance and integrated incentives by providing new performance measurements for the health system in New Zealand consisting of namely; a) build and combine existing performance measurements; b) national policies...
and shifts to integrated services; c) combining incentives for quality improvement and (d) performance-centered. Integrated planning of all existing and new Public health center indicators, improving performance outcomes.

The quality management center of the Public health care is a series of ongoing routine activities, which must be monitored regularly and regularly, monitored and controlled at all times. The Head of the Public health center guarantees that the quality management cycle runs effectively and efficiently, setting up a Public health center management team that functions as the person responsible for the quality of Public health center management.

**Mobilizing Implementation**

The function of mobilization implementation is integrated starting from the internal mini workshop program conducted by Public health center every month and cross-sector which is conducted every three months to discuss program achievements, causes of problems and solutions. The results of the study concluded that the mobilization and implementation of the Public health center plan began with situational leadership, professionalism and incentives that were implemented, optimal resource empower would improve performance outcomes. This is in line with several studies. The development of health organizations is directly proportional to the process of leadership, professional management, incentives and adequate resources in a progressive manner of service achievement. Health service organizations must be understood as a dynamic system that by complexity is able to produce strategic and professional health managers, so that they can fight obstacles and promote diversity, to generate new ideas that can help improve the health service process.

The mobilization in the effort to prepare for the implementation of activities, began by conducting a mini Public health center workshop to draw up a plan for the current year’s activities, to gather strength in Public health center. The mobilization of Public health center is also carried out to mobilize resources outside the Public health center through cross-sector workshops which are held 4 (four) times in one year.

**Supervision Control Assessment (SCA)**

The main principles of evaluation of health services and indicators can be successfully modified for the purpose, based on demographics and public health needs by ensuring flexibility and adaptation to the context. This is in line with several studies. Concludes that effective supervision determines a Public health center management so that supervision, training, administration of health services, is related to the performance and motivation of workers.

The results of Adindu’s study (2010) show that monitoring and evaluation of primary health care cannot be separated. Monitoring ensures that primary health care programs are according to plan, while evaluations ensure they are on the right track according to the plan and the impact is set.

Planning, mobilizing implementation, of Public health center are management functions carried out in an integrated and interrelated way. Implementation of the Planning Function, mobilization implementation, Supervision Control Assessment contribute to the achievement of service commitment indicators. Stakeholders will be able to play a role after knowing and understanding the objectives of the program. Need to improve the functions of planning, mobilizing implementation, supervision, control assessment of Public health center at Public health center in Bengkulu City.

Results based monitoring and evaluation systems must be considered as work in progress. Continued attention, resources and political commitment are needed to ensure the continuity and sustainability of the system. Building and maintaining a results-based monitoring and evaluation system requires time and effort, there is no perfect system and there are many different approaches, but the journey is worth the effort and the results can be many.

**Conclusion**

Public health care in carrying out its functions as: The implementation of Community Health Efforts (CHE) and Individual Health Efforts (IHE) in the working area, effective and efficient Public health center management functions can increase influence on the achievement of Public health center performance indicators in Bengkulu City. Provincial and district/city governments can establish policies by increasing the role of Public health care management functions in promoting and preventive efforts at Public health care.

**Conflict of Interest:** The authors declare that there is no conflict of interest.
Ethical Clearance: Health Research Ethics Committee, Health Polytechnic of Health Ministry Bengkulu.

References


Eruption Pattern of Permanent Molars among School Children in Chennai

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Abstract

Background: Estimation of the age of an individual is essential investigation in medicolegal cases, especially involving children and adolescents. Among the various factors used for age estimation, eruption of permanent teeth is one of them. Several factors influence the eruption of teeth, including genetic, nutritional and hormonal. This study was carried out to analyze the pattern of eruption of permanent teeth among school going children in urban Chennai.

Method: This cross sectional study was carried out among 983 school children between the age group of 4-14 years. Two schools, one belonging to the lower socioeconomic status and the other belonging to the higher socioeconomic status were taken up for this study. Eruption of permanent teeth were examined clinically.

Results: Majority of the first molars erupted by 7-7.5 years of age (95%) while majority of the central incisors erupted between 8-9 years. Lateral incisors were completely erupted between 9.5-10 years and first premolar were completely erupted between 12.5-12.9 years. Both second premolar and canine erupted by 13.5-13.9 years.

Conclusion: The visual observation of eruption of permanent teeth is a non invasive procedure and does not require any special machines like that of radiography. This method of assessing the age of the individual is considerably easier, economical and safe. Hazards of exposing the individual to radiation can be prevented.

Keywords: Chronological age, eruption of permanent teeth, medicolegal issues, anthropometry, nutritional status.

Introduction

Estimation of the age of an individual is of utmost importance in medicolegal cases, especially in populations where records are not well maintained. Medically, age of an individual can be estimated based on the eruption of teeth, ossification of bones, presence of secondary sexual characteristics and various other physical features. Among these methods, assessment of dentition is one of the most widely used techniques, given the fact that they are simple and feasible methods. Moreover, eruption of teeth is fairly constant in all races and ethnic groups, and are specific to narrow age range. The three types of human dentition (deciduous, mixed and permanent) follow a periodic sequence which is useful for determining accurate estimation of the age. There are two methods currently available for assessment of dentition, namely the clinical examination and radiological assessment. With the help of radiographic methods, it is possible to follow the formation of crowns and roots of the teeth and their calcification. However, clinical method is more suitable as it is simple, feasible and economical.

Keywords: Chronological age, eruption of permanent teeth, medicolegal issues, anthropometry, nutritional status.
especially in the low socioeconomic status population. Studies have shown linkages between delay in the eruption of the permanent teeth and protein energy malnutrition in children and stunting among adolescents. [3] There are however, no registries maintained in India to document the eruption of permanent teeth with respect to age and socioeconomic status. A study focusing on dental eruption, clinical assessed at school level will go a long way in documenting the pattern of maturation, in addition will serve as a proxy measure for evaluating the nutritional status of these school children.

**Objectives**

This study was carried out to analyze the eruption pattern of permanent dentition among school going children.

**Methodology**

**Study setting and participants**

This study was carried out as a cross sectional study among the school children of the urban field practice area of our medical college in Chennai. This study was carried out for a period of three months between July to September 2019.

**Sample size and sampling technique**

All the schools in the urban field practice area of our medical college were approached for permission to carry out the study. Two schools – one government and one private school consented for the study. Since there was no literature available regarding the eruption patterns, all the children aged between four and fourteen years studying the above two consented schools were taken up for the study. The participants were selected by purposive sampling. A total of 963 children participated, of which 490 were from government school and 473 were from a private school within the field practice area.

**Ethical approval and informed consent**

Approval was obtained from the institutional ethics committee prior to the commencement of the study. Written consent was obtained from the principals of both the schools. Each participant was explained in detail about the study. Informed consent was obtained from both the parents and the participants prior to the commencement of data collection.

**Data collection**

A structured clinical proforma was used to obtain information regarding demographic characteristics like age, sex, etc. Oral examination was carried out by the principal investigator to evaluate the dentition pattern among the study participants.

**Data Analysis**

Data was entered and analyzed using SPSS ver. 20 software. The pattern of eruption of the permanent teeth was expressed in percentages. Independent sample t test was used to evaluate the association between eruption and background characteristics. A p value <0.05 was considered statistically significant.

**Results**

This study was carried out among 963 school students in the field practice area of our tertiary teaching institution. Majority of the participants were aged between 4-7.5 years (41.4%) and were males (64.4%). (Table 1)

It was observed that central incisor had erupted in 31.1% of the participants followed by first molar (29.6%). Lateral incisor and second molar had erupted in 22.2% of the participants. (Figure 1)

The age wise comparison of the eruption of permanent teeth is given in table 2. It was observed that first molar and central incisors were the earliest to develop as early as 4-4.5 years. Majority of the first molars erupted by 7-7.5 years of age (95%) while majority of the central incisors erupted between 8-9 years. Lateral incisors were completely erupted between 9.5-10 years and first premolar were completely erupted between 12.5-12.9 years. Both second premolar and canine erupted by 13.5-13.9 years. (Table 2)

On comparing with the gender, central incisors erupted in 23.7% of the males followed by first molar (22.4%) and lateral incisor (17.8%). Among females, central incisor erupted in 44.6% followed by first premolar in 43.7%. (Table 3)

On comparison with the socioeconomic status, among the low income group, central incisor erupted in 42% followed by first molar (40.4%) and first premolar (30.6%). Among the high income group, central incisor
erupted in 19.9% followed by first molar (18.4%) and first premolar (17.3%). (Table 4)

Table 1: Background characteristics of the study participants:

<table>
<thead>
<tr>
<th>S. No</th>
<th>Characteristics</th>
<th>Frequency N=963</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Age of the participants (in years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4-7.5</td>
<td>399</td>
<td>41.4</td>
</tr>
<tr>
<td></td>
<td>7.51-11.5</td>
<td>341</td>
<td>35.4</td>
</tr>
<tr>
<td></td>
<td>11.6-14.5</td>
<td>223</td>
<td>23.2</td>
</tr>
<tr>
<td>2</td>
<td>Sex</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Males</td>
<td>620</td>
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</tr>
<tr>
<td></td>
<td>Females</td>
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<td>35.6</td>
</tr>
<tr>
<td>3</td>
<td>Socioeconomic status</td>
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<tr>
<td></td>
<td>Low</td>
<td>490</td>
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</tr>
<tr>
<td></td>
<td>High</td>
<td>473</td>
<td>49.1</td>
</tr>
</tbody>
</table>

Figure 1: Eruption of permanent teeth:
### Table-2: Age-wise distribution of eruption of permanent teeth:

<table>
<thead>
<tr>
<th>S. No</th>
<th>Age group</th>
<th>First molar N(%)</th>
<th>Central incisor N(%)</th>
<th>Lateral incisor N(%)</th>
<th>First premolar N(%)</th>
<th>Second premolar N(%)</th>
<th>Canine N(%)</th>
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</thead>
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<tr>
<td>1</td>
<td>4.0-4.5</td>
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<td>3(33)</td>
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<td>5.51-5.9</td>
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<td>11(23)</td>
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<td>39(48)</td>
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<td>20(50)</td>
<td>14(25)</td>
<td>14(35)</td>
<td>-</td>
</tr>
<tr>
<td>15</td>
<td>11.0-11.5</td>
<td>-</td>
<td>-</td>
<td>39(59)</td>
<td>33(21)</td>
<td>30(45)</td>
<td>-</td>
</tr>
<tr>
<td>16</td>
<td>11.51-11.9</td>
<td>-</td>
<td>-</td>
<td>40(67)</td>
<td>31(55)</td>
<td>33(55)</td>
<td>-</td>
</tr>
<tr>
<td>17</td>
<td>12.0-12.5</td>
<td>-</td>
<td>-</td>
<td>55(92)</td>
<td>47(52)</td>
<td>45(75)</td>
<td>-</td>
</tr>
<tr>
<td>18</td>
<td>12.51-12.9</td>
<td>-</td>
<td>-</td>
<td>52(100)</td>
<td>46(90)</td>
<td>47(90)</td>
<td>-</td>
</tr>
<tr>
<td>19</td>
<td>13.0-13.5</td>
<td>-</td>
<td>-</td>
<td>26(100)</td>
<td>26(100)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>20</td>
<td>13.51-13.9</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>11(85)</td>
<td>-</td>
</tr>
<tr>
<td>21</td>
<td>14.0-14.5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Table-3: Gender wise distribution of eruption of permanent teeth:

<table>
<thead>
<tr>
<th>S. No</th>
<th>Type of permanent teeth</th>
<th>Males N=620</th>
<th>Females N=343</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>%*</td>
</tr>
<tr>
<td>1</td>
<td>First molar</td>
<td>139</td>
<td>22.4</td>
</tr>
<tr>
<td>2</td>
<td>Central incisor</td>
<td>147</td>
<td>23.7</td>
</tr>
<tr>
<td>3</td>
<td>Lateral incisor</td>
<td>110</td>
<td>17.8</td>
</tr>
<tr>
<td>4</td>
<td>First premolar</td>
<td>82</td>
<td>13.2</td>
</tr>
<tr>
<td>5</td>
<td>Second premolar</td>
<td>69</td>
<td>11.1</td>
</tr>
<tr>
<td>6</td>
<td>Canine</td>
<td>73</td>
<td>11.8</td>
</tr>
</tbody>
</table>

*percentage will not total to 100.
Table-4: Distribution of eruption pattern based on socioeconomic status:

<table>
<thead>
<tr>
<th>S. No</th>
<th>Type of permanent teeth</th>
<th>Low N=490</th>
<th>%*</th>
<th>High N=473</th>
<th>%*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>First molar</td>
<td>198</td>
<td>40.4</td>
<td>87</td>
<td>18.4</td>
</tr>
<tr>
<td>2</td>
<td>Central incisor</td>
<td>206</td>
<td>42.0</td>
<td>94</td>
<td>19.9</td>
</tr>
<tr>
<td>3</td>
<td>Lateral incisor</td>
<td>147</td>
<td>30.0</td>
<td>67</td>
<td>14.2</td>
</tr>
<tr>
<td>4</td>
<td>First premolar</td>
<td>150</td>
<td>30.6</td>
<td>82</td>
<td>17.3</td>
</tr>
<tr>
<td>5</td>
<td>Second premolar</td>
<td>141</td>
<td>28.6</td>
<td>73</td>
<td>15.4</td>
</tr>
<tr>
<td>6</td>
<td>Canine</td>
<td>147</td>
<td>30.0</td>
<td>70</td>
<td>14.8</td>
</tr>
</tbody>
</table>

*percentage will not total to 100.

**Discussion**

On analyzing the eruption of individual teeth from the above tables, it is clearly understood that some individuals have early eruption from six months to two years. However, there was no correlation between early eruption ad socio economic status. The early shedding of primary teeth advances the emergence of the permanent teeth.[4] This could be the reason for early eruption of the permanent teeth. In addition, it was found that some individuals have late eruption from 6 months to 2 years. Root resorption of the primary tooth sometimes does not follow their routine procedure, with the result that the permanent tooth cannot emerge which may bring about the prolonged retention of deciduous tooth. This could be the reason for late eruption.[5]

The emergence of permanent teeth, whether it is primarily in the mandibular or maxillary regions was not a part of this study as the emergence of teeth in any of the quadrants were taken as the corresponding age group of the individual but in the majority of the cases it was noted that the mandibular teeth erupts earlier than the maxillary teeth.

It was stated that from the day of eruption of the permanent first molar till the day of eruption of last permanent canines there would be both temporary and permanent teeth in the jaws, referred to as the period of mixed dentition. In addition, it was stated that there would not be any deciduous teeth above 12 years.[6] The available data was analysed for this and it was found that in about 11% subjects between 12 to 14 years even after the eruption of permanent second molar, deciduous canine is still present. There was mixed dentition even after the eruption of permanent second molars.

This study observed a wide deviation from the early eruption to late eruption for each permanent tooth for both males and females. It was found necessary to arrive an average or mean period of eruption by clubbing males and females together for each permanent dentition. The mean period for each permanent dentition in the present study is almost corroborative with the earlier studies. A very few in the literature have shown mean age group for each permanent dentition but there was no mention of standard deviation. This study has clearly arrived at a standard deviation of eruption of each permanent tooth irrespective of the sex.

*Schour and Massler* have described the formation of the permanent teeth in 1940 as occurring in three clusters. The first cluster consists of the first molars, the central incisors, the lateral incisors and the cupids, which begins formation during first year. The second cluster being the second molar forms during 2 to 4 years and the third cluster being the third molar forms during 5 to 6 years.[7] This clearly shows that there was simultaneous eruption of differing permanent teeth and this was observed in the present study. Overlapping or simultaneous eruption of two differing permanent teeth whose eruption schedule is close to each other is observed. This overlapping tooth eruption corroborates with the first group of cluster formation and the second cluster with canine.
Dental age can reflect an assessment of physiological age comparable to age based on skeletal development, weight or height. In addition, it was stated, when forming, the crowns and roots of the teeth appear to be the tissues least affected by environmental influences (nutrition, endocrinopathies etc) and dentition may be considered to be single best physiological indicator of chronological age in juveniles.\cite{8}

This study has clearly shown that eruption of permanent teeth has no correlation with the socioeconomic status of the individual during the mixed dentition period and is mainly inheritable based on genetic factors unless the tooth is affected by caries or severe malnutrition. Since the eruption of permanent teeth is least affected by the socio economic status of the individual as well as by nutrition, it can be taken as the best indicator for assessment of physiological age in the juveniles. However, while giving the age of the individual, it should be given as a range by adding or subtracting the standard deviation for that tooth.

**Conclusion**

The visual observation of eruption of permanent teeth is a non invasive procedure and does not require any special machines like that of radiography. This method of assessing the age of the individual is considerably easier, economical and safe. Hazards of exposing the individual to radiation can be prevented.

**Conflict of Interest** – Nil

**Funding** – Nil

Ethical approval – Obtained

**References**

Effectiveness of Tailored Reaction Time Training Drills in Addition to Warm-Up Sessions on Performance Parameters in Recreational Cricket Players

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Abstract

Background: In the game of cricket, the players need very good reflexes to react to the situation. The players who play very rarely (recreational players) end up with more injuries compared to elite players due to improper training session and warm-ups. The recreational players in over enthusiasm often end up with injury during the match. So to improve the performance of the recreational cricket players their reaction time should be improved. Thus recreational players need appropriate training and awareness of such therapeutic reaction time training drills like Ball Drop Drill, Reactive Gear Drill, Shuffle Reaction Ball Drill, Ball Catch Drill, Run Shuffle Drill, T-Drill, Multiple Slinger Drill and Mountain climber to Sprint along with regular warm up sessions are necessary for preventing injuries as well as improving the performance parameters of the cricket players.

Objective: The objective of this study was to compare the effect of conventional and tailor made Reaction Time Training Drills sessions for recreational cricket players.

Method: In this study, 26 individuals who played cricket for recreation (all male) were taken. They were equally divided into two groups i.e. Group A and Group B. Individuals in the age group of 19-30 years were included in this study, out of which 13(50%) players were in group A and 13(50%) were in group B. This consisted of those who played recreational cricket and did not have any training or experience in professional Cricket. Pre intervention and post intervention reaction time testing were taken. Group A received conventional training while Group B received Reaction Time Training Drill.

Result: There was a significant effect of reaction time training on individuals of group B compared to conventional training in group A (p <0.0001).

Conclusion: The tailored Reaction Time Training Drills are effective in improving performance and preventing injuries in recreational cricket players.

Key Words: Reaction Time Training Drill, Reaction Time Testing, Cricket, Recreational players.

Introduction

Cricket has always been the sport of choice for most of India.1 From young children to the old, everybody has played cricket for a good part of their life. However, most of the individuals have played cricket only for recreation.2 They have generally played only for their schools, colleges or local cricket organisations in their area of residence.

This makes them vulnerable to a vast variety of problems. The most common of this being injuries. All of these players at least once in their lifetime have sustained an injury while playing cricket. Common cricket injuries include hamstring strain, ankle sprain, groin pull, shin splints, tennis elbow etc.3,5,6 Most of these injuries occur due to the player failing to catch the ball, hit the ball while batting or due to stumbling while running.
These injuries again vary according to the role of the player in the sport. Batsmen usually suffer from ankle sprain while running between the wickets, Groin pull while trying to run to score a run, getting hit by the ball due to slow reaction time etc.\(^5\)\(^6\)

Bowlers suffer from Shoulder injuries while throwing. The wrist and well as the elbow are also involved.\(^7\) Fielders get injured due to a delay in catching the ball and in turn getting hit by the ball or because of stumbling while running to catch a ball.\(^8\)\(^9\)

From the above mentioned injuries, it can be said that these injuries have mainly occurred due to a slow reaction time of the players.\(^10\) Reaction time is the minimum time taken by an individual to react to a certain stimuli. This is extremely important for cricketers as the entire game is based on reacting to the stimuli, i.e. the throw of a ball within time. Any slowing of reaction time will greatly hamper their performance.

Recreational players generally focus on improving their strength and endurance. They train at the gym frequently to build up their strength. Before playing they run a few rounds around the ground and perform a few basic stretches. At time most, they’ll perform some simple agility drills.

It is very important to improve the awareness about the concept of reaction time among these players. Focus needs to be put on teaching them on how to assess the speed of their own reflexes and try to improve them. A little increase in reaction time of these players will immensely improve their overall performance in the sport.\(^11\)\(^12\) Thus, we are conducting this study to facilitate their progression in the sport.

**Methodology**

An approval for the study was obtained from the Protocol committee and the Institutional Ethical Committee of KIMSDU. 32 individuals were approached of which 26 were selected according to the inclusion criteria. The procedure was explained and written informed consent was taken. Exercises were explained thoroughly. Training was given half hour before the game for 3 matches. Pre and post assessment of reaction time testing (Reaction Ruler Test)\(^4\) were taken and average was calculated in Milli seconds.

<table>
<thead>
<tr>
<th>Speed(milliseconds)</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>Pretty good</td>
</tr>
<tr>
<td>60</td>
<td>Average</td>
</tr>
<tr>
<td>80</td>
<td>Slow</td>
</tr>
<tr>
<td>&gt;100</td>
<td>Very Slow</td>
</tr>
</tbody>
</table>

**Reaction Time Training Drill (RTTD) includes:-**

1. Ball Drop Drill
2. Reactive Gear Drill
3. Shuffle Reaction Ball Drill
4. Ball Catch Drill
5. Run Shuffle Drill
6. T- Drill
7. Multiple Slinger Drill
8. Mountain Climber to Sprint
Result:

1) Age wise distribution

<table>
<thead>
<tr>
<th>Group A</th>
<th>Group B</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Players</td>
<td>Percentage</td>
<td>Mean±SD</td>
</tr>
<tr>
<td>13</td>
<td>50%</td>
<td>21.38 ±2.69</td>
</tr>
</tbody>
</table>

Table 1: Distribution of players according to age

*Interpretation:* Table no.1 shows that, the mean age group of players in Group A was 21.38 ±2.69 years and that of Group B was 22±1.29.

2) Role wise distribution

<table>
<thead>
<tr>
<th>Role</th>
<th>Group A</th>
<th>Group B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Players</td>
<td>Percentage</td>
<td>Players</td>
</tr>
<tr>
<td>Batsman-Fielder</td>
<td>6</td>
<td>46.1%</td>
</tr>
<tr>
<td>Bowler-Fielder</td>
<td>4</td>
<td>30.7%</td>
</tr>
<tr>
<td>All-rounder</td>
<td>3</td>
<td>23.07%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>13</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 2: Distribution of players according to their role in the sport

*Interpretation:* Table no.2 shows that, in group A 6 (46.1%) players were batsman-fielder, 4 (30.7%) were bowler-fielders and 3 (23.07%) were all-rounder. In group B, 4 (30.7%) players were batsman-fielder, 4 (30.7%) were bowler-fielders and 5 (38.46%) were all-rounder.

3) Distribution of reaction time testing scores in Group A and Group B pre and post intervention

<table>
<thead>
<tr>
<th>GROUP</th>
<th>Mean±SD Pre Intervention</th>
<th>Post Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>149.9±27.63</td>
<td>148.8±25.63</td>
</tr>
<tr>
<td>Group B</td>
<td>145.7±26.25</td>
<td>104.84±20.70</td>
</tr>
</tbody>
</table>

Table 3: Distribution of reaction time testing scores in Group A and Group B pre and post intervention

*Interpretation:* Table no.3 shows that, the mean reaction time test scores for players in group A pre and post intervention were 149.9±27.63 and 148.8±25.63 respectively. For group B the mean scores were 145.7±26.25 and 104.84±20.70 respectively.
4) **Association between Reaction time testing scores of Group A and Group B with themselves Pre and post intervention**

<table>
<thead>
<tr>
<th>GROUP</th>
<th>Paired t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>t-value</td>
</tr>
<tr>
<td>Group A</td>
<td>2.915</td>
</tr>
<tr>
<td>Group B</td>
<td>9.842</td>
</tr>
</tbody>
</table>

**Table 4: Association between Reaction time testing scores of Group A and Group B with themselves Pre and post intervention**

**Interpretation:** Table no.4 shows that, the association between reaction time test scores of Group A pre and post intervention, according to paired t-test, had a p-value of 0.0129(S) with a t-value of 2.915. For Group B, paired t-test had a p-value of <0.0001(ES) with a t-value of 9.842.

5) **Association between Reaction time testing scores of Group A and Group B with themselves Pre and post intervention**

<table>
<thead>
<tr>
<th>Reaction Time Testing</th>
<th>Unpaired t-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>t-value</td>
</tr>
<tr>
<td>Pre Intervention</td>
<td>0.3929</td>
</tr>
<tr>
<td>Post Intervention</td>
<td>4.814</td>
</tr>
</tbody>
</table>

**Table 5: Association between Reaction time testing scores of Group A and Group B with themselves Pre and post intervention**

**Interpretation:** Table no.5 shows that, the association between reaction time test scores of Group A and Group B before intervention, according to unpaired t-test, had a p-value of 0.6979(NS) with a t-value of 0.3929. After intervention, paired t-test had a p-value of <0.0001(ES) with a t-value of 4.814.

**Discussion**

In the game of cricket, the players need very good reflexes to react to the situation. The players who play very rarely (recreational players) end up with more injuries compared to elite players due to improper training session and warm-ups. The recreational players in over enthusiasm often end up with injury during the match. So to improve the performance of the recreational cricket players their reaction time should be improved. Thus recreational players need appropriate training and awareness of such therapeutic reaction time training drills like Ball Drop Drill, Reactive Gear Drill, Shuffle Reaction Ball Drill, Ball Catch Drill, Run Shuffle Drill, T-Drill, Multiple Slinger Drill and Mountain climber to Sprint along with regular warm up sessions are necessary for preventing injuries as well as improving the performance parameters of the cricket players.

The aim of this study was to find the effectiveness of Reaction Time Training Drill in addition to warm-up sessions on performance parameters in recreational cricket players.

The objectives of this study were to find out the effect of conventional training in addition to regular warm-up on recreational cricket players, to find out the effect of Reaction Time Training Drills in addition to...
The objective was also to compare the effect of conventional and tailor made Reaction Time Training Drills sessions for recreational cricket players.

In this study, 26 individuals who played cricket for recreation (all male) were taken. They were equally divided into two groups i.e. Group A and Group B. Individuals in the age group of 19-30 years were included in this study, out of which 13(50%) players were in group A and 13(50%) were in group B. This consisted of those who played recreational cricket and did not have any training or experience in professional Cricket. The mean age for players in group A was 21.38 years and that for players in group B was 22 years.

The players were distributed according to their roles in the sport. Out of the 13 players in group A, 6 (46.1%) were batsmen-fielders, 4(30.7%) were bowler-fielder and 3(23.07%) were all-rounder. Out of the 13 players in group B, 4(30.7%) were batsmen-fielders, 4(30.7%) were bowler-fielder and 5(38.46%) were all-rounder.

In Group A, the subjects were given only conventional training along with regular warm-up session for improving reaction time before 3 matches individually and in Group B, the subjects were given reaction time training drills along with regular warm-up session before 3 matches individually. Reaction time testing was done for all the players before and after the training session respectively. The mean reaction time test scores for players in group A, pre and post intervention were 149.9ms and 148.8ms respectively. For group B the mean scores were 145.7ms and 104.84ms respectively.

Statistical analysis of the reaction time testing scores pre and post intervention was also done between both the groups i.e. inter group analysis was done to confirm that the difference between the pre and post measurements is significant. Unpaired t-test was used. The comparison for pre intervention scores of group A and group B was found to have a p-value of 0.6979(NS) which was not significant and post intervention scores of group A and group B was found to have a p-value of <0.0001(ES) which was extremely significant.

This shows that there was a considerably significant difference in the scores of both the groups thus showing that the improvement in group B was significantly more than that of group A.

This study will also improve the postural stability of players and by performing the drills before every match will give them habit of having controlled movements which is very much required in the game of cricket. Thus, there was a significant improvement in their performance parameters. This will also improve their confidence and in turn their performance.

This knowledge will help us to improve the training administered by the coaches at small institutions thus improving the performance of these players greatly. This will in turn improve their chances of participating in esteemed tournaments all over the nation.

**Conclusion**

On the basis of the results of the study, there was significant difference in the reaction time testing (Reaction Ruler Test) score of group B than that of group A which shows that Reaction Time Training Drills is effective in improving performance of recreational cricket players.

**Conflict of Interest:** There were no conflicts of interest in this study

**Ethical Clearance:** Ethical clearance was taken from institutional committee of Krishna Institute of Medical Sciences, Deemed to be University, Karad.

**Source of Funding:** Krishna Institute of Medical Sciences Deemed to be University, Karad
References


2. Thomas NG, Harden LM, Rogers GG. Visual evoked potentials, reaction times and eye dominance in cricketers. Journal of sports medicine and physical fitness. 2005 Sep 1;45(3):428.


Action Algorithm for the Diagnosis of Prostate Hyperplasia in Dogs

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Abstract

In veterinary practice, at present, specialists often have to deal with pathology of the prostate gland in dogs. The reason for this is that the pathological process in the tissues of the prostate gland can occur asymptomatic and for a long period of time, subsequently leading to organ hypertrophy. An increase in the volume of the prostate gland most often has a benign character, which is generally accepted to be diagnosed as prostatic hyperplasia. The disease is often detected at a late stage, which complicates the treatment and worsens the prognosis. Hyperplasia, as a medical condition, is an indicative term used to describe the abnormal increase in the number of cells in any organ, in this case the prostate gland. This article describes the main symptoms, diagnostic methods and differential diagnosis proceeding from practical veterinary experience.

Key words: reproductive system, secretion, seminal plasma components, pathologies.

Introduction

The prostate gland (prostate) is an important part of the male reproductive system, producing a fluid that contains simple sugars, citric acid, calcium and a number of enzymes that are involved in the balance and protection of seminal fluid, contributing to the survivability and motility of sperm and increasing its ability to fertilize the ovum. The prostate gland is the only accessory sex organ in dogs that plays an important part in the secretion of seminal plasma components. This is an oval-shaped bicuspid exocrine gland located in the pelvic cavity of adult dogs, through which pass the urethra and deferens ductus, where sperm is transferred to the urethra. The prostate communicates with the urethra through several holes along the entire prostatic urethra through which the seminal plasma is released. Pathologies of the prostate gland are extremely common in dogs, therefore their study is of great importance for a better understanding of these conditions.¹

Benign prostatic hyperplasia (BPH) is a condition of enlarged prostate gland. This is the most common prostate disease observed in intact male dogs, less common in cats. The word “hyperplasia” means increased size.² Medium and large breeds are prone to the development of BPH. This condition is associated with proliferation (hyperplasia) and an increase in cell volume (hpyertrophy) of prostate tissue. Benign prostatic hyperplasia begins as glandular hyperplasia and subsequently passes into cystic hyperplasia with the formation of many small cysts in the parenchyma of the caudal part of the abdominal cavity; from this age on, during puberty, the prostate is located in the pelvic cavity. After reaching puberty, the organ increases in size, extending cranially into the abdominal cavity. Prostate hyperplasia in dogs is a pathological age-related change in the form of a painless increase that manifests itself in two phases: glandular and complex. The glandular phase is characterized by an increase in the number of cells and a symmetric increase in the gland. The complex phase is characterized by glandular hyperplasia, glandular atrophy, the formation of small cysts, chronic inflammation, including squamous metaplasia of the epithelium.
prostate gland. The aetiology of BPH is understudied, but it is known that dihydrotestosterone (DHT) plays a key part in the pathogenesis. The function of the prostate depends entirely on the testosterone produced by the testes, which significantly affect its function and size. Since the balance of hormones in a dog’s body changes with age, the prostate tends to increase as a result of excessive production of sex hormones. Clinically manifested benign prostatic hyperplasia predominantly affects older dogs. On the other hand, a structural change in the glandular epithelium begins already at the age of two years and eventually leads to multiple, small intraprostatic cysts, which are filled with a vitreous yellowish fluid. These cysts can also protrude above the surface of the organ at an advanced stage. It is estimated that approximately 50% of intact males will develop BPH at the age of 5 years, 60% – at the age of 6 years, and 95% – at the age of 9 years. BPH is a condition observed only in intact (unesterified) male dogs.

Unlike humans, dogs have an enlarged prostate gland that usually does not cause problems with urination, but can sometimes cause changes in bowel function. An increase in the volume of prostate gland can put pressure on the colon and reduce its diameter. When the prostate enlarges, it expands backwards in four-footed animals, that is, to the spine. If there is a significant increase, it can cause stress during bowel movements, constipation, and even faecal exposure. Faeces can be flat or ribbon-shaped. From time to time, an enlarged prostate pushes forward as against backward, pressing on the urethra. This can cause the dog to strain while urinating.

### Materials and Method

Using the analysis method, other diseases that cause an enlargement of the prostate gland or similar clinical signs were identified:

- prostatitis is a bacterial infection of the prostate gland. The prostate is usually painful on palpation;
- abscess is an insulated pocket of infection containing white blood cells, bacteria and cell debris;
- paraprostatic cysts are fluid-filled sacs that are connected to the prostate by a thin stem;
- prostate neoplasia (cancer). Prostate cancer can closely mimic other types of prostatomegaly, but usually dogs with prostate cancer have an asymmetric increase in one of the prostate lobes. Animals with prostate neoplasia are also usually systemically ill and have a history of weight loss;
- squamous cell metaplasia. Squamous metaplasia is a change in the prostate gland due to elevated levels of oestrogen in the blood.

The main diagnostic tests carried out in patients with suspected prostate disease include general clinical tests, including haematological and biochemical tests of blood and urine, palpation of the gland through the rectum, microscopy of prostate secretion. The studies were conducted during 2019 in the Veterinary Centre “Krokodil” in the city of Petropavlovsk-Kamchatsky. During the study period, 260 dogs with suspected benign prostatic hyperplasia were examined.

![Figure 1. Clinical signs of prostatic hyperplasia](image1)

![Figure 2. Physical examination (palpation of the prostate): 1 – penis; 2 – bladder; 3 – prostate gland; 4 – rectum; 5 – testis](image2)

In the process of diagnosis, the following research methods were used: gathering of medical history and clinical examination (Fig. 1); palpation of the gland through the rectum (Fig. 2); cytological and microbiological examination of the secretion of the prostate gland by obtaining ejaculate; X-ray examination, general urine analysis; biochemical and clinical blood
Results and Discussion

Rectal examination showed an increase in the size of the prostate gland in the animals under study; upon evaluation of the results of a general urinalysis, minor inflammatory changes were noted in 10 animals. A cytological evaluation of seminal fluid showed the presence of tumour cells that are large, irregular in shape, and react well to haematoxylin-eosin technique (Fig. 3).

On radiographs, the prostate is visible either in the pelvic canal or in the caudal part of the abdominal cavity, somewhat more cranial to the pubic tubercle. With an enlarged prostate, the colon can be pushed up and squeezed, while the bladder can be pushed further into the abdominal cavity (Fig. 4). Abnormal calcification of the prostate gland is easily visualized radiologically and sometimes correlates with the tumour process. Infection can also cause these changes.8

Ultrasound of the abdominal cavity, performed to evaluate the texture and consistency of the prostate gland, including its size and shape (Fig. 5). A smooth capsule with a symmetrically enlarged gland is noted. Small cystic areas can be observed, which are usually well defined and have smooth edges.

The advantages of ultrasound are high information content, speed of obtaining results, non-invasiveness. In veterinary practice, an ultrasound frequency of 2 to 10 MHz is used. A certain echographic picture appears depending on the structure of the organ. Ultrasound of the prostate can be performed using abdominal and rectal sensors. Transabdominal ultrasound is a simple and quite informative method of research. The location of the prostate provides easy access for ultrasound
examination, allows to evaluate the shape, size, presence or absence of structural changes in the gland.9

Ultrasound is a common imaging technique used to examine the dog’s prostate gland, which has proven successful in diagnosing many clinical conditions. While B-mode ultrasound is useful for evaluating the prostate, there are apparently significant differences in the emergence of certain pathological conditions, although some experienced ultrasound doctors often have a high ability to make the correct diagnosis.10 Aspiration in the tissue of the prostate gland allowed to obtain small samples for histological analysis. Fine needle aspiration is useful upon collecting fluid from cysts or obtaining small samples of cells from prostate tissue. A biopsy provides the nucleus of the tissue for histopathology (microscopic examination of the tissue), and usually gives more accurate information on the pathology of the prostate gland, as more tissue can be evaluated.3

According to the studies, the following results were obtained. In 134 males, slight increases in size and a change in the structure of the prostate gland were detected. Proceeding from the studies, 67 dogs were diagnosed with benign prostatic hyperplasia (adenomas) and prostatitis was diagnosed in 28 dogs. 31 dogs had a suspicion of prostate adenocarcinoma, which was confirmed in 8 dogs subsequent to an additional histological examination.

Conclusions

Upon diagnosing benign prostatic hyperplasia (adenoma) in dogs, it is necessary to use a comprehensive approach involving several research methods for the differential diagnosis of this pathology: gathering medical history, palpation of the gland through the rectum, cytology of prostate secretion, x-ray, cytological and microbiological examination of prostate secretion, ultrasound, histological examination upon aspiration or percutaneous biopsy. General urinalysis, biochemical and clinical blood tests constitute non-informative research methods for diagnosis clarification with given prostate pathology in dogs.

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Conflict of Interest: There is not conflict of interest.

Ethical Clearance: All procedures were performed in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. A study was approved by Animal Research Ethics Committee of the St. Petersburg State University, November 13, 2019, No 1347-A.

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Caffeine, Alcohol and Tobacco Pattern Use and Risk Factors in Use Risk During Pregnancy in the Middle Zone of Northeastern Thailand

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Abstract

Background: Prenatal substance use is a public health problem deserving the highest priority of attention because it poses devastating risks of maternal and fetal consequences. Situational analysis of current substance use in pregnancy and its risk factors is essential for effective preventive strategies for maternal and child health. This study explored the prevalence of risky substance use (caffeine, alcohol, and tobacco) along with associated factors patterning among pregnant women in the middle zone of Northeastern Thailand.

Method: This cross-sectional study was conducted in 58 district hospitals located in the middle zone of northeastern Thailand. The participants were 944 pregnant women attending antenatal clinics chosen based on consecutive sampling. Data collection used a questionnaire, and data analysis used multiple logistic regression.

Result: More than two-thirds of the pregnant women (70.1%) reported current substance use, including caffeine (61.6%), alcohol (20.7%), and tobacco (3.3%). Risk factors such as family caffeine use (AOR=2.83, 95%CI: 2.02-3.97) and couple relationship (AOR=1.58, 95%CI: 1.07-2.33) were found to be associated with caffeine in use risk, while marital status (AOR=2.53, 95%CI: 1.11-5.77), couple relationship (AOR=2.27, 95%CI: 1.05-4.91), and family alcohol use (AOR=3.54, 95%CI: 1.49-8.42) were those associated with alcohol in use risk. It was notable that while family tobacco use (AOR=3.85, 95%CI: 1.05-14.06) was associated with tobacco in use risk, age was found to be its protective factor (AOR=0.31, 95%CI: 0.10-0.95) among those in the tobacco use risk group.

Conclusion: Currently there is strong evidence about the risky substance use during pregnancy. Modification solutions for suitable consumption behavior should targeted pregnant women with family substance use, poor couple relationships, single status and more than 20 years, old.

Key words: caffeine, alcohol, tobacco, risk factors, pregnancy, Thailand

Introduction

Substance abuse is a worldwide problem. In 2014, an estimated over 29 million people who use drugs suffer from drug use disorders. Moreover, 43.5 per million deaths are drug-related (¹). According to the UNODC’s World Drug Report, women are particularly affected by this kind of substance use (²,³); substance use in pregnant women has been widely recognized as a challenge to public health concerns in many countries. Women with substance abuse during pregnancy are at significant risk of adverse obstetric and perinatal outcomes with their children (⁴,⁵). Consumption of caffeine, a psychoactive substance during pregnancy is associated significantly with spontaneous abortion and fetal loss (⁶,⁷) .

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A national survey conducted in the United States among pregnant women found that 8.5% drink alcohol and 15.9% smoke cigarettes (8). A similar pattern of this substance use has been seen in many countries (9-11). In Thailand, there is little available evidence on the extent of substance use among pregnant women. Recently, substance use (alcohol and tobacco) during pregnancy in Northern and Southern Thailand was reported (12-14).

However, there have been no studied of substance use in Northeastern Thailand in particular patterns of legal substance use in women during pregnancy. These substance uses are easy to assess, and there are no restrictions among pregnant women. Therefore, this study presents a cross-sectional survey of the patterns of substance use and the associated risk factors among pregnant women in the middle zone of Northeastern Thailand.

Materials and Method

This cross-sectional study was conducted during December 2016 to May 2017 in 58 antenatal care clinics of secondary care units in four provinces (Khon Kaen, Kalasin, Mahasarakham, Roi Et) in the middle zone of Northeastern Thailand. A consecutive sampling technique was used to select participants. The sample size was calculated using the formula for sampling for proportions. (15) The final sample size was 944 pregnant women.

The self administered questionnaire was composed of 2 parts, (1) Demographic and obstetric characteristics and (2) Current substance use behavior, developed from AUDIT (Alcohol Use Disorders Identification Test) Thai version (16). There are 10-items for each substance use, which covers the domains of caffeine consumption, drinking alcohol and smoking tobacco. Scores can range from 0 to 40, (score 0-7 indicates low risk, 8-15 indicates hazardous use, 16-19 indicates harmful use and 20 or more indicates dependence). The cut-off point for identifying a potential substance use problem is more than 8. The content validity index of this questionnaire was 0.93. Cronbach alpha co-efficient were 0.85.

The descriptive and analytical statistics were analyzed using IBM SPSS statistics soft-ware Version 26.0. Respondent characteristics were described by frequency and percentage. Factors independently associated with substance use in risk level were assessed by multiple logistic regression. The results were considered statistically significant when p < 0.05.

Results

Among the 944 pregnant women who volunteered for this survey, 25.5% were adolescents. The mean age was 24.9 years (SD = 6.71). Most (91.8%) of the pregnant women had completed a lower bachelor’s degree, and 66.5% were employed.

Current substance use was found in 624 pregnant women (70.1 %). The women with substance use were caffeine use 61.6%, alcohol use 20.7% and tobacco use 3.3%. Pregnant women at risk of substance abuse were 236 individuals (35.6 %): caffeine use risk 44.9 %, alcohol use risk 22.6%, and tobacco use risk 63.6%.

Risk factors significantly associated with caffeine risk use were family caffeine use (AOR=2.83, 95%CI: 2.02-3.97) and poor couple relationships (AOR=1.58, 95%CI: 1.07-2.33). Risk factors associated with alcohol risk use were being single (AOR=2.53, 95%CI: 1.11-5.77), having poor couple relationship (AOR=2.27, 95%CI: 1.05-4.91) and family alcohol use (AOR=3.54, 95%CI: 1.49-8.42). The risk factor associated with tobacco risk use was family tobacco use (AOR=3.85, 95%CI: 1.05-14.06), while age was a protective factor (AOR=0.31, 95%CI: 0.10-0.95).

Discussions

This is the first report on patterns of caffeine, alcohol and tobacco use by pregnant women, and substance risk use factors in Northeastern Thailand. Seventy percent of pregnant women reported current use of substance, with caffeine being the most commonly used, followed by alcohol and tobacco. These finding indicate high use of legal substances during pregnancy in these areas.

That three out of five pregnant women currently using caffeine was similar to previous studies by Vitti et al. (17), but less than Jarosz, Wierzejska and Siuba (18) who found 98.4% of pregnant women using caffeine. The percentage of pregnant women was higher than sixty percent in many countries because this substance use was thought to have little effect, although use can cause fetal loss. (19–20) Current alcohol use was one in five in pregnancy; this finding was higher than other studies (21,22) because Thai alcohol purchase rules and related...
regulations do not cover the pregnancy group.\(^{(23)}\) The pregnant smokers in this study were similar with report in Northern Thailand that pregnant women smoke \(^{(12,13)}\) but lower than USA\(^{(24)}\), Canada\(^{(25)}\) and India \(^{(11)}\).

There were many risk factors associated with substance use in risk level in pregnant women. The results with confounders adjustment showed that family member use of each substance (caffeine, alcohol and smoking) was associated with pregnant use risk. This risk factor correlates with the study by Hans et al. \(^{(26)}\) that showed that substance-abusing pregnant women often have family histories of factors of substance abuse.

Couples having poor relationships were associated with more chance of risk use in two substances (caffeine and alcohol). Moreover, pregnancy while being single was associated with increased alcohol use during pregnancy; this finding was similar to the study by Foitier, 1993\(^{(27)}\) that women without a partner had higher substance use. Higher social support was associated with risk of drinking during pregnancy. A higher score for social drinking motivation increased the likelihood of drinking during pregnancy.\(^{(28)}\)

Interestingly, pregnant women with age over/equal to twenty years were the protective factor of pregnant smokers, corresponding to the Drake et al study \(^{(29)}\), as smoking prevalence reduces along with the age of pregnant women, but different from Singh et al. study \(^{(11)}\) in which pregnant women aged above 25 used tobacco during pregnancy.

**Conclusion**

The high legal use of substances during pregnancy in these areas could potentially be harmful to maternal and fetal health. Modification solutions for suitable consumption behaviors should be targeted at pregnant women with family substance uses. Specific solutions should be targeted to strengthening good couple relationships for caffeine use risk individuals, and to couple relationships and marital status for those with alcohol use risk. All result should be used- to find substance use preventive strategies for maternal and child health.

**Ethical Clearance:** Taken from the Ethics Committee for Research on Human Subjects (HE591320).

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Criminal Legal Protection Against Doctor Malpractice in Indonesia

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Abstract
One of the Human Rights elements that must be achieved in accordance with the ideals of the Indonesian people is the Health aspect, the profession as a doctor devotes his/her knowledge to the public interests, has freedom and independence which is oriented to human values in accordance with the code of ethics. In implementing the code of medical ethics, it as much as possible avoids the occurrence of medical error. The error can occur in the diagnostic stage such as error or delay in diagnosis, not implementing the appropriate examination, using an examination method that is no longer used or does not act on the examination or observation result, etc. The risk that occur if it is not carried out thoroughly and carefully, is that it will result in a fatal error. The method used in this research is the normative juridism method, namely the addition method by holding on to the applied norms or legal rules. The result in this research is the liability’s manifestation of the doctor who performs medical malpractice as a form of criminal legal protection in Indonesia, it is basically based on intentional or unintentional mistakes or negligence. If it results in the victim’s death, it is equal to murder, and if the victim does not die it is called an act of persecution with the sanction of persecution.

Keywords: Criminal, Legal Protection, Malpractice, Doctor

Introduction
Health is element of Human Rights which must be realized in accordance with the ideals of the Indonesian people, the general welfare of national goals. To achieve the ability to live healthy for each people in order to realize an optimal degree of public health. The profession as a doctor devotes his/her knowledge to the public interests, it has freedom and independence which is oriented to human values in accordance with the code of ethics.(\textsuperscript{1}) This code of medical ethics aims to prioritize the interests and the safety of patient, to ensure that the medical profession must always be carried out with noble intention and use the right way.\textsuperscript{(2)}

In implementing the code of medical ethics, it avoids the occurrence of medical error as much as possible,\textsuperscript{(3)} namely a failure of a medical action that has been planned to be completed resulting in not as expected, an error of action or wrong planning to achieve a goal. The error that occured will result in an unexpected injury to patient, it can be in the form Adverse Event (KTD). This is very detrimental and dangerous; the patient can experience bad things and the action giver can also be exposed to Article of law violation.\textsuperscript{(4)}

Near Miss (NC) is an event resulting from carrying out an action or not taking the action that should be taken, which can injure the patient, but serious injury does not occur because of luck. This can be seen from the number of actions taken that are dangerous but can be prevented before they occur or are handled before they cause effects, for example, the patient receives a contra indication medicine but there is no drug reaction occurred, prevention of a medicine with an overdose will be given, but other staff know and cancel it before the medicine is given, and relief of a medicine with an overdose is given, it is known early and then given the antidote. Adverse Event (KTD) is an event resulting in an unexpected injury to the patient due to an action or not taking the action that should be taken, and not

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because of the patient’s condition.(5)

The error can occur in the diagnostic stage(6) such as error or delay in diagnosis, not implementing the appropriate examination, using an examination method that is no longer used or does not act on the examination or observation result.(7) In the treatment stage, such as error in treatment procedures, therapy treatment, drug use method, and delay in responding to the result of improper care checks; in the preventive stage, such as not providing provilactic therapy as well as inadequate monitor and follow-up; or in other technical matter such as communication failure, device or other systems failure.(8)

The risk occurred in human is so vulnerable to an action. If it is not carried out carefully and thoroughly, it will result in a fatal error. The existence of medical risks, both those that have been detected previously and those that were not detected before or unexpected at all before, in the implementation of health services is only an adequate information.

Even so, in carrying out their professional duties, health workers are normatively obliged to remain cautious, to comply with the medical standard, to carry out the professional standard of expertise, and to respect the patient rights. This is done in order to obtain legal protection for them.

In this normative definition of a worker, it raises the definition that health worker who carries out the professional duties has a special legal position, it means that in carrying out their professional duties, they are exposed to high medical risk. Based on these explanations, it needs a criminal legal protection against doctor malpractice in Indonesia.

**Research Method**

This research used library research which is a research method that is carried out by reading and studying theories relevant to the subject matter. The data collected was then processed using data processing method which consists of: Normative juridism method, namely the addition method by holding on to the applied norms or legal rules. This discussion method is used in accordance with its need to produce an acceptable discussion both in juridical and scientific terms.

**Discussion**

A jargon that reads *errare humanum est* (error is humane), seems need to be contemplated. A theory of respectable minority rule which states that a doctor is not considered negligent if he/she chooses one of the many ways of treatment that is recognized by the medical world. Basically, a doctor will be brought before a court if there has been a loss to the patient. The loss arises as a result of a breach of obligation in which an agreement had been previously made. Even though the doctor’s obligations are not detailed in the therapeutic contract, but the doctor’s obligations are not covered by the medical services standard. While the medical services standard is made based on the rights and obligations of the doctor, both those regulated in the Code of ethics and those regulated in statutory regulation.

Legal protection for the implementation of the doctor’s duty and authority who has medical risk in the Criminal Code is formulated in Article 359 and 360, the action that causes others to be seriously injured or die which was done inadvertently. As for the elements of Article 359 and 360, there are the negligence element (culpa), the existence of certain form of action, and there are serious injuries or death of others, and the existence of a causal relation between the form of action with the result of that other person death.

Elements of medical risk and medical malpractice are as follow, in the medical risk is found the negligence element, while in the medical malpractice it is clear that there is a negligence element. In addition, specifically in health services, negligence is also associated with services that do not meet or below the medical services standard which in its practice also needs to be used to distinguish between medical risk and medical malpractice. If upon the patient, it has been performed procedures according to the medical services standard, but the patient ends up seriously injured or dead, this is a medical risk. Whereas for patient who has suffered serious injury or death as a result of doctor performing services below medical standard, this means that there is a medical malpractice.

In order to avoid misunderstanding about the emergence of risks that are detrimental to the patient, it is necessary to have clear and complete information by the doctor in a language that easily understood by the patient and by remembering where the communication is carried out. This is where the importance of a health interview is, so that in the end the patient is willing to give consent for the medical action to be taken by the doctor in the effort to cure his illness in a therapeutic
transaction.

It means that the negligence element is very instrumental in determining whether a doctor is convicted or not and negligence in the medical field is very closely related to the implementation of doctor professional standards. Not only the negligence element in medical risk, it also means that both Article 359 and 360 of the Criminal Code cannot be applied to the doctor’s action that has medical risk, because one of the elements of Criminal Code Article 359 or 360 is not fulfilled in medical risk.

In the case of medical accident, there is a judge’s decision to adjudicate a case that in Indonesia it indeed requires that a doctor must act carefully on every action taken. But we cannot just regard it as a negligence act for something that is actually an accident. Regarding the mistake of clinical examination, it is actually also understandable because after all, as a human being a doctor cannot escape from the possibility of making a mistake.

In addition, the doctor’s action toward patient also has justification reason as mentioned in Criminal Code Article 50 and Article 51 paragraph 1. Meanwhile, for the conviction of an error that can be interpreted as liability in criminal law, it must meet 3 elements, namely: the ability to be responsible for the action, the inner connection between the actor and the action that can be intentional (dolus) or negligence (culpa), and there is no forgiving or erasing reason.

Thus, to make sure that a medical action is not against the law, the action must be performed in accordance with the medical profession standard or carried out legeartically, as reflected by: The existence of medical indication in accordance with the concrete treatment goal, performed according to the standardized medical procedures standard, fulfilled the patient’s rights regarding informed consent.

We need to realize that doctor’s medical actions sometimes indeed produce undesirable consequences both by the doctor and the patient, even though doctor has tried their best. Because almost all medical actions are essentially persecution justified by the Constitution, especially those related to acts of anesthesia and surgery. So that the possibility of the risk of injury or even death is very difficult to avoid. Based on the analysis, the criminal law adheres to the principle of “no criminal without error”. Furthermore, in Article 2 of the Criminal Code mentioned, “criminal provisions in Indonesian statutory regulation are applied to everyone who commits an offense in Indonesia”.

The formulation of this article determines that every individual who is in the Indonesian legal territory, can be held liable for criminal liability upon the mistakes he/she made. Based on that provision, the doctor profession is inseparable from the provision of the article. Moreover, a doctor in his daily work is always involved in the acts regulated in the Criminal Code. Even though the criminal law recognizes the abolition of criminal act in the health service, namely justification and forgiving reasons as well as those contained in the jurisprudence, it does not necessarily mean the justification and forgiving reasons abolish a criminal offense for the doctor profession.

One of the jurisprudences that contains justification reason and forgiving reason in health services is the jurisprudence. This jurisprudence contains “informed consent” as a criminal offense omission. However, this does not mean that the doctor profession is freed from all criminal liability, because the justification reason and forgiving reason for the doctor’s action is only in a certain exception.

Legal protection toward doctor’s legal liability can be distinguished between liability that is not related to the implementation of his/her profession and legal liability related to his/her profession. The implementation of the doctor profession in Indonesia can still be distinguished between responsibility for professional provisions, namely the Indonesian Code of Medical Ethics (KODEKI) contained in the Decree of the Minister of Health No. 434/Men.Kes/SK/X/1983 and responsibility for legal provisions covering the administrative law, the criminal law and the civil law. Action or behavior of doctor as legal subject in their performance in society can be distinguished between daily actions that are not related to his/her profession.

There are special factors in Medicine that are not found in general applicable law, for example medical accident or risk of treatment. Some basis for the omission of penalties or special error in medicine, namely: Risk of treatment, Medical accident, Non-negligent error of judgment, *Volenti non fit iniura* and Contributory negligence.

Criminal law in Indonesia in the implementation of certain medical act, there is always a risk inherent in the medical act (inherent risk of treatment). If the doctor
performs the medical treatment carefully, with the patient’s permission and based on the Medical Service Standard (SPM), but it turns out that the risk persists, for example if there is an unexpected allergic reaction, as well as complications that cannot be predicted beforehand (for example, there occurs amniotic water embolism during labor), then the doctor cannot be blamed.

Article 44 of Constitution on Medical Practice as an official explanation is determined as follows, “service standard” is a guideline that must be followed by doctor or dentist in carrying out medical practice. “Service facility level” is the level of service in which the standard of personnel and equipment are in accordance with the capabilities provided. Attitude and action that must be carried out by doctor are regulated in various standards. The profession has at least 3 kinds of standards, namely: Competency standard, Behavior standard, and Service standard.

Constitution No.36 of 2009 concerning Health has formulated the criminal threat, hence the criminal threat against the error or the negligence committed by doctor resulting in patient suffering from disabilities or injuries, no longer refers solely to the provision of Article 359, 360, and 361 of the Criminal Code. The threat is contained in Article 198 of Constitution No. 36 of 2009 concerning Health. The arrangement of doctor’s legal liability towards patient in the event of malpractice, the Indonesian health law does not officially mention the term Malpractice, but only mention error or negligence in carrying out the profession (listed in Articles 54 and 55).

Thus, the malpractice term is a legal term used in Articles 54 and 55 mentioned above. Error or negligence in carrying out the profession is listed in articles 54 and 55 of Constitution No.36 of 2009 concerning Health. Article 54 and 55 stated that the sanction on medical malpractice is the imposition of disciplinary action determined by the Medical Disciplinary Council to doctor who based on the judgment of the Council have committed negligence. Whereas the compensation that must be fulfilled by the doctor concerned is carried out in accordance with the applicable statutory regulations.

Criminal offenses are listed in Article 80, Article 81 and Article 82, while criminal violation is listed in Article 84. If in the relation between a doctor and a patient in a therapeutic transaction based on the agreement of both parties, there is an inadvertent or uncareful action by the doctor, so as to cause disability or death of the patient, then the consequences are regulated in criminal law.

Indonesian law gives full rights to its people to obtain justice and to obtain it, it is done by submitting application, complaint, and lawsuit. Both in civil, criminal or administrative cases. Therefore, as a legal protection for Indonesian people, they will be tried through a free and impartial judicial process, which referred to legal procedures that guarantee an objective examination by honest and fair judge. The sanction in criminal law is basically sanction in the form of torture or restriction of freedom against the perpetrator of criminal act. With the hope that after undergoing the criminal sanction, it will cause a deterrent effect on the perpetrator or there is a preventive element against others (the society).

Conclusion

Criminal legal protection against doctor malpractice in Indonesia in the Criminal Code can not be applied to the doctor’s action who has medical risk. This is because at the medical risk, there is one element that cannot be fulfilled, namely the negligence element. However, if the negligence element from a doctor’s action can be proven, then according to the Criminal Code, the doctor can be imposed on committing act that cause serious injury or loss of patient’s life. Besides that, based on the basis of doctor’s mistake omission, namely the justification reason (treatment risk) and forgiving reason (accident occurs in difficult operation). The liability’s manifestation of the doctor who performs medical malpractice is basically based on intentional or unintentional mistake or negligence. For intentional mistake, if it results in the victim’s death, it is equal with murder, and if the victim does not die it is called an act of persecution with the sanction of persecution.

Ethical Clearence : Yes

Conflict of Interest : No

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References


Relationship of Family Support with Vegetable and Fruit Consumption Behavior

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Abstract

The family approach is the development of a home visit by the public health center effort. One of the activities is community management support system in supporting a culture of healthy living in the family. Family support is needed to behave in the consumption of vegetables and fruit every day. Clean and healthy living behavior in the household or family structure is one of the goals in clean and healthy behavior. There are 10 indicators of clean and healthy behavior in family settings, one of them is the consumption of vegetables and fruit every day. This study aims to analyze the relationship between family support and the consumption of vegetables and fruits in children. The research design used in this study is research cross sectional. The research sample is Golden Christian School elementary school students. The time of the study was in May and June 2018. The results showed that there was no significant relationship between emotional and assessment support for vegetable and fruit consumption behavior in children. There is a significant relationship between instrumental support and information support with vegetable and fruit consumption behaviors in children, respectively p-value 0.015 and 0.041. It is recommended that the school provide knowledge to parents whose children are vulnerable not to consume vegetables and fruits in order to support the healthy Indonesia program with a family approach.

Keywords: family support, behavior, consumption, vegetables, fruit

Introduction

Health development is an effort carried out by all components of the Indonesian nation to increase awareness, willingness, and ability to live a healthy life for everyone in order to realize the conditions of Indonesian people who have optimal health degrees. The healthy Indonesia program is the main health development program which was later planned to be achieved through the Ministry of Health Strategic Plan for 2015-2019.

The Ministry of Health’s strategic plan 2015-2019 confirms the healthy Indonesia program through the family approach (PIS-PK) in support of the healthy living community movement (GERMAS). The family approach is one of the ways the public health center can increase the reach of targets and increase community access to health services by visiting families.

Healthy Indonesia program through the family approach is implemented by public health center with the following characteristics such as the main target is the family, prioritizing promotive-preventive efforts, accompanied by strengthening community-based health efforts, active home visits by public health center to increase outreach and total coverage, and life cycle approach.

The family approach is one way for the public health center to increase the reach of targets and improve access to health services in the working area by visiting families. The public health center does not only provide health services inside the building but also exits the building by visiting family in the working area. The family as a focus on the approach of implementing the health Indonesia program because there are five family functions, one of which is the health care function (The

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Health Care Function). The function of health care is to maintain the health condition of family members so that they continue to have high productivity. This function is developed into a family task in the health sector, while family tasks in health care are recognize the health development disorder of each family member, make decisions for appropriate health measures, provide care to sick family members, maintaining a favorable home atmosphere for the health and personality development of family members, maintaining mutual relations between families and health facilities.

The family approach is the development of home visits by the public health center and an expansion of the community health care effort, which includes several activities, one of which is the utilization of data and information from the family health profile for community empowerment and public health center management, because the family is one support system in supporting the culture of healthy living in the family. So that family support is needed to behave in the consumption of vegetables and fruit every day. Clean and healthy life behaviour in the household or family structure is one of the targets of the order in clean and healthy life behaviour. There are ten indicators of clean and healthy life behaviour in family settings, one of which is the consumption of vegetables and fruit every day.

**Materials and Method**

This research uses quantitative methods with a cross-sectional design. The study was conducted at the Golden Christian School of Palangka Raya in May-June 2018. The sample used was 42 children from grades V and VI. Family support is defined by emotional support, assessment support, instrumental support, and information support. Vegetable and fruit consumption behavior are expressed by ever consuming fruit vegetables ≥ 1 time per week and never consuming vegetables and fruits. Analysis of the data used is the statistical test chi-square because the data is categorical with 2 levels.

**Findings and Discussion**

**Table 1. Relationship of Respondent Characteristics with Vegetables and Fruits Consumption Behavior**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Vegetables and Fruits Consumption Behavior</th>
<th>Odd Ratio (95% CI)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Consumed fruit &amp; vegetables once a week</td>
<td>Not consumed vegetables &amp; fruits</td>
<td>P Value</td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>Age</td>
<td>20</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>10 years</td>
<td>10</td>
<td>47.6%</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>(0.131-1.58)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 years</td>
<td>14</td>
<td>66.7%</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(0.384-4.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>20</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Male</td>
<td>11</td>
<td>61.1%</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>(0.384-4.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>13</td>
<td>54.2%</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>(0.309-3.26)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Favourite food</td>
<td>20</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>Vegetable and fruit</td>
<td>1</td>
<td>25%</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>(0.021-2.29)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>23</td>
<td>60.5%</td>
<td>15</td>
</tr>
</tbody>
</table>


Adolescent or adolescence is a critical period of transition from child to adult. Genetic, nutritional and other environmental factors are considered to play a role in puberty. Physical changes that occur in this period of puberty are also followed by emotional and physical anxiety. Psychosocially, adolescent growth is divided into 3 stages: early, middle, and late adolescent. Each stage has its own characteristics. Everything that interferes with the process of physical and hormonal maturation in adolescence can affect psychological and emotional development so that a good understanding of the process of change that occurs during adolescence from all aspects. Adolescence is the beginning of someone in adopting dietary behavior that tends to be settled in the future. Current adolescent diets tend to consume less vegetables and fruit. Consumption of vegetables and fruit in adolescents can be influenced by various things. As many as 61.1% of adolescent boys ever consumed vegetables and fruit more than equal to 1 times a week and 54.2% of adolescent girls had consumed more than 1 times a week of vegetables and fruit. Teenage boys in this study had a higher percentage of consuming vegetables and fruit than teenage girls as was the case with Anggraeni and Suadiarti’s research in 2018 showing that male teenagers preferred to consume vegetables and fruits.

The results showed no relationship between sex with vegetable and fruit consumption behavior. There is no relationship of gender with vegetable and fruit consumption behavior \( p\)-value 0.941. There is no significant relationship between sex and vegetable and fruit consumption \( p\)-value 0.435. Adolescent girls have poorer dietary habits than male.

Favorite food or termed food preference is whether or not someone likes a food that is influenced by various factors. Food preferences are considered as a determining factor in consuming foods including vegetables and fruit. The love of fruit and vegetables has a direct relationship to the consumption of vegetables and fruit in adolescents, similar things expressed by other studies that state the taste and liking for a food is closely related to a person’s consumption behavior, including vegetables and fruits. The results of statistical analysis showed no relationship between food preferences or favorite foods with vegetable and fruit consumption behavior. Most of the respondents chose other food preferences such as cooked chicken, steak, noodles, fried rice, potatoes. There was no significant relationship between food preferences on vegetable and fruit consumption behavior.

### Table 2. Relationship Family Support with Vegetables and Fruits Consumption Behavior

<table>
<thead>
<tr>
<th>Variables</th>
<th>Vegetables and Fruits Consumption Behavior</th>
<th>Odd Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Consumed fruit &amp; vegetables once a week</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not consumed vegetables &amp; fruits</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Support in the Form of Information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never informed</td>
<td>18</td>
<td>72%</td>
</tr>
<tr>
<td>(1.25-17.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ever informed (always or sometimes)</td>
<td>6</td>
<td>35.3%</td>
</tr>
<tr>
<td>(1.01-13.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family Support in the Form of Assessment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never given rating</td>
<td>18</td>
<td>69.2%</td>
</tr>
<tr>
<td>(1.59-134.09)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ever given rating (always or sometimes)</td>
<td>6</td>
<td>37.5%</td>
</tr>
<tr>
<td>(0.18-2.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instrumental Support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>23</td>
<td>67.6%</td>
</tr>
<tr>
<td>(0.18-2.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ever (always and sometimes)</td>
<td>1</td>
<td>12.5%</td>
</tr>
<tr>
<td>Emotional Support</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>12</td>
<td>52.2%</td>
</tr>
<tr>
<td>(1.59-134.09)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ever (always and sometimes)</td>
<td>12</td>
<td>63.2%</td>
</tr>
<tr>
<td>(0.18-2.2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The family is the smallest social unit in society and can have a major influence on the social changes and the child’s closest environment. The role of the family environment is one of the pillars of the dam shape the good and bad of the human person so that it develops well. One of the roles of the family is in fulfilling children’s nutrition. Good parental knowledge will be very helpful in directing children to consume vegetables and fruits. The role of fathers and mothers is very important for the growth and development of children and the formation of children’s character including in consuming food.

Information support from the family in this case is expressed by supporting information in the form of the content and benefits of vitamins in vegetables and fruit. The role of the family as an information provider is a form of implementation for children to consume vegetables and fruit. Families who introduce various types of vegetables and fruits and always provide information related to the importance of consumption of vegetables and fruit can stimulate children to increase consumption of vegetables and fruit to the recommended.

The results showed that there was a significant relationship between information support and vegetable and fruit consumption behavior. The same thing was shown by the results of the Afif and Sumarmi research in 2017 that there was a significant relationship between the role of the mother as an educator and initiator of the consumption of vegetables and fruits (p-value=0.003). 

Appraisal support can be used as subjective norm, subjective norms are individual perceptions about whether others will support or not the realization of actions or behavior. Subjective norms can also be interpreted as a result of one’s beliefs about what other people or groups think, combined with their motivation to adjust. An individual will intend to display a certain behavior if he perceives that other important people think that he should do it. Suppose someone believes that a person is considered important as a parent wants that person to consume fruits and vegetables or vice versa. Then in addition to trust, this person must have the motivation to follow what the person desires that was considered important earlier, to consume fruit and vegetables. Parents have a role in providing social support to children. as a form of support for children to carry out healthy behaviors, the role of parents includes providing rules, discipline, gifts and support that influence the interaction between parents and children.

This study shows that there is no significant relationship between assessment support and vegetable and fruit consumption behavior. There is no significant relationship between subjective norms in the form of assessment support with vegetable and fruit consumption behavior.

One of the roles of the family in instilling behavior of eating vegetables and fruit is to take advantage of the yard by growing vegetables and fruit and provide vegetables and fruit every day at home, does not have to be expensive, easy to find and affordable prices. The results showed there was a relationship between instrumental support and consumption of vegetables and fruit. Family instrumental support is expressed by providing different vegetables and fruits every day.

In the study of the availability of vegetables and fruit at school is positively related to the consumption of vegetables and fruit in adolescents. Even though food preferences are low, if the availability of fruits and vegetables is good enough, consumption will increase. The types of food that are available have more opportunities to be consumed, while the types of food that are not available will not be consumed by people. So efforts to provide more vegetables and fruit can increase consumption of these foods.

Parents play a role in providing emotional support so that the process of approaching healthy habits, such as healthy eating behavior will be created properly. This support is perceived by the child as an effort to form behaviors that are appropriate to the child and the environment. Parental support has a positive correlation with eating behavior, nutritional status and psychological development of children. the attitude of parents gives an indirect effect on children in having preferred foods, as well as children’s eating habits. For example, children will choose different types of food when being watched by parents.

The results of this study indicate there is no relationship between emotional support and vegetable and fruit consumption behavior.

**Conclusion**

The results of this study showed 42.9% of adolescents did not consume vegetables and fruits. The love of fruit and vegetables has a direct relationship to the consumption of vegetables and fruit in adolescents, similar things expressed by other studies that state the
taste and liking for a food is closely related to a person’s consumption behavior, including vegetables and fruits. The results of statistical analysis showed no relationship between food preferences or favorite foods with vegetable and fruit consumption behavior. Most of the respondents chose other food preferences such as cooked chicken, steak, noodles, fried rice, potatoes. The results showed that there was a significant relationship between information support and vegetable and fruit consumption behavior. The results showed there was a relationship between instrumental support and consumption of vegetables and fruit. Family instrumental support is expressed by providing different vegetables and fruits every day.

Ethical Clearance: This research has gone ethical feasibility testing by the Ethical Research Commission of the Polytechnic of Health, Ministry of Health, Palangka Raya.

Source Funding: This study was done by self-funding from the authors.

Conflict of Interest: The authors declare that they have no conflict interests.

References
The Relationship Between Qor-40 Questionary Value And Pupillary Pain Index As Assessment Of Recovery Quality On Post-Operating Patients Treated By Multimodal Analgesia (Parasetamol + NSAID + PCA OPIOID)

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Abstract
This study analyzes the correlation between QoR-40 questionnaire value and the Pupillary Pain Index as an assessment for the quality of recovery of postoperative patients receiving multimodal analgesia (Paracetamol + NSAID + PCA Opioid) in Dr. Soetomo Hospital. An observational analytic study with cross-sectional design was conducted on patients aged 18-60 years who underwent elective surgery with general anesthesia at Dr. Soetomo Hospital Surabaya and receiving multimodal analgesia therapy, which includes intravenous paracetamol 4 x 500 mg, intravenous ketorolac 3 x 10 mg, and intravenous fentanyl via PCA. Recovery quality checks were performed at 12 and 24 hours postoperatively. Retrieval of data in the form of a QoR-40 questionnaire and pupillary pain index examination using algiscan® pupillometry. Both parameters will be analyzed by correlation test. The total need for fentanyl and PCA demand dose was also evaluated for use within 24 hours postoperatively. From 46 samples, obtained characteristics of study are widely distributed in terms of age, sex, anthropometry, and preoperative physical status. The average total fentanyl PCA requirement is relatively small at 0.28 mcg / kg / hour. The correlation formed between QoR-40 and pupillary pain index is significant. It can be concluded that Pupillary Pain Index can replace the QoR-40 questionnaire as an alternative assessment of the quality of recovery of patients after surgery.

Keywords: QoR-40 Questionnaire, Pupillary Pain Index, Quality of Postoperative Recovery.

Introduction
Uncontrolled postoperative pain can have various consequences including increased morbidity, delayed recovery, and a high incidence of chronic pain. Postoperative pain affects the quality and duration of the patient’s postoperative recovery period and will affect his quality of life. The postoperative recovery that has been developed and specifically designed for multimodal perioperative care pathways that will be aimed at obtaining rapid healing after major surgery with preoperative support of organ function and exacerbating the stress response caused by surgical trauma¹.

In the United States, more than 80% of patients undergoing surgery experience acute postoperative pain and approximately 75% report moderate, severe or extreme pain ². Based on the Ministry of Health survey data, more than 80% of surgical patients reported experiencing moderate pain and 31-37% of patients experiencing severe to very severe pain³. Inadequate pain control has a negative impact on quality of life, risk after surgery, and risk of postoperative persistence².

Multimodal analgesia is the use of more than one type of analgesia drug and technique which targets different mechanisms of action in the central and / or peripheral nervous system (which can be combined with non-pharmacological interventions) that allow for synergy or addiction effects and are more effective in relieving pain than with a single capital intervention².

The selection of tools to check pain and the quality of recovery also needs to be considered in the form of
pain scores such as the Numeric rating system (NRS) and Visual analogue Scale (VAS) or questionnaire. The recovery quality questionnaire (QoR-40) is a tool used to assess the quality of recovery after surgery through questions relating to 40 items related to 5 domains. However, QoR-40 has limitations, which requires a long time and good understanding from sufferers to be able to obtain the quality of postoperative pain.

Objective parameters of pain and quality of recovery can be evaluated using biomarkers and tools. Studies on pain biomarkers do not have very significant results and are considered not cost-effective. Recent research reveals, evaluation of pain and quality of recovery can use tools that utilize a variety of body responses due to pain or discomfort, one of which is Pupillary Pain Index (PPI) which can be assessed by interpreting the response of dilated pupils to the presence of pain or discomfort. PPI is considered more practical, non-invasive, does not require a long time and is inexpensive in evaluating the objective parameters of pain and its relation to the quality of postoperative recovery. Studies that have evaluated the quality of postoperative recovery with subjective and objective parameters in the provision of multimodal analgesia have never been done, this study tried to analyze the relationship of recovery quality as measured by a QoR-40 questionnaire and PPI using the pupillometry.

Materials and Method

This type of research is an observational analytic research using Diagnostic Test intended to find the relationship between QoR-40 questionnaire and PPI using the pupillometry so that it can determine that PPI can replace the QoR-40 questionnaire as an evaluation of quality recovery postoperatively. This research was carried out at the recovery room at the Dr. Soetomo Hospital Surabaya in September-October 2019. The study samples were aged 18-60 years who underwent elective surgery with general anesthesia. With the inclusion criteria are patients with physical status ASA (American Society Anesthesiologist) 1-2, can communicate well, not deaf, not mute, not mentally retarded and not senile. The sampling technique in this study was conducted with judgment sampling. Patients who entered the inclusion criteria will be examined preoperatively 1 day before surgery, including history, physical examination, laboratory and radiological examination. Patients will receive multimodal analgesia therapy, which includes intravenous paracetamol 4 x 500 mg, intravenous ketorolac 3 x 10 mg, and intravenous fentanyl via PCA (Patients-Controlled Analgesia). Recovery quality checks were performed at 12 and 24 hours postoperatively. Retrieval of data is in the form of a QoR-40 questionnaire and pupillary pain index examination using pupillometry. Parameters will be analyzed by correlation test. The total need for fentanyl and PCA demand dose was also evaluated for use within 24 hours postoperatively. Data analysis is divided into 2 parts, descriptive statistical analysis, and correlation analysis of two variables.

Results

There were 46 patients was taken in the Recovery Room of Dr. Soetomo Hospital Surabaya during September to October 2019. Following are the characteristics of the research subjects:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Variable</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>Male</td>
<td>22(47.8%)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>24(52.2%)</td>
</tr>
<tr>
<td>Age</td>
<td>18-20</td>
<td>4 (8.7%)</td>
</tr>
<tr>
<td></td>
<td>21-30</td>
<td>9 (19.6%)</td>
</tr>
<tr>
<td></td>
<td>31-40</td>
<td>7 (15.2%)</td>
</tr>
<tr>
<td></td>
<td>41-50</td>
<td>12 (26.1%)</td>
</tr>
<tr>
<td></td>
<td>51-60</td>
<td>14 (30.4%)</td>
</tr>
<tr>
<td>Body Mass Index</td>
<td>&lt;18,5</td>
<td>4 (8.7%)</td>
</tr>
<tr>
<td></td>
<td>18,5 - 24,9</td>
<td>23 (50%)</td>
</tr>
<tr>
<td></td>
<td>25,0 - 29,9</td>
<td>19 (41.3%)</td>
</tr>
<tr>
<td>PS ASA</td>
<td>1</td>
<td>17 (37%)</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>29 (63%)</td>
</tr>
<tr>
<td>Type of Operation</td>
<td>Digestive</td>
<td>5 (10.9%)</td>
</tr>
<tr>
<td></td>
<td>Gynecology</td>
<td>5 (10.9%)</td>
</tr>
<tr>
<td></td>
<td>Head and Neck</td>
<td>8 (17.4%)</td>
</tr>
<tr>
<td></td>
<td>Laparoscopy</td>
<td>1 (2.2%)</td>
</tr>
<tr>
<td></td>
<td>Oncology</td>
<td>8 (17.4%)</td>
</tr>
<tr>
<td></td>
<td>Orthopedic</td>
<td>11 (23.9%)</td>
</tr>
<tr>
<td></td>
<td>Plastic Surgery</td>
<td>2 (4.3%)</td>
</tr>
<tr>
<td></td>
<td>Urology</td>
<td>6 (13%)</td>
</tr>
</tbody>
</table>
The characteristics of the initial preoperative hemodynamic examination of patients in this study are described in table 2.

### Table 2 Characteristics of Subjects Preoperative Hemodynamic

<table>
<thead>
<tr>
<th>Hemodynamic Parameter</th>
<th>Min</th>
<th>Max</th>
<th>Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic Pressure (mmHg)</td>
<td>99</td>
<td>156</td>
<td>118.41 ± 11.76</td>
</tr>
<tr>
<td>Diastolic Pressure (mmHg)</td>
<td>54</td>
<td>97</td>
<td>73.91 ± 9.12</td>
</tr>
<tr>
<td>MAP (mmHg)</td>
<td>73</td>
<td>109</td>
<td>87.54 ± 8.66</td>
</tr>
<tr>
<td>HR (x/minute)</td>
<td>18</td>
<td>98</td>
<td>81.56 ± 13.50</td>
</tr>
<tr>
<td>RR (x/minute)</td>
<td>14</td>
<td>20</td>
<td>17.54 ± 1.61</td>
</tr>
<tr>
<td>Temperature (°C)</td>
<td>36.3</td>
<td>37.3</td>
<td>36.68 ± 0.26</td>
</tr>
</tbody>
</table>

Evaluation of the patient’s initial pain scale using WBFS (Wong Baker Faces Scale) prior to anesthesia and surgery. From the data table below, there were no patients with moderate or severe pain scale at the beginning of the preoperative examination.

In this study, the use of modalities used for postoperative pain relief therapy is multimodal analgesia with PCA fentanyl. Provision of the amount of fentanyl need for pain relief through PCA was measured for each patient in this study. There are 2 parameters of PCA fentanyl requirements that are evaluated, namely total fentanyl and total demand dose within 24 hours of administration.

The quality of recovery of postoperative patients evaluated in this study includes 2 things, namely from the subjective parameters of the patient using the self-reporting method using the QoR-40 questionnaire and also from the objective parameters using the pupillary pain index which is examined by digital pupillometry. Quality recovery checks were performed in 2 times, namely at 12 hours postoperatively and 24 hours post surgery. This study uses a cut-off point 142 as a clinical interpretation of good and poor quality of recovery, following previous study. While in the PPI assessment, the range of values is between 1 and 10, where the smaller the value, the better the quality of recovery well.

Examination of the quality of recovery of patients after surgery when compared between the 12th hours to the 24th hour on both parameters. It showed a significant difference with p <0.01.

Correlations analysis between the quality of recovery of postoperative patients based on QoR-40 and PPI is drawn according to the graphs in Figure 1 and Figure 2.

![Figure 1](image1.png)
Discussion

This broad distribution of types of surgery shows that the results of the correlation analysis between QoR-40 and PPI, apply in all types of operations. It showed that the number of fentanyl PCA requirements can be seen according to table 4. In this study, Fentanyl can be used as a single modality for postoperative analgesia with a continuous dose ranging from 0.5 to 0.75 mcg / kg / hour. The dose of fentanyl continuous infusion as a mild-moderate postoperative opioid analgesia is 0.4-0.6 mcg / kg / hour. This shows the number of fentanyl needs of patients is low.

The concept of multimodal analgesia can be given at a smaller dose than a single administration of the drug. In this study the provision of multimodal analgesia was clinically effective, because with the combination of paracetamol and ketorolac the amount of PCA fentanyl requirement was relatively small at 0.28 mcg / kg / hour. According to the study, the administration of therapeutic regimens through PCA can be tailored to individual needs for improving the quality of healing and care.

According to a study, the quality of patient recovery at 12 hours postoperatively is unsatisfying because it has a mean value QoR-40 is below the cut-off point. Further, from 46 samples, 28 patients (60.8%) had a QoR-40 questionnaire value of less than 142. Only 39.2% of patients who had a QoR-40 score of 142 and above, or clinically had good recovery quality at 12 o’clock after surgery. But in evaluating the quality of recovery at 24 hours postoperatively, the Qor-40 questionnaire value of the sample patients in this study had a statistically significant improvement compared to 12 hours (p < 0.01). The mean QoR-40 at 24 hours was 161.06 ± 24.56, exceeding the cut-off point of 142. Most, 37 patients (80.4%), had good recovery quality (QoR-40 more than 142) 24 hours postoperatively. Only 9 or 19.6% of patients had poor recovery quality (QoR-40 value < 142) at 24 hours.

Several things can cause the lack of quality postoperative recovery at 12 hours based on the QoR-40 questionnaire. The quality of recovery in QoR-40 is assessed based on 5 dimensions: patient support, patient comfort, patient emotions, physical independence, and pain. The provision of multimodal analgesia dealing with pain and comfort for patients, but support, emotional, and independence factors are more subjective and cannot be controlled with multimodal analgesia in the acute phase, less than 1 day after surgery. Maybe, the patient does not feel pain, but emotionally does and his physical independence is still lacking. This causes the quality of recovery at 12 hours is unsatisfying.

In evaluating the quality of recovery using objective parameters (PPI), the value at 12 hours postoperatively varies from 1 to 10. While at 24 hours, the value of PPI variations 1 to 6. In contrast to QoR-40, quality assessment recovery using PPI has the opposite interpretation. In PPI, the higher the value the clinical patient feels very painful or uncomfortable, while the smaller the value, the better the quality of recovery. There is no cut-off point for PPI values that can be used as a clinical interpretation in the classification quality of recovery.

When compared between the 12th hour PPI value and the 24th hour, there was a statistically significant difference (p < 0.01). At the 12th hour postoperatively the PPI mean value was 4.39 ± 1.94, while at the 24th hour there was a decrease in the PPI mean value of 2.82 ± 1.33. In the sample data of this study, there were 36 patients (78.2%) who experienced a decrease in PPI values from 12 to 24 hours. There were 7 patients (15.2%) who had the same PPI values at 12 and 24 hours, and only 3 patients (6.6%) experienced an increase in PPI values from 12 to 24 hours.

Based on the analysis of the relationship between QoR-40 and PPI, it can be concluded clinically that PPI
evaluation can be used as a substitute for QoR-40 in assessing the quality of recovery of patients after surgery. This is in accordance with a study conducted by Rollins et al., that the characteristics of pupils and pupillary dilation reflex (PDR) can be used as an objective response to discomfort or pain in postoperative patients. Comfort and pain are also factors that influence the quality of patient recovery directly, this causes PPI to have a significant relationship and can be used to replace QoR-40 as an assessment of the quality of recovery of patients after surgery.

Clinically, the use of PPI when compared to the QoR-40 questionnaire is more practical and effective. PPI examination with pupillometry is an objective measurement of pain, the same as pain biomarkers such as cortisol, IL-6, TNF-alpha and others. But studies of pain biomarkers do not have very significant results and are considered not effective. On the other hand, evaluation of pain and quality of recovery can use tools that utilize a variety of body responses due to pain or discomfort, one of which is PPI which can be assessed by interpreting the response of dilated pupils to the presence of pain or discomfort. PPI is considered more practical, non-invasive, fast and inexpensive in evaluating the objective parameters of pain and its relation to the quality of postoperative recovery.

Conclusion

The QoR-40 questionnaire has a significant correlation with the Pupillary Pain Index as an assessment of the quality of recovery in postoperative patients (p <0.01). Pupillary Pain Index can replace QoR-40 as an alternative assessment of the quality of recovery of patients after surgery.

Conflict of Interest: The authors declare that there is no conflict of interest.

Source of Funding: This research is financed by independent financial from the researchers.

Ethical Clearance: Taken from Dr. Soetomo Hospital Ethics Committee, 09/09/2019, 1495/KEPK/IX/2019. Further, all the subjects on this research are agreed to fill the consent form for this publication.

References


Coal Dust Exposure and Gingivial Lead Line in Coal Miners

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Abstract
Coal dust contains less than 1% lead (Pb). This dust can enter the body through breathing, mouth and skin. Lead contained in coal dust can react with Sulfur and form gingivial leadline. The study was an observational study with cross-sectional design. The research subjects were coal miners in Sambung Makmur Sub-District, Banjar District, amounting to 100 people. The number of samples was calculated by the Slovin formula and obtained 80 people as samples and determined by simple random sampling technique. The sample obtained then determined the value of the gingivial lead line score as done by Sudibyo. The degree of gingivial lead line is assessed based on the score as follows: 0 = no gingivial lead line; 1 = gingivial lead line found in 1-2 marginal gingival anterior teeth labial surface; 2 = gingivial lead line found at 3-4 marginal gingival anterior teeth labial surface; 3 = gingivial lead line at>4 marginal gingival anterior teeth labial surface. In addition, age, working period (tenure), and smoking habits are the variables measured in this study. The data obtained were analyzed using the chi-square test with a = 5%. The conclusion is the incidence of gingivial leadline of coal miners was related to age, tenure, and smoking habits.

Keywords: gingivial leadline, lead, coal dust, coal miners

Introduction
Kalimantan Selatan is one of the provinces in Indonesia which has the largest coal mining with locations spread throughout the region. One of the problems arising from mining is the issue of coal dust which can have an impact on health. This is due to the metal content found in coal dust, namely Fe 36.9%; Si 17.9%; Mo 15%; Al 10%; Ca 8.67%; S 4.7%; Ti 3.65%. Some heavy metal content of less than 1% includes K, V, Cr, Mn, Ni, Cu, and Pb.1

Coal dust containing metals can enter the body through breathing, mouth and skin. Furthermore, metals contained in coal dust, especially Lead and Sulfur will accumulate in gum tissue through systemic and local processes, namely direct absorption by the oral mucosa. Lead and Sulfur produce lead sulfate which is deposited in the basement membrane of gum.2 These deposits provide a picture of the lead line in the gums. Various factors that are thought to influence the occurrence of gingival lead line, such as working period, age, use of personal protective equipment (PPE), smoking habits, etc.3

The working period (tenure) affects the incidence of gingivial lead line, because the working period shows the length of time someone is exposed to coal dust. The longer the exposure time, the incidence of gingival lead line will be more severe. Likewise, increasing age causes the detoxification rate to slow down, resulting in a buildup of lead from coal dust. This incident gingivial lead line will be more severe.4

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Previous research has revealed that the working period has a relationship with the incidence of gingivial lead line in traffic police.\(^4\) Other studies have also revealed that the workshop workers have a risk of gingivial lead line because every day they are exposed to fumes that contain lead.\(^5\) Coal miners are a group at risk of developing gingivial lead lines. This is due to his daily exposure to coal dust containing lead and sulfur. However, not many studies have revealed this. Therefore in this study we will examine the relationship of working period, age, and smoking habits to the incidence of gingivial lead line of coal miners.

**Materials and Method**

The study was an observational study with cross-sectional design. The research subjects were coal miners in Sambung Makmur Sub-District, Banjar District, amounting to 100 people. The number of samples was calculated by the Slovin formula and obtained 80 people as samples and determined by simple random sampling technique.

The sample obtained is then determined by the value of the gingivial lead line score as done by Sudibyo.\(^6\) The degree of gingivial lead line is assessed based on the score as follows:

- 0 = no gingivial lead line
- 1 = gingivial lead line found in 1-2 marginal gingival anterior teeth labial surface
- 2 = gingivial lead line found in 3-4 marginal gingival anterior teeth labial surface
- 3 = gingivial lead line at>4 marginal gingival anterior teeth labial surface

In addition, age, working period, and smoking habits are the variables measured in this study. The data obtained were analyzed using the chi-square test with \(a = 5\%\).

**Findings and Discussion**

This study involve 80 male who were willing to be sample in the study. The lowest age is 19 years and the highest is 45 years. The existence of gingivial lead line can be seen in Figure 1.

![Figure 1. Normal gum looks reddish (a) and gingivial lead line (b)](image)

Gingivial leadline, also called Burtons’s Line, is a pigment in the form of gray-blue lines at the border between teeth and gums.\(^7\) Leadline occurs due to a reaction between lead and sulfur ions released by the bacterial oral cavity, leading to lead sulfid at the tooth and gingivial surface.\(^8\)

**Relationship between age and gingival lead line**

The relationship between age and the gingival lead line is presented in table 1. Gingivial lead line is found in>4 marginal gingival anterior teeth labial surfaces. It is found more at the age of 30-45 years.
Table 1. Relationship of Age with Gingival Lead Line

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Gingival Lead Line Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>15-30</td>
<td>15%</td>
</tr>
<tr>
<td>30-45</td>
<td>7.5%</td>
</tr>
</tbody>
</table>

Based on the results of the chi-square test obtained $p = 0.005$ ($p < 0.05$), it was concluded that age was associated with the incidence of gingival lead lines in coal miners. The relationship between age and gingival lead line caused by in the young age more sensitive to lead activity. It is closely related to organ development and function are not perfect. In the old age the sensitivity is higher, this is caused by the activity of the biotransformase enzyme decreases with increasing age and the resistance of certain organs decreases to the effectsof coal dust containing lead. The older the person, the higher the amount of lead accumulated in the body tissues.

On the other hand, the activity metaloprotein (metal-binding protein) in the oral cavity will slowly decrease the activity. This causes lead contained in coal dust can not be transported optimally by metalloproteins. As a result, lead reacts with sulfur in the oral cavity and leadline is formed. The results of this study are in accordance with the study by Vera$^9$, which states that the age of street vendors in the city of Semarang affects the incidence of gingival leadline.

<table>
<thead>
<tr>
<th>Working period (month)</th>
<th>Gingival Lead Line Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>&lt;3</td>
<td>12.5%</td>
</tr>
<tr>
<td>3-6</td>
<td>5%</td>
</tr>
<tr>
<td>6-9</td>
<td>1.25%</td>
</tr>
<tr>
<td>9-12</td>
<td>2.5%</td>
</tr>
<tr>
<td>&gt;12</td>
<td>1.25%</td>
</tr>
</tbody>
</table>

Based on the results of the chi-square test obtained $p = 0.000$ ($p < 0.05$), it was concluded that the working period of coal miners was related to the incidence of gingival lead line. The working period shows the length of exposure to coal dust containing lead. Lead as the cause of many lead lines accumulates in gum tissue through systemic processes or local processes, namely direct absorption by the oral mucosa. This lead will only form a lead line after reacting with sulfur ions produced by anaerobic bacteria in the oral cavity.$^{10}$ The results of
the reaction are lead sulfate compounds which are then deposited on the gum basement membrane. These deposits provide a picture of the lead line in the gums. Thus, it can be concluded that indirectly the Oral Hygiene Index (OHI) and Gingivitis Index (GI) are important factors that determine the quality of lead line formation because these two factors are closely related to the presence of bacteria in the oral cavity.\textsuperscript{11}

**Relationship between smoking habit and gingival lead line**

In table 3, the relationship between smoking habits and the incidence of gingival lead line is presented.

<table>
<thead>
<tr>
<th>Smoking habit</th>
<th>Gingival Lead Line Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Not a smoker</td>
<td>7.5%</td>
</tr>
<tr>
<td>Smoker</td>
<td>15.0%</td>
</tr>
</tbody>
</table>

Based on the results of the chi-square test obtained $p = 0.158$ ($p < 0.05$), it was concluded that the smoking habits of coal miners were not related to the incidence of gingival lead lines. The standard of cigarettes taken from tobacco, in the handling process often uses pesticides which also contain basic ingredients of lead (Pb).\textsuperscript{12} Thus, research subjects who had a smoking habit of Pb levels increased the amount of Pb exposure both from the contents of the cigarette and from coal dust were also sucked. This can worsen the incidence of gingival leadline.

**Conclusion**

The results of this study concluded that the incidence of gingival lead line in coal miners was significantly related with age, working, and smoking habits. Thus, a comprehensive effort is needed to improve dental and oral health.

**Ethical Clearance:** This research has gone ethical feasibility testing by the Ethical Research Commission of the Faculty of Dentistry, University of Lambung Mangkurat and declared as ethical: no. 28 / KEPKG-FKGULM / EC / IX / 2017.

**Source Funding:** This study was done by self-funding from the authors.

**Conflict of Interest:** The authors declare that they have no conflict interests.

**References**


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Abstract

Background: Child nutritional status needs to be assessed accurately so that early and appropriate management can be carried out. Indonesia has launched child growth standards in 2005, known as Growth Diagrams of Indonesian Children (GDIC), while the WHO 2006 child growth standards (WHO-CGS) is currently use as standards to assess growth of Indonesian children.

Aim: This study aims to analyze differences in the interpretation of nutritional status between 2006 WHO-CGS and 2005 GDIC.

Method: This is a cross sectional study. 1162 children aged 0-60 months in five selected villages in a public health center in East Java, Indonesia were included in this study. Interpretation of growth was categorized into weight-for-age, length/height-for-age, and weight-for-length/height based on two growth assessment standards; 2006 WHO-GCS and 2005 GDIC.

Results: 2005 GDIC detected underweight, stunted, wasted, and obese children fewer than the 2006 WHO-CGS. There are significant differences in the interpretation of weight-for-age in girls aged 0-50 weeks (p<0.001) and length/height-for-age in children aged 0-60 months (p<0.001). While weight-for-length/height showed significant differences in boys aged 0-60 months (p=0.008) and aged 6-36 months (p=0.027).

Conclusion: 2005 GDIC detects fewer children with malnutrition than 2006 WHO-CGS. The significant difference on interpretation between two growth charts was particularly found in height-for-age.

Keywords: 2006 WHO child growth standards, 2005 Growth Diagrams of Indonesian Children, malnutrition, children 0-60 months

Introduction

Malnutrition is one of the important public health problems, affecting more than 900 million people worldwide. It is responsible for the highest death rates in children and has long-term physiological impacts. Malnutrition in children has been linked to poor mental development and school performance as well as behavior disorders. 1 Children’s height for 2 years of age is the best predictor of human capital, therefore malnutrition is associated with lower human capital. Damage suffered early in life leads to permanent decline and may also affect future generations. Malnutrition prevention might bring important health, educational, and economic benefits. Chronic diseases are especially common in malnourished children who gain rapid weight gain in their growth. 2 Cooperation of all stakeholders is needed to act to overcome malnutrition. 3

The prevalence of underweight children under five years old with in the world in 2011 is estimated at 16% (101 million) and has shown a decrease from 1990 with 159 million. The prevalence of stunted and very stunted toddlers in the world in 2016 was 22.9% (155.8 million). But this data has shown a decrease compared
to 2011 which was 26%.\textsuperscript{4} The 2018 national prevalence of underweight and stunted children is higher than the world prevalence (17.7% and 30.8%, respectively), but it shows lower prevalence than 2013 national data (19.6% and 37.2% respectively).\textsuperscript{5} Those prevalence rates were obtained from interpretations of nutritional status using the 2006 WHO child growth standards (2006 WHO-CGS).

Large number of malnutrition prevalence becomes national priority program and concern in daily clinical management. Nonetheless, several studies have concluded that the interpretation of nutritional status using the WHO child growth standards results in overestimation of malnutrition prevalence rate.\textsuperscript{6-10} Those studies were conducted to compare interpretation between the 2006 WHO-CGS growth chart and the national growth charts of each country. This suggests that specific factors play a role to affect child growth in each country.

Indonesia has developed 2005 growth diagrams of Indonesian children (2005 GDIC), even though it has not been widely used.\textsuperscript{11} This research will analyze the different interpretations between 2006 WHO-CGS and 2005 GDIC, and also underline the importance of using national growth charts to measure nutritional status more accurately.

**Method**

This study was cross sectional study conducted on October-November 2017. Secondary data were obtained from medical record of five selected villages in the working area of Berbek community health center in East Java, Indonesia. A total of 1162 boys and girls aged 0-60 months who took part in the routine Pos Pelayanan Terpadu (posyandu)/integrated healthcare center in their respective villages on August 2017 were included in this study. Patients with congenital anomalies, chronic diseases, or patients taking long-term corticosteroids were not included in the study.

The selection of five villages from nineteen villages was chosen used simple random sampling. Children were divided into boys and girls, and each sex group were divided into three age groups; 0-5 months, 6-36 months, and 37-60 months. Anthropometric data was collected, both weight (kg) and length/height (cm). The data were plotted based on its nutritional status using two growth charts, the 2006 WHO-CGS and 2005 GDIC. The nutritional status is categorized into weight-for-age, length/height-for-age, and weight-for-length/height. The data were statistically analyzed through comparison test using the Wilcoxon Signed-rank Test. p<0.05 was considered significant.

**Results**

Table 1 shows the sample characteristics of children. From a total of 1162 children under five the majority of children were male (53.4%) and their age were 6-36 months (55.5%). Measurements using the two growth charts cannot be done in all age groups because the weight-for-age diagram of 2005 GDIC is only available for children aged 0-50 weeks and weight-for-length/height diagrams of 2005 GDIC is only available for children with length/height <60 cm. Of about 1162 children, only weight-for-age of 374 children were measured using those 2 standards, and only weight-for-length/height of 1094 children were measured using those 2 standards. However, length/height-for-age can be measure in every sex and age groups. The total prevalence of underweight, stunted, wasted, and obesity among children was smaller when interpreted using 2005 GDIC growth chart.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>n (%)</th>
<th>Mean±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>621 (53.4%)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>541 (46.6%)</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>0-5 months</td>
<td>152 (13,1%)</td>
<td></td>
</tr>
<tr>
<td>6-36 months</td>
<td>645 (55,5%)</td>
<td></td>
</tr>
<tr>
<td>37-60 months</td>
<td>365 (31,4%)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Height</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5 months</td>
<td>58,33 ± 5,30</td>
<td></td>
</tr>
<tr>
<td>6-36 months</td>
<td>77,11 ± 9,04</td>
<td></td>
</tr>
<tr>
<td>37-60 months</td>
<td>95,79 ± 6,21</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Underweight (0-50 weeks)</th>
<th>20 (5,34%)</th>
<th>3 (0,80%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stunted (0-60 months)</td>
<td>346 (29,8%)</td>
<td>24 (2,06%)</td>
</tr>
<tr>
<td>Wasted (0-60 months)</td>
<td>42 (3,83%)</td>
<td>0 (0 %)</td>
</tr>
<tr>
<td>Obesity (0-60 months)</td>
<td>91 (8,31%)</td>
<td>22 (2,01 %)</td>
</tr>
</tbody>
</table>

Most of children have normal weight-for-age, both according to 2006 WHO-CGS or 2005 GDIC. 2005 GDIC detects fewer underweight children in both sexes and fever obese boys than 2006 WHO-CGS. The difference of weight-for-age interpretation was significant only for girls (p<0.001). Most of children have normal weight-for-length/height, both according to 2006 WHO-CGS or 2005 GDIC. 2005 GDIC detects fewer both wasted and obese children than 2006 WHO-CGS. The difference of weight-for-length/height interpretation was significant only for boys aged 0-60 months (p=0.008) and boys 6-36 months (p=0.027).

Weight comparison on male subject aged 0-50 weeks old (p=0.439), Weight comparison comparison on female subject aged 0-50 weeks old (p<0.001), Height interpretation based on age comparison on male toddlers 0-60 Months old, 0-5 Months old, 6-36 Months old, 37-60 Months old (p<0.000), BW/BH interpretation comparison on male toddlers aged 0-60 Months old (p=0.008), 0-5 Months old (p=0.157), 6-36 Months old (p=0.027), 37-60 Months old (p=0.371) and WHO Curve dan GDIC Curve comparison in BW/BH interpretation of female toddlers aged 0-60 Months old (p=456), 0-5 Months old (p=0.059), 6-36 Months old (p=0.841), 37-60 Months old (p=0.782).

**Discussion**

Abnormalities of child growth either under-nutrition or over-nutrition are associated with morbidity and mortality as well as long term impacts in adulthood, such as cardiovascular and metabolic disease. Therefore, precise measurement of growth is important to monitor child health and prevent malnutrition.

This study shows that both growth charts mostly detect normal growth in our study participants. Prevalence of national under-five underweight, stunted, and wasted children were higher (17.7%, 30.8%, 10.2%, respectively), but obese children was fewer (8.0%) than prevalence found in this study. However, prevalence of stunted children in this study was higher than world prevalence in 2016. 4
2006 WHO-CGS detects more underweight, stunted, wasted, and obese children than 2005 GDIC. However, significant differences were only found in weight-for-age of girl, height-for-age of all age and sex groups, weight-for-length/height of 0-60 months boys, and 3-36 months boys.

This indicates that Indonesian children are lighter and shorter than the population standard used to develop the 2006 WHO-CGS. Previous study also suggest that the nutritional status of Indonesian children according to weight-for-length/height tends to be the same as the population of American children because Indonesian children are lighter and shorter. 11

Weight-for-age interpretation was only significantly difference in 0-50 weeks girl, and weight-for-age interpretation was only significantly difference in 0-60 months boys and 3-36 months boys. This suggests that gender plays an important role in child growth. Genetic expressions that affect body weight appear to be significantly higher in girls starting at 9 months compared to boys. 14

Racial factor is thought to be associated with child growth difference between Indonesian and American populations. But the influence of race in child growth is still controversial. Despite differences in race, WHO Multicentre Growth Reference Study Group (2006) found similar child growth rate among their subjects. It is thought that environmental factor such as nutrition have more impact on child growth, because poor nutrition and infection can increase risk of stunted children. 15 Previous review also indicate that application of specific racial and ethnic groups growth chart is not recommended because child growth are more affected by environmental factors rather than genetic factors. 16 Therefore, WHO recommends to use only one growth chart for all child populations in the world. 17

However, some studies show that the interpretation of height-for-age using WHO chart shows different result than interpretation using height-for-age national chart of some countries. 18 Racial difference in child growth is a fact but this phenomenon is caused by inequality in environmental factors such as economics, psychosocial, and cultural factors that affect minority groups. However, previous study has shown the biological influence on child growth. Hong Kong Chinese children is shorter than WHO growth standards as a result of epigenetic constrains on growth rather than environmental factors

A meta-analysis from 55 countries also showed that the standard deviation score (SDS) of European children in general are +0.5 SD, while children from Saudi Arabia and India are -0.5 SD compared to the WHO 2006 chart reference population. 20 Research by Batubara et al (2006) also shows that Indonesian children have lower SDS than the 2000 CDC chart reference population. This data shows that there are different characteristics of child growth in various regions.

The different interpretations of two growth chart in this study indicate that estimation of children malnutrition in Indonesia using 2006 WHO-CGS is exaggerated, and perhaps Indonesian children have grown in accordance with their genetic potential. This can lead to unnecessary examination and intervention which can interfere exclusive breastfeeding and cause excessive supplemental feeding. 7 Formula milk and excessive supplementation of food can cause excess weight which will be accompanied by long-term complications in the future. It must be considered in the national policy of malnutrition management in Indonesia. However, because children’s growth is not only influenced by race or genetic factors, good environmental factors must also be considered. Interventions to correct problems that affect the nutritional status of the population such as lack of breast milk, low or high calorie food, lack of health facilities, sanitation, and poverty must be continued. 17

This study also has several limitations. Our study analyzed secondary data collected from integrated healthcare center, hence anthropometric measurements tend to vary in each center. Nutrient intake including breast milk and parent socioeconomic status were not evaluated. This might lead to some bias in evaluating differences in interpretation of nutritional status. Application of growth chart that developed from Indonesian children as standard population should be considered in estimating children with malnutrition. Further study is needed to confirm whether the interpretation of child nutritional status using growth chart is consistent with their clinical condition and also to determine whether Indonesian children have grown.
according to their genetic potential.

**Conclusion**

2005 GDIC detects fewer children with malnutrition than 2006 WHO-CGS. The significant difference on interpretation between two growth charts was particularly found in height-for-age.

**Ethical Clearance:** This research is approved by ethical clearance from Universitas Airlangga

**Source of Funding:** This research funded by self

**Conflict of Interest:** There is no conflict of interest

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Association between Blood Total Testosterone Levels and Consolidated Memory on Eldery Men at Veterans Institution

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Abstract

Background: Decreased total testosterone levels in the blood will disrupt memory consolidation. In this phase, one could still function normally even though it is difficult to recall the information that has been learned.

Methods: The subjects were taken consecutively and conducted by interview, generalist, and neurological physical examination, Word List Memory Task examination twice as well as measurement of total testosterone in the blood. The subjects were grouped into total blood testosterone levels of less than 298 ng/dl and more than equal to 298 ng/dl.

Results: Fifty-four subjects studied obtained that total blood testosterone levels <298 ng/dl in the Word List Memory Task (WLMT) group <21 (62.5%) were higher than the WLMT group ≥21 (37.5%). Furthermore, Total Testosterone in the blood more ≥298 ng/dl in the WLMT group <21 (15.2%) was less than in the WLMT group ≥21 (84.8%).

Conclusion: There was a correlation between total testosterone levels in the blood and memory consolidation in elderly men at the Veterans' Institute of Republic Indonesia in Surabaya.

Keywords: Elderly men, Total Testosterone in the Blood, Consolidation of Memory, Neurology

Introduction

It is estimated that the world population is 7 billion, up from 6.5 billion in 2006. The increase in number is followed by an increase in people aged 60 years and over. Between 1970 and 2025, the number of elderly people is expected to increase by 223% or about 694 million. In the year 2025, there will be about 1.2 billion people in the world aged 60 years and over. Then soon will be 2 billion in 2050. Increases occur in many developing countries, including Indonesia. The increasing number of elderly people in the world brings several problems in the health field. Health problems of decline in cognitive function will affect the pattern of interaction with the elderly living environment, with family members and social activities. This will add to the burden of families, the environment, and society.

In the aging process, there will be a circadian rhythm disorder that is a biological process that shows endogenous oscillations and recurs every 24 hours, including sleep-wake cycle, heart rate, blood pressure, hormone secretion, sensory ability, and mood are all governed by the hypothalamus.

Disorders of hormone secretion possibility cause a decrease in total testosterone levels in men resulting in some symptoms and complaints such as cognitive and mood disorders as well as disorders of virility.
Cognitive impairment is much complained by 39% of the population aged 50-59 years and increased to more than 85% at the age of over 80 years. Men (6,7) will experience a decrease in total blood testosterone levels of about 0.8-1.6% every year starting when entering the age of about 40 years. The decrease in total testosterone levels will disrupt the consolidation of memory so that there possibility complaints of forgetfulness. In this phase, one could still function normally even though it is difficult to recall the information that has been learned. However until now, the correlation between total testosterone levels and memory consolidation remains unclear.

Research on total testosterone levels with memory consolidation disorder in elderly men will be conducted at the Community of Veterans of Republic Indonesia8. This community consists of the struggle retired veteran (before independence), retired armed forces of Republic Indonesia (after Indonesian independence) and retired police9. The selection of Veterans Institution of the Republic of Indonesia in its population has a high well being educated, has the spirit to move and socialize and still pay attention to the importance of health problems10. So hopefully this community could help the smoothness of this research.

Examination of total blood testosterone levels needs to be performed, as the total blood testosterone levels could affect the formation of consolidated memory and the learning process, leaving the elderly easily to forget their memories.11 Until now in Indonesia there is no research on this topic, therefore the authors are interested to determine the correlation between total blood testosterone levels and memory consolidation in the elderly male.

**Methods**

Fifty-four elderly men in Veterans of Republic Indonesia in Surabaya were enrolled from November 2014 to October 2015, attention function (Digit Span) >5, concentration function (Vigilance) >10, Mini-Mental State Examination (MMSE) >24, minimum level of senior secondary education or equivalent, willing to participated the research (informed consent). The method was performed according to consecutive cases (sampling from consecutive admission) until the sample number has been reached to set. Then, it was conducted an interview, performed memory check word list memory task twice and laboratory on participants who meet the criteria for inclusion.

This was an observational analytic with the cross-sectional approach and has obtained the approval of ethical clearance from the ethics committee of Dr. Soetomo General Hospital, Surabaya Indonesia. The dependent and independent variable data will be analyzed analytically by using chi-square. Data analysis results will be displayed in graphical form. The entire process of data analysis will be processed using the SPSS 21 computer program. (SPSS, Inc., Chicago, IL)

**Results**

**Basic Characteristics of Research Subject**

A total of 54 study subjects consisting of 8 subjects with total testosterone less than 298 ng/dl and 46 subjects with testosterone more than or equal to 298 ng/dl. Characteristics age of the subjects obtained; 60-65 years was 25 people (46.3%) and age 66-70 years was 29 people (53.7%). Educational Characteristics was high school graduate level by 52 (96.3%) and university graduate by two (3.7%).

The subjects with hypertension were 17 (31.5%) people, and those who not suffer were 37 (68.5%) people. Subjects with diabetes mellitus were 19 (35.2%) people and those without was 11 (35.8%) people. Subjects with dyslipidemia were 11 (20.4%) people, and those who did not suffer were 43 (79.6%) people. Active subjects smoked was 22 (40.7%) people, and who did not smoke was 32 (59.3%) people. Subjects with memory consolidation disorder were 12 (22.2%) people, and those with no memory consolidation problems were 42 (77.8%) people. Subjects with total testosterone levels less than 298 ng/dl were 8 people (14.8%), and subjects with total testosterone levels more than or equal to 298 ng/dl were 46 people (85.2%).

**The correlation between Hypertension and Memory Consolidation**

In subjects with uninterrupted consolidation who experienced hypertension was fewer by 2 people (11.8%) than non-hypertensive by 10 people (27.0%). This difference was not statistically significant or clinical, with p = 0.300 and odds ratio (RO) of 0.360 (CI 95% 0.070-1.864).

**Correlation between Diabetes Mellitus and Memory Consolidation**
In the subjects with consolidated disruption who had diabetes was 6 (31.6%) people more than those who did not have diabetes by 6 (17.1%) people. This difference was not statistically significant or clinical, with $p = 0.307$ and odds ratio (RO) of 2.231 (CI 95% 0.604-8.224)

The correlation between Dyslipidemia and Consolidation of Memory

In subjects with uninterrupted consolidation who experienced dyslipidemia was 2 (18.2%) people fewer than non-dyslipidemia by 10 (23.3%) people. This difference was not statistically significant or clinical, with $p = 1.000$ and odds ratio (RO) of 0.733 (CI 95% 0.136-3.965)

Correlation between Smoking and Memory Consolidation

In subjects with uninterrupted consolidation who smoked was 5 (22.7%) people more than non-smokers by 7 (21.9%) people. This difference was not statistically significant or clinical, with $p = 1.000$ and odds ratio (RO) of 1.050 (CI 95% 0.286-3.864)

Correlation between Education and Memory Consolidation

In the subjects experiencing the consolidation that interrupted with senior high school education was 11 (21.2%) people less than college education by 1 (50.0%) people. This difference was not statistically significant or clinical, with $p = 0.398$ and odds ratio (RO) of 0.268 (CI 95% 0.016-4.641)

Correlation between Total Testosterone Levels and Memory Consolidation

In subjects with impaired consolidation having total testosterone levels less than 298 ng/dl for 5 (62.5%) people, it more than those with testosterone levels greater than or equal to 298 ng/dl by 7 (15.2%) people. This difference was statistically and clinically significant with $p = 0.01$ and odds ratio (RO) of 9.286 (CI 95% 1.798-47.964). This means that subjects with a total testosterone level less than 298 ng/dl have a risk for memory consolidation disorder 9.286 times greater than subjects with testosterone levels greater than or equal to 298 ng/dl.

**Discussion**

In this study, there was a difference in the proportion of memory consolidation disorders in subjects with total testosterone levels less than 298 ng/dl and greater than or equal to 298 ng/dl. It was tested by chi-square test with $p = 0.01$ and odds ratio (RO) of 9.286 (CI 95% 1.798-47.964). Based on these data, it could be stated that there was a significant correlation between total testosterone levels and memory consolidation, where subjects with total testosterone levels less than 298 ng/dl have a risk for memory consolidation disorder 9.286 times greater than subjects with testosterone levels more or equal to 298 ng/dl.

Based on data, there was no statistically significant difference with $p = 0.307$ and the odds ratio (RO) 2.231 (CI 95% 0.604-8.243). Therefore, the status of diabetes mellitus was not a meaningful confounding factor for the occurrence of memory consolidation disorder. This possibly due to the good control of blood glucose in subjects suffering from Diabetes Mellitus. All subjects who suffer from Diabetes have received adequate therapy so that blood glucose levels during examination have been controlled. This was in accordance with the assertion that the correlation of intensive decreased blood glucose levels in diabetics to memory function impairment. The study concluded that intensive blood glucose control could be slowing the decline in cognitive function (CI 95% 1.02 to 1.19; $p <0.0156$). While the condition of chronic hyperglycemia accelerates the decline in cognitive function.

Hypertension was one of the confounding factors in this study. Some literature says that there is a correlation between hypertension and memory impairment. Hypertension often did not cause actual clinical symptoms so many hypertensive people did not realize it. If not treated, hypertension could cause coronary heart disease, heart failure, stroke, kidney failure and other problems such as memory function impairment. Hypertension causes narrowing of the blood vessels. Decreased blood flow to the brain due to the narrowing could cause the brain to become inefficient.

Measures of cognitive function in 288 hypertensive patients were produced high blood pressure (mean systolic 154.7 ± 21.3 and diastolic mean 88.6 ± 92) that had the significant role to cognitive function, including memory function with $p <0.001$.15
In data there was no significant difference between a statistic and clinical with \( p = 0.300 \) and the odds ratio (RO) 0.360 (CI 95% 0.070-1.864). So it could be stated that the status of hypertension was not a meaningful confounding factor for the occurrence of memory consolidation disorder. The study of 50 elderly patients with hypertension who performed cognitive examination using MMSE obtained the result of no difference in the cognitive disturbance between elderly and hypertension \( (p = 0.331) \). In contrast, other studies provide different results due to differences in subject research factors included in the inclusion criteria. Giordano included inclusion criteria ranging in age from 53 years to 94 years and male or female sex. While in this study the subject of research was aged 60 years to 70 years and all are male sex.

In data there was no statistically significant difference in the value of \( p = 1.000 \) and the odds ratio (RO) of 0.733 (CI 95% 0.136-3.965). So it could be stated that in this study, dyslipidemia was not a significant confounding factor for memory consolidation disorder. This was in contrast to prospective longitudinal community studies of LDL cholesterol with the risk of dementia in elderly people. The result of increased LDL cholesterol correlates with the risk of dementia with an odds ratio of 3.1 (CI 95% 1.5 - 6.1). In other studies provide a controversial result that there was a weak correlation between levels of High-Density Lipoprotein Cholesterol (HDL-C) and Low-Density Lipoprotein Cholesterol (LDL-C) with dementia disorders. This result was similar to Table 2. In Table 2, there was no statistically significant difference in the value of \( p = 1.000 \) and the odds ratio (RO) of 1.050 (CI 95% 0.286-3.864).

There have been several studies on the correlation of nicotine to cognitive function especially attention, learning, and memory. The effects of nicotine on neuroplasticity are controversial. Even some research on the effects of nicotine on attention, learning, and memory provide heterogeneous results. Subject who smoked had improved performance in motor responses, good attention, and memory recognition, but had a disruption to learning and memory recall. There have been several studies on the correlation of nicotine to cognitive function especially attention, learning, and memory.

In data, there was no statistically significant difference with \( p = 0.398 \) and odd ratio (RO) 0.268 (CI 95% 0.016-4.641). So it could be stated that in this study, the level of education was not a confounding factor that meaningful for the occurrence of memory consolidation disorder. These results not in accordance with some studies on the correlation between education level and cognitive impairment to the risk of dementia. Previous studies mentioned that the level of education was a predisposing factor of cognitive impairment and dementia. While the research using MMSE (Mini-Mental State Examination) and CDT (Clock Drawing Test) on elderly cognitive function profile over 60 years showed significant result, that subjects who received more than nine years of education (senior high school, diploma or bachelor), has a cognitive function that classified as normal while the elderly who only educated 9 years more experienced a decrease in cognitive function.

Based on the activity theory proposed Stanley to achieve successful aging, the elderly must remain active in both mental and physical activity. One of the mental activities is by undergoing formal education up to the highest level.

Results from previous studies were different from current research. In the previous study, there was no significant correlation between MMSE score and testosterone levels. Most patients have had low MMSE results although testosterone levels are within the normal limits. While in this study the factors (attention, concentration, MMSE and sleep disorders also depressive disorders) will be inserted into the subject of research when getting a bad result. Therefore, the memory consolidation disorder could be concluded as a result of low levels of testosterone alone.

Conclusion

There was a correlation between total testosterone levels and memory consolidation in elderly men at the Veterans’ Institute of Republic Indonesia in Surabaya.

Conflict of Interest: There is no conflict of interest.

Source of Funding: This study is self-funded.

Ethical Clearance: This study was approved by Ethical Commission of Health Research Faculty of Medicine University of Airlangga.

References


The Analysis of Workload and Safety Communication Against Burnout Syndrome in Inpatient Nurses

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Abstract

Introduction: Burnout is a psychological problem that attacks nurses and is one of the risks causes nurses to do unsafe actions. Nurses suffering from burnout and have a less safe environment will implement inefficient care systems. Generally, high workload is directly proportional to the incident of burnout. This research study aimed to find the effect of workload and safety communication on the level of burnout in inpatient nurse services.

Method: This research was a cross-sectional study implemented at Rumah Sakit Umum Haji and Rumah sakit Islam Jemursari Surabaya, Indonesia. This implementation of research study was started in April to June 2019. The samples were collected using two populations of sampling method and got 138 nurses as samples. To analyze the effect of workload and safety communication on burnout syndrome, the researcher used multinomial logistics.

Results: The results of Multinomial logistic test showed that workload affected the incidence of burnout with a value of p = 0.037 and safety communication did not affect the incidence of burnout syndrome with a value of p = 0.274.

Conclusion: Workload affected the burnout syndrome incidence, while safety communication had no notable effect on burnout syndrome. The researcher suggests the hospitals to provide mental and physical health services, as well as stress coping training for nurses.

Keywords: Workload, Safety communication, Burnout

Introduction

Nurses who work in hospitals faced many difficult situations every day. At the same time, nurses are part of the public who are concerned with economic problems. They often work more than one burden and are constantly under emotional, physical and mental pressure.

The facts in the field, not all nurses can do their duties and functions properly because they often experience mental and emotional exhaustion due to their duties, which must always be ready to provide maximum service for others. If this problem is not resolved immediately by the hospital, of course, the nurses’ stamina and emotions will be drained and generating pressure that creates in nurse’s burnout.

The fact that nurses have a high risk of experiencing burnout was discovered long ago. An imbalance between workload and number of nurses causes an overload of workload. The emergency department, orthopedics & traumatology, oncology, and advanced care are the work environment, which possesses the highest-pressure levels. If the nurses experience continuous overload workload, they will experience burnout. One sign of burnout on nurses is the expression of nurses who rarely smile to patients.
Nurses experienced burnout and have an uncomfortable environment triggered them to provide inefficient care compared to nurses who suffer from burnout. Safety climate is defined as the description or perception of nurses on safety practices, regulations, and procedures so that they act effectively in the work environment; associated with other priorities such as productivity. One dimension of safety climate is safety communication. This communication is very important, so dangerous situations could be prevented or avoided and the management may take the necessary initial action to dodge the dangerous situation and problems of environmental exposures.

There has been a lot of research on burnout and climate safety, but only a few researchers have studied in a comprehensive and detailed to investigate the effect of safety communication on the incidence of burnout syndrome, especially in health care organizations such as hospitals.

Therefore, the researcher was interested to analyze the effect of workload and safety communication on the burnout syndrome occurrence in inpatient nurses.

**Method**

This research study is a cross-sectional study. It was applied at Rumah Sakit Umum Haji and Rumah Sakit Islam Jemursari Surabaya, Indonesia started from April to June 2019.

The population in this research study was nurses in Rumah Sakit Umum Haji and Rumah Sakit Islam Jemursari Surabaya, Indonesia. The samples were 138 nurses and collected utilizing two population sampling methods.

The researcher collected primary and secondary data. Primary data in this research study were obtained by observing work sampling and questionnaires. Secondary data were from interviews and standard operating procedure documents.

Independent variables in this research study were workload and safety communication, while the dependent variable was burnout syndrome.

The multinomial logistic test was adopted to analyze the effect of workload and safety communication on burnout syndrome. There were three categories of burnout syndromes; those are low, medium, and high.

**Results**

**Workload**

The technique used in observing workload was work sampling, which was an observation of nursing care activities conducted by nurses in doing their daily tasks.

**Table 1: The Distribution of Workload**

<table>
<thead>
<tr>
<th>Workload Value (%)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>75</td>
<td>2</td>
<td>1.45</td>
</tr>
<tr>
<td>76</td>
<td>2</td>
<td>1.45</td>
</tr>
<tr>
<td>77</td>
<td>2</td>
<td>1.45</td>
</tr>
<tr>
<td>78</td>
<td>5</td>
<td>3.62</td>
</tr>
<tr>
<td>79</td>
<td>6</td>
<td>4.35</td>
</tr>
<tr>
<td>80</td>
<td>4</td>
<td>2.90</td>
</tr>
<tr>
<td>81</td>
<td>7</td>
<td>5.07</td>
</tr>
<tr>
<td>82</td>
<td>6</td>
<td>4.35</td>
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<tr>
<td>83</td>
<td>5</td>
<td>3.62</td>
</tr>
<tr>
<td>84</td>
<td>5</td>
<td>3.62</td>
</tr>
<tr>
<td>85</td>
<td>5</td>
<td>3.62</td>
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<td>86</td>
<td>5</td>
<td>3.62</td>
</tr>
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<td>87</td>
<td>8</td>
<td>5.80</td>
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<td>13</td>
<td>9.42</td>
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<td>90</td>
<td>19</td>
<td>13.77</td>
</tr>
<tr>
<td>91</td>
<td>8</td>
<td>5.80</td>
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<td>92</td>
<td>15</td>
<td>10.87</td>
</tr>
<tr>
<td>93</td>
<td>3</td>
<td>2.17</td>
</tr>
<tr>
<td>Total</td>
<td>138</td>
<td>100</td>
</tr>
</tbody>
</table>

The calculation of nurse workload on 138 samples of nurses was based on the percentage of productive time used for direct and indirect nursing activities of total working hours.

**Safety Communication**

Safety communication measurements functioned part of the safety climate questionnaire from Naghavi et.al. The results of safety communication measurements are described in the table below:
Based on the questionnaire results, most respondents (64%) declared the organization had high safety communication. This revealed, in general, respondents believed the organization had tried to communicate about work safety like safety talk. However, some respondents viewed the lack of safety communication from the head of the room.

**Burnout Syndrome**

Burnout syndrome measurement used a questionnaire from the Maslach Burnout Inventory (MBI). Based on the questionnaire results, respondents experienced high category burnout syndrome of 4%. Burnout-syndrome measurement results are described in the table below:

<table>
<thead>
<tr>
<th>Burnout Syndrome category</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>58</td>
<td>42</td>
</tr>
<tr>
<td>Mid</td>
<td>75</td>
<td>54</td>
</tr>
<tr>
<td>High</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>138</td>
<td>100</td>
</tr>
</tbody>
</table>

The Effect of Workload and Safety Communication on Burnout Syndrome

The researcher implemented statistical testing using multinomial logistic regression. It showed that there was a significant effect of the workload on burnout syndrome, (p = 0.037) and p <0.05. Safety communication did not affect burnout syndrome, (p = 0.274) and p> 0.05. The higher the workload of nurses might raise the chance of burnout syndrome incident.

**Discussion**

**Workload**

The observation results on workload analysis suggested the average value of 86.59 % of the total working hours per person. It indicated the workload of nurses had exceeded productive time. The maximum productive work time was only 80% of total work hours and 20 % was for non-productive activities. The excessive workload could cause physical or mental fatigue and emotional reactions such as headaches, indigestion, and irritability.

**Safety Communication**

On the questionnaire results, most respondents (64%) perceived that the organization possessed high safety communication. This explained in general, respondents assumed the organization tried to communicate about work safety such as safety talk. Nevertheless, some respondents considered the lack of safety communication from the head of the room. Safety communication is an influential contributor in improving safety at work. Regular communication about safety issues between managers, supervisors, and workers is an operative habit in improving health and safety in the workplace.

**Burnout Syndrome**

Questionnaire analysis presented respondents experienced low burnout (42%), moderate (54%), and high (4%) syndrome. Burnout syndrome means a condition encountered by someone in the form of physical, mental, and emotional fatigue that lasts for a long time. It potentially is likely to attack nurses and to increase in nurses implementing services, since they often meet with a variety of characters and illnesses suffered by patients. Hence, the nurses are at risk of having fatigue, both physically and mentally.

The data obtained from questionnaires analysis indicated the nurses frequently experienced burnout syndrome several times a month; it happened on which they worked with other people. They felt that working made them tired. Besides, nurses sensed responsible for some patient problems occurred several times a month, and this responsibility was considered as a burden.

**The Effect of Workload on Burnout Syndrome**

The results of this study showed there was a notable effect of workload on burnout syndrome. The
high workload triggered nurses to endure burnout and fatigue. This would have an impact that the nurses gave less quality of services. Another study conducted by Kiekkas presented burnout syndrome had a significant relationship with nurses’ workload. Kiekkas also stated high workload specifically affected one of the burnout-syndrome dimensions, namely physical and emotional exhaustion.

The high workload prompts the nurses to feel fatigued or burnout. Consequently, it produces job stress and influences on the decreasing job satisfaction. The excessive work stress on nurses led to burnout syndrome. Physical fatigue happened continuously for a long period will have an impact on psychological fatigue.

**The Effect of Safety Communication on Burnout Syndrome**

Safety communication did not affect burnout syndrome because safety communication between management and nurses was considered good. Good management communication reduced stress on workers.

**Conclusion**

The workload value per person was 86.59% of the total working hours. Based on the results of the questionnaire analysis, most respondents (64%) perceived that management had high safety communication.

Workload positively affected on the burnout syndrome incidence, while safety communication did not influence the burnout syndrome.

The researcher suggests the hospital’s management instill nursing care values so that work the nurses’ motivation increases. It also needs to provide refreshment to the nursing tasks. Thus, the subjective workload can be reduced, improve safety communication such as safety talks, provide mental and physical health services, and training coping with stress to the nurse.

**Conflict of Interest:** Nil

**Ethical Clearance:** Received from the Ethics Committee of RSU Haji Surabaya, Indonesia

**Source of Funding:** Self

**References**


Effectiveness of *Garra Rufa Care* Toward Pruritus Elderly Who Live in Indonesian Village

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Abstract

Pruritus is a neurodegeneratif disease that attacks the peripheral skin. It is not infrequently the elderly experience these health problems with itching complaint, so that it cause a feeling of wanting to scratch. High itching complaint can also cause the anxiety level increased. The purpose of this study was to determine the effectiveness of Garra Rufa Care pruritus elderly who live in the village area, Indonesia. This study was designed as a quasi experiment using non-probability techniques with a simple random sampling method. The respondents of this study consisted of 40 elderly people who had pruritus caused by dermatology and were divided into an experimental group and a control group. The independent variable was Garra Rufa Care, and the dependent variable was elderly with pruritus. This instrument of the study used the Numeric Rating Scale (NRS), Geriatric Anxiety Inventory (GAI) and used the Wilcoxon and Mann Whitney test with α <0.05 as data analysis. The results showed the effect of Garra Rufa Care on itching complaint (p = 0.000) and there was a significant low (α = 0.014). The results showed the effect of Garra Rufa Care on anxiety level (p = 0.000) and there was a significant significance (α = 0.000). Psychological effect have given “micro massage” and decreased the anxiety level which have physically reduced itching scores. Garra Rufa was effectively used as an intervention in the elderly with pruritus by decreasing itching complaint and anxiety level. Further study was expected to replicate similar studies with more samples and carried out observation after making intervention.

Keywords: Anxiety, Elderly, Garra Rufa, Itching, Pruritus.

Introduction

Pruritus is an unpleasant sensory perception that causes a strong desire to scratch and has a high impact on the quality of life¹. Chronic pruritus (CP) is a symptom with a negative impact on quality of life and it is known to be associated with anxiety². The elderly is one of the patients who often experience pruritus skin disorders. This is due to pruritus being one of the neurodegeneratif diseases that attacks peripheral skin³. Patient with the high pruritus intensity is more susceptible to experience anxiety⁴.

Pruritus can be found all over the world. According to a cross-sectional study in Oslo, Norway, pruritus affects 8.4% of the general population⁵. While in a French study a survey was sent to 10,000 randomly selected households ⁶. From the 7,500, 87% reported skin problems since their born and 43% of patients with skin diseases stated that they had experienced pruritus¹. According to a study in Turkey which involving 4099 elderly dermatological patients, 11.5% reported pruritus, and the highest prevalence was recorded in patient who aged over 85 years. From a study in Thailand which involving 149 elderly patients, pruritus was the most common in 41% of the total patients involved ¹. The results of the preliminary study conducted in one of the Villages, Indonesia, there were 40 elderly out of 521 elderly who experienced pruritus or 7.6% of the number of elderly people.

The number of elderly people in Indonesia is 7.6% or 18 million out of 237 million inhabitants. In East Java, there are elderly with 11.6% or 4.4 million inhabitants as the highest number ³ after the Daerah Istimewa
Yogyakarta (DIY) and Central Java. Based on the data from the population in the village there are 10.9% elderly or 521 out of 4810 inhabitants.

Skin aging comes from a combination of chronological and environmental factors. This involves intrinsic, hormonal, biological and genetic factors as well as extrinsic and dangerous stimuli such as accumulation of UV radiation, pollution or nicotine for life. Ageing skin will be characterized by epidermal and dermal atrophy, due to the loss of collagen, degeneration of elastic fiber tissue and loss of hydration. The characteristics of intrinsic and extrinsic aging are progressive loss of function, structural integrity and physiological function of the skin, which involves impaired immune responses and skin barrier function, vascular atrophy, metabolic imbalance of reactive oxygen species and extracellular matrix component. Therefore, the molecular mechanism that protects and defends against extrinsic factor decreases progressively over a lifetime.

While the problem of pruritus continues to be left and it is not immediately treated in the elderly, then the negative impact that will arise such as a scratching scar that can cause ulceration in the legs. Then the ulcer can develop into an infection and worsen the skin condition of the elderly. Therefore a special nursing intervention is needed to overcome this.

Garra Rufa Care is an action in the form of nursing intervention using Garra Rufa fish. Garra Rufa is a fish species that is beneficial for skin health by releasing the enzyme ditranol (anthralin) which can decrease the inflammatory process and increase skin moisture. Garra Rufa can also be used for aesthetic purposes and as a medical treatment of patient with psoriasis. The function of the ditranol enzyme released by Garra Rufa fish produces a therapeutic effect to improve blood circulation, the skin becomes smoother, reduces and blurring of the scars and increases skin regeneration. This study was conducted to determine the effectiveness of Garra Rufa Care Toward Pruritus Elderly in Village Areas of Indonesia.

**Material and Method**

Quantitative approach with the Quasy Experimental design and pre-post control design research was conducted to determine the effectiveness of garra rufa care toward pruritus elderly who live in the villages of Indonesia. This study was carried out in Pagerejo Village, Pacitan Regency, East Java, Indonesia. The population in this study was 521 elderly who aged more than 60 years. Calculation of the large sample using the application G * Power 3.1.9.2. A sample of 40 elderly is obtained, that is 20 samples from the control group and 20 samples from the treatment group (nursalam).

The instrument in this study used the Geriatric Anxiety Inventory (GAI) and Numeric Rating Scale (NRS). The study process began with pre-test activities to determine itching complaint and anxiety level, then intervening with Garra Rufa fish in accordance with SOP (Standard Operating Procedure). After the intervention, it was carried out a post-test to determine the final condition of itching complaint and anxiety level.

The collected data was then analyzed using the Wilcoxon test to determine whether there was difference between the 2 samples. Then, it also performed a non-parametric test using the Mann-Whitney statistical test. Finally the data were analyzed using the SPSS windows program.

**Result**

Characteristic of respondent in the gender category were dominated by women in both the control group (60%) and the treatment group (60%), if it was counted, the total female respondent were 24 respondents (52.5%).

<table>
<thead>
<tr>
<th>No.</th>
<th>Characteristic</th>
<th>Treatment</th>
<th>Control</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
<td>1.</td>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a.</td>
<td>Male</td>
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<td>40</td>
<td>8</td>
</tr>
<tr>
<td>b.</td>
<td>Female</td>
<td>12</td>
<td>60</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>20</td>
<td>100</td>
<td>20</td>
</tr>
</tbody>
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Cont... Table 1. Respondent Demographic Characteristics.

<table>
<thead>
<tr>
<th>2. Age</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>a. 60-74 years old</td>
<td>18</td>
<td>90</td>
<td>14</td>
<td>70</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>b. ≥75 years old</td>
<td>2</td>
<td>10</td>
<td>6</td>
<td>30</td>
<td>8</td>
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<td></td>
<td>Total</td>
<td>20</td>
<td>100</td>
<td>20</td>
<td>100</td>
<td>40</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. Last Education</th>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>a. Not finished Primary School</td>
<td>2</td>
<td>10</td>
<td>5</td>
<td>25</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>b. Finished Primary School</td>
<td>18</td>
<td>90</td>
<td>15</td>
<td>75</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>20</td>
<td>100</td>
<td>20</td>
<td>100</td>
<td>40</td>
</tr>
</tbody>
</table>

The pretest results of the elderly itching complaint in treated group before being given Garra Rufa Care showed that 17 respondents felt moderate itching, and 3 respondents felt severe itching. The posttest results of the treatment group after being given Garra Rufa Care showed 18 respondents felt moderate itching, and each respondent in mild itching and normal/not itchy.

Table 2. Itching Complaint Scores in the Elderly with Pruritus Before and After Garra Rufa Care.

<table>
<thead>
<tr>
<th>No</th>
<th>Treatment Group</th>
<th>Control Group</th>
<th>Treatment</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
<td>Difference</td>
<td>Pre</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
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<td>4</td>
<td>0</td>
<td>9</td>
</tr>
<tr>
<td>3</td>
<td>7</td>
<td>6</td>
<td>1</td>
<td>6</td>
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<td>4</td>
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<td>6</td>
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<td>2</td>
<td>5</td>
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<td>11</td>
<td>5</td>
<td>5</td>
<td>0</td>
<td>8</td>
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<tr>
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<td>7</td>
<td>6</td>
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<td>7</td>
</tr>
</tbody>
</table>

P = 0.000 Wilcoxon
P ≤ 0.05

The Decrease Average
\[ \frac{44}{20} = 2.2 \]

The Decrease Average
\[ \frac{35}{20} = 1.95 \]

α = 0.014
Mann Whitney
α ≤ 0.05
The results of statistical tests using the Wilcoxon Test in the treatment group found a decrease in itching complaint of the elderly with pruritus after being given Garra Rufa Care with p value = 0.000 which means p <0.05, then H1 was accepted, it means that there was an effect of Garra Rufa Care in itching complaint of the elderly with psoriasis by an increase average in the treatment group of 2.2 points. Mann Whitney test results in the control and treatment group obtained a value \( a = 0.014 \), which means there were significant differences in the treatment group and the control group. So it was said that there was an influence of Garra Rufa Care on itching complaint of the elderly with significant pruritus.

**Discussion**

Pruritus was caused by a number of causes, including dry skin, immunosuppression and nerve degeneration and also it can caused by skin diseases, systemic condition, and psychogenic condition\(^20\). As we got older, changes of skin structure and loss of cell function gradually cause the skin to become more sensitive which was susceptible to disease. Pruritic skin disorder that occurred in the elderly was the result of normal skin aging due to the decrease of mobility\(^21\).

Function changes of the Stratum Corneum (SC) barrier, lipid matrix cell and intercellular (ILM); pH variations; SC protease changes; the decrease of sebaceous and sweat gland activity; and the decrease of estrogen level. All of these factors can cause itching induction\(^20\). As we got older, the decrease of cell function gradually causes the skin to become more sensitive and at risk of itching.

After being given the Garra Rufa Care therapy there was a change in the decrease of itching complaint. Garra Rufa fish was known as “nibble fish” or “doctor fish of Kangal” which was an effective therapy to reduce itching complaint and it was used as ichthyotherapy for medical treatment of psoriasis\(^22,23\). By Ichthyotherapy, itching complaints that often arises will not relapse although it has been for some time\(^23\). Plaque psoriasis patient with severe pruritus report the higher scores for depression and anxiety\(^4\). A decrease in anxiety can occur due to a decrease in itching complaint with Garra Rufa Care which provided the effect of psoriasis spa therapy in the form of a relaxation sensation that results a comfortable feeling\(^27\).

The treatment of pruritus was very complex and depends on the underlying condition and the accompanying disorders\(^19\). Skin disease was often suffered by the elderly, and therefore there was a necessity for special nursing intervention to handle it\(^28\). Types of treatment in pruritus were creams and ointments that contain anti-pruritic substances such as urea, menthol, or polydocanol\(^19\).

The intervention using Garra Rufa fish works spontaneously, that was the condition of fish that will swarm around the skin which contains many dead skin cells and simultaneously the fish will secrete the enzyme ditranol\(^29\). Other benefits can also improve blood circulation, eliminate bacteria, and also reduce foot odor. Moreover to the benefits above, Garra Rufa Care provides a “micro-massage” therapeutic effect providing psychological comfort when the fish bites produce a feeling of comfort\(^20\).

**Conclusion**

Garra Rufa Care intervention was effective in reducing itching complaint in the elderly with pruritus, without any side effects. Providing Garra Rufa Care intervention was also effective in reducing anxiety level in the elderly with pruritus, on the other hand, decreasing anxiety level was obtained without any side effects. There was an influence of Garra Rufa Care in the reduction of itching complaint and the anxiety level of the elderly with significant pruritus. Garra Rufa Care can reduce itching complaint, so that reducing anxiety after the intervention.

**Ethical Clearance:** This research has passed the ethics test with number 501-KEPK by the health research ethics commission of the Faculty of Nursing, Universitas Airlangga, Surabaya, Indonesia.

**Conflict of Interest:** The author reports no conflict of interest of this work.

**Source of Funding:** This study is done with individual funding.

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Anxiety, Depression, and Cause-Specific Mortality_6.aspx


Effectiveness of Audio-Visual Media in Health Education about Fruits and Vegetables Consumption in Early Adolescents at Palangka Raya Elementary School

Untung Halajur

Abstract

Consumption of fruits and vegetables in Indonesia is still lacking (5%), even though fruits and vegetables play a role in maintaining the condition of blood pressure, blood sugar and cholesterol levels to prevent non-infectious diseases. One way to increase public awareness to consume fruits and vegetables is through health education. Health education through audiovisual media is considered important because it displays elements of moving images and sounds that stimulate more senses. This study aims to determine the effectiveness of audiovisual health education media to increase knowledge, attitudes, and behavior of adolescents in the consumption of vegetables and fruit every day. This research uses quasi experiment method. The sample of this research is grade 6 students of Menteng State 5, Elementary School in Palangka Raya. The results showed an increase in the proportion of knowledge and good attitude after the intervention period (p-value: 0.008 and 0.002). There is no significant relationship between sex with students’ knowledge and attitudes towards vegetable and fruit consumption (p-value: 1.0 and 0.71).

Keywords: fruit and vegetable, knowledge, attitude, gender

Introduction

The results of basic health research 2010, there are still many people who do not consume enough vegetables and fruits. In 2013, 93.5% of the population aged> 10 years consume vegetables and fruits under the recommendation. In 2018, the consumption of fruits and vegetables that were quite new reached 5 percent.1,2,3 Various studies show that the consumption of vegetables and fruits that are sufficient to play a role in maintaining normal blood pressure, blood sugar and cholesterol levels. Consumption of enough vegetables and fruit also reduces the risk of difficulty defecating (constipation) and obesity. This shows that adequate consumption of vegetables and fruits also plays a role in the prevention of chronic non-communicable diseases. Consumption of adequate vegetables and fruits is one simple indicator of balanced nutrition. The ripe fruit containing carbohydrates, the higher the fructose and glucose content, which is characterized by a sweeter taste. In the eating culture of the Indonesian urban society at this time, increasingly known sugary juice drinks. In a glass of sugary fruit juice containing 150-300 calories, about half comes from added sugar. Therefore, consumption of overripe fruit and sugary juice drinks need to be limited in order to help control blood sugar levels.

Daily consumption of vegetables and fruit is a government program through the Ministry of Health which is stated in the community movement to increase public awareness of the importance of consuming fruits and vegetables every day. Increasing public awareness especially teenagers one of which is to provide knowledge through health education about the consumption of vegetables and fruit every day, both in schools and directly to the wider community. Health education in schools about the consumption of vegetables and fruits...
each day as well as education in general consisting of students, teachers, teaching media, teaching methods, teaching aids and materials to be taught.

Audiovisual media is media that has sound elements and picture elements. This type of media has better capabilities because it combines audio and visual media. There are 2 types of audiovisual media namely silent audiovisual and motion audiovisual. Audiovisual still is a media that displays sound and still images such as sound slides, sound chain films and sound prints. While audiovisual motion is a media that can display sound elements and moving images such as video cassette sound films. The senses that channel much knowledge into the brain are the eyes (approximately 75% to 87%), while 13% to 25%, human knowledge is obtained and transmitted through other senses.

Based on the description above, this research is important to be done to find out the effectiveness of audiovisual health education media to increase knowledge, attitudes, and behavior of adolescents in the consumption of vegetables and fruit every day.

Materials and Method

This research uses quasi-experiment method. The pretest-posttest group design is described as follows: (1) give an experiment to one group that is a group that is treated using audiovisual media (video) (2) provide initial tests for groups and calculate the mean of achievement; (3) providing treatment using audiovisual learning media (video); (4) give a final test for one group and calculate the mean group achievement; (5) calculate the difference between the average value of the initial test and the final test (improvement in learning outcomes) of the group then compare with statistics. In this study, audiovisual media about the consumption of vegetables and fruit every day as an independent variable. Knowledge variable, the attitude of consumption of vegetables and fruits every day as the dependent variable. Characteristics of respondents viewed were age and sex, and favorite food. The research sample was Grade 6 students of Menteng 5 Elementary School in Palangka Raya. The time for conducting research is in the range of May 2019 to August 2019.

Findings and Discussion

Table 1. The Different of Student Knowledge and Attitude Before and After Intervention

<table>
<thead>
<tr>
<th>Variable</th>
<th>Before Intervention</th>
<th>After the Intervention</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well</td>
<td>61</td>
<td>81.3%</td>
<td>69</td>
</tr>
<tr>
<td>Less</td>
<td>14</td>
<td>18.7%</td>
<td>6</td>
</tr>
<tr>
<td>Attitude</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Well</td>
<td>57</td>
<td>76%</td>
<td>67</td>
</tr>
<tr>
<td>Less</td>
<td>18</td>
<td>24%</td>
<td>8</td>
</tr>
</tbody>
</table>

Table 2. The Relationship of Gender and Student Knowledge and Attitude

<table>
<thead>
<tr>
<th>Variable</th>
<th>Gender</th>
<th>p-value</th>
<th>Odd Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge</td>
<td>29 (90.6%)</td>
<td>40 (93%)</td>
<td>1</td>
<td>1.37</td>
</tr>
<tr>
<td></td>
<td>3 (7%)</td>
<td>3 (7%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude</td>
<td>28 (87.5%)</td>
<td>39 (90.7%)</td>
<td>0.71</td>
<td>1.39</td>
</tr>
<tr>
<td></td>
<td>4 (12.5%)</td>
<td>4 (9.3%)</td>
<td></td>
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</tr>
</tbody>
</table>
Audiovisual media is media that has sound elements and picture elements. This type of media has better capabilities because it combines audio and visual media. There are 2 types of audiovisual media namely silent audiovisual and motion audiovisual. Audiovisual still is a media that displays sound and still images such as sound slides, sound chain films and sound prints. While audiovisual motion is media that can display sound elements and moving images such as video cassette sound films.4 The senses that channel much of the knowledge into the brain are eyes (approximately 75% to 87%), while 13% to 25%, human knowledge is obtained and transmitted through other senses.5

In the learning process until learning outcomes are obtained, there is a process that requires learning media. The learning process becomes more interesting because of the use of media so that it encourages students to love science and likes to search for their own sources of knowledge, students’ habits to learn from various sources will be able to instill an attitude to students to always take the initiative to find a variety of learning resources needed. Learning media are all forms and channels used to convey information or messages. Media is one of the communication tools in conveying messages which is certainly very useful if implemented in the learning process, the media used in the learning process is called learning media.6

Attractive learning media can increase student interest in the learning process, learning media can also provide stimulation in student learning activities.7 The principles that have been used in the media in this study are the effectiveness (accuracy) in achieving learning objectives, relevance: the suitability of the media used with the goals, efficiency: selection and use of media must properly pay attention that the media is cheap and cost-effective, can convey the purpose of purpose, can be used and applied in learning so as to increase student understanding and improve the quality of learning, contextual: the selection and use of learning media must prioritize aspects of the student’s social and social environment.6

The learning method used is audiovisual, audiovisual media is an intermediary or visual aid used by researchers in learning activities that use material absorption through sight (pictures) and hearing (sound). The use of audio visual media takes into account the duration, with the duration of the learning meal will be more efficient in the use of time, if learning is planned with the right time then the success rate of learning will also be greater.8

Consumption of fruit and vegetable by students can not be separated from the behavior of people who carry out these activities, because the behavior of these people will affect food products to be selected or purchased. Behavior arises because of a driving factor that causes a force to arise so that the individual acts. The driving factor in behavior is determined by two things namely the driving factor from within the individual which includes beliefs, motivation, emotional level and gender. Encouraging factors from outside the individual include knowledge, education, experience, environment, and so on.9 Knowledge is more an introduction to an object or thing objectively.10

Knowledge and attitude are internal factors that influence student behavior. In detail human behavior (which in this case is the consumption of vegetables and fruit) is actually a reflection of various symptoms such as knowledge, desires, desires, interests, motivation, perceptions, attitudes and so on. Knowledge is the result of knowing, and this happens after someone senses a certain object. Most of human knowledge is obtained through the eyes and ears.11 Know is defined as remembering a material that has been studied previously and is the lowest level of knowledge. Before someone behaves he must know in advance what the meaning and benefits of the behavior are for him, so that it can be interpreted that before students behave to consume vegetables and fruit, students must know what information about vegetables and fruit is like.

Attitude is a reaction or response that is still closed from someone to a stimulus or object. One of the social psychologists, states that the attitude is the readiness or willingness to act and not the implementation of certain motives. Attitude is a readiness to react to objects in a particular environment as an appreciation of the object. Attitude is one of the psychological or mental aspects that is formed through the learning process along with one’s growth and development. So that what is meant by student attitudes in the consumption of vegetables and fruit is the views or responses of students who
are still closed to the consumption of vegetables and fruit. The formation of attitudes is influenced by internal factors and external factors. Internal factors include physiological and psychological. While external factors are experience, culture, mass media, others that are considered important and the learning process.\(^\text{11}\)

The results showed that there was an influence of audio-visual media on students’ knowledge and attitudes between before and after and between the intervention and control groups. Audio-visual media is a medium that involves the sense of hearing and vision as well as in a process that is able to stimulate the sense of sight and sense of hearing together, because this media has sound elements and picture elements.\(^\text{4}\) There was an increase in student knowledge. This type of media has a better ability, because it includes both types of auditive (listening) and visual (seeing) media, which means materials or tools used in learning situations to help writing and words spoken in transmitting knowledge, attitudes, and ideas.\(^\text{12}\)

Based on the results of the study, researchers assume that health education using media that involves the sense of hearing and vision as well as in a process that can stimulate the sense of sight and sense of hearing together can affect the level of knowledge and attitudes of adolescents about consumption of vegetables and fruit. Thus, health education is needed by using audio-visual media that can stimulate the sense of sight and sense of hearing together, because this media has sound elements and picture elements that can affect the level of knowledge. The goal is that teenagers can understand vegetables and fruit.

The attitude of growth begins with the knowledge that is perceived as a good or bad thing, and then internalized into him. Knowledge is one of the factors that influence attitude. The better the knowledge the better the attitude, on the contrary the less knowledge, the less good (less) attitude. Someone’s experience related to an object can influence the formation of one’s attitude towards the object.\(^\text{13}\) By paying attention to attitude we get a tendency to choose whether to accept or reject a suggestion that is accepted as something good or not good. Attitude is an internal ability that plays a role before someone takes action.\(^\text{14}\)

**Conclusion**

Percentage and number of respondents based on gender, female gender as many as 57.33% or as many as 43 people and male students as much as 42.67% or 32 people. Before the intervention of students ‘knowledge of vegetable and fruit consumption by 81.3% was well knowledge, after the intervention, students’ knowledge of vegetable and fruit consumption by 92% was good knowledge. There is an increase in the proportion of knowledge both after the intervention period. The attitude of students before the intervention that is equal to 76% being good, after the intervention as much as 89.3% of students being good. There is an increase in the proportion of good attitudes after the intervention period. As many as 95% of female students are well-informed and 90.6% of male students are well-informed. There is no significant relationship between sex with students’ knowledge of the consumption of vegetables and fruit. As many as 90.7% of female students behaved well and 87.5% of male students behaved well. There is no significant relationship between gender and students’ attitudes towards consumption of vegetables and fruit.

**Ethical Clearance**

This research has gone ethical feasibility testing by the Ethical Research Commission of the Polytechnic of Health, Ministry of Health, Palangka Raya.

**Source Funding**: This study was done by self-funding from the authors.

**Conflict of Interest**: The authors declare that they have no conflict interests.

**References**


The Effect of Research Project Course on Nursing Students’ Attitudes toward Research Process

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Abstract

Objective: Investigate the effect of research project course on nursing students’ attitude toward research at a college of nursing in Kerbala University and identify the relationship between nursing student’s attitude and demographic variables. A pre-experimental design (One-group Pretest-Posttest design) was utilized to determine the effect of research project course on nursing students’ attitude toward research at a college of nursing in Kerbala University. All participants were exposed to assess of attitudes regarding research before and after the implementation of the research project course in order to detect the effect of the course. The current study results revealed that; the majority (74.2%) of nursing students were within age groups (20-22) years old the mean age of the all students was (22.27) years. 82.3% of total students were female. the majority (82.3%) of subjects were single, most of sample (80.6%) were urban resident, the mean of score of the positive attitude of respondents in posttest of the research project course was significantly higher than the pretest of the research project course in all aspects of attitude regarding research project course, and no significant difference between the nursing students’ demographic variables and attitude responses in the posttest of research project course.

Key words: Nursing students, Attitudes, research project course, research

Introduction

Nursing research is characterized as the integrating, and dispersing procedure to have effect on the current nursing practice by utilizing research produced information. Additionally, nursing research application has been connected with enhance nature of nursing practice. According to Chien, et., al. (2013) and Nieswiadomy (2011), Applying research prove amid day by day clinical practice help to upgrade the; nature of nursing care, medical attendants’ close to home and expert execution and additionally to enhance the responsibility for training, and documentation of the cost-adequacy of nursing care. So, the nursing research acts to give a base to confirm base practice by approve and refine existing information (science) and growing new learning that is connected to nursing practice. What’s more, when you are connected the nursing research finding in nursing practice prompt abatement expenses of medicinal services, expands individual profitability, long more advantageous lives for patients, and lessening torment and enduring of patients. The act of nursing care needs particular information and clinical aptitudes to take care of real or potential issues that influence wellbeing of people. Therefore, the enthusiasm for nursing research is considered as a need for medical attendants instructors and school of nursing, in light of the fact that the utilization of research is of extraordinary significance to the up and coming age of nursing staff in aptitudes, for example, leading examination, settling on free clinical choices perusing logical articles, and critical thinking approaches. Baccalaureate programs get ready understudies for section level nursing positions. The center is to nurture all people through the human life expectancy. Information is procured from course books, classroom and Web-based direction, recreation,
and clinical encounters. The objective of all projects is for understudies to graduate as protected, section level experts, have gotten a balanced introduction to the nursing field. Understudies are presented to prove based nursing practice all through their educational programs; nonetheless, the apportioned time for nursing research is frequently constrained. Nursing research is significance of its incorporation amid undergrad guideline can’t be overemphasized. Just with introduction and experience students would be able to start to comprehend the idea and significance of nursing research. Hence, a basic research course wound up obligatory in most baccalaureate nursing programs the world over to build understudies’ interest in research and usage of research discoveries practically speaking. Working on nursing understudies, is tested to stay up with the latest via searching for recovering and scrutinizing research articles that apply to hone issues that are encountered in their clinical setting. Also, it is essential to outfit understudies with a solid establishment in research to enable them to assess inquire about judge explore discoveries for conceivable application to clinical settings and to take an interest in investigate ponders. Undergraduate research project program aims to facilitate quality undergraduate research between students and mentors and to bring students into a community of scholars within their field. They urge medical caretakers to use and be effectively engaged with investigate. Undergraduate education positively affects understudies to gain an essential perspective about research and encourage them to undertake research. The initial step into compelling use of research, which makes incredible commitments to change of nursing, is preparing for look into amid undergrad training. The exploration course ought to be joined into all undergrad training projects and educational program. With the goal that undergrad medical attendants can turn into a compelling exploration per user and set research discoveries in motion, they ought to have the capacity to comprehend look into reports, reprimand them and comprehend phases of research. Among investigate exercises anticipated from nursing understudies are; perusing research articles fundamentally, gathering and announcing solid and legitimate information, going to nursing meetings, utilizing library assets, and plan theoretical or paper introduction. A nursing research course is viable in expanding learning about strides of research and getting the capacity to assess after effects of research and in addition having a positive attitude towards research. Students’ attitudes are connected with their inclusion in inquire about as future nurses. Positive students’ attitudes toward research encourages students to contribute in research, and increases effective application of research findings as well as, improving healthcare outcomes.

**Methodology**

A pre-experimental design (One-group Pretest-Posttest design) was conducted on nursing students’ attitudes toward research in nursing college. During the period from October 25th 2017 to April 15th, 2018 a non-probability (purposive) sample of (62) nursing students in nursing college was participated in the research project course which are selected after taking their consent. All of the students in the fourth undergraduate academic year 2017-2018, were invited to participate in this study. The aims of the study was clarified before achievement the participants’ consents. Only 62 students were participated and returned the questionnaires. All subjects participated in the research project course at the same time, place, and environment; All participants nursing students exposed to posttest assessment of attitudes regarding research after the implementation of the research project in order to detect the effect of the research project. The tool of this study was adapted from a study by Larson (1989), Halabi and Hamdan (2010) and Halabi, (2016). Several statements of this questionnaire were modified and developed to increase the validity of this instrument and to be more appropriate for achieving the aims of the present study. After reviewing the related literatures and relevant studies, and prior to implementation of the research project, the researchers constructed the attitudes test questionnaire to assess the nursing students attitudes respondents pre and post the implementation of the research project, in order to identify the difference in attitudes of the respondents toward research. The study instrument consisted of (2) parts as the following: Demographic data (which include nursing students’ gender, age, marital status, and residence) and nursing students’ attitudes which is comprised of (22 items): section one is related to usefulness of research (4 items), section two is related personal interest in research (4 items), section three is related to research abilities (7 items), and section four
is related to using research in clinical practice (7 items). Likert Scale was used to assess the level of student’s attitude towards research pre/post research project. It was adopted from Likert Scale (2006) and modified by the researchers according to the aims of the study. The overall number of the items included in the nursing students’ attitudes were measured in a three levels scale; Agree, uncertain and disagree, and rated as 3, 2, and 1, respectively with a cut-off point=2. Assessment of nursing students’ attitudes was based on: Mean score for attitudes items equal to 2 or more is considered as a positive. While Mean score for attitudes items below (2) is considered as an negative. The researchers calculated the score percentages of attitudes response for each nursing student in the two related period of the course, and then calculated the difference between the posttest and pretest for each study sample to achieve the attitudes improvement effect for each nursing student.

**Data Analysis**

SPSS version 20 was used to analyze of the data. Statistical analysis was made using Chi-square and paired T-test, have been used to identify the significant change in attitudes before and after research project. The level of significance was set at \( P \leq 0.05 \).

**Ethical Considerations:** The study was approved by the research department of the participating college of nursing. Students were assured anonymity and confidentiality as well as the right to refuse participation and to withdraw from the study without penalty.

**Results and Discussion**

Table 1 reveals that the majority ((n=46) 74.2%) of nursing students participant in study sample were (20-22) years old with mean age of the all students was 22.27 (20-41) years. 82.3% (51) of total students were female and 17.7% (n=11) were male. Regarding to the nursing students marital status, the majority ((n=51) 82.3%) of the subjects were single. Also, this table shows most of sample ((n=50) 80.6%) of the residents were urban. Results related to attitude respondents regarding to research project, were presented in this table, indicate that the mean of score of the attitude respondents in posttest of the research project course was higher than the pretest of the research project course in all aspects of attitude regarding research project course (positive attitude respondents in comparison between pretest and posttest of the research project course). This table also indicates that a significant difference between pretest and posttest of the attitude of respondents at p-value (0.001). The study results reveal that there is a high significant difference between the nursing students’ attitude responses in the two tests (pretest and posttest) of research project course. Table 4 shows that there is no significant difference between the nursing students’ demographic variables and attitude responses in the posttest of research project course. Nursing research is fundamental to the practice of nursing staff, and the significance of its incorporation during undergraduate direction can’t be overemphasized. Just with presentation what’s more experience nursing students can be able to start to comprehend the concept and significance of nursing research. After the analysis of demographic characteristics as shown in table (Table 1) it was revealed that the majority of subjects (74.2 %) were at age 20-22 years old with mean age of the all students was 22.27. Regarding to the nursing students gender the findings indicate that slightly more than three quarters (82.3%) of the students (82.3%) were females and the other (17.7%) were males. According to marital status of nursing students, the study results reveal that more than half (51%) of samples were single and 49% were married. Concerning resident place, the study findings indicate that more than three quarters (80.6%) of the sample were urban. This finding is consistent with Erkin et al. (2017) who revealed that the mean age of the nursing students was 20.72 years . 86.3 % of nursing students were females and 13.7% were males (17).While, other study which was done by Hasan (2016) , to assess students’ attitudes towards research at mazandaran university of medical sciences shows that approximately half (61%) of students were females and (39%) were males, this result was inconsistent with the findings of the present study. After participating the nursing students in the graduation research project course the results of analysis indicate a significant improvement in nursing students’ positive attitudes regarding research in comparison with the two periods (pretest and posttest), when the results of current study revealed that the nursing students’ attitudes about research; Usefulness of research in pretest 11.145 while in posttest 11.467 ; Personal interest in research is pretest 10.129 while in posttest 10.612; Research abilities in pretest 14.919 while in posttest 16.871; and
Using research in clinical practice in pretest 13.919 while in posttest 17.112.

Table 1: distribution of nursing students that participant in research project course with their socio-demographic characteristics (N.62).

<table>
<thead>
<tr>
<th>Socio-demographic data</th>
<th>Scale</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>20-22</td>
<td>46</td>
<td>74.2</td>
</tr>
<tr>
<td></td>
<td>23-25</td>
<td>13</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>26 and More</td>
<td>3</td>
<td>4.8</td>
</tr>
<tr>
<td>Mean ± SD (Range)</td>
<td>22.27± (20-41)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>11</td>
<td>17.7</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>51</td>
<td>82.3</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>62</td>
<td>100</td>
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<tr>
<td>Marital status</td>
<td>Single</td>
<td>51</td>
<td>82.3</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>11</td>
<td>17.7</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>62</td>
<td>100</td>
</tr>
<tr>
<td>Resident</td>
<td>Rural</td>
<td>12</td>
<td>19.4</td>
</tr>
<tr>
<td></td>
<td>Urban</td>
<td>50</td>
<td>80.6</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>68</td>
<td>100</td>
</tr>
</tbody>
</table>

Table (2): Summary statistics for the students’ Attitude Towards Research respondents in the two periods (pretest and posttest) Research Project Course with comparisons significant (N=62).

<table>
<thead>
<tr>
<th>No.</th>
<th>Domains</th>
<th>Pretest</th>
<th>Posttest</th>
<th>P(∗).value</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>M.S</td>
<td>S.D</td>
<td>M.S</td>
<td>S.D</td>
</tr>
<tr>
<td>1.</td>
<td>Usefulness of Research (4 items)</td>
<td>11.145</td>
<td>1.303</td>
<td>11.467</td>
<td>.881</td>
</tr>
<tr>
<td>2.</td>
<td>Personal Interest in Research (4 items)</td>
<td>10.129</td>
<td>1.722</td>
<td>10.612</td>
<td>1.395</td>
</tr>
<tr>
<td>3.</td>
<td>Research Abilities (7 items)</td>
<td>14.919</td>
<td>2.234</td>
<td>16.871</td>
<td>2.191</td>
</tr>
<tr>
<td></td>
<td>Using Research in Clinical Practice (7 items)</td>
<td>13.919</td>
<td>2.650</td>
<td>17.112</td>
<td>2.104</td>
</tr>
<tr>
<td>5.</td>
<td>Overall Domain</td>
<td>50.112</td>
<td>4.835</td>
<td>56.064</td>
<td>3.806</td>
</tr>
</tbody>
</table>
Table (3): Paired T-test of Difference of the Nursing Students’ Attitude Responses Relative to Pretest and Posttest (N.62).

<table>
<thead>
<tr>
<th>Pairs (Paired T-test)</th>
<th>T-value</th>
<th>D.F</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest / Posttest</td>
<td>-9.200-</td>
<td>61</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table (4): The NOVA Test to Study the Differences Between the nursing students’ attitude responses in the posttest of research project course and Demographic Characteristics (N.62).

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>Posttest</th>
<th>Comparative patterns</th>
<th>Df.</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age/ Years</td>
<td></td>
<td>Between Groups</td>
<td>14</td>
<td>1.090</td>
<td>.391 N.S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Within Groups</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td>Between Groups</td>
<td>14</td>
<td>.867</td>
<td>.597 N.S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Within Groups</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td>Between Groups</td>
<td>14</td>
<td>1.084</td>
<td>.396 N.S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Within Groups</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residents</td>
<td></td>
<td>Between Groups</td>
<td>14</td>
<td>.241</td>
<td>.997 N.S</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Within Groups</td>
<td>47</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion**

According to the findings of this study, the nursing students’ attitudes toward research were increasing significantly after exposing to the research project course and the demographic variables (gender, age, marital status and resident) of the nursing students had no significant effect on their attitudes toward research.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Community Health Nursing Department / College of Nursing/ University of Kerbala, Iraq and all experiments were carried out in accordance with approved guidelines.

**References**

106.


The Effectiveness of Mobile Application as an Alternative of Health Education Media for Adolescents in the Middle School

Noordiati1, Erina Eka Hatini1, Greiny Arisani1
1Lecturer on Department of Midwifery, Polytechnic of Health, Ministry of Health, Palangka Raya, Indonesia

Abstract

Adolescent health problems are still becoming major issues in health issues such as smoking behavior, drugs, and free sex. Improving health school age and adolescent is prioritized in promotive and preventive efforts. One of them is done through the school health effort. The purpose of this study was to determine the effectiveness of mobile applications as a health education media for adolescents in secondary schools towards adolescent knowledge and attitudes about health, compared to printed media. This type of research is quasi experimental research with a two group comparison pretest-posttest design. There were significant mean differences in knowledge, attitudes and skills before and after getting an intervention using the mobile application media (p = 0.000). There were significant mean differences in knowledge, attitudes and skills before and after getting an intervention using the My Health Report Card (p = 0.000). There was a significant mean difference in knowledge, where the mean score of knowledge was higher in the group using the mobile application media compared to using the My Health Report Card (p = 0.000). There are no differences in the attitudes and attitudes of groups who use the mobile application media and who use the My Health Report Card.

Keywords: mobile application, adolescent, health school

Introduction

Based on the results of the 2015 School-Based Health Survey in Indonesia, it can be seen health risk factors for students aged 12-18 years (junior and senior high) nationally. As many as 41.8% of men and 4.1% of women claimed to have smoked, 32.82% of those who smoked for the first time at the age of ≤ 13 years. The same data also shows 14.4% of men and 5.6% of women have consumed alcohol, then also found 2.6% of men have ever consumed drugs. Another illustration of health risk factors is sexual behavior in which 8.26% of male students and 4.17% of female students aged 12-18 years have had sexual relations. Premarital sexual behavior certainly has a broad impact on adolescents, especially related to the transmission of infectious diseases and unwanted pregnancy and abortion. 1

Seeing the existing problems, improving school-age and adolescent health is prioritized on promotive and preventive efforts. One of them is done through the health school effort which aims to improve the ability to live healthy and student learning achievements so that healthy and quality human resources can be produced. One of the efforts to improve the health of students through the health school program, since 2013 my Health Report Card has been developed for students. In 2015 the book received support and approval from the Minister of Education and Culture to be implemented in schools. My Health Report Card consisted of 2 types of books namely Information Books and Health Record Books, Information Books containing health knowledge about clean and healthy living behavior, dental and oral health, balanced nutrition, eye health, ear health, prevention of infectious and non-communicable diseases, reproductive health, prevention of violence, mental health, accident prevention. Whereas the Health Record Book contains a sheet recording the results of health services: health screening and periodic examinations, giving blood-added tablets, administering
worm medicine, health checks at health facilities.  

The results of a preliminary study conducted in the City of Palangka Raya, obtained information that not all junior high schools and senior high schools received the books, although there were those who received but the number was very small and did not reach all students. Data collected from health school program in several Palangka Raya Community Health Centers states that the number of books received from the Palangka Raya City Health Office is very limited, so that only a few books are distributed to each school and it is recommended to increase their respective schools. The existence of different schools certainly led to different decision-making processes, only a few schools were willing to reproduce the book, and the rest said they could not because of the limited availability of funds.

Currently advances in information technology play a very effective role in helping the health system and allows removing time and place barriers to providing high quality services. In the last few years significant growth has been observed in cell phone use. This portable device provides the impact of fast access to information and easy communication between individuals.

Based on the above, researchers intend to make alternative media other than printed books to expand the reach of the utilization of Information Books and Health Records through a mobile application that can be accessed by students, teachers and parents, so that they can support government programs in improving adolescent health. To find out the effectiveness of mobile applications as a medium for health education for adolescents in secondary schools towards adolescent knowledge and attitudes about health, compared to printed text media.

### Materials and Method

This type of research is a quasi-experimental research, with a two-group comparison pretest-posttest design, the approach used is quantitative. The study was conducted at senior high schools in the Menteng Sub-District, namely ISIE Vocational School and Karsa Mulya Vocational School.

The population in this study are all high school or equivalent students in the Langkai Village and Panarung Village which are the work areas of the Panarung Community Health Center. The sample in this study were students who met the inclusion criteria, namely Grade X High School students or equivalent, for intervention groups using mobile application students had an android mobile phone, got permission from their parents or guardians, were willing to attend an explanation meeting using printed books and mobile application. Exclusion criteria are students do not follow the meeting and explanation of the use of a printed book mobile application, students are exposed to the information book/book notes into health and not follow the post-test.

The method of taking samples in this study is by consecutive sampling. The independent variable, which is the variable that influences or is the cause of change, is the Mobile application media and the Health Information Book for high school students. Dependent variable, is a variable that is affected or that is due to the presence of independent variables, namely knowledge, attitudes and skills of high school students about health (clean and health behavior, oral health, balanced nutrition, eye health, ear health, prevention of infectious diseases, reproductive health, prevention of violence, mental health and accident prevention).

### Findings and Discussion

#### Table 1. The Mean Differences in Knowledge, Attitudes, and Skills of Paired Groups

<table>
<thead>
<tr>
<th>Knowledge Variable</th>
<th>Pre Test Mean (Elementary)</th>
<th>Post Mean Tests (Elementary)</th>
<th>Mean difference (95%) CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Application</td>
<td>45.60 (8.65)</td>
<td>74.72 (10.62)</td>
<td>29.12 (-34.62 - (-23.61)</td>
<td>0.00</td>
</tr>
<tr>
<td>- book</td>
<td>54.88 (9.06)</td>
<td>67.84 (9.69)</td>
<td>12.96 (-16.30 - (-9.61)</td>
<td>0.00</td>
</tr>
<tr>
<td>- Application</td>
<td>80.96 (5.88)</td>
<td>91.76 (4.38)</td>
<td>10.80 (-12.12 - (-9.47)</td>
<td>0.00</td>
</tr>
<tr>
<td>- book</td>
<td>78.96 (3.43)</td>
<td>87.00 (4.67)</td>
<td>8.04 (-9.71 - (-6.36)</td>
<td>0.00</td>
</tr>
<tr>
<td>- Application</td>
<td>76.08 (4.63)</td>
<td>84.76 (4.30)</td>
<td>8.68 (-9.63 - (-7.72)</td>
<td>0.00</td>
</tr>
<tr>
<td>- book</td>
<td>72.72 (4.12)</td>
<td>78.60 (3.69)</td>
<td>5.88 (-7.56 - (-4.19)</td>
<td>0.00</td>
</tr>
</tbody>
</table>
Table 2. The Mean Difference of Knowledge, Attitudes and Skills Inpaired Groups

<table>
<thead>
<tr>
<th>Knowledge Variable</th>
<th>Post Mean Tests (Elementary)</th>
<th>Mean difference (95%) CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Application</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- book</td>
<td>29.12 (13.34)</td>
<td>16.16 (9.88-22.43)</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>12.96 (8.10)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Application</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- book</td>
<td>10.80 (3.20)</td>
<td>2.76 (0.67-4.84)</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>8.04 (4.06)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Application</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- book</td>
<td>8.68 (2.30)</td>
<td>2.80 (0.91-4.68)</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>5.88 (4.08)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Differences in changes in the mean score of knowledge, attitudes and skills in each of the mobile application and My Health Report Card groups

Based on the results of the analysis, it was found that there were significant mean differences in knowledge before and after getting health education in groups using the mobile application and My Health Report Card, with the difference in mean scores higher in the groups using the Health Application My Health Report Card. In conducting research, each group has obtained the same health information about adolescent health through different media.

My Health Report Card for junior high or high school students is equivalent to a book that contains health information about puberty, balanced nutrition, reproductive health, STI and HIV/AIDS, drugs, mental health and myths. This book has been developed since 2013. In 2015 received support from the Ministry of Education and Culture to be applied in schools. Students are asked to read the My Health Report Card, communicate with parents and as a media for health education to peers.

Nowadays information technology is developing more rapidly, many people are helped by various facilities produced by the advancement of technology. One technology that is developing is an Android-based smartphone (smartphone), because it is considered to provide convenience and benefits for its users, many practitioners and academics who develop the application. Technology development may to help health workers role in the socialization of MCH Handbook, Pre Scrinning Child Development Questionnaire and monitoring the nutritional status of children.

Most mobile phone users are teenagers, so it becomes an opportunity in the health sector to use mobile phones as a medium in them his health information and services. The development of technology is very possible to be used to help in the dissemination of information and socialization of several health programs. In this study the application that was made and used as a health education media in the form of the My Health Report Card had an impact on meaningful knowledge enhancement for high school students.

The results of this study are in line with the results of Pratiwi and Restanty’s (2018) research on the application of android-based applications to mother’s knowledge in monitoring the nutritional status of children. The results showed that there were significant differences in the knowledge of mothers before and after applying an android-based application “nutritional status of children”.

The attitudes and skills of adolescents in this study indicate that there is an equally increase in the average score of attitudes and skills in groups using the mobile application and My Health Report Card, with differences in mean scores higher in groups using the
Some research abroad related to improving attitudes and skills in health through application was shown by Denghani et.al. (2019) regarding the prevention of high-risk sexual behavior using a mobile application shows an increase in students’ attitudes compared to previous risky sexual behavior, so the use of a mobile application plays a role in preventing high-risk sexual behavior and can increase sexual attitudes in students. The results of this study are in line with the results of research conducted by Bull (2012) who conducted research on sexual health interventions through social media to send sexual health messages through the Facebook network to reduce STIs, the results show that social networks are effective for health interventions.

**Differences in changes in the mean score of knowledge, attitudes and skills between the Mobile Application My Health Report Card and the My Health Report Card.**

The difference in knowledge scores in the pre-test and post-test results for the two groups showed a significant difference with the increase in knowledge in the mobile application group was higher than those using the My Health Report Card. From the results of this analysis it can be concluded that the mobile application is more effective towards increasing knowledge.

Research conducted by Novaeni et.al (2018) shows that 85% of adolescents said that very good about android-based adolescent health applications, can increase understanding of reproductive health, interesting, easy to remember and understand material, add motivation and in accordance with adolescent needs.

The results of other studies that show the same results as this study are studies conducted by Novianto, Suryoputro and Widjanarko (2019) about the influence of the application of “Smart Mobile Teenagers” on the knowledge, attitudes and self-efficacy of adolescents about the prevention of prediabetes, showing a significant influence on the improvement knowledge, attitude and self-efficacy in the prevention of prediabetes. Clever Teen Mobile Application can be an alternative in the use of health promotion media as a means of communication of educational information in adolescents in the prevention of prediabetes.

**Conclusion**

There are significant mean differences in knowledge, attitudes and skills before and after getting an intervention using the mobile application media. There are significant mean differences in knowledge, attitudes and skills before and after getting an intervention using the My Health Report Card. There is a significant mean difference in knowledge, where the average score of knowledge is higher in groups using the mobile application media than those using the My Health Report Card. There are no differences in the attitudes and attitudes of groups who use the mobile application media and who use the My Health Report Card.

**Ethical Clearance:** This research has gone ethical feasibility testing by the Ethical Research Commission of the Polytechnic of Health, Ministry of Health, Palangka Raya.  

**Source Funding:** This study was done by self funding from the authors

**Conflict of Interest:** The authors declare that there are no conflicting interests.

**References**


Detect of Phylogenetic Relationships by RAPD_PCR among *Staphylococcus aureus* Isolated from Different Sources in Hilla City

Amal Raqib Shamran¹, Zainab A.Tolaifeh¹

¹University of Babylon /Collage Of Science For Women, Iraq

**Abstract**

*Staphylococcus aureus* (brilliant staphylococcus) is a Gram-positive, cocci–shape, it is an individual from the typical verdure of the body, oftentimes found in the nose, respiratory tract, and on the skin. Usually positive for catalase and nitrate decrease. We can portrayed *S. aureus* strains that are across the board in hospitals in Hilla city.60 clinical and condition tests were gathered from numerous parts of patients like injuries, skin, nails and urinary tract disease taken from general doctor’s facilities of Hilla city. Strategies for segregation and distinguishing *S. aureus* dependent on culture strategies with biochemical tests, A sum of 17 enhanced DNA sections from 250 to 1K base match) were watched utilizing the 2 ground works, and every one of preliminary that fruitful giving intensification groups uncovered distinctive hereditary example. End: RAPD-Polymerase Chain Reaction investigation it used to discover an incentive in structuring an assortment of sub-atomic DNA unique finger impression dependent on epidemiological examinations that centers around the recognizable proof and portrayal of *S. aureus*.

**Key words:** Phylogenetic, RAPD_PCR, Staphylococcus aureus

**Introduction**

*Staphylococcus aureus* is an opportunistic pathogen that causes a nosocomial infections ranging from self-limiting to lifethreatening in both developing and developed countries. It is critical in the study of disease transmission and nature to have the capacity to distinguish bacterial species and strains precisely. Fast distinguishing proof and order of microscopic organisms is ordinarily completed by morphology, healthful prerequisites, anti-microbial obstruction, isoenzyme examinations, phage affectability. Meanwhile, a few strains of *S. aureus* have mecA quality which presents protection from methicillin and the greater part of the regularly utilized antimicrobial operators including β-lactams and cephalosporins. These strains are called methicillin-safe Staphylococcus aureus (MRSA) and they thought to be more destructive than methicillin-powerless Staphylococcus aureus (MSSA) strains. The expanding rates of nosocomial and network related MRSA diseases and their capacity to exchange between people, ox-like, and nourishment of creature birthplaces have turned into a worldwide hazard. Recognition and distinguishing proof techniques utilizing the PCR to enhance DNA have been utilized for different creatures, yet these require sequence information for particular preliminaries. In any case, PCR utilizing discretionary groundworks (AP-PCR) requiring no earlier arrangement data has uncovered DNA polymorphisms that might be valuable for fingerprint (Welsh and McClelland, 1990; Williams et al., 1990). Haphazardly Amplified Polymorphic DNA (RAPD), a straightforward PCR based procedure, has been broadly utilized for epidemiological examination. In addition, RAPD preliminaries can successfully examines the entire chromosomal DNA for the nearness of little reversed rehashes and intensifies the interceding DNA portions of variable length that can be utilized for distinguishing hereditary variety and setting up strain-particular fingerprints. Likewise the test can be performed with low convergence of DNA utilizing short

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engineered oligonucleotide groundworks long.

**Methodology**

**Sampling**

Sixty samples were collected from clinical and environmental cases. Samples were taken from out and inpatients who admitted to AL-Hilla General Teaching Hospital and Babylon Hospital for Maternity and Pediatric Hospital. Between October 2016 and May 2017.

**Bacterial Isolation**

Around 250 ml S. aureus detach was enraptured into a 100 ml of supplement soup (pH seven.5) and command underneath consistent shaking at thirty seven C for twenty-four h. The microorganism cell was expelled o by action, washed with zero.1mM Tris EDTA and unbroken at - 20oC for DNA extraction.

**Genotypic identification**

**DNA Extraction**

DNA of *staphylocus aureus* isolates was extracted and purified using Extraction and purification Kit from Geneaid company (UK).

**Primers**

Two arbitrary or random primers (OPB-10, OPX-01) obtained from Bioneer, IDTDNA (USA). Bacterial isolates were tested for single primers for RAPD-PCR technique (table 1).

**RAPD-PCR amplification**

Final product of 30μl reaction volumes containing ten ul of single primer, 12.5 ul of inexperienced Master combine, .5 ul of Genomic DNA and therefore the volume of reaction was completed up to thirty ul by adding a pair of.5 ul of enzyme free water Amplification was applied during a thermo-cycler (Eppendorf) programmed for 2 minutes at 94°C; for 45cycles one minute at 94°C, one minute at 35°C and 2 minutes at 72°C; and a final extension of 5 minutes at 72°C. Amplification product were electrophoresed in one.8% agarose gels so pictured by staining with ethidium bromide. commonplace molecular markers were conjointly enclosed in every action run. Ultraviolet trans-illuminated gels were photographed.

**Phylogenetic Analysis:**

Positions of unequivocally scorable RAPD bands were transformed into a binary characters matrix (‘1’ for the presence and ‘0’ for the absence of a band at a particular position). Phylogenetic tree was created by the unweighted pair-group method arithmetic (UPGMA) average cluster analysis.

**Results and Discussion**

**RAPD analysis of staphylococcus aureus**

Polymorphism assay for *staphylocous aureus* isolates was carried out using two primers. Random amplification of the DNA of *S. areus* isolates reveals the efficacy of these selected nucleotides sequences in determination the similarity or variations among all isolates.

*S. aureus* isolates by RAPD:

A total of 9 amplified DNA fragments ranging in size from 250 to 1 Kpb were observed using two random amplified polymorphic DNA (RAPD) primers (opX-10, opB-01) where as17 polymorphic amplified fragments were commonly detected among the 9 *S. aureus* isolates (table 1) and each of primer give different genetic profiles. UPGMA analysis for the dendrogram made based on the RAPD data generated by primer OPX-10 were performed and shown in figure 3. Analysis showed that the 9 s. aureus strains were grouped into two and clustered into three classes. The large cluster comprised the Stap4, Stap5, Stap9, Stap7, and Stap8; a second cluster included strains of the S2, S8 and S9; and the third remaining clusters corresponded to the Stap1, Stap3, Stap2 and Stap6. While primer OPX-01 were performed and shown in figure 4. Analysis showed that the 9 *S. aureus* strains were grouped into two and clustered into three classes also. Genetic fingerprint and process diversity between Staphyllococcus aureus isolates were determined by ever-changing RAPD data into a Jaccard similarity analysed by UPGMA to produce a organic process tree. The compound band pattern obtained is equivalent to a Universal Product Code, allowing the identification of each individual. as Associate in Nursing example, isolate Sa1 presents distinctive bands once its compound amplified with most of the primers tested
It’s well documented that RAPD-PCR is one of the most widely used method to investigate the genetic variability of any given nosocomial pathogen, moreover in RAPD the power of designated and discriminatory primers can be been easily assessed. Phenotypes consist of isolates that less related and such identification isolates using cultural and morphological techniques often lack consistency and precision. In the current examination, we have discovered that distinguishing proof of hereditary assorted variety in S. aureus relies upon wellsprings of segregates, diverse host cells and event of freaks. RAPD markers uncovered conceivable association between host start line, amendment and hereditary selection among S. aureus separates, and this shown its process and symptomatic potential. Clearly, for these deoxyribonucleic acid teams examples to possess a helpful significance within the zones of prescription, people science and also the study of illness transmission, explicit deoxyribonucleic acid teams should be known with host beginning points, transformation and quality qualities. Rapd-pcr is important to possess fast and solid epidemiologic composing method to screen the bury or intra-spread of multidrug safe MRSA strains. this might be practiced by a organized correlation of deoxyribonucleic acid band styles among microorganisms differentiating for the varied host birthplaces, transformation and quality qualities gift. Comparative methodology has been utilised to separate forceful from non-forceful disengages of the seed assault microorganism Phoma symbol. The DNA mark characterized for each race of S. aureus ought to be valuable for epidemiological reviews, medicinal analyses, and in the distinguishing proof of new destructive strains and detaches and their birthplace.

Figure 1. RAPD –PCR using the primer OPX-10. {M Line (ladder) , the isolates numbered (1,2,3,4,5,6,7,8,9) were positive for OPX10 primer}
Figure 2. RAPD–PCR using the primer OPX-01 (M Line (ladder), the isolates numbered 1, 2, 4, 6, 8, 9) were positive for OPX-01 primer, while 3, 5, 7 were negative.

Fig. 3: Dendogram analysis showing biological process diversity of 9 Staphylococcus isolates known by RAPD markers.

Fig. 4: Dendogram analysis showing phylogenetic diversity of 9 Staphylococcus isolates identified by RAPD markers.
Fig. 5: Dendogram analysis showing phylogenetic diversity of 9Staphylococcus isolates identified by RAPD markers using OPX-10, OPX-01

Table 1. Type and sequence of RAPD primers used for PCR analysis

<table>
<thead>
<tr>
<th>Primer</th>
<th>Sequence 5---------3</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPB-10</td>
<td>5- TCGCATCCCT-3</td>
</tr>
<tr>
<td>OPX-01</td>
<td>5- GGTGGCATCT-3</td>
</tr>
</tbody>
</table>

Conclusion

Strategies for segregation and distinguishing *S. aureus* dependent on culture strategies with biochemical tests, A sum of 17 enhanced DNA sections from 25s0 to 1K base match) were watched utilizing the 2 ground works, and every one of preliminary that fruitful giving intensification groups uncovered distinctive hereditary example . End: RAPD-Polymerase Chain Reaction investigation it used to discover an incentive in structuring an assortment of sub-atomic DNA unique finger impression dependent on epidemiological examinations that centers around the recognizable proof and portrayal of *S. aureus*.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Babylon /collage of science for women, Iraq and all experiments were carried out in accordance with approved guidelines.

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Blood pressure, Blood Sugar, Smokers and their Relationship with Physiological Variables of Some Risk Factors

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Abstract

This study deals with the physiological measurements of fasting blood sugar (FBG), clinical blood pressure (CBP) and smokers and their association with risk factors (obesity, gender and age) among university students. A total of 257 students (77 females and 180 males) were registered. Including 41 healthy and 42 students who were FBG; 33 were healthy and 69 were suffering from CBP; 39 non smokers and 33 students who were smokers; aged 19-26 years. A statistically not-significant connection was found between FBG, CBP and smoking with obesity rates; but a significant difference between smoking and CBP with age and gender, respectively. These findings highlight the prevalence of FBG and CBP also smoking in students and its relation to certain risk factors such as obesity, sex and age among selected student groups.

Keywords: blood glucose, blood pressure, smoking, risk factors.

Introduction

It is important to prove now that many factors such as obesity, sex and age are linked to BG, BP and smoking. The obesity is a hazard factor to many diseases, as diabetes and hypertension\(^1\). In 2030, around 438 million people worldwide (7.8%) in adult population are suffering from diabetes. This global rise in the propagation of diabetes is attributed to urbanization, population growth, aging and obesity\(^2\). According to\(^3\) there is a significant impact of diabetes with gender, and women are more probability to develop diabetes than men. A study in Iraq found that the diabetes prevalence was 15.2% in female compared with 11.8% in males\(^4\). Despite the increasing burden of obesity and HBP in growing countries, there was limited information about BMI contribution in BP in these populations, especially among students. BMI is independently and positively connected with mortality and morbidity due to HBP, cardiovascular disease CVD and diabetes II\(^5\). For all BMI categories in study\(^6\), age was higher with HBP and HBP in men than in women. The systolic-BP and diastolic-BP increased with age, both for men and women\(^7\). Smoking is one of the leading causes of death as well as the main challenge to public health all over the world\(^8\). Smoking is connected with low weight\(^9\). Lack of smoking propagation has been proposed as one of the agents connected with a high in obesity\(^10\). There may be a causal impact of smoking on weight because nicotine is a metabolic stimulant as well as appetite suppressant\(^11\). The difference in CVD risk among smokers and non-smokers is significant in middle age, particularly for men\(^12\).

Materials and Method

Criteria of participants

A sample of 257 students was selected randomly among students. About 83 participants of FBG with mean(X)±standard deviation (SD) of age were divided to: health (<100 mg/100cm\(^3\); 21.97±1.49), pre-diabetes (100-125 mg/100cm\(^3\); 21.83±1.59), diabetes (≥126 mg/100cm\(^3\); 21.77±1.09), and hypoglycemia (≤70 mg/100cm\(^3\); 21.66±2.30). In addition, 102 participants of a CBP-level with X±SD of age, systolic blood pressure (mmHg), diastolic blood pressure (mmHg) and pulse pressure (Min) were divided as: normotensive (<120/<80; 21.38±1.706, 110.87±5.129, 72.16±6.126, 86.29±11.07), EPB, elevated blood pressure (120-129/<80 mmHg; 21.96±2.007, 124.78±2.848, 75.71±4.767, 86.40±11.09), hypertension (130-139/80-89 or ≥140/90 mmHg; 22.00±1.647, 144.68±10.90, 90.41±6.873, 84.82±9.26), and hypotension (<90/60 mmHg; 20.28±1.603, 84.57±6.160, 56.57±3.101, 84.28±8.76). In addition, only 72 men were employed
for smoking and the periods of cigarette smoking of 2-3 year with X±SD of age were divided into 39 non-smokers (control; 22.25±1.91), 9 light-Smokers (≤10 cigarette daily; 22.11±1.96), 16 moderate-smokers (11-20 cigarette daily; 22.06±1.80), and 8 heavy-smokers (≥20 cigarette daily; 22.25±1.90).

Collection of data and measurement

The data were gathered utilizing a self-administered questionnaire. It is built on several axes such as: age, smoking case, duration of smoking, the number of cigarettes smoked per day, the family history of diabetes and physical activities. The criteria for selecting students were that no one should suffer any medical complication such as heart disease, stroke or any other disorder. BG was measured in the morning after fasting for at least 8-10 hours, using the active glucose Accu-chek meter. BP was measured by the electronic pressure device by taking the pressure rate while students rested for at least 10-15 minutes.

Measurement of obesity.

The obesity was estimated using body mass (BMI) index, measured by weight in kilograms (kg) divided by a height in the meters squared [kg/m²]; BMI classification was based on WHO as: normal weight, 18.5-24.9; underweight, less than 18.5; and overweight 25-29.9. The waist circumference, (WC), is measured by placing the measurement meter tightly on the waist (cm) and the WC/risk level are classified as follows: Low (Women <80 and Men <90), high (Women 80-88 and men 94-102), and very high>102 for smokers men.

Statistical analysis

The descriptive analysis was also used to show the X±SD of the results. Gender, age and obesity were statistically tested by Chi-square (c²) test at p<0.05.

Results and Discussion

Fasting blood glucose and obesity, sex and age

In Table 1: A statistically insignificant in BMI with BMI c²= 5.652 among smoking status. A statistically not-significant in CW risk level of smokers compared to non-smokers. And a significant in age in which the high percentage was appeared at age (21-22) years of light-smokers followed by low percentage appeared at age (23-24) years of moderate-smoker compared to non-smokers. In addition to high percentage that noted at age (21-22) years in light-smokers, moderate-smokers, and heavy-smokers compared to control, and heavy-smokers has been shown in age 25-26 years compared with non-smokers of a same age. Obesity is connected with poorer control of BP-levels and BG-levels making people with diabetes more susceptible to micro-vascular and cardiovascular diseases. Other studies have shown a strong epidemiological link between the development of diabetes and obesity. When the study trends were studied by BMI groups, disease increased only among those who have obese (18.0% to 20.1%), indicating that much of the rise in the prevalence of diabetes is due to the growing prevalence of obesity, and diabetes was less

Clinical blood pressure level and obesity, gender and age

In Table 2: No-significant relationship between the level of CBP and obesity measured by BMI and WC, although the highest rate of EBP and hypertension was overweight and obese compared to normotensive, respectively. Hypertension and EBP are the highest in low and high of WC risk level compared with normotensive, respectively. The male had a high percentage of hypertension (82.76) and a high percentage of hypotension (85.71) in female compared with normotensive. EBP and hypertension appeared 21-22 and 23-24 years of age, compared to normotensive, respectively.

Smoking status with obesity (BMI and WC) and age.

In Table 3: A statistically not-significant in obesity with BMI c²= 5.652 among smoking status. A statistically not-significant in CW risk level of smokers compared to non-smokers. And a significant in age in which the high percentage was appeared at age (21-22) years of light-smokers followed by low percentage appeared at age (23-24) years of moderate-smoker compared to non-smokers. In addition to high percentage that noted at age (21-22) years in light-smokers, moderate-smokers, and heavy-smokers compared to control, and heavy-smokers has been shown in age 25-26 years compared with non-smokers of a same age. Obesity is connected with poorer control of BP-levels and BG-levels making people with diabetes more susceptible to micro-vascular and cardiovascular diseases. Other studies have shown a strong epidemiological link between the development of diabetes and obesity. When the study trends were studied by BMI groups, disease increased only among those who have obese (18.0% to 20.1%), indicating that much of the rise in the prevalence of diabetes is due to the growing prevalence of obesity, and diabetes was less
prevalent in males than in females in Iraq community\textsuperscript{17}. In Turkey, there was a statistically non-significant relation between BP and sex\textsuperscript{18}. Although this study was statistically insignificant in age with FBG, the results were favorable with\textsuperscript{19} the prevalence of disease and hazard factors among people aged 15 Years and older in Ethiopia. A significant connection was also found\textsuperscript{20} on college students between age, overweight, and sex, as well as between BG elevation with gender. Many people own a classification of BP without knowing it. The results of the current study were consistent with\textsuperscript{21}, where a positive relationship was absorbed between obesity and hypertension, also\textsuperscript{22} which observed a positive connection between hypertension and BMI. The current study shows that male students had a high percentage of hypertension compared with a healthy and female students, and is close to\textsuperscript{23}. It is also appropriate with\textsuperscript{24} that there is a positive connection with BP and increasing age.

The low prevalence of smoking has little impact, often less than 1%, on increasing the prevalence of obesity and reducing the healthy weight of the population\textsuperscript{25}. The BMI of smokers appeared a diminishing trend compared with nonsmokers\textsuperscript{26}. No-significant variation in the physical mean parameters such as obesity are found when calculating X±SD in smokers and passive-smoker\textsuperscript{27}; but my results do not identical the results of\textsuperscript{28}, it was observed that both cigarette consumption and smoking frequency had positive effects with weight loss in adolescents. There has been a significant elevate over the past decade in the numbers of smokers of college age\textsuperscript{29}. Various studies have reported that the spread of smoking raises between the first to last year among college students, confirming the fact that the early years of the university are important to target anti-smoking activities\textsuperscript{30}. The University of Karbala, smokers (45.7%) smoked before the age of 18 years, and were positively correlated with male sex and growing age\textsuperscript{31}.

Table 1. Fasting blood glucose classes and obesity rates measured by BMI (kg/m\textsuperscript{2}) and WC (cm), sexes and age (years).

<table>
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<td>N(%)</td>
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<td>N(%)</td>
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Table 1. Fasting blood glucose classes and obesity rates measured by BMI (kg/m²) and WC (cm), sexes and age (years).

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<td>3</td>
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Table 2. Clinic blood pressure level and obesity rates measured by BMI (kg/m²) and WC (cm), sexes and age (years).

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<th>N(%)</th>
<th>moderate smokers</th>
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<th>heavy smokers</th>
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**Conclusion**

There was insignificant association between obesity and cases, but significant differences between age and sex with smoking rate and CBP level among students.

**Conflict of Interest:** Author declares no conflict of interest.

**Ethical Clearance:** This research was reviewed by the Research Review Board of the Department of environmental pollution at the University of Al-Qasim Green.

**Funding:** This current study was self-funded.

**References**


29. Houston TP, Kolbe LJ, Eriksen MP. Tobacco-use cessation in the 90s— not “adults only” anymore.

The Relationship of Self-Motivation in Diabetes Mellitus Management with Blood Sugar Levels of Diabetes Mellitus Type II Clients

Berthiana T 1, Noordiati 1

1 Lecturer on Department of Nursing, Polytechnic of Health, Ministry of Health, Palangka Raya Indonesia

Abstract

The purpose of this study was to determine the relationship of self-motivation to diabetes mellitus (DM) management with blood sugar levels of DM type ii clients in Outpatient Polyclinic Installation in Dr. Doris Sylvanus Hospital Palangka Raya. The research uses descriptive correlational with cross sectional research design. The sampling technique uses purposive sampling. The respondents of this study were 40 people. Data collection using a questionnaire and recording the value of blood sugar from the results of laboratory tests in the client report status. Statistical tests use the Chi-Square test. The results of statistical analysis revealed that self-motivation on clients was in the unfavorable category of 32 people (80%), blood sugar levels were in the high category of 26 people (65%) with a p-value of 0.001 (p <0.05). There is a significant relationship between self-motivation to DM management with blood sugar levels of DM type II clients in the Outpatient Polyclinic Installation of Dr. Doris Sylvanus Hospital Palangka Raya.

Keywords: self-motivation, blood sugar level, diabetes mellitus

Introduction

Diabetes mellitus is a group of metabolic diseases with characteristic hyperglycemia that occurs due to abnormal insulin secretion, insulin action or both.1

Based on a preliminary study in the medical record section of Dr. Doris Sylvanus Hospital Palangka Raya which was conducted on January 24, 2018, obtained data on the number of patients with Type II DM in 2016 the number of DM cases was 4111 cases with an average monthly of 343 cases and increased to 4942 cases in 2017 with an average monthly to 412 cases. The increase in cases of Type II DM is accompanied by an increase in the occurrence of cases of Type II DM complications, based on the medical record of complications that often occur is hyperglycemia which is the forerunner to the growth of various other diseases to the point of death. If hyperglycemia in people with Type II diabetes can be controlled properly, then all these chronic complications can be prevented, at least inhibited.1

The goal of diabetes mellitus management for the short term is to eliminate complaints/symptoms and maintain a sense of comfort and health, while in the long run to prevent complications, both macroangiopathy and neuropathy with the ultimate goal of reducing diabetes morbidity and mortality.

Management of diabetes mellitus with 5 main pillars, namely first, meal planning by making dietary arrangements based on the nutritional status of diabetes. Second, physical exercise so that muscle contraction when doing physical exercise will make the membrane permeability to glucose increase. Third, pharmacological therapy. Fourth, counseling. The fifth routine and independent monitoring of blood sugar with sugar control can reduce the number of complications in patients with diabetes mellitus

DM management problems that often occur in Dr. Doris Sylvanus Hospital Palangka Raya based on the results of a survey on January 24, 2018 in people with
DM is the lack of self-motivation related to carrying out the four pillars of DM. One of the factors that influence a person’s behavior in improving and maintaining their health is motivation, including in managing DM regularly as an effort to prevent complications in diabetes mellitus patients. One of the DM management is regular blood sugar control, which is one of the treatments for diabetes mellitus patients to support stable blood sugar and prevent complications, therefore there is a need for self-motivation in carrying out the examination and management of diabetes mellitus.

**Materials and Method**

This type of research is quantitative in the form of descriptive correlation which is research that aims to reveal the correlative relationship between the independent variables and the dependent variable, with the cross-sectional approach which is a study to study the dynamics of the correlation between factors and risks with effects by approaching, observing or collecting data at once in one when.

The population in this study is type II diabetes mellitus clients who seek treatment at the Internal Medicine Outpatient Clinic of Dr. Doris Sylvanus Hospital Palangka Raya. The sample used in this study with a sampling technique using purposive sampling with a total sampling of 40 respondents. This research was conducted on April 20-May 12, 2018. The time was used to collect data through a questionnaire that was filled in completely and returned to the researcher.

**Findings and Discussion**

Table 1. Relationship between Self-Motivation and Other Confounding Variables with Blood Sugar Levels

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<td>7</td>
<td>87.5</td>
<td>1</td>
</tr>
<tr>
<td>Not good</td>
<td>7</td>
<td>21.9</td>
<td>25</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early adulthood (26-35 years old)</td>
<td>1</td>
<td>50</td>
<td>1</td>
</tr>
<tr>
<td>Late adulthood (36-45 years old)</td>
<td>3</td>
<td>75</td>
<td>1</td>
</tr>
<tr>
<td>Early elderly (46-55 years old)</td>
<td>7</td>
<td>38.9</td>
<td>11</td>
</tr>
<tr>
<td>Late elderly (56-65 years old)</td>
<td>3</td>
<td>35</td>
<td>13</td>
</tr>
</tbody>
</table>
### Table 1. Relationship between Self-Motivation and Other Confounding Variables with Blood Sugar Levels

<table>
<thead>
<tr>
<th>Gender</th>
<th>Male</th>
<th>Female</th>
<th>Ref</th>
<th>P</th>
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<tbody>
<tr>
<td>Male</td>
<td>6</td>
<td>31.6</td>
<td>13</td>
<td>68.4</td>
</tr>
<tr>
<td>Female</td>
<td>8</td>
<td>38.1</td>
<td>13</td>
<td>61.9</td>
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<table>
<thead>
<tr>
<th>Education</th>
<th>College</th>
<th>4</th>
<th>40</th>
<th>6</th>
<th>60</th>
<th>Ref</th>
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<tr>
<td>High school</td>
<td>8</td>
<td>38.1</td>
<td>13</td>
<td>61.9</td>
<td>1.08 (0.23-5.06)</td>
<td>0.91</td>
</tr>
<tr>
<td>Middle School</td>
<td>2</td>
<td>25</td>
<td>6</td>
<td>75</td>
<td>2 (0.26-15.3)</td>
<td>0.505</td>
</tr>
<tr>
<td>Elementary school</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>100</td>
<td>0</td>
<td>1</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Profession</th>
<th>Civil servant/army/police</th>
<th>3</th>
<th>50</th>
<th>3</th>
<th>50</th>
<th>Ref</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers/laborers/trader</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>100</td>
<td>0</td>
<td>0.99</td>
</tr>
<tr>
<td>Other</td>
<td>5</td>
<td>0</td>
<td>10</td>
<td>66.7</td>
<td>2 (0.29-13.73)</td>
<td>0.48</td>
</tr>
<tr>
<td>Not Working/housewife</td>
<td>6</td>
<td>35.3</td>
<td>11</td>
<td>64.7</td>
<td>1.83 (0.27-12.06)</td>
<td>0.52</td>
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<table>
<thead>
<tr>
<th>Marital status</th>
<th>Married</th>
<th>14</th>
<th>36.8</th>
<th>24</th>
<th>63.2</th>
<th>Ref</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not married/widowed</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>100</td>
<td>0.63 (0.49-0.80)</td>
<td>0.53</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DM suffered</th>
<th>0-10 years</th>
<th>14</th>
<th>35.9</th>
<th>25</th>
<th>64.1</th>
<th>Ref</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 10 years</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>100</td>
<td>0.64 (0.50 - 0.81)</td>
<td>1</td>
</tr>
</tbody>
</table>
Chi-square correlation test results obtained p-value of 0.001 \((p < 0.005)\). The results showed that only 8 people (20%) were good in self-motivation and had blood sugar levels in the normal range of 7 people (87.5%) while respondents in the good self-motivation category with high blood sugar levels were 1 person (12.5%). While the remaining 32 people (80%) with poor self-motivation category, where most of the blood sugar levels in the high category are as many as 25 people (78.1%) and as many as 7 respondents (21.9%) with self-motivation not good to have a value of blood sugar levels within normal limits. The results of the analysis of the motivational questionnaire items found that the highest score on statement number 6 is the statement “I am happy if my blood sugar is in the normal range” with a score of 138 with 19 answer choices answered “agree” and 21 respondents answered “strongly agree”. This means that the majority of respondents actually feel happy and want their sugar levels within the normal range. While the analysis of motivation questionnaire items with the lowest score on statement number 2 is the statement “I am challenged to undergo treatment” with a score of 99. It shows that most respondents feel less challenged in undergoing treatment so that is one of the factors that can affect client motivation.

Odds Ratio (OR) value is 25.00, that is \(OR > 1\), this shows that a person with DM with low self-motivation has a 25.00-fold risk of having uncontrolled blood sugar levels, the lowest has a risk of 2,617 times and the greatest risk is 238,787 times that of having an uncontrolled blood sugar level compared to someone with good self-motivation. The results of this study indicate the less motivation of clients in managing DM the more uncontrolled or high blood sugar levels. From the results of the study the researchers concluded that the self-motivation of Type II DM clients in the Outpatient Clinic of the Internal Medicine Polyclinic of Dr. Doris Sylvanus Hospital Palangka Raya is in the unfavorable category. This is influenced by several factors such as age, gender, level of education, occupation, marital status, and length of time with DM.

The results showed that the majority of respondents were early elderly, aged between 46-55 years. As a person ages, changes in function and composition in the body can affect one’s ability to carry out activities including one’s motivation. The results showed that the majority of respondents who came to control the disease in poly disease in the female sex. Gender also influences a person’s motivation and behavior. This is because women tend to be more obedient to the rules than men.

Most of the respondents studied had a high school education level. The level of education is an indicator that someone has taken formal education in certain fields. The higher the level of education a person will usually have more knowledge including about health and the presence of this knowledge will affect someone to have awareness in maintaining their health.

People who work tend to have less time to visit health facilities so that there will be less time available and opportunities for treatment. Whereas in this study the results were obtained that the majority of respondents were housewives/not working which means that respondents had plenty of time to visit health facilities including managing DM.

The marital status of most respondents is married and has a spouse. This is one of the factors that can affect a person’s motivation, including respondents in managing DM, because respondents get support from their husband or wife. The length of time with DM is also one of the factors that influence a person’s willingness to manage DM. The longer a person with DM, the better the coping and self-efficacy of a person and the more experienced in managing the disease.

This study is in accordance with previous research conducted by Yesi Ariani (2011) about the Relationship between Motivation and Self-Efficacy of Type II DM Patients in the Context of Nursing Care at H. Adam Malik Hospital Medan, stated that with the results of 45 respondents had poor motivation in conducting self-efficacy. Motivation the majority of patients lack self-care so it is advisable for nurses and physicians to increase patient motivation in the context of DM by increasing patient autonomy intrinsically.

Social environment, family, and health workers influence in increasing motivation and changes in patient behavior. Someone who has the support of the family, and surrounding and support from health workers who are not pressing, controlling tight or authoritarian will increase motivation in checking blood sugar levels.
Conclusion

There is a significant relationship between self-motivation and blood sugar levels of DM Type II clients in the Outpatient Polyclinic Installation of Dr. Doris Sylvanus Hospital Palangka Raya.

Ethical Clearance: This research has gone ethical feasibility testing by the Ethical Research Commission of the Polytechnic of Health, Ministry of Health, Palangka Raya.

Source Funding: This study was done by self-funding from the authors.

Conflict of Interest: The authors declare that there are no conflicting interests.

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Utilization of Local Wisdom to Overcome Malnutrition of Children in South Sorong Districts, West Papua Province, Indonesia

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²School of Midwifery, Faculty of Medicine, Universitas Airlangga

Abstract

Introduction: In South Sorong Districts in 2013 there were 47.6% cases of malnourished and underweight children under five; short and very short toddler cases (stunting) of 60.7%. In 2017 South Sorong Districts was one of the 100 districts that were the priority in handling stunting problems. Where the problem of stunting is chronic malnutrition in the period ranging from uterus to toddlers.

Purpose: this research aims to find the socio-cultural potential and local wisdom in overcoming nutritional problems in these children under five.

Method: this riset mix methods by looking for quantitative and qualitative data. Quantitative data with anthroprometry and qualitative data conduct in-depth interviews and village community consultations in finding solutions that are appropriate to the conditions of the community.

Result: It was found as many as 49.41% of malnutrition, while stunting was 54.1%. Natural potential in the form of food ingredients, fish, sea shrimp, chicken, sago and various vegetables already exists in the community. The community made an agreement in dealing with the nutritional problems of these children with child care, nutrition, nutrition and sanitation.

Conclusion: that in handling nutritional problems of children there is involvement of the community, traditional leaders, religious leaders, support from the village head and the support of the regional government in the form of special team formation and additional budgets on children under five nutrition programs

Keywords: malnutritions, children under five, local wisdom

Introduction

Preparing future generations who are resilient for the welfare of the Indonesian nation is common responsibility, and health care must be prioritized from pre-marriage phase, fetus to teenagers. Health problems are often specific local health problems related to local socio-culture that need to be explored in order to find out basic problems so that repairs can be made or empowered for a culture that has a positive impact on health. An understanding of the culture of the community related to health issues is very important to note as a determining factor towards the success of health programs aimed at improving the quality of life of individuals and communities. The description can be used by health workers for knowing, learning, and understanding what applies in the community¹,².

Specific local health problems related to the local socio-culture need to be explored in order to find out the basic problems so that it needs to be improved or empowered for a culture that has a positive impact on health. Thus a good wealth of Indonesian culture can continue to be developed, conserved and utilized locally even if possible nationally. Health programs can be designed to improve the nutritional status of children under five according to specific local problems. In this process the cultural approach is one of the important
and cannot be ignored ways. Understanding the cultural potential and local wisdom is very important in solving the nutrition of children under five\(^3,4\). The existence of churches and religious leaders and community leaders is important in resolving these problems. In addition, the sustainability of the approach that is in accordance with the culture of the community and local wisdom can be maintained and improved, so that the community will be better and minimize health problems in the nutrition of children under five and increase the level of public health in general\(^5\).

The aim of this cultural-based research that will be carried out in South Sorong District is to make an interventional model by utilizing local wisdom involving community leaders, religious leaders, figures and health workers related to overcoming the problem of malnutrition in children under fifth by exploring all the potential that exists in the community to make models that are in accordance with regional culture in overcoming the nutritional problems of children under five in that area.

**Method**

The research conducted was a mixed methods research which is the method combines two research methods at once, qualitative and quantitative in a research activity, so that more comprehensive, valid, reliable, and objective data will be obtained. Exploring the value system and community behavior related to health phenomena using ethnographic methods, researchers and stakeholders and the community conduct social construction to resolve existing health problems.

The researcher updated the nutritional status data for children under five in Konda and Wamargege villages, in South Sorong, West Papua Province Indonesia. The research team conducted discussions internally, then advocated the results of the research to the community, both in the church and village office.

The ethical approval was taken from Health Research and Development Agency (Balitbangkes) of Ministry of Health Indonesia (No: LB.02.01/KE.237/2018). This research was funded by Health Research and Development Agency (Balitbangkes) of Ministry of Health Indonesia.

**Result**

Konda and Wamargege villages are part of the Konda Sub-District in South Sorong District. It is located about 35 km from the capital city of Teminabuan, South Sorong District. The transportation to reach the area uses land vehicles with a travel time of around 2 hours, while if using a river lane it takes about 45 minutes. On the outline, these two villages 3 major tribes namely the Yaben tribe, the Tehit tribe and the Nakma tribe. In these two villages, the three tribes have intermingled, both in residential and inter-tribal marriages. Most people’s lives are fishermen and farmers or gardening. The location of the village of Konda and Wamargege is close to the beach which is flowed by the Teminabuan river and adjacent to the sea estuary\(^6,7\).

The existence of children under fifth in Konda and Wamargege is pretty much. In the village of Konda there are around 90 children under five, while in the village of Wamargege there are more than 150 children. The research team saw many children under fifth in these two villages, and at first glance the children were small (short) and thin. According to some of their experiences there are those who weigh weight and some who don’t. There is even a tendency for children over 2 years not to go to the posyandu. Every family has many children, on average they have 5 to 7 children. There are also in one family having more than one children under fifth, some even have 3 children under fifth\(^8\). The existence of schools in this village has elementary and junior high schools, but there are still many children who are not in school and the reasons are unclear. This is very important to reduce illiteracy rates in the community with obligate all school children up to 9 years of study/school (to graduate from elementary and junior high school)\(^9,10\).

Measurement of the nutritional status of children under five in Konda and Wamargege villages by measuring height and weight, and age of children under five. The number of children under five is 85 children consisting of 36 children under fifth from Konda village and 49 children under fifth from Wamargege village. Data is seen in the diagram below.
Measurement Of Weight/Age On Children Under Fifth

From 85 children under fifth who have measured body weight per age, it was found that there were 49.1 percent of good nutritional status, there were 28.23 percent of malnutrition status and there were 23.35 percent with poor nutritional status. Data can be seen in the following diagram.

Graph 2: Nutritional Status Children Under Fifth Weight/Age

Measurement Body Height/ Age on Children Under Fifth

Stunting conditions for Children under fifth were 54.1% (sum of stunting and severely stunting), the normal was 44.7% and tall was 1.2%.
Discussion

Based on environmental health science, good community potential that can be developed as a source of family nutrition intake, especially the nutrition of children under five among them is the location of the village by the sea. This makes the main work of the community in both villages is fishermen. The captured seafood such as fish, shrimp, crabs are types of foods that contain high protein nutrition which are very good for toddlers to consume. However, sea products so far have always been sold, the results of which are to meet the daily needs of life. For the sake of fulfilling the nutrition of children under five, it is necessary for each family to allocate family income to buy the nutritional needs of children under five such as milk, chicken eggs, chicken, and vegetables.

Related to the availability of garden land for each family. The garden land owned by each family is very broad, but it is still not well taken care of. The garden is still full of grass and perennials, such as durian, rambutan, coconut and sago palm (Fa or sago), but there are no kitchen plants. The main nutrient consumption of the family from these hard plants is sago, because sago is a typical food type of Papua, which is generally processed into a staple food called papeda. The existing sago, which is still limited to papeda, has not been processed well with various variations to adjust the fulfillment of toddlers’ meals.

The existence of Posyandu in the village is also a potential village that is useful to help provide health services for toddlers and pregnant women. But the use of posyandu is still not maximized. Posyandu has not yet played a role in the transfer of knowledge. This can be seen when weighing toddlers, mothers who come do not carry cards to health (KMS) or MCH books, so babies are weighed only as notes in cadre books. There is no explanation of the results of weighing up or down if it goes up how and if it goes down what should be done by the mother. Posyandu in both villages is also used for supplementary feeding (PMT) by PKK mothers which is held every month in the first week.

Broadly speaking, the potential of the community in Kampung Konda and Wamargege are as follows:

1. The community has a social structure, namely the Village Chief Konda and Wamargege, the Chairperson of the Village Representative Body Konda and Wamargege, religious leaders, the administration of village administrators, community leaders, traditional leaders

2. The existence of customary law that is obeyed, for example regarding marriage, which must be obeyed
by all the ringal communities in Kampung Konda and Wamargege.

3. Community compliance with religious leaders, village administration, community, and traditional leaders.

4. The wife’s obedience to her husband, given the customary marriage process that requires her husband to buy or dowry around 10 million or even more and as much as 200 bunches of cloth. After the traditional marriage, the church marriage continues.

5. Occupations of residents in Wamargege are generally fishermen and in the village of Konda they generally do farming, raising livestock

6. Most of the fishermen’s products are shrimp, and are sold to middlemen who have been subscribed to fishermen in Kampung Konda and Wamargege. Some fish are sold to local people, and eaten by fishermen themselves.

7. The results of gardening are generally sago, cassava, banana, spinach.

8. Livestock: chickens raised by the local community do not have special pens. The chickens are wild and find food in their home pages or in their neighbors. For pigs, there are wild animals and there are cages near the house.

9. Hunting results: Deer, wild boar, birds, forest rats and others.

10. There is a helper health center 1, Pudtu Konda. consisting of 4 nurses, 3 midwives and also there is a monthly attendance at the local health center staff for posyandu activities.

11. There are two Posyandu, one in Kampung Konda and one in Kampung Wamargege. Elderly Posyandu only 1 piece.

The implementation of the research during 2018 was carried out with the preparation stage, continued at the data collection stage and made the intervention plan that was most appropriate to the conditions of the Konda and Wamargege Village communities. First data collection by measuring height or length of body and weight of children under five. It was found that children under fifth who were malnourished were 49.4% while those who were stunting (short and very short) were 54.1%. Furthermore, a clinical examination by a health center doctor was found that there were acute respiratory infections, pneumonia, diarrhea and suspected pulmonary tuberculosis.

From the field findings, the research team carried out awareness and advocacy for people on Sunday church services, in Kampung Konda to have a dialogue with the community in overcoming the problem of malnutrition children under fifth in Konda and Wamargege Village. The results obtained, from the village meeting were community agreement in overcoming the problem of malnutrition and lack of these are as follows: (1) the mother or wife who has children less than 2 years old, are not permitted to join the husband go to the sea (2) Nutrition House, where there is a special place for cooking and gathering menus with local raw materials, then the results of the cooking are given to children under five who are malnourished and lacking in Konda and Wamargege Village, and (3) Nutrition Reef, where every house has plants that are eaten as a source of vitamins from food ingredients.

Conclusion

The average family has more than 2 children, in fact most families have children 6 to 8 children. Interventions and recommendations for overcoming the problem of malnutrition in South Sorong Regency are the use of natural resources and local wisdom. in addition, community participation and collaboration with local community leaders can be used as a step to overcome the problem of malnutrition in children.

Source of Funding: This research was completely funded by Ministry of Health, Indonesia.

Conflict of Interest: There is no conflict of interest.

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Parametrization of Pedestrian Injuries and Its Utilisation in Proving Traffic Accidents Course

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Abstract

This paper deals with the unique FORTIS system for parametrization of injuries, which allows one to make the scoring of injuries resulting from accidents, while it offers possibilities for its utilisation for the needs of the road transportation experts or biomechanics during the analysis of vehicle - pedestrian accident cases or for forensic biomechanical assessment of a course of other accidents. The work presents forensic investigation of fatal injuries of pedestrians and an assessment carried out via the FORTIS system in comparison with AIS. The output is a complex parametrization of accident consequences that can be used for the needs of traffic accident analysts and experts in other forensic sciences in calculations in a simulation program or using other forensic exact methods.

Key Words: Injury, description of injuries, injury parametrization system, injury localization, collision analysis

Introduction

Nowadays, an expert in the field of road transport as well as an expert in the field of forensic biomechanics has considerably limited possibilities to use the information on a type, extent or exact location of an injury in the assessment of an accident or an injury case. This is due to the fact that usually it is only a verbal description of injuries carried out by a doctor, but the form of such information is only a small help to expand the necessary knowledge about a movement of an injured person and a particular way the injury was caused.

For further investigation of the possibilities to use the injury parametrization and localization of injuries in practice the „Theory of injury and contact signatures“ was used, which was prepared by forensic engineers in cooperation with the (Institute of Forensic Medicine of P. J. Šafárik University in Košice, Slovakia) in the past years (since 2002) based on the theoretical evaluation of the simulation results of 250 traffic injuries and about 200 actual accidents.

Pedestrian injuries as an information on the course of the collision

In this respect, the primary parameters were particularly

- location on pedestrian’s body (injury location), resulting from the first contact with the vehicle
- extent of injuries (consequence of collisions) determined on the basis experts forensic assessment

It is obvious that the distinctness of every injury or accident plays a decisive role here as the localization, the type and extent of injuries in connection with the localization and the type and extent of damage to a vehicle provide a specific picture of a collision, the „reading“ or recognition of which would, together with other data, significantly improve the collision analysis, eliminate the current inaccuracies and scholastic phenomena.

The following question may be raised in relation to the above:

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“How to use the information on injuries sustained by the pedestrian during the sequence of impact, after “throwing” and movement to final position in the crash analysis, provided that the injuries cannot be sufficiently measured at the level acceptable for calculation purposes“

Additional two methodological questions arise when we attempt to answer the question:

1. How to express the location, extent and type of pedestrian injuries (in general – consequences of violence acting upon human body resulting in the injury), to enable any degree of quantification, whereas the quantification should be correct especially from medical viewpoint, as performed by forensic specialists?

2. How to make use of this forensic quantification to assist in the analysis of traffic accidents?, i.e. how to transmit and subsequently use the knowledge from the two fields – forensic medicine and forensic engineering to analyse the sequence of the accident?

Provided that a collision and an injury are, physically speaking, a unique and unrepeatable set of phenomena, which is affected by an undefined number of influences, out of which many are specific for a particular collision, we may predict that in order to achieve the best solution for its analysis it is vital that we make use of all known circumstances and facts.

Parametrization and determination of injury extent from medical point of view – current state

The effort to standardize injuries to a human body (including pedestrian injuries in traffic accidents) is motivated by a need to define causes and consequences of injuries. During an interaction of a human body part and a vehicle (or a vehicle interior, a road, a motorcycle, etc.) there are mechanical and physiological changes of the contacting human body parts due to the action of force. These changes are called a biomechanical response to an external load[5].

To describe the dependence between a mechanical (time and force) action and a biomechanical response for the needs of technical experts it is necessary to define the criteria that express a degree of an estimated biomechanical response to a mechanical load. The extent of injuries may help to reconstruct the course of an accident and it also may be a very useful control value.

The AIS/ISS injury scale is currently considered a classic injury parameter evaluation system from the medical point of view. The mentioned parametrization is based on the medical esvaluation of injury type and extent.

Methodology of injury severity score AIS/ISS

The point values according to Abbreviated Injury Score (AIS) and Injury Severity Score (ISS) for injuries (adapted according to Baker et al., 1974, 1984, Moore et al., 1998):

<table>
<thead>
<tr>
<th>AIS point value of one body part</th>
<th>Injury description</th>
<th>ISS value (AIS2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No injury</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>Minor injury</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>Moderate injury</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>Serious injury</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td>Severe injury</td>
<td>16</td>
</tr>
<tr>
<td>5</td>
<td>Life-threatening injury</td>
<td>25</td>
</tr>
<tr>
<td>6</td>
<td>Fatal injury</td>
<td>36</td>
</tr>
</tbody>
</table>

ISS = AIS2 max1 + AIS2 max2 + AIS2 max3  (0 … 75 points)

Among other well-known there are GSI (Gadd Severity Index), HIC (Head Injury Criterion – a head injury parameter), 3MS, TTI (Thoracic Trauma Index – a trunk injury parameter), VC (a soft tissue injury parameter), EIC (Extended Injury Criterion – an extended injury parameter), which are the ways of injury parametrization, but they provide a universal information means neither for the entire body of an injured person nor for all types of injuries.

Parameterization of injuries in crashes involving pedestrian injuries – FORTIS system (Forensic Traumatology Injury Scale)

Nowadays, a forensic analysis of injuries, especially traffic injuries, is not always standard, mainly due to the lack of an established, precisely defined procedure of injury parameter standardization. The proposed
procedure for the assessment of traffic injuries, including
the key element of injury parameter standardization
according to internationally accepted AIS/ISS scale
(abbreviated Injury Scale/Injury Severity Score) as
follows:

Materials and Methods

➢ Investigated circumstances, accompanying
documentation, autopsy reports, image documentation
and results of supplementary investigation evidence
from traffic accidents involving pedestrian fatalities

➢ Completed autopsy report in accordance with
the requirements of International Disease Classification
(10th revision)

➢ Assessment of injury parameters using
proprietary modified FORTIS system, comparison of
FORTIS values with AIS/ISS values

The modified FORTIS system

The result is the modified FORTIS system – a range
of injuries in forensic traumatology, the use of which
enables a more complex expression of the severity of
an injury, thus enabling its further use to solve traffic
accidents and other injury events resulting in damage to
health. The FORTIS system uses a proprietary modified
point value system, which besides determining the
basic injury to health (ZPZ), proposes classification
of accompanying complications in two groups: Ko1 -
primary post-injury complications - such as traumatic
shock, haemorrhagic shock, cardiac tamponade,
haemothorax, pneumothorax) and secondary
complications Ko2 – such as inflammatory changes,
oedema of non-traumatic origin, thromboses, conditions
arising from surgeries, etc.

Such division provides an opportunity to indirectly
assess quality of healthcare provision in case of a
surviving injured. To verify the proprietary modified
FORTIS system, 12 fatal traffic accidents were subjected
to assessment by forensic pathologists, evaluating each
case as a single event and subsequently each relevant
item in the autopsy report was assessed in a similar
way. The results acquired through above analysis were
compared to standard assessment of injury parameters –
AIS/ISS in order to demonstrate new possibilities of the
FORTIS system in quantification of injury parameters.

Point values of the 12 assessed pedestrian fatalities
using standard AIS/ISS method and the modified

FORTIS system can be seen in Table 1.

Table 1: Scoring of traffic accidents of pedestrians, using classical methodology AIS/ISS and respective modified FORTIS system

<table>
<thead>
<tr>
<th>Case No.</th>
<th>Name, age</th>
<th>M/W</th>
<th>Vehicle</th>
<th>Survival period (hour)</th>
<th>ISS</th>
<th>FORTIS total</th>
<th>FORTIS ZPZ</th>
<th>FORTIS Ko1</th>
<th>FORTIS Ko2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>P.U., 41</td>
<td>M</td>
<td>Van</td>
<td>0</td>
<td>66</td>
<td>44,1</td>
<td>22,4</td>
<td>11,7</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>M.J., 38</td>
<td>M</td>
<td>Car</td>
<td>0</td>
<td>75</td>
<td>82,8</td>
<td>47,7</td>
<td>16,1</td>
<td>19</td>
</tr>
<tr>
<td>3</td>
<td>A.P., 67</td>
<td>W</td>
<td>Car</td>
<td>0</td>
<td>75</td>
<td>78,2</td>
<td>53,6</td>
<td>17,6</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>E.P., 9</td>
<td>M</td>
<td>Car</td>
<td>0</td>
<td>75</td>
<td>57,1</td>
<td>41,1</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>5</td>
<td>P.S., 49</td>
<td>W</td>
<td>Truck</td>
<td>0</td>
<td>75</td>
<td>66,3</td>
<td>65,3</td>
<td>1,0</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>A.Č, 80</td>
<td>M</td>
<td>Car</td>
<td>0,8</td>
<td>57</td>
<td>83,2</td>
<td>66,2</td>
<td>12</td>
<td>5</td>
</tr>
<tr>
<td>7</td>
<td>J.N., 58</td>
<td>M</td>
<td>Car</td>
<td>2</td>
<td>75</td>
<td>97,4</td>
<td>77,4</td>
<td>7,3</td>
<td>12,7</td>
</tr>
<tr>
<td>8</td>
<td>J.B., 57</td>
<td>M</td>
<td>Car</td>
<td>24</td>
<td>75</td>
<td>99,2</td>
<td>60,8</td>
<td>20,7</td>
<td>17,7</td>
</tr>
<tr>
<td>9</td>
<td>I.M., 47</td>
<td>M</td>
<td>Car</td>
<td>72</td>
<td>75</td>
<td>102,7</td>
<td>46,9</td>
<td>16,1</td>
<td>37,7</td>
</tr>
<tr>
<td>10</td>
<td>Š.Ch., 57</td>
<td>M</td>
<td>Truck</td>
<td>239</td>
<td>75</td>
<td>59</td>
<td>19,1</td>
<td>14,5</td>
<td>25,4</td>
</tr>
<tr>
<td>11</td>
<td>F.K., 51</td>
<td>M</td>
<td>Car</td>
<td>288</td>
<td>75</td>
<td>27</td>
<td>9,3</td>
<td>7,7</td>
<td>10</td>
</tr>
<tr>
<td>12</td>
<td>M.P., 39</td>
<td>M</td>
<td>Car</td>
<td>291</td>
<td>75</td>
<td>60,8</td>
<td>24,2</td>
<td>8,5</td>
<td>28,1</td>
</tr>
</tbody>
</table>
It is undeniable that the possibilities of the point injury evaluation by the FORTIS system are wider; the system is more flexible, more accurate and it differentiates a degree of damage to health caused by the injury, which was fully confirmed by a research focused on the possibilities of using the proposed system.

Illustrative examples of scoring of forensic examination of fatal injuries with a different ratio ZPZ, Ko1 and Ko2

A. Results - case No.4

Investigated circumstances: involving motor vehicle VW Passat, whereas the vehicle with its right side collided with underage pedestrian who entered its trajectory from the right side, causing him head injury to which he succumbed shortly after the accident.

Immediate cause of death: Rupture of the connection between medulla oblongata and cerebral pons and contusion and laceration of brain and intracranial haemorrhage resulting from fragmented fractures of cranial calvaria and base.

Fig. 1 Documentation of finding - illustration to case no. 4

Fig. 2: Evaluation of parameters of injuries in the case no. 4 via custom modified FORTIS system and comparison of FORTIS values with AIS/ISS values
B. Results - case No.11

Investigated circumstances: involving a collision between passenger vehicle and pedestrian. The injured pedestrian was subsequently hospitalized at the traumatology department with bilateral fracture of pelvis (treated by conservative – Kirschner’s extension of left leg). On the 12th day of hospitalization, F.K. died.

Immediate cause of death: Bilateral focal catarrhal-purulent broncho-pneumonia.

Fig. 3 Documentation of the finding - illustration to case no. 11

Fig. 4 Evaluation of parameters of injuries in case no. 11 via custom modified FORTIS system and comparison of FORTIS values with AIS/ISS values
EVALUATION AND BENEFITS OF FORTIS SYSTEM

The informative value of the modified FORTIS system according to the extent of the damage to health in connection with the immediate consequences of the actuating violence (ZPZ – basic damage to health) and associated complications (Ko1, Ko2) in the selected cases, case No.4 and case No. 11, in relation to the survival period of the injured persons is shown in Fig.5 and Fig.6:

Fig. 5 Relationship of FORTIS ZPZ, Ko1 and Ko2 in the event of death on the spot DN- case no. 4

Fig. 6 Relationship of FORTIS ZPZ, Ko1 and Ko2 in the event of survival - case no. 11

The research conducted so far, outcomes of which are presented herein, enables us to state that the technique of standardization of pedestrian injury parameters in case of traffic accidents (quantification of injuries) requires the application of the proprietary modified scoring system FORTIS, that enables (subject to good quality of input parameters) to calculate the degree of the basic injury to health, primary post-injury complications and secondary complications, including painful treatment procedures and poor quality of healthcare and in case of fatal injuries it enables to determine the immediate cause of death.

The modified system of injury scoring differs from the existing systems in the following aspects:
FORTIS vs. AIS/ISS

Scoring of injuries and their complications using modified tables Injury Score in Forensic Medicine

- Special scoring of the basic injury to health (ZPZ)
- The complications are divided in two categories:
  1) primary post-injury complications (Ko1)
  2) secondary complications (Ko2)
- The score values include decimal positions
- Maximum score of FORTIS is not limited

It is clear that the above mentioned differences between FORTIS and the scale of the AIA/ISS system significantly increase FORTIS’s utility, accuracy resulting in certain parameter of the injury expressed in the form of a number, enabling the generation of characteristic signatures with respect to the parameters of the collision between the vehicle and the pedestrian, or in general to the mechanism of injuries.

Currently, the total number of 39 tables of individual body parts is being processed with regard to decisive health consequences in relation to the extent and location of the actuating violence, which are gradually verified and completed with others. The stated methodology continues to be constantly improved.

In order to manage a full use of FORTIS system for the needs of the accident course analysis (or the injury course analysis) it is necessary to display the localization of the spot on the body surface, where the violence resulting in an injury actuated. Then, we may compare this localization with the localization of the contact according to a calculation in the simulation program, as shown in Fig.7.

![Examples of visual identification of contacts in PC Crash program](image1)

Fig. 7 Examples of visual identification of contacts in PC Crash program [3]
Conclusion

It is apparent that in such way we created an opportunity, for the needs of analysts of traffic accidents at solving the vehicle-pedestrian collision, sto compare a level of concordance of localisation of injuries at own calculations, and even by comparing the concordance of distribution of total energy acting upon collision to the pedestrian’s body, using calculation program. The said FORTIS system has considerably greater possibilities of use within forensic medicine and traumatology as it includes not only the area of evaluation of road traffic injuries, but also all injury phenomena (railway accidents, aviation accidents, violent criminal acts, etc.), during the analysis of which it is possible to obtain the information on severity of individual traumatic contacts for individual calculations, than the simulation programs used to analyse traffic accidents. We may presume that the FORTIS system should be already used in the first contact between a doctor and a patient suffering an injury and that it should accompany the patient until he/she recovers and that it should also be used to investigate the accident/injury as well as for a legal assessment of all its aspects, for which it provides all available information for the mentioned said purpose.

Acknowledgement:

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The manuscript is not in a conflict of interests with any natural or legal entity.

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Ethical clearance: No special ethics approval is needed, the information shared to the Ethics committee, Faculty of Medicine, P. J. Safarik University in Košice, Slovakia.

References


Citrus Hystrix D.C Fluid Inhibits the Growth of Escherichia Coli, Pseudomonas aerogenosa, and Bacillus subtilis

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Abstract

Background: Citrus hystrix D.C is a plant traditionally used for herbs and medicinal plants in Indonesia. Citrus hystrix D.C fluid is proven to inhibit the growth of Staphylococcus aureus. The purpose of this study was to determine the ability of the fluid of Citrus hystrix D.C concentrations of 25%, 50%, 75%, and 100% in inhibiting the growth of Escherichia Coli, Pseudomonas aerogenosa, Bacillus subtilis.

Material and Method: This research is experimental with Posttest Only Control Group Design. The material used was local Citrus hystrix D.C, fresh and clean green, obtained from the Astambul area, Banjar Regency, South Kalimantan Indonesia.

Results: The results showed that there was a zone of inhibition of Citrus hystrix D.C fluid at a concentration of 25%, 50%, 75%, and 100% on the growth of Escherichia Coli, amounting to 7mm, 10mm, 13mm, 15mm. Pseudomonas aerogenosa, amounting to 6mm, 9mm, 13mm, 14mm. Bacillus subtilis, amounting to 6mm, 8mm, 11mm, 14mm.

Conclusion: It concluded that the fluid of Citrus hystrix D.C affected the growth of Escherichia Coli, Pseudomonas aerogenosa, Bacillus subtilis with the most significant inhibition zones respectively 15mm, 14mm, and 14mm.

Keywords: Citrus hystrix D.C; Antibacterial; Escherichia Coli; Pseudomonas aerogenosa; Bacillus subtilis

Introduction

Unhealthy lifestyles and poor sanitation are factors that support bacterial infections. The bacterial infection is still a health problem in Indonesia. Bacterial diseases such as tuberculosis1,2,3 and Staphylococcus aureus4,5. There are also problems with bacterial environmental contaminants such as Salmonella6, E. coli7, Staphylococcus aureus8,9 and Bacillus10,11.

Gram-positive Bacillus subtilis can cause bacteremia, septicemia, and endocarditis12. E. coli bacteria are Gram-negative bacteria that cause infections of the urinary tract and digestive disorders such as diarrhea13 whereas P. aeruginosa is a Gram-negative bacterium that causes urinary tract infections, meningitis, diarrhea, necrosis of enterocolitis and pneumonia14.

We are handling bacterial infections, in general, using synthetic bacteria. Synthetic antibacterial has side effects that can cause allergic reactions for users who are not suitable to use the antibacterial. So the manufacture of natural antibacterial originating from plants began to be investigated15.

Indonesia is a country rich in herbal plants as medicinal plants such as Anredera cordifolia16, Cananga odorata (Lamk). Hook17, lime18, Syzygium polyanthum19, Carica papaya Linn20, Jatropha curcas21, Kaempferia galanga L.22, Cinnamomum burmannii23, Eleutherine palmifolia (L) Merr24, Hibiscus sabdariffa L.25 Ocimum basilicum Linn26, Citrus hystrix D.C.27. Citrus hystrix D.C. is an Indonesian endemic plant originating from the family Rutaceae, genus Citrus. The community has commonly used plants belonging to the genus Citrus for the treatment of various diseases28.

Citrus hystrix D.C fruit fluid has a pH of 1.62, which shows very acidic, compared with lime (Citrus aurantifolia swingle) Research that has carried out on the fluid owned by the plant genus Citrus proves its activity
as an antioxidant and antibacterial (male). Citrus hystrix D.C fluid contains flavonoids which play a significant role in inhibiting bacterial growth.

The results of Kusumawardhani (2019) Citrus hystrix D.C fluid can inhibit the growth of *Staphylococcus aureus* at concentrations of 25%, 50%, 75%, and 100%, respectively 13.75mm, 17.25mm, 19.75mm, and 21.75mm. The inhibitory water of Citrus hystrix D.C against *Staphylococcus aureus* has known, but the inhibition has not been identified yet on *Escherichia Coli, Pseudomonas aerogenosa, Bacillus subtilis*. The purpose of this study was to determine the antibacterial ability of Citrus hystrix D.C fluid against *Escherichia Coli, Pseudomonas aerogenosa, Bacillus subtilis*.

**Subjects and Method**

The research carried out was an experimental study by examining the inhibitory power of Citrus hystrix D.C fluid with concentrations of 25%, 50%, 75%, and 100% when compared with the control group.

The material used in this study was Citrus hystrix D.C fluid with the criteria of local fruit, fresh and clean green, obtained from Astambul, Banjar Regency, South Kalimantan Indonesia.

The independent variable used is Citrus hystrix D.C. The Bound Variable used is the diameter of the bacterial inhibitory zone on Muller Hinton (MH). Determination test of Citrus hystrix D.C conducted at the Laboratory of Basic Mathematics, and Natural Sciences University of Lambung Mangkurat Banjarbaru Antibacterial activity test carried out using the diffusion method in a well with repeated work three times. This study uses sterile aqua dest as a thinner in various concentrations of Citrus hystrix D.C. The results obtained were read by measuring the inhibitory zone of Citrus hystrix D.C fluid against bacteria using a ruler.

**Results**

Testing the antibacterial activity of Citrus hystrix D.C fluid on bacteria showed variations in the inhibition zone. Data of Citrus hystrix D.C fluid inhibition zone data for bacteria presented in Table 1-3.

<table>
<thead>
<tr>
<th>Various Concentrations (%)</th>
<th>Zone of inhibition (mm)</th>
<th>Average (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>25</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>50</td>
<td>10</td>
<td>9</td>
</tr>
<tr>
<td>75</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>100</td>
<td>15</td>
<td>15</td>
</tr>
</tbody>
</table>

**Table 2 The Zone of Inhibition of Citrus hystrix D.C fluid against Pseudomonas aerogenosa at Various Concentrations.**

<table>
<thead>
<tr>
<th>Various Concentrations (%)</th>
<th>Zone of inhibition (mm)</th>
<th>Average (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
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<tr>
<td>25</td>
<td>6</td>
<td>5</td>
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<tr>
<td>50</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>75</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>100</td>
<td>15</td>
<td>14</td>
</tr>
</tbody>
</table>
### Table 3 The Zone of Inhibition of *Citrus hystrix* D.C fluid against *Bacillus subtilis* at Various Concentrations.

<table>
<thead>
<tr>
<th>Various Concentrations (%)</th>
<th>Zone of inhibition (mm)</th>
<th>Average (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
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<td>25</td>
<td>6</td>
<td>5</td>
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<tr>
<td>50</td>
<td>8</td>
<td>7</td>
</tr>
<tr>
<td>75</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>100</td>
<td>14</td>
<td>15</td>
</tr>
</tbody>
</table>

### Discussion

Based on the data obtained in tables 1-3, it known that *Citrus hystrix* D.C. fluid can inhibit the growth of *Escherichia Coli*, *Pseudomonas aerogenosa*, *Bacillus subtilis*. The higher the concentration of *Citrus hystrix* D.C. fluid, the greater the diameter of the inhibition zone formed. This result shows that by increasing the level of *Citrus hystrix* D.C. fluid, the higher the content of active ingredients contained in *Citrus hystrix* D.C. fluid, which functions as an antibacterial, so the higher its ability to inhibit bacteria.

*Citrus hystrix* D.C. fruit fluid has a pH of 1.62, which shows very acidic so that when oxidized, the structure will change, and its function will decrease and even disappear. In general, pathogenic bacteria cannot grow very slowly at pH below 4.6. The limitation of this study is that no phytochemical tests carried out on the research material. The unknown chemical content of *Citrus hystrix* D.C., such as flavonoids, saponins, tannins, alkaloids, and others, is hidden.

Chowdhury et al. (2009) stated that the methanol extract of *Citrus hystrix* fruit and some of its fractions had moderate to healthy antibacterial activity against some Gram-positive and Gram-negative bacteria. The ethyl acetate extract and essential oil of *Citrus hystrix* rind have more effect on *S. aureus* than *E. coli*. *Citrus hystrix* D.C. fluid used in this study also proved that the inhibition zone of *E. Coli* at a concentration of 100% was only 15mm, compared to the inhibition zone of *Staphylococcus aureus* in Kusumawardhani’s study (2019) resulting in a higher inhibition zone at the same concentration of 21.75mm.

The limitation of this study is that no phytochemical tests carried out on the research material. The unknown chemical content of *Citrus hystrix* D.C., such as flavonoids, saponins, tannins, alkaloids, and others, is hidden.

### Conclusion

There is a zone of inhibition of *Citrus hystrix* D.C. fluid at concentrations of 25%, 50%, 75%, and 100% on the growth of *Escherichia Coli*, amounting to 7mm, 10mm, 13mm, 15mm. *Pseudomonas aerogenosa*, amounting to 6mm, 9mm, 13mm, 14mm. *Bacillus subtilis*, amounting to 6mm, 8mm, 11mm, 14mm.

**Conflict of Interest:** Nil

**Source of funding:** Self

**Ethical Clearance:** mTaken From Health Research Ethics Committee Politeknik Kesehatan Banjarmasin Indonesia
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Study of Analytical Characterization and Antibacterial Activity of Silver Nanoparticles Synthesized by Using Pineapple Juice as a Reducing Agent

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Abstract

In the past years, various phytosynthetic processes have been utilised of silver nanoparticles for the low cost and environmentally friendly comparing to the chemical and physical methods. These unique metal nanoparticles are used in several applications which are including pharmaceuticals, antimicrobial and biomedical applications. Wherefore, the object of this work is biosynthesizing AgNPs from extracts of pineapple juice as reducing studying their characteristics by Ultraviolet-Visible (UV-vis) Spectrometer, Atomic Force Microscope (AFM), SEM Scanning Electron Microscope and Transmission Electron Microscope (TEM) The UV-Vis spectra results show a strong resonance centered on the surface of silver nanoparticles (AgNPs) at 410 nm. the presenting study is involved the preparation of (AgNPs) from natural source, which confirmed by UV-Visible spectral analysis in 410nm and the synergism effects with some antibiotic to increase the sensitivity to some pathogenic bacterial isolate as *E. coli*. In addition, our study is presented results of the minimum inhibitory concentration (MIC) that MIC for AgNPs is 25 while other antibiotics are (32,64,128). Finally, the synergism activity shows a significant difference in the sensitivity of some antibiotics used against *E. coli* bacteria, especially with levofloxacin and increased the inhibition form 419 mm to 1657.2 mm.

Keywords: AgNPs, pineapple juice, UV-Vis, *E. coli*, synergistic role.

Introduction

Nanoparticles (NP) are atomic or molecular aggregates with dimensions between 1 nm and 100 nm (¹,²). NPs great Have a great scientific interesting because have a bridge between bulk material and atomic or molecular structure (³). There are different processes to prepare silver nanoparticles (AgNPs), such as conventional temperature assisted process, controlled reaction at high temperatures, and microwave assisted process (⁴). Green method for the synthesis of AgNPS with plant extracts plays a very important role in nanotechnology without any harmful chemicals (⁵). Recently, some plants were used to synthesize silver nanoparticles including Ziziphus mauritiana (⁶) and Cyperus sp. (⁷). The Green synthesized is by using pineapple juice. Pineapple [Ananas comosus (L.) Merr.], is the third most important fruit crop in the tropical and subtropical regions of the world, it is only preceded by banana and citrus (⁸). Pineapple has an important source of sugars, organic acids and the most important is considering as an antioxidant, such as ascorbic acid, flavonoids, and other phenolic compounds related to antioxidant activities (⁹,¹⁰). UV-vis spectroscopy is rapid, easy, sensitive, selective technique for various types of NPs and the measurements of this technique are consuming short times (¹¹, ¹²).

Experimental section

Materials: Research chemicals were supplied by MERCK Company-Germany.

Instruments: UV-Vis spectroscopy (Shimadzu, Japan), Atomic force microscope (AFM);
Synthesis of silver nanoparticles using pineapple juice

Only, 440 ml of pineapple juice aqueous was added to 240 ml distilled water in conical flask, the solution was heated to 50 - 60 °C. 10 ml of aqueous solution was added to 1mM AgNO₃ with stirring. the color of the solution will change to orange after 15 min. This indicates for the formation of AgNP₅.

Antibacterial activity

Isolate

E. coli isolates were obtained from microbiology laboratories at the Faculty of Science, Anbar University. the isolation was confirmed by using some of the biochemical investigations that included with growth of the nutritious broth and Macconky agar. In addition to carrying out some special tests including Gram stain and some biochemical tests after that the isolation was diagnosed using VITEK 2.

Sensitivity test

A number of antibiotics were used by Bioanalyse company. Where they were followed the method of spreading around the tables on Mueller Hinton Agar fertilized with E. coli bacteria (13).

The minimum inhibitory concentration (MIC).

The values of the minimum inhibitory concentrations (MIC) were determined by broth dilution technique in microtiter plates and this technique is based on the Clinical and Laboratory Standards Institute (CLSI) guidelines (14) for each compound: Ag⁺ ion, AgNPs, chitosan, and the antimicrobial drugs (Gentamycin,Amikacin, Doxycycline, Levofoxcacin, Trimethoprim,Cefixime) against Grum-positive bacteria E.coli. The MIC investigations, the bacterial suspension 0.5 McFarland (approximately 108 colony forming units per mL) were prepared from E. coli bacteria in Mueller Hinton agar, at 37 °C, for 24 h. It was added 150 µL of bacteria suspension and 150 µL of the antibacterial agent solution in a polystyrene microtiter plate, both solution was diluted in Mueller Hinton broth. The concentrations of the compound are ranged between (0.03-64 µg mL⁻¹). The plates were incubated for 24 h and the bacteria growth was determined by turbidity and color change in the system by adding the non-enzymatic marker (resazurin aqueous solution 0.01 g L⁻¹). Resazurin turns from dark blue to colorless under the metabolism of bacteria (15).

Results and Discussion

Characterization

The formation of silver particles (AgNPs) was confirmed after 15 min at 50-60 °C by the color change of the solution and the surface plasmon resonance (SPR) band which obtained by UV-Visible spectrum with 410 nm (13). The optical absorption spectra are normally determined by a UV-visible spectrophotometer. The function of UV-visible absorption is based on measuring the intensities of two transmitted beams, one beam transmitted from the sample and another transmitted from the reference cavity. UV-Visible spectral analysis of the bio-synthesized AgNPs from pineapple juice and their color were checked in this test to confirm the formation of AgNPs (16). The color change of the mixture solution from yellow to the brown color at peak 410 nm, and that agree with results of (6, 7).

The atomic force microscope (AFM) is used to differentiation the NPs. It supplies the ability of 3D visual image and both qualitative and quantitative information about different actual features such as size, roughness, morphology and surface texture (17). AgNP₅ that formed from pineapple juice as reducing agent have smooth a surface and small particles diameter. distribution, the average particle of AgNPs is measured by AFM images was (32 nm),

SEM analysis in most of measurements s that specialized with nano particles. This study gave image for synthesized silver nano particles was shown high-resolution. Average of size particles around between 20 -30 nm with spherical shape.

Transmission electron microscopic (TEM) is one of the most popular characterization techniques for NPs (18). In this technique, a real image of NPs is taken; different magnifications can be used to show more detailed or general shape of NPs. These images are containing a
lot of information regarding shape and size distribution, and even crystallographic structure and characteristics of nanoparticles. TEM images data clearly shows that the structure and nature of reducing agent play an important role to reduce the Ag ion into Ag atom. This method provides highly stable water-soluble. Mono dispersion and Spherical Shape only particles, average size between (18- 30) nm 

The EDX spectrum of the biosynthesized AgNPs (figure 1) shows finding silver element as an indicator for the formation of silver nanoparticles from the. Also, it exhibits the C, O, N, Al Si, and Sr elements have been presented in the used sample. Si element has been presented from deposition of AgNPs on the bottom

Biological Applications of AgNPs

AgNPs have been used in applications of AgNPs in different biological and biomedical applications, example antibacterial, antifungal, antiviral, anti-inflammatory, anti-cancer, and anti-angiogenic. In our study, we focused on the efficacy of AgNPs as an antibacterial agent using a number of common antibacterial against E. coli bacteria. Antimicrobial Activity of AgNPs

One of the most typical model organisms is E. coli which is used in medical and biology researchs as well as drug mechanisms and drug targets studies. The nature of E. coli is Gram-negative bacteria which has the same structure of any cell by using the minimum inhibitory concentration.

The MIC value of AgNPs tested against E. coli was found to be high (in the range of (32 -128) (µg/ml) table (1).

(Table 1) Antibiotics and (AgNPs) MIC (µg/ml) determination by micro-titer plate

<table>
<thead>
<tr>
<th>Isolate</th>
<th>Cefixime</th>
<th>Trimethoprim</th>
<th>Levofoxacin</th>
<th>Doxycycline</th>
<th>Amikacin</th>
<th>Gentamycin</th>
<th>(AgNPs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E.coli</td>
<td>128</td>
<td>128</td>
<td>32</td>
<td>-</td>
<td>64</td>
<td>32</td>
<td>25</td>
</tr>
</tbody>
</table>

Therefore, we investigated the mechanism of synergistic influence of combination between AgNPs and antibiotics against E. coli. The synergism was presented with E. coli when AgNPs combined with Gentamycin, Amikacin, Levofoxacin, Trimethoprim, Cefixime, if found the highest value of MIC at Trimethoprim, Cefixime. AgNPs were effective in inhibiting bacterial growth Therefore, it can be said that AgNPs are broad spectrum agents whose performance is not blocked by the drug-resistant mechanisms of the bacteria. (23)

The combination test between antibiotics and silver nanoparticles (Synergistic role)

Ten microliters colloidal AgNPs was injected into wells in media which containing antibiotics. The plates were cultured by bacteria and then incubated at 37°C for 18-24 h. The diameter of inhibition zone was measured by the ruler compared with the control; antibiotics and AgNPs alone. AgNPs have utilised in medicine field, and in this work, it was used the synthesised AgNPs as antibacterial agent through simple technique called well
diffusion assay. The potential of anti-bacterial properties for AgNPs was shown against *E. coli*. The synthesised AgNPs has ability to inhibit *E. coli* growth with various types of antibiotics. The empty spaces were significantly increased with using AgNPs-antibiotics as shown in table 2.

### Table 2. Zone of inhibition for *E. coli* growth by synergistic effect between antibiotics and AgNPs.

<table>
<thead>
<tr>
<th></th>
<th>CEFTRIAXONE</th>
<th>CEFIXIME</th>
<th>Trimetho</th>
<th>DOXYCYCLINE</th>
<th>GENTAMICIN</th>
<th>AMIKACIN</th>
<th>LEVOFLOXACIN</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. coli without (AgNPs)</td>
<td>78.6</td>
<td>38.5</td>
<td>0</td>
<td>0</td>
<td>616</td>
<td>707.175</td>
<td>254.6</td>
</tr>
<tr>
<td>E. Coli with (AgNPs)</td>
<td>78.6</td>
<td>95</td>
<td>78.5</td>
<td>66.144</td>
<td>962.543</td>
<td>855.7</td>
<td>855.7</td>
</tr>
</tbody>
</table>

The increasing of inhibition zone relates with the combination of the Ag nanoparticle with antibiotics which increase methods of killing bacteria *in vitro* and that is called synergistic effect between AgNPs and antibiotics (24). The role of silver nanoparticles biosynthesized from natural organic compounds in fruits extracts may be play an important agent against microbes (7), referred to that silver nanoparticle which produced in the green chemistry method is considered potential nano-drug against human microbes’ pathogens *in vitro*.

**Conclusion**

In this study, we used green method to synthesis AgNPs by using pineapple extract as reducing and stabilising agent which proved by UV-Visible spectral analysis, EDX, SEM, and AFM analyses. we tested activity of synthesized Ag NPs as anti-bacterial against *E. coli* by using well diffusion assay technique. The study showed that Ag NPs were anti-bacterial very active with different type of antibiotics against *E. coli* and we found sliver nanoparticles has the synergism effect with some antibiotic such as (Gentamycin, Amikacin and Doxycycline, Levofloxacin, Trimethoprim and Cefixime) in increase its activity towards *E. coli*.

**Acknowledgement**

The authors are grateful for scientific support which presented from College of Science in University of Anbar, Iraq.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Funding:** Self-funding

**Reference**


Adolescents’ Knowledge and Attitude Before and After Exposure to Media of Youth Sexual Behavior in Indonesia

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Abstract

The increasing number of cases regarding adolescent free sex is due to a lack understanding of reproductive health. Someone’s knowledge about reproductive health is believed to be closely related to what action they take. In the context of adolescence, their knowledge of reproductive health undoubtedly influences their attitude toward premarital sex. Most of premarital sex cases occur because they are lacking of knowlegde about its impact. This quasi-experiment was conducted on a senior high school in Indonesia. Subjects were 144 nine grade students, selected using purposive random sampling from a total population of 229 students. For each control and experiment groups, 72 students each were selected. The experiment group participated in the treatment of the study. Data was analyzed using paired t-test to find the differences of control and experiment groups’ knowledge and attitude. Both groups showed an increase of knowledge. However, the increase in experiment groups were more than one of the control group. There were only 10 students (14%) of experiment groups reached the category of having good understanding on the pre test and the number increased on the post to 39 students (54%).

Keywords: Knowledge, Attitude, Video, Leaflet.

Introduction

Health is a good condition physically, mentally, spiritually and socially, which enables everyone to live productively socially and economically. Health is among the most important thing for anyone no matter how old they are. Health is a serious matter, which is related to one person to another in the national development. Therefore, everyone must fight for the highest level of health. Everyone should promote health life style ranging from digestion, exercise to sex.

Many of teenagers exhibit behaviors that tend to lead to free sex. This is due to their ignorance about proper sex. Free sex behavior in adolescents is mostly caused by their association, which is now very alarming(1).

Premarital sexual behavior lead to disastrous consequences for health. It can lead to transmission of sexually transmitted diseases and unwanted pregnancies, which later can result in these teenagers dropping out of school, getting social sanctions or suffering complications during the pregnancy to the postpartum.

The increasing number of cases regarding adolescent free sex is due to a lack understanding of reproductive health. Nurhayati (2011) stated that someone’s knowledge is closely related to his/her action. In the context of adolescence, their knowledge of reproductive health influences their attitude toward premarital sex(2). As they are lacking of comprehensive knowledge about the effect of their sexual behavior, the premarital sex in adolescents depends on their how their knowledge and attitude towards it. Among numbers of effort we can take to increase their understanding is by conducting health promotion program using audio-visual media.

There are three kinds of health promotion media, namely audio, visual and audio-visual. One of visual media is a leaflet. It is good to stimulate adolescents vision sense during the promotion program. For the
audio-visual media, the common known media is video. It is widely used to increase people knowledge by stimulating their hearing and vision sense so that the knowledge can be acquire well and maximum(3).

Another research (Furqoni, 2015) about the effectivity of health promotion program using leaflet and video toward adolescents’ knowledge and attitude found that there were an increase of youth knowledge, comparing before and after experiments(5). The use of leaflet increased subjects knowledge score from 6.75 to 10.8, while the use of video increased it to 11.6 from the average score of 6.50. Another research (Pratama, 2014) also found that increasing knowledge gained by adolescents using audio-visual and leaflet. The average score of the use of leaflet increased significantly youth understanding from 33.3% doubled to 75.4%. On the other hand, the use of audio-visual media showed an increase, but not significant. from 60.6 to 63.6(6).

Research by Tindaon (2017) supports the finding above. It found that health promotion using leaflet can increase adolescent knowledge of reproductive health by 9.62%. It is because message and information conveyed in the leaflets are concise, interesting, solid and clear so that it can attract readers to learn and therefore have better understanding about the problem(7).

Audio-visual public service advertisments are believed to be an effective tool in delivering information and messages, especially in the purpose of education. Research by Dewi (2017) found that adolescents who watch audio-visual public service advertisement showed marked increase in their knowledge by 24.9% by demonstrating 75.1% understanding of all conveyed messages(8). Aeni (2018) also argued that audio-visual media can increase student knowledge. Her post-test result showed that there were significant improvement of student knowledge after health promotion using video(9).

Material and Method

This is a quasi-experimental study with pre-test post-test Control Group Design, which is an experiment where measurements are taken both before and after treatment to see the effect of the treatment. Samples were selected using purposive random sampling. Data of knowledge and attitude were collected using a 30-questions questionnaire asking adolescent knowledge and attitude towards adolescent sex behavior. The treatment participated in an sex education session using video and leaflet, while the control group participated in different sex education session, which is only using a leaflet. The post-test were given after the treatment. Data were analyzed using SPSS version 21. To find the differences, mean score before and after treatment were compared and analyzed using paired t-test.

This study was conducted on April 2019 in one of senior high school in Indonesia. Total population was 229 students, with selected sample of 144 students using below formula. The sample were divided into two group, 72 students for each control and treatment group.

\[ s = \frac{\lambda^2 N P Q}{d^2(N-1) + \lambda^2 P Q} \]

Annotation:

s = number of sample

N = number of population

\(\lambda^2\) = Chi Square, with df = 1, with margin of error of 1%, 5% and 10%

P = Q = 0.5

d = 0.05

During the experiment, the treatment group watched video about the impact of premarital sex of teenagers aged 16-19 years old. After the video, they were given leaflet containing the same topic and the leaflet were read to them. Total duration for the video and leaflet reading was 15 minutes. Twenty minutes after the treatment, the group answered the questionnaire as the post-test 1 containing the same question from the pre-test questionnaire. The post-test 2 was carried out 4 days after the treatment.

Findings

Each experiment and control group consisted of 72 students. There were 28 boys and 44 girls in the experiment group and 38 boys and 34 girls in the control group. Subjects were 16 – 19 years old. The frequency of respondents in the treatment group and control group who had been exposed to health promotion media about adolescent sexual behavior was 26% and 29% respectively. Those who had never been exposed to the media about sexual sexual behavior were 74% and 71%, respectively.
The analysis results found that the average score of subject knowledge about adolescent sexual behavior before treatment for the control group was 18.21 with the lowest score of 14 and the highest score of 23, while of the treatment group was 18.74 with the lowest value of 14 and the highest value of 24. According to the results of the independent-test results, the average value of the control and the treatment group was not different, with a significant value \( p = 0.271 < \alpha \) (0.05).

The analysis results on the value of adolescent attitudes about adolescent sexual behavior before treatment showed that the control group had an average value of 51.61 and the treatment group had an average value of 53.21, with a significant value of \( p = 0.105 < \alpha \) (0.05). It can be interpreted that the attitude values of the two groups have no difference.

The normality test was used to test whether the data obtained was normal or not. To find it out, the Kolmogorov-Smirnov (K-S) was employed. Data is said to be normal if the significance value is more than 0.05. This value means that there is no significant difference, which also means that the data is normally distributed. If the significance value is less than 0.05, the data has a significant difference, which means that the data is not normally distributed.

<table>
<thead>
<tr>
<th>Table 1. Normality Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment Group</td>
</tr>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>Pre Test Knw.</td>
</tr>
<tr>
<td>Post Test I</td>
</tr>
<tr>
<td>Post Test II</td>
</tr>
<tr>
<td>Pre Test Att.</td>
</tr>
<tr>
<td>Post Test I</td>
</tr>
<tr>
<td>Post Test II</td>
</tr>
<tr>
<td>Control Group</td>
</tr>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>Pre Test Pengetahuan</td>
</tr>
<tr>
<td>Post Test I</td>
</tr>
<tr>
<td>Post Test II</td>
</tr>
<tr>
<td>Pre Test Att.</td>
</tr>
<tr>
<td>Post Test I</td>
</tr>
<tr>
<td>Post Test II Sikap</td>
</tr>
</tbody>
</table>

Table 2 shows that the average value of knowledge on post test for control and treatment group were 18, 21 and 18.74 respectively with \( p \)-value of 0.271 > \( \alpha \) (0.05). This result shows that there were no significant differences of knowledge between the two groups before the treatment. On the post test I, the average score for control group and treatment group were 19.49 and 23.11 respectively with \( p \)-value of 0.000.

In post test II, the average score for the control and treatment group were 19.15 and 22.08 respectively with \( p \)-value of 0.000. From these results, it is clearly seen that the \( p \)-value for both post tests were 0.000 < \( \alpha \) (0.05), so it can be concluded that there was a difference in knowledge of the control group and treatment group after the treatment.

<table>
<thead>
<tr>
<th>Table 2. Paired T-test Results for Knowledge of the Control Group and Treatment Group on Pre Test, Post Test I, and Post Test II</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>Pre Test</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Post Test I</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Post Test II</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Table 3 shows the analysis result for subjects’ attitude during this experiment. Pre-test result shows \( p \)-value of 0.105 < \( \alpha \) (0.05). This shows that there was no significant difference between the control and treatment group before the treatment regarding their attitude toward the topic. The result of post test I and post test 2 obtained \( p \)-value of 0.000 and 0.006 < \( \alpha \) (0.05). So, it can be concluded that was a difference in attitude of the control group and treatment group after the treatment.
Table 3. Paired T-test Results for Attitude of the Control Group and Treatment Group on Pre Test, Post Test I, and Post Test II

<table>
<thead>
<tr>
<th>Test</th>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre Test</td>
<td>Control</td>
<td>72</td>
<td>51.61</td>
<td>0.105</td>
</tr>
<tr>
<td></td>
<td>Treatment</td>
<td>72</td>
<td>53.21</td>
<td></td>
</tr>
<tr>
<td>Post Test 1</td>
<td>Control</td>
<td>72</td>
<td>51.76</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Treatment</td>
<td>72</td>
<td>56.93</td>
<td></td>
</tr>
<tr>
<td>Post Test 2</td>
<td>Control</td>
<td>72</td>
<td>50.85</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>Treatment</td>
<td>72</td>
<td>53.35</td>
<td></td>
</tr>
</tbody>
</table>

Discussion

Respondents knowledge of before treatment was in the category of sufficient. The control group score was in the category with an average value of 18.21. The treatment group was also in the same category with an average score of 18.74. Knowledge of respondents in the control group and treatment group is classified as sufficient because it was between the values of 18-22.

In the treatment group, there were 39 people (54%) who scored well. The increase occurred in the treatment group. Their initial average score of 18.74 (sufficient category) increased to 23.11 (good category). It can be concluded that the two groups experienced an increase after the intervention. This is also supported by the research of Furqoni (2015) who stated that there was an increase in knowledge before and after the treatment was given.

The treatment group experienced a greater increase compared to the control group. This is because the treatment group received treatment in the form of video public service advertisements and leaflets, while the control group only received intervention in the form of leaflets.

This result proves that audio-visual media in the form of public service video ads and visual media in the form of leaflets can increase the knowledge of respondents as seen in both groups in this experiment. This result is also supported by Aeni (2018) who stated that video media can increase adolescent knowledge, and improve the learning system of students, especially teenagers.

It can be concluded that video media is able to stimulate people in improving their level of knowledge and attitude. Changes that occur are significant at the time before and after the intervention is given. So that, it can be concluded that the public service ads in form of video media created by BKKBN is effective in increasing people’s knowledge and attitudes toward the topic, especially for adolescents.

Conclusion

There was a difference in knowledge after the health promotion program using videos and leaflets. The increase of knowledge for respondents was found in both groups. However, the increased in the treatment group is much better than one in the control group. In the treatment group, there were 10 people (14%) in the pre-test who were in the category of good. The number increased to 39 people (54%) after the treatment.

Differences in attitudes of respondents after the experiment were clearly seen. After the treatment, the number of subjects who were in the category of good were 15 respondents (21%) and 30 respondents (42%) for the control group and treatment group respectively. However, the subject in the treatment group were more likely to have better attitude than the control group.

Based on the results of paired t-test, which obtained p-value of 0.000 < α (0.05), it is clearly seen that there are differences in the level of knowledge and values of attitudes of respondents before and after intervention. Video media about adolescent sexual behavior is proven to be effective in increasing knowledge and changing attitudes of respondents.

It is strongly recommended for the public service ads makers to increase the intensity of broadcasting the video through television stations or any other programs involving a lot of teenagers. By inserting advertisements on the such events, the messages will more likely to be easily seen and remembered by teenagers as they attend those events. Schools are strongly suggested to provide this kind information or health promotion program and education like this in a regular basis. It is due to the fact that most respondents feel more pleased to have the information conveyed through these methods.

Conflict of Interest: All authors have no conflicts of interest to declare.
Source of Funding: This is an article “Adolescents’ Knowledge and Attitude Before and After Exposure to Media of Youth Sexual Behavior in Indonesia” of Health Promotion and Behavioral Science Department that was supported by Faculty of Public Health, Airlangga University.

Ethical Clearance: The study was approved by the institutional Ethical Board of the Dental Medicine, Airlangga University.

Reference


Effect of Methamphetamine Addiction on Brain Chemistry Through the Adoption of Fractalkine as an Indicator

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Abstract

Methamphetamine (METH), a highly addictive drug and a strong stimulant of the central nervous system. METH abuse is increasing, especially among young people and adolescents, and therefore we wanted in this research to shed light on some of the problems resulting from meth use, especially its effect on the central nervous system, the blood-brain barrier, and Fractalkine (CX3CL1).

CX3CL1 is the only member of the CX3C subcategory of chemokines, which have a major role in the central nervous system by regulating interactions between neurons, glial cells, and immune cells. It is also considered heavily involved in traumatic brain injury (TBI) and spinal cord injury (SCI).

The study was conducted on eighty people divided into three groups, thirty non-addicted men as a control group (G1), taking into account and excluding, cigarette smoking, age, social and cultural conditions, and chronic diseases, also thirty people addicted to methamphetamine (G2), and twenty people addicted to methamphetamine and other narcotic substances (mix) (G3), whose ages ranged between (15-45) years and the period of methamphetamine abuse ranged between (1-7) years.

The results of study showed that CX3CL1 values were higher among addicted persons compared to non-addicts (G1), this difference in values shows us the effect of meth on the total values of CX3CL1.

Keywords: CX3CL1, Fractalkine, CX3CR1, Chemokines, Methamphetamine, blood–brain barrier (BBB).

Introduction

Methamphetamine (Meth) is an amphetamine derivative that is abused increasingly world-wide (¹). And it is a widely abused psychostimulant contributes to altered neuronal function, addiction, and cellular damage (², ³).

Meth affects glial cell activity, and glial cell activity that lead to modulate the neurotoxic and addictive effects of methamphetamine. Microglia are the major antigen-presenting cells in brain and when activated, they secrete an array of signaling molecules (e.g., proinflammatory cytokines and chemokines) that can cause neuronal damage.

Astrocytes are the most numerous and diverse glial cells in the CNS, with a variety of functions including, but not limited to maintenance of brain homeostasis, storage and distribution of energy substrates, synaptogenesis, and brain defense.

Like microglia, astrocytes can also secrete a number of signaling molecules that play a putative role in methamphetamine-induced neurotoxicity, such as pro- and anti-inflammatory cytokines including interleukins (ILs), interferons (IFNs), and tumor necrosis factors (TNFs), as well as chemokines (⁴).

Activation of microglia and astrocytes are normal compensatory reactions to brain injury, but excess neuro inflammation can lead to further brain damage. Indeed, repeated or neurotoxic (i.e., high dose) Meth
exposure induces alterations in glial cell functions that contribute to a complex cascade of events, leading to neuroinflammation, neuronal damage, and behavioral impairments (Fig. 1)\(^5\).

Pre-clinical in vivo studies and cultured human brain microvascular endothelial cell in vitro experiments show that methamphetamine contributes to inflammation-induced BBB dysfunction in a dose- and time-dependent manner\(^6\).

Methamphetamine exposure, in combination with stress, can synergistically exacerbate BBB damage via inflammatory mechanisms that persist for at least 7 days following methamphetamine\(^7\). Collectively, these methamphetamine-induced effects on BBB contribute to immune dysfunction, such as increased leukocyte/monocyte transmigration across the endothelium and into the CNS\(^8,9\) as shown in (Fig. 1).

(Figure 1): simplified schematic of brain and periphery the blood–brain barrier (BBB)\(^5\)

Fractalkine is a large cytokine protein of 373 amino acids, that has a chemokine domain located on top of a mucin-like stalk\(^10,11\), it contains multiple domains and is the only known member of the CX\(_3\)C chemokine family. It is also commonly known under the names fractalkine (in humans) and neurotactin (in mice)\(^10\).

The main source of chemokines is white blood cells (WBC), but CX3CL1 is mainly produced in endothelial cells and neurons\(^12\). It is not surprising that CX3CL1 expression is elevated in highly vascularized and well-innervated organs and also in locations with an increased concentration of immune system cells, such as the CNS,
lungs, cardiac muscle, liver, intestines, and placenta \textsuperscript{(13, 14)}

Soluble CX3CL1 potently chemo-attracts T cells and monocytes, while the cell-bound chemokine promotes strong adhesion of leukocytes to activated endothelial cells, where it is primarily expressed.\textsuperscript{(10)} CX3CL1 elicits its adhesive and migratory functions by interacting with the chemokine receptor CX3CR1.\textsuperscript{(15)}

Fractalkine is found commonly throughout the brain, particularly in neural cells, and its receptor is known to be present on microglial cells. It has also been found to be essential for microglial cell migration.\textsuperscript{(16)}

CX3CL1 is also up-regulated in the hippocampus during a brief temporal window following spatial learning, the purpose of which may be to regulate glutamate-mediated neurotransmission tone. This indicates a possible role for the chemokine in the protective plasticity process of synaptic scaling.\textsuperscript{(17)}

The disruption of homeostatic paracrine and autocrine interactions of the CX3CL1/CX3CR1 axis in the context of neuron-microglia communication may be seen as one of fundamental elements in the pathogenesis of CNS related diseases \textsuperscript{(18)}. One inducer through which neurons and microglia can communicate to regulate inflammation is fractalkine (CX3CL1) (Fig 2).\textsuperscript{(19)}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{image.png}
\caption{The scheme shows intraneuronal protein accumulation. \textsuperscript{(19)}}
\end{figure}

\textbf{Material and Method}

The study was conducted on eighty people divided into three groups, thirty non addicted men as a control group (G1), taking into account and excluding, cigarette smoking, age, social and cultural conditions, and chronic diseases, also thirty people addicted to methamphetamine (G2), and twenty people addicted to methamphetamine and other narcotic substances (mix) (G3), whose ages ranged between (15-45) years and the period of methamphetamine abuse ranged between (1-7) years.

This study was conducted at the University of Babylon / College of Science / Chemistry Department, and also in Baghdad Governorate, Ibn Rushd Teaching Hospital for Psychiatry.

The addicted persons were chosen for study after being clinically examined and diagnosed by
the laboratories of Ibn Rushd Teaching Hospital for Psychiatry. The results of the screening of people taking methamphetamine during the past (24-48) hours were positive.

Determination of Fractalkine: Human Fractalkine (CX3CL1) (Chemokine C-X3-C-Motif Ligand 1) measured according to method that described in ELISA Kit.

Results and Discussion

The current study included fifty addicted males their ages were 26.7±7.4 years who had a history they of meth abuse for 1-7 years as test group, While the control group was thirty persons non addicted males their ages 27.9±6.9 years as shown in Table (1).

Table (1). Age(Years) for addicts group and non addicts (controls)

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Ages Mean± SD</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age for addicts</td>
<td>50</td>
<td>26.7 ± 7.4</td>
<td>1.04</td>
</tr>
<tr>
<td>Age for non addicts</td>
<td>30</td>
<td>27.9 ± 6.9</td>
<td>1.27</td>
</tr>
</tbody>
</table>

Also, the addict group was divided into: two groups, thirty people were addicted to methamphetamine and considered as G2, and twenty people were addicted to methamphetamine with other drugs G3.

Table (2) Fractalkine levels, the results in table (2) show the levels of Fractalkine for addict groups compared with non-addict group.

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Mean ± SD</th>
<th>SE</th>
<th>CI 95%</th>
<th>Compared group</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
<td>30</td>
<td>0.414 ± 0.13</td>
<td>0.02</td>
<td>0.36</td>
<td>0.46</td>
<td>1 2 0.65</td>
</tr>
<tr>
<td>G2</td>
<td>30</td>
<td>0.500 ± 0.22</td>
<td>0.04</td>
<td>0.41</td>
<td>0.58</td>
<td>2 1 0.65</td>
</tr>
<tr>
<td>G3</td>
<td>20</td>
<td>0.502 ± 0.17</td>
<td>0.03</td>
<td>0.42</td>
<td>0.58</td>
<td>3 1 0.09</td>
</tr>
</tbody>
</table>

Also, the group of meth addicted (G2), and the group of mix addicted (G3), were divided dependent on addict age to A1 (15-21) years, A2 (22-27) years, A3 (up 27) table (3) and (4), as well as they divided depend on abuse duration for D1 (1-2) years, D2 (3-4) years, D3 (5-6) years, the results are show in Table (5) and (6).

The results in Table (3) that show of Fractalkine level were higher in METH addicts group (A3) as compared to addicts group (A1) and (A2) (P >0.05).
Table (3) CX3CL1 level, for addict (Meth) sub groups within variable ages.

<table>
<thead>
<tr>
<th>Addicts age (Meth)</th>
<th>N</th>
<th>Mean ± SD</th>
<th>SE</th>
<th>CI 95%</th>
<th>Compared group</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
<td>Upper</td>
</tr>
<tr>
<td>A1</td>
<td>7</td>
<td>0.40 ± 0.12</td>
<td>0.04</td>
<td>0.28</td>
<td>0.51</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A2</td>
<td>10</td>
<td>0.51 ± 0.19</td>
<td>0.06</td>
<td>0.37</td>
<td>0.65</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A3</td>
<td>13</td>
<td>0.54 ± 0.26</td>
<td>0.07</td>
<td>0.38</td>
<td>0.70</td>
<td></td>
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</tbody>
</table>

The results in Table (4) that show of Fractalkine level were higher in METH addicts group (A2) as compared to addicts group (A1) and (A3) (P >0.05).

Table (4) CX3CL1 level, for addict (Mix) sub groups within variable ages.

<table>
<thead>
<tr>
<th>Addicts age (Mix)</th>
<th>N</th>
<th>Mean ± SD</th>
<th>SE</th>
<th>CI 95%</th>
<th>Compared group</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
<td>Upper</td>
</tr>
<tr>
<td>A1</td>
<td>7</td>
<td>0.47 ± 0.14</td>
<td>0.05</td>
<td>0.34</td>
<td>0.59</td>
<td></td>
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<td></td>
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<tr>
<td>A2</td>
<td>7</td>
<td>0.52 ± 0.20</td>
<td>0.07</td>
<td>0.34</td>
<td>0.70</td>
<td></td>
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<td></td>
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<td></td>
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<tr>
<td>A3</td>
<td>6</td>
<td>0.51 ± 0.19</td>
<td>0.08</td>
<td>0.31</td>
<td>0.71</td>
<td></td>
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</tbody>
</table>

Table (5) CX3CL1 level, Subgroups Dependent on Abuse Duration(Years) for Addicts Group (Meth)

<table>
<thead>
<tr>
<th>Duration of addicts (Meth)</th>
<th>N</th>
<th>Mean ± SD</th>
<th>SE</th>
<th>CI 95%</th>
<th>Compared group</th>
<th>P value</th>
</tr>
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<tbody>
<tr>
<td></td>
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<td></td>
<td></td>
<td>Lower</td>
<td>Upper</td>
</tr>
<tr>
<td>D1</td>
<td>20</td>
<td>0.50 ± 0.24</td>
<td>0.05</td>
<td>0.38</td>
<td>0.61</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>D2</td>
<td>6</td>
<td>0.49 ± 0.20</td>
<td>0.08</td>
<td>0.28</td>
<td>0.70</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D3</td>
<td>4</td>
<td>0.50 ± 0.08</td>
<td>0.04</td>
<td>0.38</td>
<td>0.64</td>
<td></td>
</tr>
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<td></td>
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</tbody>
</table>
Table (2) show that CX3CL1 levels were higher among addicted compared to non-addicts (control group), and this results explained the effect of meth on the CX3CL1 levels.

METH abuse is also shown to exert neurotoxic effects by increasing the secretion of pro-inflammatory cytokines IL-6 and TNF-alpha in the brain (20, 21). METH abuse appears to impair blood-brain barrier (BBB) vascular function (22, 23).

These myriad effects of METH on cardio-neurovascular function and on astrogliosis-related neurotoxicity clearly emphasize the importance of the blood and brain interface. The blood-brain barrier, principally composed of the brain endothelium tight junction proteins, is a dynamic interface. BBB function is maintained at the expense of huge bio-energy consumption (24-26).

Fluctuations in CX3CL1 levels are also observed in many neurodegenerative diseases. Increased levels of serum CX3CL1 are reported in patients with multiple sclerosis (27, 28), traumatic brain injury (29), and human immunodeficiency virus (HIV) with CNS complications (30).

The CX3CL1/CX3CR1 axis acts in many physiological phenomena including those occurring in the central nervous system (CNS), by regulating the interactions between neurons, microglia, and immune cells. CNS injuries represent a serious public health problem, despite improvements in therapeutic management. To date, no effective treatment has been determined, so they constitute a leading cause of death and severe disability. Recent evidence implicated the role of the CX3CL1/CX3CR1 axis in neuro inflammatory processes occurring after CNS injuries (31).

there are numerous newly discovered phenomena as regards the influence of the CX3CL1/CX3CR1 axis on CNS physiology and pathology, such as the effect on the synaptic plasticity, maturation, activity and a marked effect on the functioning of hippocampal formation (32).

**Conclusion**

The study showed an increase in the levels of Fractalkine among meth addicts. This increase may lead to infection with various diseases such as traumatic brain injury (TBI) and spinal cord injury (SCI).

Also, the study shows us that the Fractalkine levels increase with age, which increases the risk of developing various diseases directly related to the Fractalkine.

**Ethical Clearance:** The college’s ethical committee has no objection to conducting the research and the numbers and date of acceptance are (no: 3275, 13/9/2019)

**Source of Funding:** The author declares no funder and no grant recipient
Conflict of Interest: Nil.

References
1. Tata DA, Yamamoto BKJA. Interactions between methamphetamine and environmental stress: role of oxidative stress, glutamate and mitochondrial dysfunction. 2007;102:49-60.


The Correlation between Lipid Profile and Smoking

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Abstract

The objectives were to find out the alterations in serum lipid status among adult male smokers and non-smokers in Maysan Province, south of Iraq, as well as to evaluate the relationship between the heaviness of smoking and dyslipidemia in smoker subjects. A comparative study was achieved on 160 men with aged 30-63 years which were grouped to smokers and nonsmokers, among them 120 individuals were smokers and the other 40 were nonsmokers. According to the intensity of smoking, the smoker group is divided again into three subgroups: mild (A), moderate (B), and heavy (C) smokers. The concentrations of total cholesterol (TC), high density lipoprotein-c (HDL-c), triglycerides (TG), low density lipoprotein-c (LDL-c) and very low density lipoprotein-c (VLDL-c) were measured and calculated. The results revealed that concentrations of serum lipid profiles in smokers were significantly higher than that of nonsmokers except in case of high density lipoprotein-c which was significantly reduced among smokers. In addition to that the lipid profile had a significant correlation with the cigarette numbers of that smoked daily; the mean values of all lipid fractions except HDL-c were noticeably increased from group A to group C, while they were decreased in the case of HDL-C. There were significantly different between nonsmokers and different groups of the smoker, the values of TC of groups A, B, and group C were (178.6, 181.7, and 183.5) mg/dl respectively. According to similar arrangement of above smoker groups, the mean values of TG were (238.4, 245.2, and 248.7) mg/dl. In case of HDL-c, they were (31.5, 28.4, and 26.8) mg/dl. Among LDL-c level, they were (194.8, 203.8, and 204.9) mg/dl. In VLDL-c level, they were (47.7, 48.2, and 50.5) mg/dl. The findings of the study showed that smokers (especially heavy smokers) are at much greater risk of initiating atherosclerotic plaques and various heart diseases than non-smokers.

Keywords: Lipid Profile, smokers, non-smokers, TC, HDL-c, TG, LDL-c, and LDL-c, Maysan.

Introduction

The lipids are playing a crucial role in all parts of biological life. Some roles involve acting as hormones and hormone precursor, using in digestion, producing energy, storing functions, and metabolic fuel; serving as structural and functional substances in biological membranes and forming padding to permit neuron transfer or to prevent the losing of heat [1]. The blood test that used to investigate the levels of serum Tc, TGs, LDL-c, HDL-c, and VLDL-c is called lipid profiles [2]. The smoking is an essential risk factor causing atherosclerosis, and the disease of coronary artery [3].

Several studies have recorded increase in blood TC levels among people who repeatedly having smoking and decrease in TC levels among individuals leaving smoking. Further researches also showed that smoking decreases HDL-c levels, causing increased risks of heart disease. Smoking leads to an elevate in LDL-c and TG levels. Several studies have shown a dose-dependent relationship between smoking and serum lipid profile [4]. The mechanism by which the smoking changes the metabolism of lipoprotein is not completely understood. Numerous mechanisms assumed are stimulation of the sympathoadrenal system by nicotine leading to lipolysis and raised serum free fatty acid level which is causing an increase the synthesis of VLDL from the liver. A high intake of free fatty acid by heart leads to increased myocardial oxygen demand. Depressive acting of smoking on estrogen levels leads to decreased HDL-c. Smokers are thought to eat a diet that rich in fat and
lipids and lesser in fibers as well as cereals\cite{5}. Nicotine stimulates the releasing of catecholamine leading to activate the adenyl cyclase of the adipose tissue causing an increase in lipolysis, elevated concentration of free fatty acids of plasma, secreting hepatic triglycerides and hepatic free fatty acids along with VLDL-c in bloodstream\cite{6}. Although the exact mechanism of tobacco smoke that having role in the process of atherosclerotic and coronary artery disease remains not wholly clear, many chemicals that is found in tobacco smoke cause risky effects on the health\cite{7}. In the World Health Organization’s Western Pacific Region (WHO WPR), being born males is the unique highest risky indicator for tobacco usage \cite{8}. The prevalence of male smoking was (62.3\%) and the rates of increasing are the greatest in world \cite{9}. Atherosclerotic alterations that found in the middle of age initiate in childhood and the mechanisms may linked to irregular levels of risky factors such as serum lipid profiles and smoking, which are supposed to be associated with initially stages of atherosclerosis and coronary artery disease. In adults, increased level of LDL-c and decreased level of HDL-c and its main subfractions are correlated with myocardial infarction or risk factors for coronary heart disease (MI)\cite{10,17&19}. Although many researches have been achieved globally to investigate the lipid profile status in smokers, there were a little data concerning the influence of smoking on lipid profiles in Iraqi smokers \cite{11}. The current study has been achieved to reveal the correlation between smoking and lipid profiles among smoker persons in Maysan Province, south of Iraq and to estimate the p-value between lipid profile tests of smokers and nonsmokers based on the intensity of smoking.

Materials and Method

The present study was a comparative study, carried out from October 2019 to February 2020 at Al. Sadr Teaching Hospital in Maysan Province. The total samples of this study were consisting of 160 adult males; out of them 40 individuals were non-smokers and the other 120 were smokers since at least 15 years duration, aged between 30-63 years. The smokers were divided into three groups: (mild, moderate, and heavy smokers) depending on heaviness (intensity) of their smoking.

Group A: Mild smokers = 20-34 cigarettes per day (N =40)

Group B: Moderate smokers = 35-49 cigarettes / day (N =40)

Group C: Heavy smokers = 50-64 cigarettes / day (N =40)

Under the aseptic condition, about five ml of fasting (12-14 hours) venous antecubital blood samples were collected from each individual in a test tube and waiting for at least 30 minute until blood were clotting. Then the sera were centrifuged up to 4000 round per minute for 10 minutes. Sera were stored at -20°C until tested. Total cholesterol, triglycerides and high density lipoprotein-c were tested by standard enzymatic kit of Human Ltd while low density lipoprotein-c and very low density lipoprotein-c were estimation by calculated method of Friedewald. All data were analyzed by using (SPSS) version (V. 18.0).

Results

Table 1 demonstrates the difference in means ± standard deviation (SD) of lipid levels between smokers and nonsmokers. All the levels of lipid profile were found to be higher with significant values among the smokers compared to the nonsmokers (p <0.05) except HDL-c levels, it was lower among smokers with significant p-value (p <0.05).

<table>
<thead>
<tr>
<th>parameters</th>
<th>Lipid Levels (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total cholesterol</td>
</tr>
<tr>
<td>Smokers (N = 120)</td>
<td>181.3±46.7</td>
</tr>
<tr>
<td>Nonsmokers (N = 40)</td>
<td>150.4±30.6</td>
</tr>
<tr>
<td>t-value</td>
<td>3.9</td>
</tr>
<tr>
<td>p-value</td>
<td>0.000</td>
</tr>
</tbody>
</table>

*The units of all types of lipids are measured with mg/dl
The table 2 show the degree of smoking was inversely proportional to HDL- c levels i.e. the level of HDL- c decreased as the smoking degree increased.

**Table 2: Difference between nonsmokers and the groups of smokers in lipid profile**

<table>
<thead>
<tr>
<th>Lipid profile parameters</th>
<th>Nonsmokers (N = 40)</th>
<th>smokers</th>
<th>Group (A) N = 40</th>
<th>Group (B) N = 40</th>
<th>Group (C) N = 40</th>
<th>Total N = 120</th>
</tr>
</thead>
<tbody>
<tr>
<td>TC mg/dl</td>
<td>150.4±30.6</td>
<td>178.6±36.5</td>
<td>181.7±55.1</td>
<td>183.5±47.9</td>
<td>181.3±46.7</td>
<td></td>
</tr>
<tr>
<td>TG mg/dl</td>
<td>163.4±63.9</td>
<td>238.4±64.9</td>
<td>245.2±69.3</td>
<td>247.8±69.7</td>
<td>244.1±70.8</td>
<td></td>
</tr>
<tr>
<td>HDL- c mg/dl</td>
<td>50.6 ±11.8</td>
<td>31.5±4.9</td>
<td>28.4±9.3</td>
<td>26.8±7.8</td>
<td>28.9 ±7.8</td>
<td></td>
</tr>
<tr>
<td>LDL- c mg/dl</td>
<td>132.5±35.6</td>
<td>194.8±40.9</td>
<td>203.8±58.8</td>
<td>204.9±54.7</td>
<td>201.2±49.5</td>
<td></td>
</tr>
<tr>
<td>VLDL- c mg/dl</td>
<td>32.7±12.8</td>
<td>47.7±12.9</td>
<td>48.2±14.9</td>
<td>50.5±14.6</td>
<td>48.8±14.2</td>
<td></td>
</tr>
</tbody>
</table>

The Analysis of variance (ANOVA) in table 3 was done between the different groups for TC. It was found that the F value was significantly more for comparison between smokers and nonsmokers.

**Table 3: Difference between various groups of smokers and nonsmokers in total cholesterol**

<table>
<thead>
<tr>
<th>The Groups</th>
<th>Total Cholesterol</th>
<th>Group of Smoker</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The range</td>
<td>Mean±SD</td>
</tr>
<tr>
<td>Nonsmokers</td>
<td>140.6-160.2</td>
<td>150.4±30.6</td>
</tr>
<tr>
<td>Group A</td>
<td>166.9-190.3</td>
<td>178.6±36.5</td>
</tr>
<tr>
<td>Group B</td>
<td>164.1-199.3</td>
<td>181.7±55.1</td>
</tr>
<tr>
<td>Group C</td>
<td>168.2-198.8</td>
<td>183.5±47.9</td>
</tr>
</tbody>
</table>

One way ANOVA (F = 5.12, P <0.002), Ns: Non significant

One way ANOVA in table 4 was done between the different groups for TG. It was found that the F value was significantly more for comparison between smokers and nonsmokers but not across the degrees of the smokers.

**Table 4: Difference between various groups of smokers and nonsmokers in Triglycerides**

<table>
<thead>
<tr>
<th>The Groups</th>
<th>Triglycerides</th>
<th>Group of Smoker</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The range</td>
<td>Mean±SD</td>
</tr>
<tr>
<td>Nonsmokers</td>
<td>142.9-183.8</td>
<td>163.4±63.9</td>
</tr>
<tr>
<td>Group A (mild)</td>
<td>217.7-259.1</td>
<td>238.4±64.9</td>
</tr>
<tr>
<td>Group B (Moderate)</td>
<td>217.3-265.1</td>
<td>241.2±74.9</td>
</tr>
<tr>
<td>Group C (Heavy)</td>
<td>229.2-276.1</td>
<td>252.7±73.2</td>
</tr>
</tbody>
</table>

One way ANOVA (F = 13.8, P <0.000), Ns: Non significant
One way ANOVA in table 5 was done between the different groups for HDL-c. It was found that the F value was significantly more for comparison between smokers and nonsmokers and it was found to be statically significant difference between group A and group C, while it was not significant between group A and group B and between group A and group C.

**Table 5: Difference between various groups of smokers and nonsmokers in HDL-c**

<table>
<thead>
<tr>
<th>The Groups</th>
<th>HDL-c</th>
<th>Group of Smoker</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The range</td>
<td>Mean±SD</td>
</tr>
<tr>
<td>Nonsmokers</td>
<td>46.8-54.3</td>
<td>50.6±11.8</td>
</tr>
<tr>
<td>Group A (mild)</td>
<td>29.9-33</td>
<td>31.5±4.9</td>
</tr>
<tr>
<td>Group B (Moderate)</td>
<td>25.4-31.4</td>
<td>28.4±9.3</td>
</tr>
<tr>
<td>Group C (Heavy)</td>
<td>24.3-29.3</td>
<td>26.8±7.8</td>
</tr>
</tbody>
</table>

One way ANOVA (F = 62.1, P <0.000), Ns: Non significant

In the table 6 the Show that the LDL-c and VLDL-c value was significantly different between nonsmokers and all groups of smokers. But it was not different between the groups of smokers.

**Table 6: Demonstrates difference between smoker groups and nonsmokers in LDL-c and VLDL-c.**

<table>
<thead>
<tr>
<th>Groups</th>
<th>LDL-c</th>
<th>VLDL-c</th>
<th>Group of Smoker</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The range</td>
<td>Mean±SD</td>
<td>The range</td>
</tr>
<tr>
<td>Nonsmokers</td>
<td>121.1-143.9</td>
<td>132.5±35.6</td>
<td>28.6-36.8</td>
</tr>
<tr>
<td>Group A</td>
<td>181.9-207.7</td>
<td>194.8±40.2</td>
<td>43.5-51.8</td>
</tr>
<tr>
<td>Group B</td>
<td>183.7-219.3</td>
<td>201.5±55.6</td>
<td>43.5-53</td>
</tr>
<tr>
<td>Group C</td>
<td>190.7-223.8</td>
<td>207.3±51.8</td>
<td>45.8-55.2</td>
</tr>
</tbody>
</table>

LDL-c: One way ANOVA (F = 22.3, P <0.000), Ns: Non significant

VLDL-c: One way ANOVA (F = 13.9, P <0.000), Ns: Non significant

**Discussion**

The present study has shown that the mean values of total cholesterol, triglycerides, low density lipoprotein-c, and very low density lipoprotein-c were expressively higher in smokers when compared to nonsmokers. Simultaneously the levels of HDL-c were considerably lower in smokers comparing to nonsmokers (Table 1), these findings in accordance with this study [1, 11, & 12]. Among the various groups of total cholesterol in nonsmokers, the mean values of groups A, B, and C were in the range of (150.4, 178.6, 181.7, and 183.5) respectively. The values of TG were in the range of (163.4, 238.4, 245.2, and 248.7) among nonsmokers, group A, B and group C respectively. Further parallel raise is seen in LDL-c level from nonsmokers, group A, B and C in the range of (132.5, 194.8, 203.8, and 204.9) respectively. VLDL-c level also increased substantially in nonsmokers, group A, group B and group C, in the range of (32.7, 47.7, 48.2, and 50.5) respectively. Inversely, mean value of HDL-c level was decreased in the range: (50.6, 31.5, 28.4, and 26.8) mg/dl from nonsmoking groups A, B and C respectively. The decrease in HDL-c in smokers explained by the smoking-induced increase
catecholamine release, causing an increase in VLDL-C and a decrease in HDL-c concentrations also promotes Coronary Heart Disease and atherosclerosis by lowering HDL-c and increasing the LDL-C which further may lead to vascular endothelium damage[18]. As above results, there was a significant elevation in the level of TC, TG, LDL-c, VLDL-c and decline in HDL-c level among different groups of smoking in regarding to increase in the intensity of the smoking (Table 2). These findings were agreed with the several studies [1, 12, 14 &15]. From table3 to table 6, p-value was with highly significant(P <.000) between nonsmoker and various groups of smokers in all lipid values, while there was no significant within the smoking groups except in HDL-c levels, It was found to be significant between group A and group C (P <.01). These results were in line with the findings of many studies [1,11,12, & 16]. The mechanisms by which smoking causes the above observed dyslipidemic alterations are still not fully understood. High serum low density lipoprotein-c and low serum High density lipoprotein-c are correlated with an increased risk of atherosclerosis. Raised levels of HDL-c are indicative of decrease efflux of cholesterol from arterial wall thus favoring atherosclerosis and Chronic Heart Diseases (CHD)[12]. The rise in lipid levels in smokers explained by the mechanism: Cigarette smoking causes absorption of nicotine into the body which leads to lipolysis and release of free fatty acids into the bloodstream via activation of adenyl cyclase in adipose tissue by nicotine stimulated secretion of catecholamines, increased of free fatty acids in the liver give rise to increased hepatic Triglyceride and VLDL synthesis, so thus increasing the concentration of Triglyceride and VLDL-C in blood[18].

**Conclusion**

The study clearly showed a considerable correlation between the elevation of lipid levels and smoking. It has been found that the alterations in the serum lipid profiles tend to be elevated with the increase in the heaviness of smoking. The risk of an increase in serum levels of TC with an increase in low-density lipoprotein-c and a reduced in levels of high-density lipoprotein-c assumes great importance since it has been the patterns correlated with CHD. The declined levels of high-density lipoprotein-c in smokers and the raised exposure of the vascular endothelium to actively atherogenic lipids as a result of impairment of clearance of triglyceride-rich lipoproteins could produce a mechanism whereby smoking predisposes to a larger risk of developing atherosclerotic plaques and CHD.

**Acknowledgment:** We would like to thank the staff of Al. Sadr Teaching Hospital at Maysan Province for helping us and Shaima R. Banoon at Department of Biology, college of science, University of Misan for her assistance.

**Financial Support and Sponsorship:** Nil.

**Conflict of Interest:** There are no conflicts of interest.

**Ethical Clearance:** Permission to conduct this study was issued by the Health institutional and the collection of Blood samples of individuals was carried out by under public health technician supervision.

**References**


Investigation the Abuse of Family with Rural Elderly in Ilam in 2019

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Abstract

Background: ABUSE is among the meaning of deprivation of human rights and grandeur that appear as negligence, authority negation, financial exploitation, physical and psychological vexations, and rejection. This study was done to investigate the ABUSE of family with rural elderly in the city of Ivan in 2019.

Methods: 92 elderlies who lived in two villages of the city of Ivan in 2019 were selected by stage cluster sampling in this descriptive cross-sectional study. An 8-point Iranian questionnaire of ABUSE related to the elderly in the family and with scores ranging from 0 to 100 was the research tool. Data were analyzed using descriptive statistics in SPSS-16 software.

Results: There was no physical ABUSE and rejection, but the highest level of ABUSE was emotional negligence. The mean scores of financial ABUSES were less than 10%, authority negation less than 15%, financial neglect less than 20%, caring neglect and psychological ABUSE less than 25%, and emotional negligence less than 55% in both villages.

Conclusion: It is suggested that the ABUSE level be measured using the elderly in homes and centers such as hospitals, nursing homes, etc. the injured elderly should be screened and receive necessary consultation and support services.

Keywords: Abuse, Rural, Elderly

Introduction

The population of the elderly has grown nowadays (1, 2), and the elderly are affected by various diseases at this age that these diseases have negative effects on the elderly (3). ABUSE is one of the problems affecting this group. Elderly ABUSE means that a career or trustee deliberately or unintentionally does or does not a specific behavior that increases the risk and harm or violates human rights and decreases the quality of life of the elderly (over 60 years). This ABUSE includes physical, sexual, and emo-psychological ABUSE, negligence, rejection, or financial ill-use (4-6). Some factors such as no readiness of family to take care of the elderly or specific social conditions such as modernism, change, and conflict in the value system make the elderly at risk of ABUSE by family members (7).

The likelihood that a person being abused in the family is far higher than outside the family (8).
family members neglect deliberately or unintentionally by insouciance to provide emotional, caring, and safety needs, neglecting to help them to do their indoors and outdoors works and providing a decent living for the elderly. Different degrees of ABUSE have a significant impact on reducing the health and safety of the elderly. ABUSE is not a new issue and is among substantial public and social health problems around the world. Socio-economic and geographical factors in different age groups influence social support. Sometimes, family members ABUSE weak the social base of the elderly due to not reach the stage of filial puberty or compulsory responsibility, as well as changing the roles of family, the existence of the crisis, the psychological stresses of modern life, and unfaithfully.

the results of various studies have confirmed the presence of elder abuse in Iran. ABUSE, regardless of its type, is often hidden, especially if ABUSE is psychological. The effects of elderly ABUSE include decreased self-confidence, feelings of hopelessness, inadequacy, disability, and even reduced quality of life and increased mortality. The rate of elderly ABUSE at the home account from 67 to 73.3% of all elderly ABUSE cases in Europe. Providing proper solutions to reduce elderly ABUSE helps to improve their quality of life. Educating how to communicate and care for the elderly in families and promoting a culture of family respect for the elderly is too vital in preventing elderly ABUSE and is effective in improving the quality of life of the elderly. This study was done to investigate the ABUSE of family with rural elderly in the city of Ivan in 2019.

Material and Method

92 elderlies who lived in two villages of the city of Ivan in 2019 were selected by stage cluster sampling in this descriptive cross-sectional study. Inclusion criteria included being at the age of 60 and older, ability to answer questions, no severe hearing impairment, no psychological illness and cognitive disorders (MMSE score of 6 or higher), informed consent of the elderly to participate in research and do not participate in other studies.

Then, the aims of the study were explained to the participants and were completed the written consent form, demographic information, and the questionnaire of elderly ABUSE in the family. Heravi Karimvi et al designed this questionnaire, and in 2009, then validated for the Iranian community, which includes 49 items in 8 sub-scales: Caring negligence, psychological ABUSE, physical ABUSE, financial ABUSE, authority negation, rejection, financial neglect and emotional negligence. Scores ranging from 0 to 100 and higher scores indicate more abuse. The mean duration of each questionnaire answering was 30 minutes. Data were analyzed using descriptive statistics and in SPSS-22 software.

Findings

Tables 1 provide demographic information of the elderly in the two villages, and Table 5 shows the mean and standard deviation of the dimensions of elderly ABUSE in the two villages.

Table 1 - Dimensions of Elderly Family Abuse in Two Villages

<table>
<thead>
<tr>
<th>Index</th>
<th>Group</th>
<th>Mean (SD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional neglect</td>
<td>Rural 1</td>
<td>28(55.4)</td>
</tr>
<tr>
<td></td>
<td>Rural 2</td>
<td>14(53.3)</td>
</tr>
<tr>
<td>Neglect of care</td>
<td>Rural 1</td>
<td>7(23.6)</td>
</tr>
<tr>
<td></td>
<td>Rural 2</td>
<td>4(18.2)</td>
</tr>
<tr>
<td>Financial neglect</td>
<td>Rural 1</td>
<td>2(18.7)</td>
</tr>
<tr>
<td></td>
<td>Rural 2</td>
<td>3(16.4)</td>
</tr>
<tr>
<td>Disclaimer</td>
<td>Rural 1</td>
<td>8(12.2)</td>
</tr>
<tr>
<td></td>
<td>Rural 2</td>
<td>5(6.5)</td>
</tr>
<tr>
<td>Psychological Abuse</td>
<td>Rural 1</td>
<td>14(25.5)</td>
</tr>
<tr>
<td></td>
<td>Rural 2</td>
<td>16(19.6)</td>
</tr>
<tr>
<td>Physical Abuse</td>
<td>Rural 1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Rural 2</td>
<td>1.7</td>
</tr>
<tr>
<td>Financial Abuse</td>
<td>Rural 1</td>
<td>2(9.8)</td>
</tr>
<tr>
<td></td>
<td>Rural 2</td>
<td>3(9.7)</td>
</tr>
<tr>
<td>Exclusion</td>
<td>Rural 1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Rural 2</td>
<td>0.5</td>
</tr>
</tbody>
</table>
Discussion

Based on the results of the present study, there was no physical ABUSE and rejection. Physical ABUSE in studies by Va’ezil et al. was 3.12% (20), Hervey et al. 4.7% (11), in studies by Burji et al. in rural regions, was 1.5% (26), and Skirbekk et al. 5.3% (22). Elderly rejection in the studies by Burji et al. in rural regions was 8.5% (23), and studies by Rohani et al. were 9.3% (24). The results of these studies are in line with the results of the present study.

Emotional negligence had the highest level of ABUSE with almost 55%. Emotional neglect in the study by Va’ezi’s et al. was 42% (20), which is consistent with the present study. In the study by Hervey Karimvi et al., the level of elderly ABUSE in the dimension of emotional negligence was 17.4% (11) that is not in line with the present study that it could be caused by the cultural and social differences in the life of the elderly in urban and rural regions.

The mean scores of financial ABUSES were less than 10% in both villages, and financial negligence was less than 20%. Financial ABUSE in studies by Hervey et al. was 7.9% (11), in the studies by Skirbekk et al., was 5.4% (22), and in the studies by Amstader et al., was 6.6% (25), which are consistent with the results of the present study. Financial negligence of the elderly in the study by Va’ezi et al. was 28.7% (20), which is higher than the present study. In the study by Hosseini, financial abuse was 14.3% (26). The authority negation was less than 15% in this study. The authority negation of the elderly was 10% in the survey by Karimvi et al. (11) and in the study by Va’ezi et al. was 12.5% (20) which is consistent with the present study. Caring negligence and psychological abuse were less than 25% in this study. The psychological abuse in the survey by Va’ezil et al. was 22.18% (20), and in the study by Nasiri et al. was 53.3% (12). Also, in the study of Rahimi et al., Psychological ABUSE is the second most common familial elderly ABUSE (27). In the study by Nanjing in China, 35% of older adults were abusive and neglected. (28). In the study of Abdi et al., The prevalence of abuse in the elderly was equal to one percent (1). In old age, this group of people may be abused in viral diseases such as Covid-19, which requires preventive measures to prevent (29).

Conclusion

According to the results of the present study, there was no physical ABUSE and rejection. Although the elderly was assured of confidentiality, they may report less to ABUSE because of being confident, shame in disclosing abuse, fear of losing caregivers, and fear of diminishing social status. Emotional negligence had the highest level of ABUSE, and there were some aspects of the ABUSE in behavior with the elderly. It is suggested that the ABUSE level be measured using the elderly in homes and centers such as hospitals, nursing homes, etc. the injured elderly should be screened and receive necessary consultation and support services.

Conflict of Interest: There is no conflict of interest between authors.

Acknowledgment: The present study is the result of a Master’s thesis form Ilam University of Medical Sciences.

Source of Funding: Ilam University of Medical Sciences

Ethical Clearance: Ethics Code IR.MEDILAM. REC.1397

References

5. HERAVI M, ANOUSHEH M, MEMARIAN
Electrodiagnostic Studies Role in Diagnosis and Management of Thoracic Outlet Syndrome

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Abstract

Introduction: Thoracic outlet syndrome (TOS) is caused by the compressive effect on brachial plexus or subclavian vessels at the thoracic outlet. The symptoms are usually neurologic, arterial or venous or the combination of them.

Method: From these patients we chose 70 patients whom underwent surgery (resection of first rib, with neurolysis with trans axillary approach) and we had the complete data on EMG -NCV and could follow postoperative course and were completely satisfied by the operation and their symptoms was relieved according the quick DASH Questionnaire and thereby the diagnosis of TOS was proved by the result.

Result: The electro diagnostic tests of 6 patients (1.5%) were completely normal. The lower trunk symptoms which should be more frequent in TOS was purely present in 7.1%. Fibrillation and fasciculation along the course of ulnar nerve was present in 10% of cases. The middle trunk abnormal motor NCV was the pure pathology in 2.9%. Fibrillation and fasciculation along the course of median nerve (abductor pollicis brevis) 2.4% and for Brachioradialis (radial nerve) NCV was abnormal in 1.8%.

Conclusion: To prove this fact, we selected only the patients who were completely satisfied by the operation and their symptoms was relieved according the quick DASH Questionnaire and thereby we were sure that the diagnosis of TOS has been correct. Retrospectively we evaluated the electrodiagnostic findings in these patients.

Keywords: Diagnosis, Thoracic outlet syndrome, Management, Iran

Introduction

Thoracic outlet syndrome (TOS) is a condition caused by compression of nerves or blood vessels at the thoracic outlet. (1) Pain, paresthesia, and weakness in the hand, arm, and shoulder, plus neck pain and occipital headaches, are the classical symptoms of neurogenic (NTOS). Other names according to presumed etiologies such as scalenus anticus, costoclavicular, hyperabduction, cervical rib, and first rib syndromes was assigned to this syndrome. (1) The various syndromes are similar and the specific compression mechanism is often difficult to identify.

The symptoms are usually a neurologic, venous or arterial or a combination of them. Occasionally, the pain is atypical in distribution and severity and is experienced predominantly in the chest wall and parascapular area, simulating angina pectoris. (1)
Diagnosis of the nerve compression can be objectively substantiated by determining the nerve conduction velocity.

The ulnar nerve conduction velocity (UNCV) test, as described by Jebson(4) and by Caldwell and associates,(3) has widened the clinical recognition of this syndrome and improved diagnosis, selection of treatment, and assessment of therapeutic results.

Although in mild cases with no sign of nerve palsy physiotherapy to improve posture and stretch neck muscles is used primarily, in cases without improvement and the sever cases surgery is advised.

Surgical treatment involves resection of the first rib neurolysis of brachial plexus and scalenectomy, usually through the transaxillary approach except for arterial procedures, which may employ the supraclavicular approach.

**Material and Method**

We have probably one of the largest series of TOS patients. From these patients we chose 70 patients whom underwent surgery (resection of first rib, with neurolysis with trans axillary approach) and we had the complete data on EMG -NCV and could follow postoperative course and were completely satisfied by the operation and their symptoms was relieved according the quick DASH Questionnaire and thereby the diagnosis of TOS was proved by the result.

58 were female and 12 patients were male (83%-17%) median age was 40.5 years old with the range of 15-62 years.

According to the disabilities of the arm shoulder and hand score (quite DASH) the median score preoperative was 63.6 and median post-operative score with the follow up at least 24 months (2-6 years) was 13.6.

**Results**

The electro diagnostic tests of 6 patients (1.5%) were completely normal. The lower trunk symptoms which should be more frequent in TOS was purely present in 7.1%. Fibrillation and fasciculation along the course of ulnar nerve was present in 10% of cases. The middle trunk abnormal motor NCV was the pure pathology in2.9%. Fibrillation and fasciculation along the course of median nerve (abductor policis berevis) 2.4% and for Brachioradialis (radial nerve) NCV was abnormal in 1.8%.

The other finding are summarized in tables 1-12

<table>
<thead>
<tr>
<th>Table 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Male</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
</tr>
<tr>
<td>39.17±11.26</td>
</tr>
</tbody>
</table>

**Discussion**

As the electro diagnostic reports are performed according the most frequent pathology compatible with the findings, TOS was only reported in 22 patients (in 31%) of our cases.

The mainstay diagnostic consideration for thoracic outlet syndrome includes the history and physical examination and although EMG-NCV findings are not necessary to confirm the diagnosis and cannot reliably rule out this diagnosis. These test are performed to show the extent of nerve damage before the surgery and save the surgeon from legal issues concerning the intraoperative nerve damage.

The subclavian vessels and brachial plexus traverse the cervicoaxillary canal to reach the upper extremity. The outer border of the first rib divides this canal into a proximal division triangle. This proximal division is composed of the scalene triangle and the space bounded by the clavicle and the first rib (the costoclavicular space (1))

The proximal division is the critical space in which the neurovascular compression happens. This space is
bounded superiorly by the clavicle and the subclavius muscle; inferiorly by the first rib; anteromedially by the border of the sternum, the clavi pectoral fascia, and the costoclavicular ligament; and posterolaterally by the scalenus medius muscle and the long thoracic nerve. (1)

The scalenus anticus, inserting on the scalene tubercle of the first rib, divides the costoclavicular space into two compartments: an anterior compartment, containing the subclavian vein, and a posterior compartment, containing the subclavian artery and brachial plexus. (1)

Many factors can cause compression of the neurovascular bundle at the thoracic outlet. The basic factor, which was pointed out by Rosati and Lord (5) is deranged anatomy, to which congenital, traumatic, and atherosclerotic factors may contribute. Bony abnormalities are present in approximately 30% of patients, either as a cervical rib, a bifid first rib, and fusion of first and second ribs, clavicular deformities, or previous thoracoplasty.

Pathologic changes in the configuration of the cervicoaxillary canal alter the normal functional dynamics and serve as the basis of the clinical maneuvers used in the diagnosis of thoracic outlet syndrome.(1)

The mainstay diagnostic consideration for thoracic outlet syndrome includes the history and physical examination. Radiographs of the chest and cervical spine, EMG-NCV, cervical myelography, magnetic resonance imaging (MRI), computed tomography (CT), coronary angiography, venography, or arteriography are not necessary to confirm the diagnosis.(1)

The symptoms and signs of thoracic outlet syndrome depend on whether the nerves, blood vessels, or both are compressed at the thoracic outlet.

Signs and symptoms of nerve compression occur most frequently; arm pain and paresthesias are present in about 95% of patients and motor weakness in <10%. Pain and paresthesias are segmented in 75% of cases, with the ulnar nerve distribution involvement more prominent. Pain is usually insidious in onset and commonly involves the neck, shoulder, arm, and hand. (1)

In some patients the pain is atypical, involving the anterior chest wall or the parascapular area; it is then termed pseudoangina because it simulates angina pectoris (1)

Urschel and associates (7) reported that these patients have normal coronary arteriograms and decreased ulnar nerve conduction velocities, strongly suggesting the diagnosis of thoracic outlet syndrome.

This atypical manifestation of the thoracic outlet syndrome is due to the neuroanatomy, innervation, and pain pathways of the arm, chest wall, and heart.

To confirm the diagnosis, we can use the compression tests from which Adson or Scalene Test is the most helpful one.

The Adson test, described by Adson in 1951(2) tightens the anterior and middle scalene muscles, thus decreasing the interscalene space and magnifying any preexisting compression of the subclavian artery and brachial plexus. The patient is instructed to take and hold a deep breath, extend his or her neck fully, and turn his or her face toward the side. Obliteration or diminution in the radial pulse suggests compression.

There is no single diagnostic test that can confirm the presence of a NTOS (1) Variable presenting symptoms, complicated by multiple anatomical anomalies, present a diagnostic dilemma to the physician. Diagnosis is usually confirmed by a combination of a proper history and physical examination and electrophysiological studies are only performed to rule out other pathologies and to have a confirmation of the extent of disease before the operation.

Electrodiagnostic studies fall under two categories: electromyography (EMG) and nerve conduction studies (NCS). EMG studies have been found useful in the diagnosis of neurogenic TOS, but may not be sensitive enough in patients with a milder form of the disease. Motor NCS can test the brachial plexus motor component at the root or cord level. Any decrease in amplitude of response is suggestive of axonal loss. Delayed conduction may implicate a demyelinating disease. (13,14) Motor conduction velocities of the ulnar, median, radial, and musculocutaneous nerves can be reliably measured, as described by Jebson. Caldwell and associates(3) improved and adapted to clinical use the technique of measuring UNCV in evaluating patients
with thoracic outlet compression. Conduction velocities over proximal and distal segments of the ulnar and median nerves are determined by recording the action potentials generated in the hypothenar or first dorsal interosseous muscles. The points of stimulation are the supraclavicular fossa, mid-upper arm, area below the elbow, and wrist.

Urschel and colleagues reported that the normal UNCV values are 85 m/s across the thoracic outlet, 55 m/s around the elbow, 59 m/s in the forearm, and 2.5 to 3.5 m/s at the wrist.

In patients with thoracic outlet syndrome, the average UNCV value was reduced to 53 m/s across the outlet (range of 32-65 m/s). (6-10)

Somatosensory-evoked potential studies have been utilized to diagnose neurogenic TOS (17,18) but may be nonspecific. (15,19)

Electromyography (EMG) and nerve conduction velocity (NCV) tests are normal in the large majority of patients with clinical signs of NTOS. When positive, the changes are usually nonspecific. In a small number of patients, usually those with cervical ribs and hand atrophy, electrodiagnostic studies reveal typical changes of ulnar neuropathy.

**Conflict of Interest:** There is no conflict of interest between authors.

**Acknowledgment:** The present study is the result of a Master’s thesis form Iran University of Medical Sciences.

**Source of Funding:** Iran University of Medical Sciences

**Ethical Clearance:** Ethics Code IR.MEDILAM.REC.1396

**References**


Assessment of Serum Visfatin Levels in Patients with Chronic Obstructive Pulmonary Diseases in Babylon-Iraq

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¹Al-Karama Teaching Hospital in Kut, Wasit Health Department, ²Chemistry & Biochemistry Department, College of Medicine, University of Babylon, ³College of Medicine, University of Babylon

Summary

The presented study aims to evaluate the levels of serum Visfatin, in patients with chronic obstructive Pulmonary diseases in Babylon-Iraq, to find the correlation of Visfatin, with lipid profile in these patients and compared with apparently healthy as case-control study. The study included (50) patients as patients group diagnosed with COPD (G1) and (50) as apparently control group (G2). The age of all studied groups ranged between (40-65) years and BMI with (18.8-24.4) Kg/m². Serum was used in determination of FBS, lipid profile (Ch, TG, HDL-c, LDL-c and VLDL-c), insulin, CRP and Visfatin. Whole blood was used for determination of HbA1C. The results revealed significant elevation in FBG and HbA1c levels were seen in patients groups when comparing to healthy control. The results indicates a significant elevation in TC, TG, LDL-c and VLDL-c in G1 comparing to G2. Also, HDL-c significant decreased in G1 comparing to G2. Also, the results showed significant increased in CRP levels in G1, when comparing to G2. A non significant visfatin and insulin level in G1 when compared with G2 (p value = 0.486). A non significant correlation was found in G1 between visfatin, TC, TG, HDL-c and VLDL-c.

The conclusion from this study indicate that G1 which HDL-c is low in this group has the highest value for FBS, HbA1c, TC, TG, LDL and VLDL. Also, the study found non correlation between lipid profile parameters in G1.

Keywords: COPD, visfatin, Lipid profile, CRP.

Introduction

Chronic obstructive pulmonary disease (COPD) is a common, preventable, and treatable disease characterized by persistent respiratory symptoms and airflow limitation that is due to airway and or alveolar abnormalities, usually caused by significant exposure to noxious particles or gases. The chronic airflow limitation that characterizes COPD is caused by a mixture of small airway disease (e.g., obstructive bronchiolitis) and parenchymal destruction (emphysema), the relative contributions of which vary from person to person. Chronic inflammation causes structural changes, small airway narrowing, and destruction of lung parenchyma. A loss of small airways may contribute to airflow limitation and mucociliary dysfunction, a characteristic feature of the disease. Chronic respiratory symptoms may precede the development of airflow limitation and be associated with acute respiratory events (1). Visfatin, also called nicotinamide phosphoribosyltransferase (NAMPT) and previously identified as pre-B cell colony-enhancing factor (PBEF) is a 52 kDa protein encoded by the PBEF gene located on chromosome 7. It was originally discovered in lymphocytes, bone marrow, liver and muscles (2), but later identified in many other organs including the lungs (3). Leucocytes, especially granulocytes and monocytes, are the major sources of visfatin (4).

Materials and Methods

This study included one hundred with aged ranged (40-65) years and BMI ranged between (18.8-24.4) Kg/m². Subjects were divided into two groups:

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ahmodlab17@Gmail.com.
Group (1) consist of (50) as Patient group diagnosed with COPD.

Group (2): consist of (50) as apparently healthy control group.

The patients attended the Marjan Medical City in Babylon Province, Hilla city, from November 2018 till March 2019. Ten milliliters of blood were collected after an overnight fasting from all subjects by venipuncture. A liquate of (0.5 ml) of whole blood was used in determination of HbA1C. The other part was left in 37°C for (15min) to clot then centrifuged at (3000 rpm) for (5min). The serum which obtained was freeze at (-20°C) until analysis of lipid profile, visfatin, insulin and CRP.

**Laboratory Tests**

Glucose was determined after enzymatic oxidation in the presence of glucose oxidase (GOD)\(^{(5)}\). Total serum cholesterol determined by utilizing a kit based on the enzymatic hydrolysis \(^{(6)}\). The absorbance was recorded for the quinonimine (red complex) at 500 nm. The determination of TG based on the enzymatic hydrolysis. The intensity of the color formed is proportional to the triglycerides concentration in the sample. The lipoproteins of VLDL, and LDL contained in the serum sample were precipitates by the addition of (4%) phosphotungstic acid solution, which contain (10%) magnesium chloride (PH 6.2). The supernatant obtained after centrifugation contains the HDL, from which the cholesterol can be determined by complementary kit used in determination of total serum cholesterol as described in reference \(^{(7)}\). LDL-cholesterol and VLDL-cholesterol were estimated indirectly by using Fried Ewald formula \(^{(8)}\):

\[
LDL-c = \text{Total Cholesterol} - (\text{HDL-c} + \text{VLDL-c})
\]

\[
VLDL-c(\text{mg/dl}) = \frac{\text{TG}}{5}
\]

Insulin and visfatin were determined by using ELIZA technique based on the sandwich method \(^{(9)}\), CRP were determined by using NycoCard CRP single test of solid phase, Sandwich-Format, immunometric assay, HOMA-IR insulin resistance calculated by using the following formula \(^{(10)}\):

\[
\text{HOMA-IR}: \frac{\text{fasting glucose} \times \text{fasting insulin}}{22.5}
\]

This work was done in the Department of Biochemistry, College of Medicine /University of Babylon and in Hilla city Iraq.

**Statistical Analysis**

The results expressed as mean ± SD. Students t-test was applied to compare the significance of the difference between all the studied groups. P-value \((p<0.05)\), \((p<0.001)\) and \((p>0.05)\) considered statistically significant, highly significant and non-significant respectively. The correlation coefficient \((r)\) test is used for describing the association between the different studied parameter.

**Ethical Issues:**

**A-Approval** by scientific committee of the Clinical Biochemistry Department, College of Medicine/ University of Babylon, Iraq.

**B-Approval** by Babylon Health Directorate, Ministry of Health and Information Centre for Research and Development of Babylon Province.

**C**-The objectives and methodology were explained to all subjects and verbal consent had been taken.

**-Study Design**

This study design was a case – control study.

**The Results**

The mean ± SD and T-test of descriptive parameters for COPD in the studied groups with aged ranged (40-65) years and BMI ranged between (18.8-24.4) Kg/m\(^2\) are presented in table (1).
### Table (1): Descriptive parameter for G1 (patients) and G2 (controls).

<table>
<thead>
<tr>
<th>Group parameter</th>
<th>G1 ) No. 50( Mean ± SD</th>
<th>G2 ) No. 50( Mean ± SD</th>
<th>T- Test,</th>
</tr>
</thead>
<tbody>
<tr>
<td>FBS (mg/dL)</td>
<td>105.86 ± 20.0</td>
<td>89.25 ± 9.94</td>
<td>0.00001(S)*</td>
</tr>
<tr>
<td>HbA1c (%)</td>
<td>5.98 ± 0.52</td>
<td>5.76 ± 0.34</td>
<td>0.013(S)*</td>
</tr>
<tr>
<td>TC (mg/dL)</td>
<td>201.94 ± 53.86</td>
<td>173.46 ± 23.28</td>
<td>0.001(S)*</td>
</tr>
<tr>
<td>TG (mg/dL)</td>
<td>126.67 ± 73.91</td>
<td>89.21 ± 36.57</td>
<td>0.002(S)*</td>
</tr>
<tr>
<td>HDL (mg/dL)</td>
<td>36.87 ± 9.13</td>
<td>43.82 ± 10.13</td>
<td>0.001(S)*</td>
</tr>
<tr>
<td>LDL (mg/dL)</td>
<td>136.43 ± 49.47</td>
<td>111.79 ± 28.01</td>
<td>0.003(S)*</td>
</tr>
<tr>
<td>VLDL (mg/dL)</td>
<td>25.31 ± 14.78</td>
<td>17.84 ± 7.31</td>
<td>0.002(S)*</td>
</tr>
</tbody>
</table>

*(S) significant differences.

The results in table (1) revealed significant elevation in FBS and HbA1C levels was found in patients groups when comparing to healthy control. The results indicate significant elevation in TC, TG, LDL and VLDL in G1 comparing to G2. Also, the results also illustrated significant decreased in HDL in G1 when comparing to G2.

Systemic inflammation and steroid use could be important contributory factors responsible for both COPD and hyperglycemia. Similarly, Mannino et al., also found out that COPD patients with severe and very severe airflow obstruction had a higher prevalence of diabetes. Dyslipidemia, a major risk factor for CHD and metabolic syndrome, is characterized by a cluster of lipid abnormalities such as an elevated level of triglyceride (TG), a reduced level of high-density lipoprotein cholesterol (HDL) and an increased level of low-density lipoprotein cholesterol (LDL). A number of studies have evaluated the relationship between COPD and blood lipid profiles with inconsistent results. While some authors reported reduced serum levels of HDL or increased serum levels of TG in COPD patients, the objective of the present study was to investigate the association between COPD and the serum levels of FBS, total cholesterol (TC), triglyceride (TG), HDL, LDL and VLDL. The prevalence of lipid profile abnormalities in COPD are different in studies and range of 9-50% have been reported. Smoking affects the lipid profile in the following ways. The plasma β-lipoprotein, cholesterol and triglycerides concentration are higher and HDL is lower in smoker than in nonsmokers.

Nicotine stimulates the release of adrenaline from the adrenal cortex leading to increased serum concentration of free fatty acids (FFA) which further stimulates hepatic synthesis and secretion of cholesterol as well as hepatic secretion of very low density lipoprotein (VLDL) and hence increased TGL.

Smoking decreases estrogen levels and further leads to decreased HDL cholesterol concentration. Also, HDL concentration was inversely related to VLDL concentration in serum.

Smoking increases insulin resistance and thus, causes hyperinsulinemia. LDL, VLDL and TGL are elevated in hyperinsulinemic conditions due to decreased activity of lipoprotein lipase. R. Gupta et al. study shows significantly higher LDL and significantly lower VLDL levels when compared to controls.
Table (2) showed (mean ± SD) and (T-Test) of insulin, HOMA-IR, visfatin, for studied groups. The results in table (2) showed a non-significant elevation in insulin for G1 when compared with G2, while HOMA-IR highly significant elevation was noticed in G1 when comparing to G2.

Table (2): Levels of insulin, HOMA-IR, hs-CRP & Visfatin in patients and controls.

<table>
<thead>
<tr>
<th>groups parameters</th>
<th>G1 (No. 50) Mean ± SD</th>
<th>G2 (No. 50) Mean ± SD</th>
<th>T-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>insulin</td>
<td>9.91 ± 4.63</td>
<td>9.40 ± 3.92</td>
<td>0.553(NS)*</td>
</tr>
<tr>
<td>HOMA - IR</td>
<td>2.57 ± 1.29</td>
<td>1.98 ± 0.89</td>
<td>0.009(S)*</td>
</tr>
<tr>
<td>hs-CRP</td>
<td>21.52 ± 29.55</td>
<td>4.01 ± 2.41</td>
<td>0.0001(HS)*</td>
</tr>
<tr>
<td>Visfatin</td>
<td>7.63 ± 4.19</td>
<td>8.31 ± 5.43</td>
<td>0.486(NS)*</td>
</tr>
</tbody>
</table>

*(S) Significant differences, (HS) highly significant differences, (NS) No significant differences.

The results in table (2), also, showed significant increase in CRP levels for G1 when comparing to G1, but visfatin levels non-significant elevation was found in G1 when comparing to G2.

The HOMA-IR is a condition in which the body’s cells become resistance to the effects of insulin. That is the normal response to a given amount of insulin is reduced. Other study results suggest that increased HOMA-IR index has significant association with COPD\(^{(17)}\), this study agreement with our result.

Results also showed highly a significant increase in hs-CRP levels in G1 when compared with G2 (p value = 0.0001). The patients with COPD had significantly higher leukocytes and CRP levels. Pinto-Plata et al. showed that CRP levels in COPD patients are significantly higher compared to the control group and the CRP level\(^{(18)}\). Two studies, one each reported by Smith et al. and Varma et al. have suggested that the serum visfatin levels are not associated with parameters of body composition or the insulin resistance. Taken together, it would appear that there is no relation between visfatin and insulin resistance\(^{(19,20)}\) this study agreement with our result.

Relationships and correlation coefficients:

Part of the study was to investigate the relationships and correlation coefficients: Relationship between visfatin, TC, TG, HDL, LDL, insulin, HOMA-IR and CRP were studied for studied groups which shown in table (3).

Table (3): Correlation coefficient and p-value between visfatin levels and other parameters for patients and controls.

<table>
<thead>
<tr>
<th>Group parameters</th>
<th>G1 (No. 50)</th>
<th>G2 (No. 50)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>r*</td>
<td>P-value</td>
</tr>
<tr>
<td>Visfatin vs TC</td>
<td>0.106</td>
<td>0.465(NS)</td>
</tr>
<tr>
<td>Visfatin vs TG</td>
<td>0.130</td>
<td>0.370(NS)</td>
</tr>
<tr>
<td>Visfatin vs HDL</td>
<td>0.207</td>
<td>0.150(NS)</td>
</tr>
<tr>
<td>Visfatin vs LDL</td>
<td>0.054</td>
<td>0.711(NS)</td>
</tr>
<tr>
<td>Visfatin vs VLDL</td>
<td>0.130</td>
<td>0.367(NS)</td>
</tr>
<tr>
<td>Visfatin vs insulin</td>
<td>0.093</td>
<td>0.521(NS)</td>
</tr>
<tr>
<td>Visfatin vs HOMA-IR</td>
<td>0.119</td>
<td>0.412(NS)</td>
</tr>
<tr>
<td>Visfatin vs CRP</td>
<td>0.204</td>
<td>0.156(NS)</td>
</tr>
</tbody>
</table>
A non-significant correlation was found between visfatin levels and (TC) in G1 ($r = 0.106$), as shown in figure (1), and negative significant between visfatin with G2 ($r = -0.320$).

**Figure (1): Correlation between visfatin & TC in G1**

A non significant correlation coefficients was found between visfatin and TG in two studied groups ($r = 0.130$, $r = -0.049$) respectively.

**Figure (2): Correlation between visfatin and TG in G1**
Results also showed a non-significant correlation between visfatin levels and HDL for all studied groups ($r_1 = 0.207$, $r_2 = 0.095$) respectively. Results in table (3-3) illustrated a non-significant correlation in visfatin levels with LDL in G1 ($r = 0.054$) and also in G2 ($r = 0.244$). Also, non-significant correlation was found between visfatin levels with VLDL in G1 ($r = -0.054$) and also in G2 ($r = 0.130$). Also, non-significant correlation was found between visfatin levels with VLDL in G1 ($r = 0.054$) and also in G2 ($r = 0.244$). Also, non-significant correlation was found between visfatin levels with VLDL in G1 ($r = 0.130$) and G2 ($r = 0.049$).

A non-significant correlation between visfatin and insulin levels was found in G1 ($r = 0.093$) as shown in figures (3). A significant negative correlation between visfatin and insulin levels was found in G2 which ($r = -0.026$).

A non-significant correlation between visfatin and HOMA-IR levels are shown in G1 which ($r = 0.119$), while positive significant correlation between visfatin and HOMA-IR levels are shown in G2 which ($r = 0.016$). A non-significant correlation was found in visfatin and hs-CRP levels in all studied groups which ($r = 0.204$, $r = -0.253$) respectively.

Conclusion

The conclusion could be drawn from this study that visfatin non changed in G1 comparing to G2. Also, there are non-significant correlation between visfatin levels with insulin and CRP, while positive significant correlation between visfatin and HOMA-IR levels are shown in G2 which ($r = 0.016$). As far as to our knowledge this is the first study determined the levels of visfatin in COPD patient with normal BMI and find its non-relation with lipid profile in patients with COPD.

Source of Funding: Self

Conflict of Interest: The authors have nil conflict of interest.

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Use Markers of Short Tandem Repeats (STR) for Samples of Bone in the Forensic Diagnosis of the Human Being in the Kerbala Governorate

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Abstract

STR’s analysis of DNA from bone samples plays an important role in identifying missing persons. We present a method for DNA extraction from bone samples that involve complete demineralization and digestion of the sample, followed by purification by silica binding. This method, along with the multiple STR typing approach, has also proven highly successful in recovering DNA profiles from bone samples from a wide range of contexts. These methodological steps include bone cutting and grinding, DNA extraction, Repurification in case of highly inhibited samples, quantification, amplification multiplex STR, Data Analysis of the DNA Typing and The guidelines for the preparation of personal reports. the total number of study samples reached 48, whose ages ranged between (14 to 33) years divided into 3 groups, group (1) in which (16) bone samples from the son, group (2) in which (16) blood samples from the father and group (3) It contains (16) blood samples from the mother. Conformity was carried out in the identification tests for persons in the forensic evidence laboratories of the Iraqi Ministry of the Interior, according to the protocols in the Kits used and by forensic experts.

Keywords: Forensic Sciences, Identification Human, STR typing.

Introduction

Forensic science is an area that solves legal cases in civil and criminal cases (1). Forensic is a mixture of different branches of science that can provide information to the legal courts that are imposed by investigative bodies in the criminal justice system worldwide (2).

Forensic science is a multidisciplinary field, which helps rebuild a crime scene based on the collection, analysis, and interpretation of scientific evidence. Each crime is unique in its own way. This is because the nature of the crime that was carried out, the location of the crime scene, the people involved in the crime, and the things that were used, all differ from one crime scene to the next (3).

The availability of DNA samples is absolutely essential to determine the DNA pattern in a forensic study. DNA pattern determination is a method in which genetic differences at the DNA level are used to determine an individual (4).

The DNA samples present at the crime scene or mass disasters may be insufficient in quality and quantity, because they may often contain very small amounts of DNA or may be very degraded due to prolonged exposure to various environmental conditions such as heat, light, moisture, and microorganisms (5). It is common in the forensic study to have highly degraded DNA samples from a variety of sources. Therefore, it is preferable for the collection of samples to be proper, and to handle carefully during the identification of the DNA pattern to reduce the chances of external contamination (6).
Bones are often the primary source of samples in person identification and criminal investigations. Bones are often used in forensic study because they have the ability to demonstrate resistance to extreme and severe conditions such as high temperature, humidity, and bacteriological action(7)(8).

Bones is one of the important evidence that is often found at the crime scene related to mass disasters, terrorism, human trafficking and missing persons. Morphological observations can be used by forensic scientists to determine the age, gender, residence, and race of a human individual(9).

Defining a forensic DNA pattern has a significant impact on society by providing reliable evidence to convict violators or exonerate innocent suspects. Another area for applying DNA pattern determination is paternity testing using autosomal, mitochondrial or Y chromosome markers(10)(11).

DNA is often referred to as the “genetic blueprint for life” as the individual whose genetic makeup is coded into the DNA. This is intended to mean that DNA is passed from parents to their offspring(12).

The signs currently used are known as Short Tandem Repeat (STR), and they are length polymorphs. STR are short repeating sequences that are mostly found in the not encoded areas of DNA, either within or between genes(13).

**Materials and Method**

**Sample collection:** Samples were collected from Al-Shaheed Ghazi Hospital and Al-Kindi Teaching Hospital from sick and injured people from Kerbala governorate, after their approval was obtained. The total of 16 bone samples obtained was as follows (femur: 4, hip bone: 2, tibia: 2, ulna: 1, instep: 2, hand comb: 1, radius bone: 2, Humerus: 2). 16 blood samples were obtained from the father and mother of the person.

Samples were obtained directly from the operating theaters and placed in the (Cup Tube) and saved directly in the storage box, which contains ice bags, so that they can be kept cool until they are transferred to the laboratory.

Blood samples were collected and stored on FTA Cards and kept at room temperature.

**Sample preparation:** A portion of the calcium was removed using an emery machine (Dremel, Racine, WI, USA) to ensure the sample was cleaned properly and that there were no other tissues on the bone. Then cut the large bones into small pieces and wash twice with 10% sodium hypochlorite for 15 minutes, then wash twice with deionized water for 15 minutes, once rinsed in 96% ethanol. Allow samples to dry overnight at room temperature. It is placed in marmeric slurry and liquid nitrogen is poured on it until the sample is immersed and begins to move the slurry stick in a continuous circular motion until the nitrogen dries and this process is repeated until a fine-grained powder is obtained because the more accurate the flour, the more pure the DNA is. Each bone sample is prepared separately using sterile instruments in a specially designed room(15).

**DNA extraction:** The extraction of bone samples was performed using the EZ1 DNA Investigator Kit (48) by the EZ1 Advanced XL device and extracted according to the protocol for the EZ1 DNA Investigator Kit (48) DNA extraction kit supplied with the kit and as approved by the forensic laboratories.

As for blood samples collected by FTA™ Mini Card, they are used directly with the process of DNA amplification (PCR), which will be mentioned later.

**DNA quantification:** The quantification of DNA was estimated using a 7500 REAL-TIME PCR using the Quantifier™ Trio DNA Quantification Kit with the HID Real-Time PCR software for v1.2 analyses to determine the isolated DNA. The samples were diluted according to the amplitude of the relevant short tandem frequency group (STR) amplified, while the samples that specified a small quantity of the recommended concentration were amplified using the maximum size of the DNA extract.

This group was used to evaluate the quantification of human DNA, the presence of PCR inhibitors and the level of DNA degradation (via the degradation index (DI) for each sample at one time. Data were accepted with R2 values from 0.99 or higher.

**PCR amplification**

**Bone samples:** PowerPlex® Fusion 6C System (PC) was used to amplify bone samples according to the Promega Corporation (2017) manual and according to the method used in forensic laboratories. A mixture of reaction solution was prepared for each sample in a 1.5 ml PCR reaction tube:

\[
\text{Master Mix} = 5.0\mu l; \text{ Primer Pair Mix} = 5.0\mu l; \text{ template DNA} = 15.0\mu l \quad \text{“Total reaction volume} = 25.0\mu l”
\]
The Thermal Reaction and cycling setup was performed according to the procedures described in the PowerPlex® Fusion 6C System user manuals. Reaction products were kept at 4°C until use.

**Blood samples:** A small piece (punch) with a diameter of 1.2 mm was taken from the dried spots from each of the samples saved on the FTA™ cards. The punch was cleaned with alcohol to prevent cross contamination. The punch was processed according to the manufacturer’s instructions. The punch was washed three times using the FTA™ purification reagent for 5 minutes at room temperature, followed by two washes with the TE (10 mm Tris pH 8.0, 0.1 mm EDTA). Washed punches were dried for 30 minutes at 60 °C.

FTA™ punches are placed in PCR tubes, with the following components added and final volume adjusted to 50µL with sterile dual distilled water: 200 nM per primer, 800µM DNTPs, 1.5 mM MgCl2 and 2.5 U Taq polymerase. The Thermal Reaction and cycling setup was performed according to the procedures described in the PowerPlex® Fusion 6C System user manuals. Reaction products were kept at 4 °C until use.

**Capillary electrophoresis separation:** PCR products were detected and separated by capillary electrophoresis on 3550 Applied Genetic Analyzer (Thermo Fisher Scientific, Oyster Point, CA). A mixture of 0.5 µl of GeneScan™ 600 LIZ® Size Standard v2, 9.5 µl of Hi-Di™ Formamide, was dispensed and 1.0 µl of PCR products was added to each well. The Capillary electrophoresis was performed with run settings as indicated by the manufacturer for PowerPlex® Fusion System - Promega Corporation.

**Data analysis:** Genotypes and electrical diagrams obtained after DNA separation were obtained using the Gene Mapper ID-X version 1.4 (Applied Biosystems, USA). Data were statistically analyzed using GenoProof 3 SoftwareKinship Examination (Qualitype GmbH, Dresden, Germany) (Dumache, 2017).

**Results and Discussion**

The paternity test is based on the alleles matching at STR 24 loci between the child, mother and father (Trio Cases). In this case, no genetic discrepancy was observed for the alleged relationship between the father and the child in any of the STR 24 loci. Results are shown in Table 1.

The combined parenting index was calculated (CPI) and Paternity Probability (W) for standard trio cases using GenoProof3 software. The paternity index (PI), the Combined paternity index (CPI), is then calculated by multiplying the individual PIs across, obtained from each loci tested. Using a CPI and a prior probability of 0.5, the parenting probability (W) is calculated according to the following equation:

\[ W = \frac{CPI}{CPI + 1} \]

**Table 1: The value of the paternity index father-son and the maternity index mother-son for each locus**

<table>
<thead>
<tr>
<th>Locus</th>
<th>Mother</th>
<th>Son</th>
<th>Father</th>
<th>PI</th>
<th>PE</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMEL</td>
<td>X,X</td>
<td>X,Y</td>
<td>X,Y</td>
<td>2.3320</td>
<td>61.7167%</td>
</tr>
<tr>
<td>D3S1358</td>
<td>15/18</td>
<td>15/17</td>
<td>16/17</td>
<td>7.4626</td>
<td>87.0489%</td>
</tr>
<tr>
<td>D1S1656</td>
<td>11/15</td>
<td>13/15</td>
<td>12/13</td>
<td>3.3436</td>
<td>50.2681%</td>
</tr>
<tr>
<td>D2S441</td>
<td>11</td>
<td>11/14</td>
<td>14</td>
<td>1.4348</td>
<td>41.4736%</td>
</tr>
<tr>
<td>D10S1248</td>
<td>13/16</td>
<td>14/16</td>
<td>13/14</td>
<td>1.2144</td>
<td>41.4736%</td>
</tr>
<tr>
<td>D13S317</td>
<td>12</td>
<td>12/14</td>
<td>12/14</td>
<td>12.9533</td>
<td>92.429%</td>
</tr>
<tr>
<td>Penta E</td>
<td>10</td>
<td>10/18</td>
<td>17/17</td>
<td>17.2413</td>
<td>94.2841%</td>
</tr>
<tr>
<td>D16S539</td>
<td>11</td>
<td>11/12</td>
<td>11/12</td>
<td>1.6880</td>
<td>49.5334%</td>
</tr>
<tr>
<td>D18S51</td>
<td>16</td>
<td>16</td>
<td>13/16</td>
<td>3.6576</td>
<td>74.5286%</td>
</tr>
<tr>
<td>D2S1338</td>
<td>24</td>
<td>24</td>
<td>24/25</td>
<td>5.5803</td>
<td>82.8828%</td>
</tr>
<tr>
<td>CSF1PO</td>
<td>10/12</td>
<td>10/12</td>
<td>11/12</td>
<td>0.8903</td>
<td>19.2194%</td>
</tr>
<tr>
<td>Penta D</td>
<td>10</td>
<td>10</td>
<td>9/10</td>
<td>5.6179</td>
<td>82.9921%</td>
</tr>
<tr>
<td>TH01</td>
<td>7/9</td>
<td>7/9</td>
<td>9</td>
<td>3.0684</td>
<td>45.441%</td>
</tr>
</tbody>
</table>
Where was combined parenting index was Calculated (CPI) 652,559,360,682 and Paternity Probability (W) 99.9999999998% and also (CPE) calculated 99.999999999% (Paternity practically proven). In the second case, the results were as follows: combined parenting index was Calculated (CPI) 4,551,267,998,683 and Paternity Probability (W) 99.9999999999% and also (CPE) calculated 99.9999999999% (Paternity practically proven). In the third case, the results were as follows: combined parenting index was Calculated (CPI) 305,372,452,857 and Paternity Probability (W) 99.9999999996% and also (CPE) calculated 99.9999999973% (Paternity practically proven). In the fourth case, the results were as follows: combined parenting index was Calculated (CPI) 2,008,537,679 and Paternity Probability (W) 99.9999999502% and also (CPE) calculated 99.999999949% (Paternity practically proven). In the fifth case, the results were as follows: combined parenting index was Calculated (CPI) 3,362,894,053 and Paternity Probability (W) 99.9999999702% and also (CPE) calculated 99.999999966% (Paternity practically proven). In the sixth case, the results were as follows: combined parenting index was Calculated (CPI) 33,542,176,411 and Paternity Probability (W) 99.999999997% and also (CPE) calculated 99.999999922% (Paternity practically proven). In the seventh case, the results were as follows: combined parenting index was Calculated (CPI) 1,093,931,389,095 and Paternity Probability (W) 99.999999999% and also (CPE) calculated 99.999999998% (Paternity practically proven). In the eighth case, the results were as follows: combined parenting index was Calculated (CPI) 25,017,963,856 and Paternity Probability (W) 99.9999999996% and also (CPE) calculated 99.9999999925% (Paternity practically proven). In the ninth case, the results were as follows: combined parenting index was Calculated (CPI) 453,038,745 and Paternity Probability (W) 99.9999999792% and also (CPE) calculated 99.9999999632% (Paternity practically proven). In the tenth case, the results were as follows: combined parenting index was Calculated (CPI) 4,837,584,758 and Paternity Probability (W) 99.9999999997% and also (CPE) calculated 99.9999999999% (Paternity practically proven). In the eleventh case, the results were as follows: combined parenting index was Calculated (CPI) 1,093,931,389,095 and Paternity Probability (W) 99.9999999994% and also (CPE) calculated 99.9999999995% (Paternity practically proven). In the twelfth case, the results were as follows: combined parenting index was Calculated (CPI) 76,047,184,748 and Paternity Probability (W) 99.9999999986% and also (CPE) calculated 99.9999999986% (Paternity practically proven). In the thirteenth case, the results were as follows: combined parenting index was Calculated (CPI) 194,517,436,486 and Paternity Probability (W) 99.9999999994% and also (CPE) calculated 99.9999999974% (Paternity practically proven). In the fourteenth case, the results were as follows: combined parenting index was Calculated (CPI) 176,512,622,425 and Paternity Probability (W) 99.9999999994% and also (CPE) calculated 99.9999999995% (Paternity practically proven). In the fifteenth case, the results were as follows: combined parenting index was Calculated...
(CPI) 51,637,272,228,769 and Paternity Probability (W) 99.9999999999% and also (CPE) calculated 99.9999999999% (Paternity practically proven). In the sixteenth case, the results were as follows: combined parenting index was Calculated (CPI) 69,762,623,876 and Paternity Probability (W) 99.9999999985% and also (CPE) calculated 99.9999999974% (Paternity practically proven).

The current study has shown that 24 loci of STR technology have sufficient discriminatory ability to exclude or include the alleged father in disputed parenting cases. This is consistent with many reports describing the strength of interest and discrimination of STR markers. In the paternity and identity test. The calculated paternity index values and the probability of paternity that are important in applying the paternity test DNA typing method, were high with the current STR typing, and the paternity index measures the strength of the genetic match between the alleged father and a specific child. If the alleged father and child share a low frequency allele, they will be considered strong and will give a high parenting index\(^{(13-15)}\).

When the child’s biological parent is questionable, the PCR-based STR test is the accurate choice available for paternity testing, in relation to crime issues in the current study, STR’s analysis was very useful for personal identification.

Data from this study leads to the conclusion that STR genotyping is a powerful tool for analyzing conflicts between parents. From a practical point of view, standardized methodology with high reproducibility and low cost plus the availability of STR loci in the human genome is easy to implement, making it ideal genome markers for parenting/maternity evaluation.

Specifically, in all cases of trio paternity, 24 forensic loci were effective exclusion of paternity or to provide sufficient positive evidence (strong evidence) on paternity, and to provide a high discriminatory power at a rate ranging between W 99.999999996% to 99.9999999999%, by Using a database qualified well.

**Conclusion**

Successful, STR typing is a tool genetic reliable and powerful have an important central role in the community to solve the problems of family relationships and judicial studies.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

**Conflict of Interest:** Non

**Funding:** Self-funding

**References**


Impact of Exposure Period to Liquid Nitrogen Vapor on Criteria of Human Spermatozoa Cryopreserved in New Cryopreservation Technique

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Abstract

Background: The emptied sheep’s ovarian follicles recently used as a container for spermatozoa during cryopreservation, it was found a proper carrier to cryopreserving spermatoza in vapor-dependent cryopreservation. The aim of this study was to evaluate the effect of two periods of exposure to liquid nitrogen (LN₂) vapor on the parameter of spermatozoa during cryopreservation in this technique.

Method: The study was conducted on 30 semen samples from patients with oligozoospermia diagnosed by semen analysis according to the standard criteria of World Health Organization (WHO) 2010. Sheep’s ovarian follicles obtained from local slaughterhouse and prepared by slicing the ovaries and evacuating the follicular fluid and oocyte. Each semen sample diluted 1:1 with cryosolution (glycerol 10%) and injected within eight emptied sheep’s ovarian follicles. The first four follicles represent P1; exposed to LN₂ vapor for 7.5 minutes and the other four follicles represent P2; exposed to LN₂ vapor for 15 minutes before emerged in liquid nitrogen. Sperm progressive motility, total motility, normal morphology and DNA fragmentation index (DFI) were analyzed for all samples pre-freezing and post-thawing.

Results: After two months of cryopreservation, sperm progressive motility and total motility significantly (P<0.01) increased post-thawing in P2 as compared with P1, while both of P1 and P2 significantly (P<0.01) decreased as compared with pre-freezing. Normal morphology significantly (P<0.01) decreased post-thawing in both P1 and P2 as compared with pre-freezing, while no significantly difference found between P1 and P2. DFI significantly (P<0.01) increased post-thawing in P1 and P2 as compared with pre-freezing, while in P2 DFI was significantly lower than in P1.

Conclusions: The exposure to liquid nitrogen vapor for 15 minutes in emptied ovarian follicles technique gives a better result than exposure to the vapor for 7.5 minutes regarding sperm progressive motility, total motility and DFI.

Keywords: ART; cryopreservation; human spermatozoa; LN₂ vapor; ovarian follicles; sperm cryopreservation.

Introduction

Cryopreservation of human spermatozoa is a widespread routine work in clinics of assisted reproductive technologies (ART) (¹). It is used for preserving male fertility in many cases such as prior to undergoing chemotherapy or radiotherapy, vasectomy and other activities that may affect male fertility (²). It also can be used in cases of
sperm donors to prevent the distribution of infectious diseases from donor to recipient couples (3). It is found that cryopreservation cause damage to spermatozoa and reduce its viability and motility and even the fertilization ability(4). More than 40% of sperm motility found to loss after cryopreservation (2), this may due to the damage of plasma membrane, loss of acrosome function and or DNA fragmentation (5). Cryopreservation of spermatozoa not only affect sperm motility and viability, but also the concentration of sperms decreased post-thawing due to the dilutions and washing steps (6). However, this may not appropriate for low concentrations of spermatozoa because it may loss during washing steps (7,8). This reason spur many researchers to experimented different techniques for cryopreserving the low concentrations of spermatozoa(7–12).In our recent under-publication techniques for cryopreserving the low concentrations of spermatozoa, we succeeded in cryopreserving different concentrations of spermatozoa using sheep’s emptied ovarian follicles as a vehicle to carry spermatozoa during cryopreservation in order to minimize the loss of cryopreserved spermatozoa. In emptied ovarian follicles technique, spermatozoa cryopreserved by exposing to Liquid Nitrogen($\text{LN}_2$) vapor before immersed into $\text{LN}_2$. Therefore, this study builds on our prior results, to determine the best time of exposure to $\text{LN}_2$ vapor during cryopreservation of spermatozoa in this newly invented cryopreservation technique.

**Materials and Method**

**Subjects and samples collection:** Thirty semen samples were collected from oligozoospermic patients (their sperm concentration $\leq 15 \times 10^6 \text{mL}^{-1}$) their ages ranged from 22 to 57 years old. They attended to the Fertility Center Clinic at Al-Sadr Medical City, Najaf, Iraq, during the period from February 2019 to November 2019. The samples collected from the subjects by masturbation after 3 days sexual abstinence and analyzed according to the World Health Organization (WHO) 2010 standard guidelines using a light microscope (Optica, Italy) to determine the sperm parameters (sperm concentration, total motility, progressive motility, normal morphology). Each sample was analyzed twice by only one experienced biologist to avoid any personal variations.

**Ethical approval:** This study was ethically approved by the medical ethics committee in Jabir Ibn Hayyan Medical University, Iraq (Approval No: 19-0003). All the patients gave their informed agreement for research before they gave the semen samples.

**Experimental design:** After seminal fluid analysis (SFA) and DFI assay, each semen sample diluted 1:1 with cryosolution using SMART medium (14) with (10%glycerol) and injected within eight emptied sheep’s ovarian follicles. The first four follicles represent P1; exposed to $\text{LN}_2$ vapor for 7.5 minutes and the other four follicles represent P2; exposed to $\text{LN}_2$ vapor for 15 minutes before emerged in liquid nitrogen. Sperm progressive motility, total motility, normal morphology and DFI were analyzed for all samples pre-freezing and post-thawing.

**Collection and preparation of sheep ovarian follicles:** A total of 240 ovarian follicles were sliced from 186 sheep’s ovary used in this study. The sheep ovaries were collected from local slaughterhouse in Najaf city. The ovaries were collected directly from the ewes after slaughtered and kept at 32-35°C with normal saline solution (0.9%NaCl) supplemented with two types of antibiotics (100mg/ml penicillin and 100mg/ml streptomycin). The ovaries then, transported to the laboratory within 1 hour. In the Laboratory, ovaries washed three times using normal saline solution (37 °C) to remove the clotted blood and reduce contamination on the ovarian surface (15). After washing, the ovaries differentiated according to the size of ovarian follicles. The ovaries that contain follicles less than 0.3 mm in diameter were excluded, and those contain follicles larger than 0.3 mm in size sliced to remove the medulla and allows the follicles to be fit inside the cryotube. Then, the ovarian pieces that contain the follicles were stored at 4°C till the semen prepared.

**Process of sperm cryopreservation:** The prepared ovarian follicles emptied from the oocyte and follicular fluid using 23-gage sterile hypodermic needle with a disposable 2mL syringe. Then, each part of all the semen samples injected in 8 emptied follicles and inserted into two cryotubes (Thermo-scientific 1.8mL) (4 follicles in each cryotube) and covered with cryosolution. One cryotube exposed to $\text{LN}_2$ vapor for 7.5 minutes and the other exposed to $\text{LN}_2$ vapor for 15 minutes (2cm above the surface of $\text{LN}_2$), then, the cryotubes plunged inside $\text{LN}_2$ and stored at -196°C for two months using cryopreservation $\text{LN}_2$ tank (MVE SC series $\text{LN}_2$ tank 40L).

**Thawing Process:** After two months of cryopreservation, each cryotube was taken out from the $\text{LN}_2$ and immersed inside water bath at 35°C for 5 minutes, then, by using forcipes, the ovarian follicles
transferred from the cryotube to a clean Petri dish and the samples withdrawn from the follicles using 23-gage sterile hypodermic needle with a disposable 3mL syringe. The volume measured and the sample diluted 1:1 with the thawing solution (SMART medium plus 0.25M sucrose) and then utilized for analyzing the sample’s parameters (sperm concentration, motility, normal morphology and DFI).

**DNA fragmentation assay:** Sperm DFI was determined in both fresh and thawed semen using Acridine Orange (AO) fluorescence stain. The AO stain was prepared according to Tejada et al. (16). The evaluation of DFI done using fluorescent microscope with excitation at 450–490 nm to count sperms in at least 5 fields. The normal spermatozoa with intact double-stranded DNA stained green while spermatozoa with fragmented DNA showed red or orange fluorescence (Figure 1). The DFI was calculated by measuring the percentage of DNA Fragmented spermatozoa (16).

**Statistical analysis:** The statistical analysis system (SAS) program (2012) was used to analyzed the data. Parameters in this study were expressed as the means and standard deviations (mean ± SD). The least significant difference (LSD) test and analysis of variation (ANOVA) were used to analyze the differences between groups. The p-value of less than (0.01) was considered significantly different.

![Figure (1): DNA fragmentation assay using Acridine orange stain under fluorescent microscope (magnification power 40X). Green sperms ranked as spermatozoa with intact DNA, orange and yellow sperms ranked as DNA fragmented spermatozoa.](image)

**Results**

Sperm concentration was significantly (P<0.01) decreased in both post-thawing groups when compared to pre-freezing, meanwhile, no significant difference were observed in sperm concentration post-thawing between P1 and P2.

Progressive sperm motility (%) and total motility (%) found to be significantly (P<0.01) higher in samples exposed to LN$_2$ vapor for 15 minutes(11.91±3.56) (22.07±4.36) respectively as compared with samples exposed to LN$_2$ vapor for 7.5 minutes (8.23±3.05) (14.08±4.73) respectively, while both groups significantly (P<0.01) decreased as compared with pre-freezing (26.22±5.18) (34.92±6.25) respectively.

Normal sperm morphology (%) significantly (P<0.01) decreased in both post-thawing groups when compared with pre-freezing (25.19±3.79), meanwhile, in samples exposed to LN$_2$ vapor for 15 minutes, normal sperm morphology (23.02±0.35) observed to be slightly but not significantly higher than in those exposed to LN$_2$ vapor for 7.5 minutes(22.20±0.39).
DFI significantly (P<0.01) increased post-thawing both in P1 (42.91±2.18) and in P2 (39.6±3.01) as compared with pre-freezing (35.75±3.41), while in P2 (samples exposed to LN2 vapor for 15 minutes) DFI significantly decreased as compared with P1 (samples exposed to LN2 vapor for 7.5 minutes) (Table 1).

**Table 1. Human sperm parameters in pre-freezing and post-thawing using sheep’s ovarian follicles.**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Pre-freezing</th>
<th>Exposure to LN2 vapor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>7.5 min</td>
</tr>
<tr>
<td>Sperm concentration (mL X10^6)</td>
<td>8.04±3.81^a</td>
<td>1.95±0.85^b</td>
</tr>
<tr>
<td>Progressive motility (%)</td>
<td>26.22±5.18^a</td>
<td>8.23±3.05^c</td>
</tr>
<tr>
<td>Total sperm motility (%)</td>
<td>34.92±6.25^a</td>
<td>14.08±4.73^c</td>
</tr>
<tr>
<td>Normal sperm morphology (%)</td>
<td>25.19±3.79^a</td>
<td>22.20±0.39^b</td>
</tr>
<tr>
<td>DNA Fragmentation Index (%)</td>
<td>35.75±3.41^a</td>
<td>42.91±2.18^b</td>
</tr>
</tbody>
</table>

Data are presented as the (mean ±SD). Different letters (a, b and c) in the same row indicate significant differences (p < 0.01).

**Discussion**

Human spermatozoa can be cryopreserved by one of three main protocols: slow freezing\(^{(17)}\), rapid or vapor-dependent freezing \(^{(18)}\) and ultra-rapid freezing (vitrification) \(^{(19)}\). In this study, samples were cryopreserved using the direct contact between the cryotube that contain the samples and the LN\(_2\) vapor for two periods of exposure (7.5 and 15 minutes) in view to determine the effect of the two periodson the parameters of cryopreserved spermatozoa. This method is one of the most popular method in human sperm cryopreservation \(^{(20)}\). Esteves et al.\(^{(6)}\) confirmed that this method preferable than slow graduating cryopreservation for human spermatozoa. Rahiminia et al. in 2017\(^{(21)}\) concluded that human sperm DNA, chromatin and acrosome integrity status were more tolerable during cryopreservation with LN\(_2\) vapor rather than in vitrification.

In comparison between the two periods of exposure to LN\(_2\) vapor in this study, the recovery of progressive and total motility increased significantly (P < 0.01) in 15 minutes than in 7.5 minutes. This reflect that the extend period of exposure to LN\(_2\) vapor may reduce the plasma membrane damage of the cryopreserved spermatozoa during freezing process, and this in turn increase the recovery rate of sperm motility post-thawing. For the same reason, normal sperm morphology slightly improved with the exposure to LN\(_2\) vapor for 15 minutes.

In addition to conventional sperm parameters, DFI gives more information on men’s reproductive potential. Spermatozoa with fragmented DNA have been reported to be contributed in failure of fertility and loss of pregnancy \(^{(22)}\). Although the negative effect of cryopreservation on sperm motility, morphology, and viability post-thawing has been studied widely \(^{(19)}\). The effect of various cryopreservation method on sperm DNA integrity still controversy \(^{(23)}\). Several studies demonstrated that cryopreservation increase sperm DNA fragmentation post-thawing \(^{(18,24)}\) and other studies indicated that cryopreservation did not affect sperm chromatin integrity and not increase sperm DNA fragmentation \(^{(25,26)}\).

The main causes of DNA fragmentation seemed to be the increase in reactive oxygen species (ROS) during sperm cryopreservation as well as the formation of intracellular ice crystals \(^{(27,28)}\). The results of this study found that DFI significantly decreased with the exposure to LN\(_2\) vapor for 15 minutes when compared with the exposure to LN\(_2\) vapor for 7.5 minutes. This may refer to the positively role of the exposure to LN\(_2\) vapor for 15 minutes in reducing the formation of intracellular ice crystal and reducing the formation of ROS during freezing process. Exposure to LN\(_2\) vapor for 15 minutes previously used in human sperm cryopreservation. In conclusion, the exposure to LN\(_2\) vapor for 15 minutes before emerging the samples directly into LN\(_2\) gave better results regarding sperm motility, morphology and DFI than the exposure to LN\(_2\) vapor for 7.5 minutes in this technique of sperm cryopreservation.

**Ethical Clearance:** The Research Ethical
Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

Conflict of Interest: Non

Funding: Self-funding

References


19. Le MT, Nguyen TTT, Nguyen TT, Nguyen


Modification of Electrode in Dermatosensory Evoked Potential

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Abstract

Somatosensory evoked potential (SSEP) usually done using bipolar surface stimulator of peripheral nerve and recorded by cortical surface or subdermal needle electrodes, in this study we modify an adhesive large surface area, surface stimulator using the same montage and method then compare the result between them. We took nineteen patients of median nerve SSEP, locate and identify the shape of dermatom assigned according to text using large square adhesive surface electrode. The same as the shape of dermatom, this is the cathode electrode, for the anode, a strip has the same length of the cathode with a width of two centimetres placed beneath the cathode, the circular ground band between stimulated and recording electrode. The subjects In this study prepared for routine SSEP study the result obtained of both study compared using statistical method and we found there was a significant different between two method and the modified as higher amplitude using lesser stimulated threshold but not significant different between latency. That’s happened because we increased the surface area of stimulation which means more the motor nerve was stimulated.

Keyword: Somatosensory, evoked potential, electrode, electrical charge.

Introduction

Definition and review: The electrical signals were a response by evoked potentials that formed by nerves that work as receiver for stimulation.¹ Nerves disorder was diagnosed by computer testes, site and type of nerve damage, and provided a clear view about patient’s condition after and during the surgery, wherever several types of evoked potential tests that used for that purpose. The all used to induce mild stimulation the nerves to receive and send the impulse to and from the brain. The electrodes polar put on several sites on the skin for recording the work nature of the brain and spinal cord.

Type and degree the responses are recorded and analyzed by specialized computer software and the results are printed on paper as a chart. (2,3)

Prior to the production of muscle force, ion exchange across muscle fiber membranes, results in production of small electrical currents, which is generated by muscle fibers to produce muscle action. These currents represent the main part of the signaling process for the muscle fiber contraction. EMG can be measured by using specific elements to conduct the signals either superficially by applying electrodes to the skin or invasive intramuscular elements. Surface EMG method of measurement are the most common method, It is non-invasive, and it doesn’t need medical heath professional to conduct it. Surface EMG measurement, depending on many factors including UV and low mV range (5). The properties of the sEMG are affected by many factors such as⁴,⁵

• The time needs for muscle contraction
• The strength of muscle contraction
• The space between the electrode and the active muscle area

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The elements of the underlying tissue (e.g. thickness of underlying skin and adipose tissue)

- The character of electrode and amplifier
- The electrode and skin connection quality

In many situations the data of the time and muscle contraction strength is required, the other factors increased the variation in the EMG records, which makes the result analysis more complicated process. However, the influence of the non-muscular factors on the sEMG can be reduced by:

- Using the same parameters (electrodes and amplifier)
- Maintain consistency of the electrodes- skin contact

The Importance of Skin – Electrode Impedance:
The constant impedance is a very important factor for the EMG measurement accuracy. Recent design of the pre-amplifier has minimized the importance of EMG measuring with low level of electrode –skin impedance. The level of muscle impedance is not a significant factor, while the impedance stability with the time and the impedance balance between electrode sites has a significant effect on the signal to noise ratio of the sEMG measurement. To minimize the noise components, it is very important to ensure the balance in impedance between electrodes sites. The perfect balance of the impedance at each site doesn’t require, but the relative similarity is required. The impedance balance level is not arbitrary it depends on the pre-amplifier. The energy levels of the electrical signals determine by the impedance at each electrode sites. The signal strength gets in the process of differential amplification, as a consequence of the impedance differences between electrode sites. The common signal components canceled by differential amplification. In a similar way the D/C voltage potential will not be cancelled. Pre-amplifier instability and inaccuracy occurs when the pre-amplifier doesn’t have sufficient D/C noise suppression in the residual D/C component.

Skin Preparation: The electrode – skin bind results in a D/C voltage potential, generated by impedance increment from the outermost layer of skin, including dead skin material and oil secretions. This D/C potential, common to all electrodes, can be minimized with proper skin preparation.

Types of Electrodes: The most common surface electrodes include:

- Dry electrodes in direct contact with the skin
- Gelled electrodes using an electrolytic gel as a chemical interface between the skin and the metallic part of the electrode

Recommendations for Bipolar sEMG Electrodes has recommendations for construction of bipolar EMG electrodes (sensors) including:

- Electrode form
- Electrode size
- Inter-electrode dimension
- Electrode components
- Electrode structure

Electrode Shape:

- The “electrode shape is defined as the shape of the conductive area”. There are different shapes of electrodes, varies as circular, square, and bar shaped electrodes. Each electrode site must have the same surface area.

Electrode Size:

- Electrode size is defined as the size of the surface of a conductive area of a sEMG electrode. Upon an increase of the size area of a sEMG electrode, Upon an increase of the size area of a sEMG electrode, it is expected that the view of the electrodes increases. No quantitative data on the extent of this effect on the EMG characteristics is available at the moment. For bipolar sensors, in general, the size of the electrodes should be large enough to record a reasonable pool of motor units, but small enough to avoid crosstalk from other muscles.”

Material and Method

During eleven months (10th January 2018 till 19th of December 2018), twenty five cases of the median nerve, located and identified the shaped of dermatom assigned according to text using large square adhesive surface electrode the shape of dermatom. This is the cathode electrode for the anode a strip has the same length of the cathode with a width of two centimetres placed beneath the cathode, the circular ground band between the stimulated and recording electrode; the study was conducted at Erbil teaching hospital. The data collected was from random simple cases fulfilling the above
criteria SSEP, with a comparison groups analysis data done based on the reading of old and modified method for the median nerve.(8) SSEPs are usually used electrical stimulations into either dermatomes or significant nerve trunks. dermalomal SSEPs (DSSEPs) are meaning responses that done by dermatomal stimulation.

DSSEPs are used needle electrodes in the dermal and subdermal surface. Theoretically, the sites that stimulated by electrodes will produce responses into a nerve root. The responses are done medically in more than one nerve root. Dermatomal maps are included the best location for the best dermatomal responses (9)

Stimulating of the median nerve in the wrist is done for recording the response electricity by two polar the anode in proximal of the palmar, and the cathode set at three cm proximal to the anode polar, between the tendons of muscle.

Stimulating the median nerve is at the wrist region by placing the cathode pair at (2-4) centimetres of the wrist between the muscle of flexor carpi radialis and the palmaris longus. The used current uses square wave has 20 mA- 5.1 Hz and during 200 msec. Stimulation and recording are done by using a disposable intradermal needle. The reading starts and recorded gradually, and the stimulation increases to reach simple twitching in the muscle. (Macdonald DB, 2006) CPz, CP1, CPE are the location of the active electrodes at FPz depend on the international 10-20 system as figure (1). While on the forehead, the ground electrode was put between the recording sites and stimulating. The electrodes stayed less than five KOhm and required time is (50-100) msec(11).

Stimulation of nerves is done by using monophasic square pulses for (0.1-0.3) seconds. The stimulus is done either by steady constant current or constant voltage. See Figure 1

The contact should be without resistance for following causes:

• For decrease patient discomfort.
• The nerve become effective when the voltage constant.
• To decreasing the electrical stimulus in the recorded information.

The stimuli should be high in the intensity at accepted ranged where the patient should be anesthetized during making the process. The high intensity stimulus is favorite advisable for giving safety margin in decreasing nerve stimulation during operation surgery. Ischemia of the nerves and limb edema are Factors results in reducing the efficacy of nerve stimulation.

**Stimulus Rate:** Avoiding rapid stimulus delivery rates, wherever, the normal rate is (3-6) stimuli each second. And should avoid low rates such as frequency (5.0) Hz, the signal decrease the noise. If the stimulus ratio is under harmonic of the recurrence, the frequency noise must be same phase in each data time.

The characteristics of SEPs that should detected such as component amplitudes, peak latencies and waveform morphology. Wherever, component amplitudes are status during several tests of SEP recordings. Peak latencies are consistent across subjects, while the amplitudes demonstrate great contrast. Therefore, analysis of SEP diagnostic studies is based on peak latencies and measures derived from them.

![Figure 1: Median nerve SSEP recorded](image-url)
Result and Discussion

A total of 15 cases were meeting the inclusion criteria between two kinds of electrodes, no studies involved randomized comparisons, and all were simple case series. Patient age were (20-63) years, and the ratio was 2.12:1 and we excluded the value in the table 1 because we take the normal cases.

Table 1: Value of latency and amplitude don’t including in this study

<table>
<thead>
<tr>
<th>Cortex</th>
<th>P14</th>
<th>N20</th>
<th>P25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latency (msec)</td>
<td>14.8±1.2</td>
<td>18.9±0.4</td>
<td>23.6±0.32</td>
</tr>
<tr>
<td>Amplitude (uV)</td>
<td>3.0±1.4</td>
<td>2.8±0.3</td>
<td>1.85±0.69</td>
</tr>
</tbody>
</table>

For most techniques, an acute 50% amplitude drop or 5% to 10% latency increase is considered clinically significant. Smaller degrees of background variability in latency and amplitude are common but not generally of clinical significant.

That is the main problem in all patients, the traditionally used test is very painful, and in most cases the pain is unbearable. To solve this problem the area of the examination was expanded which in return reduce electrical charge and reduce the level of pain for the patients.

Statistically when increased the area that is mean decreased the electrical charge and the pain with less time.

In this study we are changed in the electrode from 1 cm in the old electrode and to modified electrode to 7 cm and then increased the stimulated with low electricity and stimulated the same region in the brain by nerve or by skin, and we found the decreased of pain when increased the surface is that mean more area was stimulated.

Advantages of the new method:

1. The traditional procedure is extremely painful causing the patient to move to make the results more valid.

2. The new test is available on the market at reasonable prices.

Charge density is the amount of electric charge per unit length, surface area, or volume at any point in a volume. Surface charge density is the quantity of charge per unit area, measured in coulombs per square meter (C∙m⁻²).

Electric charge is the physical property of matter that causes it to experience a force when placed in an electromagnetic field.

\[
\text{Charge density (C/m}^{-2}\text{)} = \frac{\text{current}}{\text{Area}}
\]

In brief, figure (2) shows a scatter plot XY, in which the Y axis shows the difference between the two paired measurements (Old electrode – modified electrode) and the X axis represents the average of these measures ((Old electrode + modified electrode/2). In other words, the difference of the two paired measurements is plotted against the mean of the two measurements. B & A recommended that 95% of the data points should lie within ± 2SD.

The figure shows that the average discrepancy between two method is not large enough to be important which support that there is a good agreement between the two used method. Thus, we can say that there is a clear relationship between Old electrode and modified electrode.
Figure 2: The correlation between pressures estimated by Old electrode and modified electrode, the blue line is mean, the red line is + 2SD

Conclusion

This study has investigated the difference in results between applying Old electrode and modified electrode in patients with different neurosurgery exam. It has shown some aspects that must be considered during doing the exam. I recommended studying the difference between the two techniques in other diseases to know the effect of the nerve which is obviously has an important effect. We also recommend to give more attention to the type and size of electrode depended on the different area investigation.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

Conflict of Interest: Non

Funding: Self-funding

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Investigation the Association of the VEGFR-2 and -2578C\A Polymorphism as a Risk Factor for Incidence of Lung Cancer in Babylon Province

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Abstract

Background: VEGF gene polymorphisms can induce either increase or inhibition of VEGF secretion, with altered promoter activity.

Aim: We investigated the association of the VEGFR-2 and -2578C\A polymorphism in the VEGF gene with Lung cancer risk in Babylon province. Methodology: VEGFR-2 level was measured by Enzyme Linked Immunoabsorbant Assay ELISA and Genotyping of the VEGF-gene variation (-2578A\C) was performed using the amplification refractory mutation system PCR. We investigated the association of VEGF gene variants with different clinicopathological features of lung cancer patients.

Results: No significant difference was seen of the VEGFR-2 levels in lung cancer patients when compared with control group (P=0.92), the allelic frequency of -2578 A\C VEGF gene no difference was seen in patients lung cancer (p=0.652). Hardy-Weinberg equilibrium showed a significant difference cases group (p=0.016), also revealed A allele exhibits a pathological behavior and it appears in over-dominant model (p=0.05), this proves that there is significant association of -2578A\C VEGF gene in lung cancer patients.

Conclusion: Our results showed no significant association of the VEGFR-2 in lung cancer patients while showed a significant association of the VEGF -2578C\A polymorphism with LC susceptibility in Babylon province. The VEGF -2578C\A heterozygote significantly increases the risk and can be useful as a predisposing genetic marker.

Keywords: Lung cancer, VEGFR-2, polymorphism, dominant model.

Introduction

Lung cancer (LC) is the main cause of cancer-related deaths worldwide, it is a complex and highly heterogeneous disease[1]. About two million person are diagnosed with lung carcinoma each year and most of them diagnosed at an advanced stage[2]. Iraqi cancer broad reports that Lung cancer is the second most common cancer in the Iraq province[3]. The lack of effective treatment choice and high mortality make lung cancer a major public health challenge all over the world[4]. With the advent of next-generation genotyping and in-depth understanding of the molecular biology of lung cancer, genotyping of single-nucleotide polymorphisms (SNPs) may be pivotal in the personalized treatment for patients with lung cancer[5]. Angiogenesis it is known as complex process of the formation of new networks of blood vessels. Angiogenesis has a major role in tumor progression and metastasis[6]. VEGF plays a major role in the progress and prognosis of malignancy[7]. VEGF is an important in establishing a vascular supply within the tumor in lung carcinoma[8]. The VEGF/VEGF-receptor axis is composed of multiple ligands and receptors with overlapping and distinct ligand–receptor binding
specificities, cell-type expression, and function[9]. VEGFR-2 is a type V receptor tyrosine kinase mainly known to be expressed in vascular endothelial cells and encoded by the KDR gene[10]. This receptor responds to the signal of VEGF binding, which initiates a phosphorylation cascade that ultimately involves nuclear regulatory targets resulting in enhancement of endothelial proliferation, angiogenesis and cell migration[11]. The VEGF gene is located at chromosome 6p21.3, covering 14 kb in length with 8 exons and 7 introns [12]. Being highly polymorphic, about 30 single SNPs have been identified and described [13]. Several SNPs of VEGF have been reported to be associated with individual susceptibility to cancer and can alter the VEGF expression and protein production[14-20].

Materials and Method

Determination of Serum VEGFR-2 Concentration: The VEGFR-2 concentration is measured by enzyme linked immune-absorbent assay kit (Sandwich-ELISA) type as the method[20].

DNA Extraction: DNA were extracted by the procedure depending on manufacture protocol and was detected by using agarose gel electrophoresis technique[15].

VEGF -2578C/A (rs699947) genotyping: VEGF -2578C/A genotyping was detected by using amplification-refractory mutation system –PCR (ARMS-PCR). ARM Systems are based on the use of sequence-specific PCR primers that allow amplification of test DNA only when the target allele is contained within the sample. Following an ARMS reaction the presence or absence of a PCR product is diagnostic for the presence or absence of the target allele. The VEGF -2578C/A genotyping primers were designed by using primer3 software as showed in table(1)[25]. The ARMS-PCR done in a reaction volume of 20µL containing MgCl$_2$ (0.5µL), FO- 1µL, RO- 1µL, RI-1µL, RI-1µL of 10pmol of each primers and 8µL from Master Mixof2.5X(Cyntol, Russian). The final volume of 18µL has been modified by adding nuclease free ddH$_2$O (5.5 µL). Finally, the DNA template (2µL), was added from each cases.

Amplification conditions of VEGF genotyping: The amplification conditions used were at 94 C for 5 minutes followed by 35 cycles of 94C for 35 sec, 63 C for 40 sec, 72 C for 45 sec followed by the final extension at 72 C for 5 minutes. The amplification products were separated by electrophoresis through 2% agarose gel stained with 3µL ethidium bromide and visualized on a UV transilluminator. Primers FO and RO flank the exon of the VEGF -2578C/A gene, resulting a band of 353bp to act as a control for DNA quality and quantity. Primers FI and RO amplify a wild-type allele (C allele), generating a band of 229 bp, and primers FO and RI generate a band of 149bp from the mutant allele (A allele). The best temperature was determined to be 58°C in the temperature range of 55°C to 63°C tested with a gradient PCR thermocycler. The annealing temperature was lowered from 60 to 58°C to favor the binding of both forward wild and reverse mutant primers that contain mismatches to the templates. The number of cycles was increased from 30 to 35 cycles, significantly enhancing the yields of all three PCR products. Together, these changes resulted in a more robust amplification of the mutant allele and a less competing reaction from the control, as shown by the relative intensities of the corresponding bands on agarose gel electrophoresis.

Results

The present results on patients showed that high age frequency of cancer occurred between (45-80) years old. The mean and standard deviation of age for lung cancer patients when compared with control group, as showed in table(2). The current results on patients showed that high age frequency of cancer occurred between (45-80) years old, this due to the lung cancer incidence is very low before age 25 years and increases with increasing age up to 40 years due to several causes such as environmental factors, the nutrition, poor health education, radiation exposure, smoking, repeated injuries, and previous lung disease[16]. The current results agree with many studies in Iraq performed on lung cancer[17-19], they expected that the risk of lung cancer is higher in middle age and elderly Men and women than in younger, this risk increase as a woman and Men ages, rising sharply after the age of 50 years old.

VEGFR-2 concentration in the serum: This results showed no significant difference for VEGFR-2 serum concentration in lung cancer patients when compared with control groups, P-value=0.92, as shown in the table(3).

Genotyping of the VEGF gene variation(-2578A/C)rs699947: The Hardy-Weinberg Equilibrium Analysis: The genotype distributions and allele frequencies of the SNPs -2578C/A located in the VEGF gene showed a deviation from HWE(P=0.016) in the
patients group while the genotype distributions and allele frequencies of the SNPs-2578C\A showed no deviation from HWE (p=1) in the control group.

**Study population:** All demographic characteristic of the subjects are showed as follows a total of 45 Lung cancer patients and the same number of gender matched healthy control were analyzed. This research was confirmed by the Research ethics committee, University of Babylon college of medicine. Blood(5ml) samples were collected from participants in EDTA and gel tubes.

The VEGFR-2 level in different genotype individual of the -2578 C\A VEGF gene: This study has shown no association of the VEGFR-2 levels in different individual that carry different genotype of the -2578C\AVEGF gene. P-values>0.05.

**Discussion**

Several studies detect a significant increase in VEGFR-2 in Lung cancer patients as a result of angiogenesis process because of the increased need for oxygen. This study did not show the significant difference in the VEGFR-2 levels of the two groups, and this does not agree with [20-22], that revealed a significant difference in regards to VEGFR-2 levels in lung cancer patients when compared to control groups. VEGF plays a paramount role in an angiogenesis through different mechanisms[23]. High VEGF expression is associated with tumor growth and metastatic process, while the inhibited VEGF expression results in suppressed growth of cancer[24]. Several functional polymorphisms of the VEGF gene that may affect serum VEGF expression level, included −634G\C, −1154G\A, 936C\T, −1498C\T, −2578C\A, and −460C\T [25]. The −2578C/A of VEGF gene, have been demonstrated to modulate the levels of VEGF expression in tumor growth especially with lung cancer[26]. Recently, the effects of the VEGF gene polymorphism on the Lung cancer risk have been extensively studied; however, the results of these studies were conflicting and ambiguous. The findings of our study proposed that VEGF -2578C\A variant significantly increased the risk of Lung cancer. These results indicate that relative risk of lung cancer associated with −2578C/A of the VEGF gene lung carcinoma in their patients. The present results agreement with[27-29], all of which demonstrated a high significant correlation of the-2578C\A VEGF with lung carcinomas, and not agreement with Liu C et al 2015 and Yang F et al 2018[30] these studies were conducted on Asians, Caucasians and Indians it did not show a significant association of the -2578C\A VEGF gene and lung cancer. In conclusion, our result showed no significant correlation with regards to levels of VEGFR-2 in lung cancer patients while showed a significant associations of VEGF -2578C\A polymorphism with LC susceptibility in Babylon population. VEGF -2578C\A in over dominant model significantly increases the risk of Lung cancer and can be useful as predisposing genetic marker for LC.

**Table(1): Amplification-Refractory Mutation System–PCR Primers for VEGF-2578C\A Gene Polymorphism**

<table>
<thead>
<tr>
<th>Direction</th>
<th>Primer Sequence</th>
<th>AT</th>
<th>Product size</th>
</tr>
</thead>
<tbody>
<tr>
<td>FO-VEGF</td>
<td>5-CCTTTTCTCATAAGGCCCTTAG-3</td>
<td>58 C</td>
<td>353bp</td>
</tr>
<tr>
<td>RO-VEGF</td>
<td>5-AGGAAGCACGCTTGGAAAAATTC-3</td>
<td>58 C</td>
<td>149bp</td>
</tr>
<tr>
<td>FI–VEGF</td>
<td>A allele 5-TAGGCCAGACCTGGCAA-3</td>
<td>58 C</td>
<td>243bp</td>
</tr>
<tr>
<td>RI-VEGF</td>
<td>C allele 5-GTCTGATTATCCACCAGATCG-3</td>
<td>58 C</td>
<td>353bp</td>
</tr>
</tbody>
</table>

Fo-outer forward primer, Ro-Reverse outer primer; AT-annealing temperature; FI-Inner forward primer, RI-Inner Reverse primer
Figure(1): Genotyping of VEGF gene polymorphism rs699947 of gene by PCR-ARMS technique, lanes 4,5,6,7,16,17 and 18 AA genotype; lanes 1,2,3,9,10,14 and 15 CC genotype; lanes 8,11,12 and 13 AC genotype.

Table(2): Genotype exact test for Hardy-Weinberg equilibrium, P-value of Chi square

<table>
<thead>
<tr>
<th>Parameter</th>
<th>C/C</th>
<th>A/C</th>
<th>A/A</th>
<th>C</th>
<th>A</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>All subjects</td>
<td>24(27%)</td>
<td>53(59%)</td>
<td>13(14%)</td>
<td>101</td>
<td>79</td>
<td>0.088</td>
</tr>
<tr>
<td>Control</td>
<td>15(33%)</td>
<td>22(49%)</td>
<td>8(18%)</td>
<td>52</td>
<td>38</td>
<td>1</td>
</tr>
<tr>
<td>Case</td>
<td>9(20%)</td>
<td>31(69%)</td>
<td>5(11%)</td>
<td>49</td>
<td>41</td>
<td>0.016</td>
</tr>
</tbody>
</table>

Table(3): Allele Frequency, Odd Ratio and P-value Between Patient and Control in all sample

<table>
<thead>
<tr>
<th>Allele</th>
<th>Control</th>
<th>Case</th>
<th>OR (95% CI)</th>
<th>P-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>52</td>
<td>49</td>
<td>0.87(0.48-1.57)</td>
<td>0.652</td>
</tr>
<tr>
<td>A</td>
<td>38</td>
<td>41</td>
<td>1.14(0.63-2.06)</td>
<td></td>
</tr>
</tbody>
</table>

Table(4): VEGF(-2578C\A) genotype association with LC under different models of inheritance

<table>
<thead>
<tr>
<th>Model</th>
<th>Genotype</th>
<th>Control</th>
<th>Case</th>
<th>OR (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Codominant</td>
<td>C/C</td>
<td>15</td>
<td>9</td>
<td>1.00</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>A/C</td>
<td>22</td>
<td>31</td>
<td>2.35(0.87-6.32)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>A/A</td>
<td>8</td>
<td>5</td>
<td>1.04(0.26-4.18)</td>
<td></td>
</tr>
<tr>
<td>Dominant</td>
<td>C/C</td>
<td>15</td>
<td>9</td>
<td>1.00</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>A/C-A/A</td>
<td>30</td>
<td>36</td>
<td>2.00(0.77-5.21)</td>
<td></td>
</tr>
<tr>
<td>Recessive</td>
<td>C/C-A/C</td>
<td>37</td>
<td>40</td>
<td>1.00</td>
<td>0.37</td>
</tr>
<tr>
<td></td>
<td>A/A</td>
<td>8</td>
<td>5</td>
<td>0.58(0.17-1.93)</td>
<td></td>
</tr>
<tr>
<td>Over dominant</td>
<td>C/C-A/A</td>
<td>23</td>
<td>14</td>
<td>1.00</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td>A/C</td>
<td>22</td>
<td>31</td>
<td>2.31(0.98-5.47)</td>
<td></td>
</tr>
</tbody>
</table>
Table (5): Mean, Std.Error, Std.Dev., and P-value of VEGFR-2 serum level in different genotype person

<table>
<thead>
<tr>
<th>(I) Genotype</th>
<th>Mean</th>
<th>St. Deviation</th>
<th>(J) Genotype</th>
<th>Mean Difference (I-J)</th>
<th>Std. Error</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A/A(13)</td>
<td>2613.38</td>
<td>841.39</td>
<td>A/C</td>
<td>175.32</td>
<td>329.60</td>
<td>0.59</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>C/C</td>
<td>161.50</td>
<td>366.04</td>
<td>0.66</td>
</tr>
<tr>
<td>A/C(52)</td>
<td>2438.05</td>
<td>1131.46</td>
<td>A/A</td>
<td>-175.32</td>
<td>329.60</td>
<td>0.59</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>C/C</td>
<td>-13.81</td>
<td>262.30</td>
<td>0.95</td>
</tr>
<tr>
<td>C/C(24)</td>
<td>2451.87</td>
<td>1008.27</td>
<td>A/A</td>
<td>-161.50</td>
<td>366.04</td>
<td>0.66</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>A/C</td>
<td>13.81</td>
<td>262.30</td>
<td>0.95</td>
</tr>
</tbody>
</table>

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

Conflict of Interest: Non

Funding: Self-funding

References


Psychological Stress among Dental Students at Al-Iraqia University after Corona Virus Pandemic

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Abstract

Aim of the Study: Among undergraduate dental students at Al-Iraqia University after “Covid-19” pandemic, this study was done in order to evaluate the amount of psychological stress between them.

Materials and Method: By the use of the General Health Questionnaire (GHQ-12), Psychological stress was evaluated among (305) students who asked to fill completely the supplied questionnaires.

Results: The highest level (22.3%) was found at the 1st stage, and generally among female higher than male, (60.9%) scored more than 3 on the (GHQ- 12) vs. (38.8%) for male, at p=0.05 which was considered to be statistically significant.

Conclusion: Despite the changes in the curriculum and the gradual increase in the number of students. The different sources of stress from the year 2020 were mostly unaltered in our study. To minimize stress among dental students during certain conditions further studies is needed.

Keywords: “Covid-19”, Stress, Dental Students.

Introduction

One of the most stressful health professions was Dentistry (1-5). Since the survey of Kay and Lowe, in the United Kingdom among the dental practitioners, observed that this risky demanding profession and continually dentists appear to be pleased as participants of profession companies (6).

From all over the world, the subject of interest for most searchers was the stress among this group of students in this field (7-20), which was considered to be a higher level if compared with medical students, even they might also have a little bit psychiatric signs which may also lead to consider them psychiatrically sick and may also be in some cases the want for psychiatric remedy is indicated (20). This occupation because of its stress may negatively affect their performance (21,22), this relation was found by Sanders and Lushington (23).

In our college the machine of find out about for undergraduate is a dental regimen of 5 years. The (first and second years) were the preclinical while the mainly preclinical is the (third year) otherwise the (fourth and fifth years) the performance of the clinical portion of our study. It was supposed that anxiety because of the “Covid-19” was experienced in about 24.9% of college students (24).

Aim of the study: The purpose of this study was to determine the stress in undergraduate dental students at Al-Iraqia University, during 1st peak of “Covid-19” pandemic the level of stress among dental students. In addition, we also liked to locate if gender and stages has effect on the results of this study.

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e-mail: mohaobosi@googlemail.com
Materials and Method

All undergraduate (460) college students at our dental university enrolled at Al-Iraqia University at some point of the educational year 2019–2020 and after 6 months of pandemic attack of “Covid-19”. Our college students had been contacted electronically via this method, and the questionnaires had been stuffed and return to us except extend on line with the aid of the usage of Google sorts and documents had been gathered by way of sheet sorts immediately.

In this article, one of the questions was about the first choice of the student that he prefers whether medicine or dentistry, the first question asked for students’ demographic data, age, sex. (GHQ-12) represent the questionnaires which was delivered to the students (General Heath Questioner) and the administration had been well-known by means of the dean’s place of business of our dental college.

In the beginning it was explained to the students the aim of this study, and they realized that participation was voluntary, nameless, and with illustrative pictures. Not more than 10 minutes was required to fill these questioners, students at virtual classes were all invited to participate. It was all in English Language. This questioner will measure psychological distress (25). In number of studies its reliability and validity have been proven (26). An enlarge in psychological distress as evaluated from first- to fifth-year university college students (27).

It is a twelve-item questionnaire, with 5 solutions to each question. The man or woman is requested to think about the ultimate two months in answering the questions. “Have you felt constantly under stress?” and “Have you been losing confidence in yourself?” are Examples of these questions. The present solutions are no greater than usual. The scoring strategies have been used for the (GHQ-12), yielding a specific (high vs. low stress) result variable.

The (GHQ-12) was first scored using the 1-5 scoring method as in the investigation by Guthrie et al (28). A rating of 1 means two low stress objects and a rating of 5 means two excessive stress objects from the 5 feasible solutions. The whole for the twelve questions was once then calculated when the scoring technique is used. It has a clear crossing factor of extra than three, and individuals who were more than score 3, are considered to have an evidence of psychological stress. The crossing element of increased than three used to be arrived at with the useful resource of Guthrie et al (29).

We reached a whole score by scoring the responses and summing it. The imply rating for the questioner was once then calculated.

Results

This descriptive study had been applied in Al-Iraqia University of dentistry with about 305 college students from university had been participated in this on-line types questioners to give an explanation for the relation between the stress occurs during education with of undergraduate student in the duration of “Covid-19” pandemic (Table 2).

Frequency distribution means, and standard deviation had been calculated for the (GHQ-12). The arrangement of the questionnaires depends on (Cronbach’s alpha). Chi square test of independence had been utilized to test the association between demographic and questions asked. P-value < 0.05 considered statistically significant.

This table describes the stress and the variation of it according to the gender male and female (table1).

<table>
<thead>
<tr>
<th>Stress * Gender Crosstabulation</th>
<th>Gender</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>Stress</td>
<td>Count</td>
<td>Count</td>
</tr>
<tr>
<td>No stress</td>
<td>60</td>
<td>81</td>
</tr>
<tr>
<td>% within Gender</td>
<td>61.2%</td>
<td>39.1%</td>
</tr>
<tr>
<td>Stress</td>
<td>38</td>
<td>126</td>
</tr>
<tr>
<td>% within Gender</td>
<td>38.8%</td>
<td>60.9%</td>
</tr>
<tr>
<td>Total</td>
<td>98</td>
<td>207</td>
</tr>
<tr>
<td>% within Gender</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Table 1: The frequency and percentage of stress according to the student gender.
This table shows the stages, frequency and percentage of the college students had been take parts in the questioners (table 2).

**Table 2: Stages, frequency and percentage of the college students had been take parts in the questioners**

<table>
<thead>
<tr>
<th>Class stage</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>68</td>
<td>22.3</td>
</tr>
<tr>
<td>2nd</td>
<td>56</td>
<td>18.4</td>
</tr>
<tr>
<td>3rd</td>
<td>57</td>
<td>18.7</td>
</tr>
<tr>
<td>4th</td>
<td>66</td>
<td>21.6</td>
</tr>
<tr>
<td>5th</td>
<td>58</td>
<td>19.0</td>
</tr>
<tr>
<td>Total</td>
<td>305</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Chi square test had been applied in this research to explain the different education stages of the college under stress at the “Covid-19” pandemic (Table 3).

**Table 3: Chi square test which represent the student with different education stages under stress.**

<table>
<thead>
<tr>
<th>Stage (Class)</th>
<th>Students are under stress</th>
<th>Very low</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
<th>Very high</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N %</td>
<td>n %</td>
<td>n %</td>
<td>n %</td>
<td>n %</td>
<td>n %</td>
<td>n %</td>
</tr>
<tr>
<td>1st</td>
<td>0.00%</td>
<td>1</td>
<td>4.30%</td>
<td>12</td>
<td>15.20%</td>
<td>18</td>
<td>29.50%</td>
</tr>
<tr>
<td>2nd</td>
<td>52.60%</td>
<td>10</td>
<td>47.60%</td>
<td>12</td>
<td>47.60%</td>
<td>8</td>
<td>11.50%</td>
</tr>
<tr>
<td>3rd</td>
<td>52.60%</td>
<td>10</td>
<td>52.60%</td>
<td>29</td>
<td>52.60%</td>
<td>9</td>
<td>14.80%</td>
</tr>
<tr>
<td>4th</td>
<td>31.60%</td>
<td>6</td>
<td>31.60%</td>
<td>6</td>
<td>31.60%</td>
<td>16</td>
<td>26.20%</td>
</tr>
<tr>
<td>5th</td>
<td>0</td>
<td>3</td>
<td>4.80%</td>
<td>8</td>
<td>10.10%</td>
<td>11</td>
<td>18.00%</td>
</tr>
<tr>
<td>Total</td>
<td>100.00%</td>
<td>23</td>
<td>100.00%</td>
<td>79</td>
<td>100.00%</td>
<td>61</td>
<td>100.00%</td>
</tr>
</tbody>
</table>

Chi square test P- value 0.001 ***

**Discussion**

This descriptive research had been done in the 1st peak of “Covid -19” with undergraduate dental students from Al-Iraqia University, this research has been taken apart with different 5 stages to explain the level of stress which effect the undergraduate students at the period of the pandemic.

This research have been done with the aid of Google forms and then these forms had been sent to the students by an email due to the spread of viral infection and to reduce face to face contact so depend on social media in filling the questioners via all participated undergraduate students30, these questioners had been answered by a 305 undergraduate students whom seems to be at different stages 98 students were male in the collage and 207 were female, and the result indicated that the female greater stressed than male 60.9% during this period of the infection (figure 1) the variation of the study may additionally be associated to the truth that female had been more in all likelihood than male in responding to emotional stress31.

The effect of this investigation had been confirmed that the peak of stress level which was measured via Chi square test used to be related to the first year 22.3% (fig 3) whilst the lowest level of stress value used to be related to the second year 18.4%, in the meantime the third year stress level represent 18.7% and the fourth year stress level in about 21% whilst the fifth year which consider the last year for undergraduate student in dentistry collage were 19% .Several studies indicated agreement with this research which had been discovered that the first year student had been regarded the highest level of stress for which may additionally be related to the young age of this stage which had been extremely great relation with the emotional exhaustion 32,33, moreover the first
year students might also observed the new study topics vary from the secondary school studies topics, course clinical necessities, full schedule and lack of time for interest or leisure all of these reasons would possibly be lead to elevate the level of stress on first year students.34

This study had been located that the other highly level of stress had been observed at the fourth stage, whilst the second and the third stage had been sort of steady. The high level of stress at fourth stage might also be due to the transition from preclinical stages to clinical stages and the close contact to actual patient instead of manikin as in the previous stages.35,36

the Variations between stages in the level of stress can also moreover affected with the unique education method of the lecturers and the new approach they have been observed in talk about the concern with the student and the approach they relay to reduce the confusion and stress on the student.37

Whilst, the result of this study had been indicated disagreement with Gorter et al which found that the Fifth year students had been relatively high stress level when compared with first year and this may also be explained to that the dental education at the final level had been focused on the clinical works extra more than the other educational years.38

Conclusion

As a result of this study, there is a strong relationship between stresses during dental study (online) and “Covid-19”, also this stress differs from stage to stage, ranging from high stress at 1st stage to lowest at 2nd stage.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

Conflict of Interest: Non

Funding: Self-funding

References


Recent Root Canal Instruments and Techniques: A Review

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Abstract

In this article the properties and advantages of NITI alloy were presented with the development of new types of endodontic files and instrumentation techniques. Each new one was designed to solve disadvantages present in older one. NITI files always considered suitable for negotiation of curved canals, this automatically will reduce any possibility of some problems like transportation, ledge formation and zipping within the canal. Cleaning and shaping of the root canal space is the most important to create a sterile area, organisms free. In order to reach this goal (sufficient information of current development of instruments and instrumentation techniques is needed). With the new versions which are rapidly becoming available, the Dentist may find it a little bit difficult to choose the most suitable file and technique for an individual case. Practitioners must always keep in mind that benefits and weaknesses is present in most file systems. In other hand clinical experience, usage safety, handling properties and outcomes of the case, should decide a particular design fate.

Conclusion: Endodontic treatment files and techniques are very rapidly developed and this is the most important point, since each new design or technique will supply advantages which improve the endodontic treatment work and prognosis.

Keywords: NITI, instrumentation technique, health; canal; roots.

Introduction

IN the 19th and early part of the 20th century, hand Instruments were the only choice. The first endodontic (handpiece) for automated root canal preparation was developed in 1889 by William Rollins. This automated handpiece used full rotation and to lessen instrument breakage, the rotational speed was limited to 100 rpm. The next improvement appeared in 1928 when the Austrian company W & H (Burmoos, Austria) brought out the —Cursor filing contra-angle. This handpiece used a combined rotational and vertical motion of the file. Eventually, endodontic handpieces became popular in Europe with the marketing of the Racer handpiece (W & H) in 1958 and the Giromatic (Micro-Mega) in 1964. The Racer handpiece worked with a vertical motion, the Giromatic with an equal reciprocal 90° rotation

In the 1980s, sonic and ultrasonic hand pieces were introduced to the dental marketplace and are still being used in various degrees today. The late 1980s to the early 1990s saw the introduction of the first rotary Ni-Ti files and corresponding hand pieces to drive them.

Generally, Ni–Ti instruments have:

1. Effective cleaning ability.
2. Can preserve the root canal anatomy (shape).

To prevent the breakage that may happen to the rotary instruments due to fatigue and appropriate speeds, continuous pecking motion in most canals is recommended

Techniques using stainless steel hand file always require:

1. Numerous files.
4. Limited flexibility ➔ canal transportation
5. Permanent plastic deformation (file breakage).
Properties of (NiTi) files:
- Flexibility, shape memory
- Also have a low modulus of elasticity (about 1/4 to 1/5 that of stainless steel files),
- Higher strength.

NiTi files always considered suitable for negotiating curved canals and reduce the risk of transportation, zipping and ledge formation within the canal\(^3\). High incidence of unexpected failure of rotary nickel–titanium instruments during use represents some limitations. These instruments frequently may fracture and may be lodged in narrow and canals with apical curvature\(^4,5\). Nowadays, greatest numbers of commercially available Ni-Ti files utilized to shape root canals are driven in a continuous rotation. Any repetitive back-and-forth motion can be defined as reciprocation which used with stainless steel files in the past. From inception, most hand pieces used equal to 90° reciprocation both clockwise and counterclockwise. Throughout time, most reciprocating systems have reduced the envelope of motion to 30° arcs of reciprocation. Now a days, the M4, Endo-Eze AET and the Endo-Express use small, equal, 30° angles of clockwise and counterclockwise reciprocation\(^1\).

Metallurgy of rotary instruments:

Nickel-titanium alloy:
1. Corrosion resistance is high,
2. Super elasticity,
3. Shape memory. This is because of the arrangement of the atoms in steel can move against each other by a small specific amount before the occurrence of plastic deformation\(^6\).

Electro polishing: The purpose of this process is to reduce irregularities in the file surfaces such as flash and milling marks, this also improve properties of the material, specifically fatigue and corrosion resistance. The resulting instruments appear to have better cutting efficiency and corrosion resistance. Changes in the alloy material have been introduced in order to make it with more resistance to cyclic fatigue. In manufacturing endodontic instruments the alloy:

1. Composed of 56 % (wt.) nickel, 44 % (wt.) titanium and is generically known as 55-Nitinol\(^7\).
2. In addition to the fact that it possesses higher amount of flexibility and highly resistant to fracture\(^8\).
3. NiTi has inherent ability of shape memory (SM) and superelasticity (SE) also called pseudoelasticity, (PE); the transition between the —austenitic and —martensitic phases in the NiTi alloy is a function of temperature and stress\(^7\).

Super elasticity (SE): The austenitic phase transforms into the martensitic phase when subjected to stress.

Shape memory (SM): The shape-memory undergo transformation when cooled from the high temperature (austenite) to the low temperature (martensitic)\(^9\).

Blue treatment: "Vortex Blue and ProTaper Gold rotary files"; are new modalities of instruments they can undergo a complex heating-cooling property treatment.
that results in the formation of a visible titanium oxide layer in the surface of the instrument which keep a shape memory alloy by controlling transition temperatures (10).

Glide path: The root canal system should first be explored with a small, pre-curved stainless steel files then enlarged by a larger hand files so we get glide path before introducing the first crown-down rotary instrument. PathFile Root Canal Drills, G-FilesTM, ScoutRace files are examples of new rotary systems used specially in severely curved canals to get the glide path (11).

Path FileTM: In order to create a glide path rapidly and safely this new rotary instrument was designed. It comes in 3 sizes and made up of NiTi alloy with a very slight taper of .02 so it can resist the cyclic fatigue (12).

Scout Race: To mechanically prepare root canals that are with sever curvature this new design appeared with3 different lengths. They have rounded safety tips to guide and cutting edges to eliminate screwing (12).

ProTaper Universal: ProTaper rotary instruments have been shown to create more regular canal diameters when compared with FlexMaster, HERO and 25 Race file systems. They have a continues ability to change helical angle and pitch over the cutting area that will prevent it from being screwed through the root canal space.

ProTaper Gold: Have the identical geometry of PTU instruments but are manufactured from a proprietary heat treated NiTi alloy. It still produces the same PTU shapes, but they are considered to be with better safety and actually better. The shapes will be more precisely replicate the original root canal system flow. The gold technology will provide better canal shapes, safer and greater efficiency.

Retreatment with ProTaper: ProTaper D1 - for coronal filling removal, ProTaper D2 - for middle filling removal, ProTaper D3 - for apical filling removal. By using very slight apical pressure during file penetration within the canal also withdraw the file frequently, inspection done for the file then cleaning from the debris, we can use a hand file to overcome if there is any resistance and confirm the canal permeability.

ProTaper NEXT: It comes as 5 instruments but mostly we can prepare by the first two. The Protaper Next X1, the Protaper Next X2 which can be considered as the first finishing instrument for optimal irrigation and root canal obturation. Protaper Next X3,Protaper Next X4 and the Protaper Next X5 .Those will be used to create tapering in the root canal or to prepare wide and large root canal systems (13).

---

**Figure 2: PROTAPER NEXT, complete system with five instruments.**
This system has several properties which include flexibility, safety and because of its bilateral symmetrical rectangular cross section it will create asymmetric rotary motion\textsuperscript{(13,14)}.

**Twisted Files (TF):** It has a raised flexibility, fracture resistance and slower crack initiation and propagation. Special surface conditioning and twisting is used during the manufacturing process which will lead to increase in the resistance of the instrument to cyclic fatigue and flexibility\textsuperscript{(15)}.

**TF Adaptive:** Most clinical cases will be easy to be treated effectively and safely by the selfiles. This file when it is used without stress it can allow better cutting efficiency and caries removal because it works in a continuous rotation movement. This will allow better brushing or circumferential filing for better debris removal in oval canals and reducing the tendency of screwing that minimizes errors that is commonly seen with other NiTi instruments of great taper and used in continuous rotation. The angles depending on the anatomical variations and intracanal stresses forced on the instrument so they vary according to these. Therefore there is reduction in the risk of intracanal failure but not affecting performance of the work\textsuperscript{(16)}.

**Hyflex CM and Hyflex EDM:**

This new instrument has: Improved flexibility, resistance to cyclic fatigue and good adaptation to the canal space anatomy reducing the risk of ledging, transportation, or perforation. This file appears to regain its shape after sterilization and can be reused, if not returned back to their original shape then they should be discarded\textsuperscript{(9)}.

**Reciproc:** These files are currently designed to allow root canal preparation without glidepath preparation, not like above mentioned systems. In order not to get root canal straightening, preparation faults and preparation time mechanical root canal preparation systems are better compared to hand instrumentation. This system is very comfortable to the dentist and the patient. Reciproc system also includes three instruments (R25, R40 and R50) and is driven by the VDW Silver Reciproc Motor (VDW) or the X-Smart Plus motor (Dentsply/Maillefer). When it rotates in the cutting direction it will advance and engage dentine to cut it before the instrument will rotate in the opposite direction to ensure disengagement\textsuperscript{(17)}.

**Reciproc Blue:** It is a single instrument required to prepare a root canal. Simple, but effective, it has enhanced safety in root canal preparation and retreatment for patients. Made from Nickel- Titanium (NiTi) undergoes innovative heat treatment, increased resistance to cyclic fatigue and additional flexibility and blue color. It provides more effective irrigation and obturation. This instrument designed specifically to be used in reciprocation. It has better properties because of specific s-shaped cross-section, the taper, the cutting angles and the thermally improved raw material.

![Figure 3: Reciproc blue, This instrument designed specifically to be used in reciprocation.](image-url)
One Shape: It is also a single file instrument which made of austenite NiTi alloy. Tip size of 25 and a constant taper of 0.06, it have different cross sectional designs over the length of the working part. It has a very good advantage of faster treatment than conventional techniques.

2Shape: It has:
1. Better cyclic fatigue resistance.
2. Better and more flexibility.
3. We insert the rotating instrument into the canal until feel resistance.
4. When the file is removed from the canal, it must be cleaned by cleaning the grooves and do irrigation through the canal, after that continuous progressive downward movement.
5. To reach the working length two to three cycles are usually sufficient. This file is suitable for about all different treatments.

Self Adjusting File (SAF): It adapts itself to the three dimensional anatomy of root canals will lead to removal of dentin uniformly, remaining wall thickness and prevention of canal transportation (18).

Properties:(19,20):
• This file has the ability to be Adapted to the root canal with three Dimensional Anatomy.
• Uniform thickness of Dentin and Remaining Wall Thickness can be removed.
• Canal Transportation prevention.
• Durable
• Irrigate the canal with Sodium Hypochlorite in continuous manner.
• In the Apical Part of the Canal Removal of the Smear Layer.

Wave One: It is a single-file system to shape the root canal completely from start to finish. One hand file only required in this technique followed by one single Wave one file to shape the canal completely. In fine canals the Wave One Small file is used. These files are designed in a manner so it works with a reverse cutting action (21).

How we can select the suitable file?:
1. We Use Wave One Small file, If size 10 K-file is very resistant to movement.
2. We use Wave One Primary file, if size 10 K-file moves to length easily loosely.
3. We use Wave One Large file, if size 20 hand file or larger goes to length.

WaveOne GOLD: The ground NiTi files are heat-treated and slowly cooled and this has a positive effect on the instrument properties and gives the file its distinctive gold finish, improves its strength and flexibility far in excess of its predecessor.

The followings have been shown:
1. Cyclic fatigue resistance of this type of files 50% greater than Wave One Primary.
2. The flexibility of this type of files Primary is 80% greater than that of Wave One Primary.

This single-file reciprocating system has four tip sizes Small, Primary, Medium and Large, in lengths of 21, 25 and 31mm lengths. Preparation of the canal is ideal for the irrigant exchange and removal of debris. A design feature present in this file result in a reciprocating movement that is very smooth, eliminating the need to push on the file promotes safety and improves cutting efficiency (21).

Gentile file: This file is made from SS. The single-use files, It enlarge the canal walls by gently scraping the dentinal walls since that it has a rough surface after undergoing particle blasting. They are operated by a special fully automated handpiece at a maximum speed of 6500 rpm. The GF system consists of files, an orifice opener 18 mm long and 5 preparation files 25 mm long. canals should be prepared by using 2 to 3 files According to manufacturer’s instructions. This will allow the dentist to choose the most appropriate file combination according to the canal anatomy (22) single file rotary and reciprocating systems also ensure ease of use and reduced preparation time (23).

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

Conflict of Interest: Non

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References


Detection Antibodies IgM, IgG and Determination Levels of IL-33 in Iraqi Diabetic Type 2 Patients Infected with Toxoplasma Gondii

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Abstract

Toxoplasma gondii is an obligate intracellular protozoan that causes a disease called toxoplasmosis which has the capability to pass its both life cycle parts asexual and sexual in the final host (cats) and also through intermediate vertebrate hosts including humans. Diabetes mellitus is a metabolic disorder that there is high blood sugar level over a prolonged period. This research included one hundred and twenty blood samples that collected from diabetic patients after diagnosing them by endocrinologist at the Imamene Kadhimein Medical City during August until the end of December 2016 with age ranging 12-76 years with mean 50.9 ± 13.8. Toxoplasmosis diagnoses was occurred by using Toxo IgG and IgM antibodies immulite torch assay while diabetes diagnosis by fasting blood sugar tests also measuring level of IL-33 in samples was done by sandwich ELISA method that showed a group of diabetic patients infected with toxoplasmosis have the highest level of IL-33. The results showed that a group of diabetic patients have the highest level of glucose in diabetes test (188.31 pg/ml) while a group of diabetic patients infected with toxoplasmosis have the highest level of IgG (106.17 IU/ml) while all samples have seronegative results for Toxo IgM also the highest level of IL-33 showed in a group of diabetic patients infected with toxoplasmosis (858.84 pg/ml) while a group of diabetic patients not infected with toxoplasmosis have (556.67 pg/ml) and control group have (315.58 pg/ml).

Keywords: Toxoplasma gondii, IgM, IgG, Diabetes mellitus type 2, IL-33.

Introduction

Toxoplasma gondii is an obligate intracellular protozoan that causes a disease called toxoplasmosis. It has the ability to pass both asexual and sexual parts of it life cycle in feline (cat) as the final host, and a wide spectrum of warm-blooded vertebrate hosts including humans as intermediate hosts. It is a zoonotic disease according to T. gondii is one of the most common parasites of animals. T. gondii passes through three shapes: tachyzoites responsible for active infection, bradyzoites found in tissue cysts and sporozoites found in environmentally resistant oocysts formed after the sexual part of the life cycle.

Diabetes Mellitus (DM), commonly referred to as diabetes, is a group of metabolic disorders in which there are high blood sugar levels over a prolonged period. Type 2 is representing about 90% of all cases of the disease; it is characterized by the coexistence of insulin deficiency and the peripheral effects of the hormone.

Diabetic patients are more amenability to infect with T. gondii due to their low level immune response, toxoplasmosis and diabetes may pave the way to each

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other; the occurrence of necrotic lesions in the pancreas of the experimental animals infected with *T. gondii* may indicate that toxoplasmosis paves the way to diabetes as the involvement of the pancreas can lead to the inhibition of insulin secretion and consequently the establishment of diabetes (7).

**The object of this research as the following:**

1. Determine levels of glucose by using FBS test.
2. Detection antibodies IgM and IgG of *T. gondii* infection.
3. Determine levels of interleukin-33 in Iraqi diabetic type 2 patients infected and control uninfected individuals in order to understand the relationship between these diseases.

**Materials and Method**

**Selection of Patients:** This research included one hundred and twenty blood samples collected from diabetic patients after diagnosed by endocrinologist at the Imam Kadhimein Medical City during August until the end of December 2016 with age ranging 12-76 years with mean 50.9 ± 13.8. Six milliliter of venous blood was gathered by using 10 ml disposable syringe. These samples were immediately carried to gel tube and left to clot at room temperature (20-25°C) for 15 – 20 minutes, after cloting it was centrifuged at 2500 to 3000 rpm for 10 min period to separate serum that used for fast blood sugar diagnoses (Glucose MR, Linear, Spain) then immulite torch assay used for *T.gondii* diagnosis (Flex reagent cartridge IgG, Siemens, Germany) while the remaining serum distributed in tightly closed eppendrof tubes by micropipette, each eppendrof included (0.25 ml) and then the tubes were stored at -20°C until used. For detection cytokines levels by Sandwich ELISA method, one hundred diabetic samples used and divided as: a group of 50 samples of diabetic patients infected with toxoplasmosis and a group of 50 samples of diabetic patients only as well as a group of 25 samples of healthy individuals selected as control.

**Sandwich ELISA method:** Sandwich ELISA technique enzyme immunoassay used for measuring the levels of interleukin-33 by using the manufacturer directives as provide with the kit from peprotech, USA.

**Statistical Analysis:** Chi-square test was used to analyze the results, also least significant difference (LSD) test used for significant compare. Statistical significant that used for this study was a P-value < 0.05.

**Results and Discussion**

*T. gondii* can infect and grow in any nucleated host cells which leading to the production of various inflammatory markers by the innate acute inflammatory responses and antigen-specific adaptive immunity which facilitates a state of chronic inflammation at various anatomical sites in the host (8). In a meta-analysis of studies on the relation between chronic toxoplasmosis and diabetes mellitus, researchers found that chronic toxoplasmosis was a possible risk factor for type 2 diabetes mellitus (9).

Table (1) showed that a group of diabetic patients only has the highest level of fasting blood sugar as compared with other groups with highly significant differences.

<table>
<thead>
<tr>
<th>Groups</th>
<th>No.</th>
<th>Mean Pg/ml</th>
<th>Std. Dev.</th>
<th>Std. Error</th>
<th>Lower Value</th>
<th>Upper Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetic patients infected with toxoplasmosis</td>
<td>50</td>
<td>155.42</td>
<td>51.84</td>
<td>7.33</td>
<td>121</td>
<td>363</td>
</tr>
<tr>
<td>Diabetic patients</td>
<td>70</td>
<td>188.31</td>
<td>72.12</td>
<td>8.55</td>
<td>134</td>
<td>289.6</td>
</tr>
<tr>
<td>Control</td>
<td>50</td>
<td>111.41</td>
<td>10.48</td>
<td>1.94</td>
<td>75</td>
<td>110</td>
</tr>
<tr>
<td>LSD-Value</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24.617**</td>
<td></td>
</tr>
<tr>
<td>P-Value</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.0001</td>
<td></td>
</tr>
</tbody>
</table>

The shown results similar to results of Modrek et al. (10) results that investigate of IgG and IgM in 205 serum samples of diabetics in Ali Asghar Hospital in Zahedan (southeastern Iran) with age (13 – 60) years that found 131 diabetic patients had fasting blood sugar levels between 121-300 mg/dL that 79 diabetics
have anti-\textit{Toxoplasma} IgG (63.2%) and 52 diabetics have anti-\textit{Toxoplasma} IgM (71.3%) with significant differences (P < 0.05).

Several experimental evidences have been evaluated and suggested as plausible pathophysiological mechanisms to explain this relation, including:

1. Infected white blood cells assimilate improved migratory feature, causing the easier distribution of \textit{Toxoplasma} in body organs, such pancreas\textsuperscript{(11)}.

2. A clinically visible autoimmune procedure could be ignited by \textit{Toxoplasma} infection, trending immune machinery across auto antibody production, for example against Langerhans islets cells\textsuperscript{(12)}.

3. A probability, is that \textit{T.gondii} itself may attack and destroy pancreatic cells directly, initiating pancreatitis and more importantly, diabetes\textsuperscript{(11)}.

4. Creation of reactive oxygen species (ROS) and nitric oxide (NO) is stimulated by diabetes, and these agents, as stimulant for intracellular pathogens, can reactivate latent, cysts of parasites, over starting acute infection\textsuperscript{(12)}.

5. Given the incapability of neutrophils to correctly achieve phagocytosis and intracellular killing in progressive stage of diabetes, there may be raise in responsiveness to intracellular pathogens like \textit{Candida} and \textit{Toxoplasma}\textsuperscript{(13)}.

6. The opsonization activity and leukocyte cytotoxicity of diabetic patients need for removal of pathogens are extensively subsided; therefore they would be more prone for opportunistic infections\textsuperscript{(13)}.

While table (2) revealed that all samples of research have seronegative for anti-\textit{Toxoplasma} IgM with highly significant differences as well as showed that 50 samples of diabetes have seropositive for anti-\textit{Toxoplasma} IgG and 70 samples have seronegative for IgG Abs in addition, a group of diabetic patients infected with toxoplasmosis has highest levels of IgG Abs that compared with other groups with highly significant differences as clarified in table (3).

\begin{table}
\centering
\caption{Distribution of \textit{T. gondii} infection according to Toxo IgM & IgG in studied groups.}
\begin{tabular}{|c|c|c|c|c|}
\hline
Diagnosis & Toxoplasmosis IgM/IgG & Diabetic Patients & Control & P-Value Sig. (*) \\
\hline
 & No. & % & No. & % & \\
\hline
Flex reagent cartridge IgM & + ve & 0 & 0.00 & 0 & 0.00 & 1.00 \\
 & - ve & 120 & 100 & 50 & 100 & \\
Total & 120 & 50 & & & & \\
Flex reagent cartridge IgG & + ve & 50 & 41.67 & 0 & 0.00 & 0.01 \\
 & - ve & 70 & 58.33 & 50 & 100 & \\
Total & 120 & 50 & & & & \\
\hline
\end{tabular}
\end{table}

\begin{table}
\centering
\caption{Levels of Toxo IgM & IgG (IU/ml) in studied groups with statistical description.}
\begin{tabular}{|c|c|c|c|c|c|c|}
\hline
Diagnosis & Groups & No. & Mean IU/ml & Std. Dev. & Std. Error & Lower Value & Upper Value \\
\hline
Toxoplasmosis IgM & Diabetic patients infected with toxoplasmosis & 50 & 0.386 & 0.21 & 0.03 & 0.1 & 0.8 \\
 & Diabetic patients & 70 & 0.366 & 0.16 & 0.02 & 0.1 & 0.8 \\
 & Control & 50 & 0.437 & 0.17 & 0.03 & 0.2 & 0.8 \\
LSD-Value & & & & & & 15.371** \\
P-Value & & & & & & 0.0001 \\
\hline
\end{tabular}
\end{table}
Lately, the immulite 2000 torch assay measure Toxo IgM and IgG in International Units per milliliter (IU/ml) of serum; this assay is simple, rapid and comparatively inexpensive needful 60–90 minutes for completion (14).

The previous results of IgM and IgG Abs matched with the research of El-Awady et al. (14) that include seroprevalence of toxoplasmosis in 110 diabetic pregnant women and 110 non diabetic pregnant women which found 47 (42.7%) of diabetic pregnant women were seropositive for anti-Toxoplasma IgG and 3 (2.7%) seropositive for IgM Ab as well as 24 (21.81%) of healthy non diabetic pregnant women were seropositive for IgG Ab and seronegative for IgM Ab. Although matched with results of Shirbazou et al. (15) that clarified the prevalence of IgG and IgM Abs in diabetic patients were (56.6%) and (2.4%) as well as in control were (22.4%) and (1.6%) respectively, in addition matched with results of Gokce et al. study (16) that include serologic detection of anti-Toxoplasma infection in 91 diabetic patients and 93 healthy control which found the prevalence of IgG Ab of T. gondii was 55 (60.43%) while in healthy control was 36 (38.7%).

These returns discovered that the prevalence rate of IgG Ab was directly associated with duration of diabetes because of the weakened immune system of diabetic patients which also proposed that toxoplasmosis patients are more capable to be diabetics than those without. Demolition of the pancreas occurs in three stages of T. gondii:

1. Hyperactive stage (hyper-period) in which β-cell obliteration of nerve cells and less interference in the insect in a hyperactive state of the pancreas, sometimes insulin secretion is excessive, frequently resulting in low or a too low blood sugar, this stage is often occurs during adolescence.

2. Disordered stage (compensatory stage), in which neurons and pancreatic β-cells have a great amount of damage, under normal conditions, insulin secretion will be insufficient, the body will begin the compensative function. So, when few in the disordered state, this stage of insulin secretion over time.

3. Decline stage (recession), in which nerve cells and β-cells destruction of more compensatory function reach to its limits (11).

The results of table (4) referred to serum levels of IL-33 in studied groups and explained that a group of diabetic patients infected with toxoplasmosis only has the highest level of IL-33 in comparison with other groups although significant differences showed in these results.

### Table 4. Concentrations of IL-33 (pg/ml) in sera of studied groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>No.</th>
<th>Mean IU/ml</th>
<th>Std. Dev.</th>
<th>Std. Error</th>
<th>Lower Value</th>
<th>Upper Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetic patients infected with toxoplasmosis</td>
<td>50</td>
<td>858.84</td>
<td>389.13</td>
<td>196.45</td>
<td>6.17</td>
<td>4553.6</td>
</tr>
<tr>
<td>Diabetic patients</td>
<td>50</td>
<td>556.67</td>
<td>112.75</td>
<td>248.82</td>
<td>24.25</td>
<td>2685.98</td>
</tr>
<tr>
<td>Control</td>
<td>25</td>
<td>315.58</td>
<td>61.80</td>
<td>58.54</td>
<td>152.69</td>
<td>821.24</td>
</tr>
</tbody>
</table>

  | LSD-Value | 358.55* |
  | P-Value   | 0.0464  |

Normal range: 32 – 4000
Table 5. Comparisons of IL-33 levels (pg/ml) estimated in sera of studied groups.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Mean Diff.</th>
<th>P-Value</th>
<th>Sig. (*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IL – 33 Concentration (Pg/ml)</td>
<td>Diabetes patients with toxoplasmosis</td>
<td>Diabetes patients</td>
<td>302.17</td>
<td>0.091</td>
<td>NS</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>Control</td>
<td>543.26</td>
<td>0.0336</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>Diabetes patients</td>
<td>Control</td>
<td>241.09</td>
<td>0.2501</td>
<td>NS</td>
</tr>
</tbody>
</table>

Interleukin-33 is a new member of the IL-1 superfamily of cytokines that is expressed by mainly stromal cells, such as epithelial and endothelial cells, and its expression is upregulated following pro-inflammatory stimulation\(^{(17)}\). It functions both as a traditional cytokine and as a nuclear factor regulating gene transcription. It increases concentration in serum of toxoplasmosis (IgG) patients due to interleukins that regulate information transfer among different types of leukocytes during various stages of immune or inflammatory response\(^{(18)}\). This is assured by increase IgG, IgA and IgM, this return may indicate that autoimmune disease like toxoplasmosis might influence cytokine production in toxoplamosis patients\(^{(19)}\). The reduction in IL-33 levels in diabetic patients may due to the protective effect of IL-33 by reducing adiposity and improving glucose tolerance and insulin resistance, this interleukin strongly induces Th2 cytokine production from these cells and can promote the pathogenesis of Th2 related disease such as asthma, atopic dermatitis and anaphylaxis\(^{(18)}\). However, IL-33 has shown various protective effects in cardiovascular diseases such as atherosclerosis, obesity, diabetes type 2 and cardiac remodeling. Thus, the effects of IL-33 are either pro- or anti-inflammatory depending on the disease and the model\(^{(19)}\).

**Conclusion**

This research has reached to the following conclusions:

1. Fifty samples of this research are diabetic patients type 2 infected with toxoplasmosis, this illustrate the relationship between diabetes and *T. gondii* which relates to depression of immune response of type 2 diabetic patients, that make them more susceptible to toxoplasmosis infection.
2. Diabetic type 2 patients infected with toxoplasmosis have the highest level of glucose in their blood as FBS test clarified.
3. Some of Diabetic type 2 patients infected have chronic toxoplasmosis infection (IgG antibodies appeared) while there is no appearance for acute toxoplasmosis (IgM antibodies).
4. Levels of IL-33 rise in diabetic type 2 patients infected with chronic toxoplasmosis.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

**Conflict of Interest:** Non

**Funding:** Self-funding

**References**


In Vivo Genotoxicity Assessment of Gold Nanoparticles of Different Doses by Comet Assays

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Abstract

Gold nanoparticles were synthesis by green method using the soaked orange peels (citrus Sinensis) as reducing and stabilizing agent. The gold nanoparticles were diagnosed using the approved method, including the transmission electron microscope and the visible UV spectroscopy. Thus, the results of the diagnosis showed the formation of spherical particles with a size of 36 nanometers. Their biological effects on the bone marrow cells of albino mice were studied.

Male albino mice were used in this study and randomly divided into seven groups. The first group was the control group injected with the physiological solution (Normal Saline) and the other six groups were injected with different doses of the solution of the gold nanoparticles (1, 2, 4, 6, 8 and 10) Mg/kg. The effect of gold nanoparticles on the DNA damage by bone marrow cells was studied using comet assay according to the following criteria:

(DNA in Head%, Comet Length, Tail Length, DNA in Tail%, Olive Moment), the results showed a significant decrease (P≤0.01) in the rate of DNA in Head%, while it showed a significant increase in Comet Length, Tail Length, DNA in Tail%, Olive Moment compared to the control group and all Doses studied. The effect of gold nanoparticles was directly proportional to the increase in the studied doses. The dose was 10 mg/kg, which was the highest toxicity, followed by the dose of 8 mg/kg, then the rest of the doses was descending.

Keywords: Gold nanoparticles, Comet assay, Orange peel, toxicity.

Introduction

Nano molecules have been designed and widely used in various technologies. Nanoparticles are generally defined as molecules sized range between 1-100 nanometers. It is believed to be within this size. They gain unique characteristics that differ from their properties when they are the largest size. (1) The evaluation of the cellular toxicity for gold nanoparticles is very important because it has a potential impact on DNA damage. This can lead to cancer and mutations in the long-term.

(2) The comet assay or single cell gel electrophoresis (SCGE) assay assesses the DNA damage resulting from the breakage of one or two double strand. Besides, this shows increasing DNA migration in the electric field. The method has become one of the standard method for assessing the DNA damage of cells (3). It is preferable to use gold nanoparticles in the medical field because these molecules have unique properties that distinguish them from other minerals, including high biological compatibility with cells and living tissues (4), the affluence of attachment to biomolecules such as polyethylene sugars that have wide medical applications, groups of carboxyl, amine, DNA, RNA, antibodies, Peptides and others (5) and chemical stability (6) have the ability to form geometries (7).

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Gold nanoparticles may cause stimulation for the immune system due to their size close to the size of proteins and even the sizes of viruses \(^{(8)}\). There is little information about the inflammatory properties of gold nanoparticles and their role as antibodies. Some studies have shown that nanoparticles of gold nanoparticles can accumulate in the reticuloendothelial system of the liver and spleen, causing thus poisoning them. \(^{(9)}\)

**Materials and Method**

- **Synthesis of gold nanoparticles:** Gold nanoparticles synthesis in an environmentally friendly green method by soaking the orange peels as a reducing agent and stabilizer\(^{(10)}\). The gold nanoparticles produced using the visible UV spectroscopy\(^{(11)}\) and the transmission electron microscope\(^{(12)}\) were described.

- **Determination of Lethal Dose LD50:** The median lethal dose was determined in male albino mice using the Dixon method\(^{(13)}\).

- **The effect of gold nanoparticles on the DNA damage by bone marrow cells:** Depending on Allen’s method\(^{(14)}\), 6 different doses of the solution of gold nanoparticles (1, 2, 4, 6, 8, and 10) were prepared mg/kg in a volume of 0.3 ml and injected under the peritoneum of the mice of the studied groups by 3 mice per group. As well as, the control group was injected with a volume of 0.3 ml of normal Saline. After 18 hours, the groups studied were injected with a solution of cholchicine (prepared at a concentration of 1 mg/ml) with a volume of 0.3 ml. After 2 hours, the mice were drugged with chlorofum and then dissected to obtain bone marrow from the femur. To determine the effect of gold nanoparticles synthesized according to the present study on the level of the genetic material of the cell, tests were conducted of the effect of gold nanoparticle on the DNA damage of bone marrow cells using Comet assay via the following criteria (DNA in Head%, Comet Length, Tail Length, DNA in Tail%, Olive Moment. The results were extracted based on the comet score program. In addition, this test was performed according to the method followed by\(^{(15)}\).

**Results and Discussions**

**Characterization of produced gold nanoparticles:**

The first way to describe the biosynthesis of gold nanoparticles was to measure ultraviolet light spectrum. After 12 hours of manufacture, the color of the solution changed from yellow to light pink, then absorbance was measured. Also, a peak appeared at wavelength (533 nm) and absorbance (0.710).

The results showed that color change plays an important role in detecting the formation of nanoparticles. This is confirmed by the appearance of the peak in conjunction with absorbance after 12 hours. The peak gave a spectral evidence for the formation of surface plasmon resonance of the golden nanoparticles \(^{(16)}\). This is consistent with \(^{(17)}\) who concluded that the color change of the solution from blue to pink light rosy is evidence of the reduction of gold salts and the formation of gold nanoparticles. This reduction and color change can be attributed to the presence of phytochemicals reduced in the soak plant. This agreed with \(^{(18)}\) who resulted that phyto-chemicals have high ability to rapidly reduce mineral solutions to nanoparticles. Citrus sinensis contains proteins and glucose molecules in addition to vitamin C, which are reducing agents for the manufacture of gold nanoparticles \(^{(19)}\).

Figure (1) shows a picture of the electron microscope for produced gold nanoparticles using soaked orange peels (Citrus Sinensis). The results showed that spherical nanoparticles of 36 nm with no clusters or conglomerations of these particles. Due to the repulsive nature of the reducing agent that enclosed the surface of the gold nanoparticles, they stabilize as well as biomolecules helped to form spherical molecules\(^{(20)}\).
The genotoxic effect in bone marrow of albino mice:

- **DNA in Head%**: The toxic effect of gold particles was directly proportional to the increase in dose in the percentage of DNA head. (Figure 2).

  ![Figure 2. The effect of Goldnanoparticles on DNA in head% in albino mice bone marrow cells.](image)

  Doses 10 and 8 mg/kg showed the highest toxicity effect in the genetic material of bone marrow cells. The ratio of DNA in head (50.48 ±3.04 and 51.87±2.89)% respectively, compared to the control group that reached (84.98±2.02)% . Significant differences (P≤0.01) were found among the different doses, except for doses 1 and 2 mg/kg. While the percentage of head DNA ratio was (2.09 ± 84.55 and 2.31 ± 84.83)% respectively.

- **Comet Length (px)**: The results (Figure 3) showed a significant increase in comet length, and significantly (P≤0.01) was directly proportional to the increase in the dose used. Obviously, the dose of 10 mg/kg showed the longest comet, reaching (95.44 ± 3.92) px compared to the control group (39.82 ±1.69)px.

  ![Figure 3. The effect of Goldnanoparticles on Comet Length (px) in albino mice bone marrow cells.](image)
Then the effect decreased by diminishing the dose (4,6,8) mg/kg at a rate of (78.70 ±1.04) and (73.63±1.84) and (80.96 ± 3.59) px, respectively. A significant difference did not indicate between them (P> 0.01), while it increased significantly for the two doses (1,2) mg/kg and the control group.

For the two doses (1,2) mg/kg, they did not show a significant difference between them, nor did they show a significant difference when compared to the control group at the rate of (39.15±1.09) and (45.57 ± 2.01) px, respectively.

**DNA in Tail %:** Gold nanoparticles caused a toxic effect on bone marrow cells, depending on the DNA in the tail at the (P≤0.01) level compared to the control group. The DNA break increased with a higher concentration (Figure 5). The doses 10 and 8 mg/kg showed the highest DNA percentage in the tail reached (49.52 ±3.04) and (48.12±2.89)%, respectively, compared to the control group (15.17±2.31)%.

**Tail Length:** The results of the Tail Length (figure 4) showed a significant height (P≤0.01) when using high doses 6, 8 and 10 mg/kg. The tail length reached (13.32 ±1.62), (13.78±1.33), (22.20±1.95) px, respectively, compared to a control group of (4.36±1.47)px. The doses 1, 2 and 4 mg/kg did not have a significant effect (P> 0.01) compared to the control group. When comparing the concentrations between them, the results showed that the length of the tail increased with an increase in the doses used.
Olive Moment: The results in Figure (6) showed a significant increase (P≤0.01) for all studied doses compared to the control treatment. The increase in the value of Olive Moment increases with increasing dose value. The dose 10 mg/kg showed the highest toxic effect on the genetic material of marrow cells, as the value of Olive Moment (11.19±0.91) compared to the control group which reached (4.05±0.52). According to this study, low doses 1, 2 and 4 mg/kg, however, did not show a significant effect compared Control group.
The results of the present study agreed with Olive (15) who studied a modified method to reduce the toxicity of gold nanoparticles for DNA damage by encapsulating these nanoparticles with glucose molecules. This indicates the toxic effect of nanoparticles on the DNA.

According to the results obtained, it was found that gold nanoparticles synthesized by the environmentally friendly biological method using soaked orange peel had a toxic effect on the DNA. It could be directly proportional to the high dose used.

The toxic effect of synthesized gold nanoparticles may induce mutations (21) and DNA strand damage (22) by stimulating the production of free oxygen radicals, causing destruction of cell membranes, proteins, and DNA (23) and stimulating DNA damage signals (24). Toxicity may also be caused by the direct association of these nanoparticles with the DNA strand due to their small size, where are able to cross cellular barriers or by stimulating oxidation systems, repairing proteins of the DNA strand and causing damage to the DNA strand in addition to its ability to stimulate apoptosis of the cells (26). It can be the size of the nanoparticles used in the study (36 nanometers) has a great role in the toxicity of these molecules. The sizes of 30-50 nanometers consider the most toxic ones compared to other sizes because of their high ability to cross cell membranes (27). The accumulation within the lysosome stimulates the mechanism of autophagosome, causing cell death (28). Besides, the spherical shape of these molecules is five times more toxic than other forms (29).

**Conclusion:**

The soaked orange peels contain reducing agents and stabilizer for making spherical nanoparticles in an environmentally friendly green method. The results of the visible UV spectroscopy and the Transmission electron microscopy for characterization of synthesized nanoparticles are the reductive ability of the soaked orange peels. The gold nanoparticleless synthesized have a toxic effect on the DNA of bone marrow of albino mice. Thus, the toxic effect depended on the doses used in this study. It showed a direct increase with the rise in the studied doses. Its toxicity was evaluated according to the comet assay test.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

**Conflict of Interest:** Non

**Funding:** Self-funding

**References**


Histological Evaluation of the Effect of Metronidazole on the Brain Tissue in Adult Female White Rats

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Abstract

The present study was undertaken to assess the neurotoxic effect of metronidazole in pregnant female rats. Twenty adult pregnant female rats were randomly divided into four groups treatment with oral metronidazole at the therapeutic dose 250 mg/kg, 500 mg/kg and 1000 mg/kg from the eight day of pregnant to the twenty day of pregnant (every eight hour), whereas the last group serve as a control. Routine Histological Techniques were done and stained by Hematoxylin and Eosin (H & E). The histopathological examination of brain show the lesion was characterized by a wide spongy cavitation and cavitation was observed around the nerve and glial cells along with atrophy of some of its nuclei and around the axonal and vascular axons with the presence of nuclear thickening of some glia cells, as well as hyperplasia of the glial cells supporting, disintegration and degeneration of nerve fibers, with damage to the meninges. In addition to the presence of bloody congestion. This study revealed that metronidazole have a neurotoxic effect in adult female rats with a severity depended on its dose and duration of administration.

Keywords: Metronidazole, Brain, Pregnant, Neurotoxic, Hyperplasia, Vacuolation, pyknosis.

Introduction

Metronidazole is an injectable and oral synthetic(1). Metronidazole is an antimicrobial agent commonly used in the treatment of several protozoal and anaerobic infections(2). Its main indications are trichomonal infection, amoebiasis, Helicobacter Pylori infection and Clostridium difficile associated diarrhea. Additionally, it is often used in Crohin disease, Rosacea and hepatic encephalopathy. Though it is well tolerated in common setting, patient may experience serious neurologic side effects in both long term and short term use. This includes peripheral neuropathy, cerebellar dysfunction, visual impairment, vestibulotoxicity, cochleotoxicity, ataxic gait, dysarthria, seizures and encephalopathy(3;4;5;6;7).

Despite of the passage of sixty years of research, metronidazole metabolism and its cellular toxicity are not clearly known. Metronidazole is considered a primary drug, Prodrug, not in the active formula. It is activated by reducing (reducing the nitro group) when there is a lack of oxygen concentration, which leads to breaking down amidazole and causing cellular toxicity. This is a currency basis for treating anaerobic infection. It has not yet been established whether the reduced (active) metronidazole is responsible for cellular toxicity or some of its metabolic derivatives that are responsible for the events of cellular toxicity(8; 9).

Metronidazole crosses the blood-brain barrier, and its induction of cerebral cytotoxicity does not depend on how it is administered orally or intravenously(10). Several studies have been conducted on the neurotoxic mechanism of metronidazole, but until now the mechanism has not been clearly defined by the hypotheses developed by researchers(11). In many experiments were conducted on animals (rats), which showed the occurrence of neuronal modulation after treatment with metronidazole.
with damage to the cerebellum, metronidazole and its metabolic derivatives are associated with RNA in the nucleus of the neuron and inhibit the production of proteins and the occurrence of bulging and breakdown of the axon.\(^{(12)}\)

Since then several cases have been reported and awareness of this entity among clinicians have substantially increased especially in the last decade. But still many questions remain unanswered and hence this entity needs further research and clarifications. Therefore, the present study was carried to investigate brain histopathological alteration associated with metronidazole administration in female rats.

**Material and Method**

Twenty Sprague-Dawley females rats were used for the purpose of this study. It was purchased from Animal House, Faculty of Veterinary Medicine, Tikrit University. The average weights were (167 grams), and were in a good health. The rats were kept in the animal house, as they were randomly distributed, at the rate of five animals for each group inside the cages intended for breeding with a floor furnished with sawdust. (27 ° C) and a 12-hour light cycle: 12-hour darkness, and give the diet feed (plate) and water in sufficient quantities to feed it throughout the breeding and livestock treatment period. Adult females were placed with adult males rats and by the rate of every two females with one male in each breeding cage for the purpose of mating, and animals were monitored until fertilization occurred by observing the vaginal plug on the next day and the day on which fertilization occurred was considered zero of pregnancy and the day after that was considered The first day of pregnancy. Used metronidazole as a tablet, and one tablet contains 250 or 500 mg/kg of metronidazole. The pharmaceutical industry used in the UAE was Julphar. Doses used for rats were calculated using the following method.\(^{(13)}\):

The pregnant animals group divided into four groups and each consist of five pregnant female.

**Pregnant Group:**

1. **Group 1 (Control group):** Given normal feeding and water.
2. **Group 2:** Given the concentration 250 mg/kg from the metronidazole medicine form the eight day to the twenty day from pregnant (every eight hour).
3. **Group 3:** Given the concentration 500 mg/kg from the metronidazole medicine form the eight day to the twenty day from pregnant (every eight hour).
4. **Group 4:** Given the concentration 1000 mg/kg from the metronidazole medicine form the eight day to the twenty day from pregnant (every eight hour).

After the end of the specified period of experiments, the histological technique of the samples was performed according to the method, and then samples were performed on the techniques of preparing the microscopic tissue sections, which were fixation and hardening, washing, and dehydration, clearing, infiltration, embedding, and trimming the mold. Cutting the paraffin sections by using a rotary microtome with thickness (6µm), Mounting and Staining. Hematoxylin and Eosin stain (H & E) used to study the histological changes caused by metronidazole. After completing the preparation of the microscopic tissue sections, they were examined by optical microscopy.

**Result**

**Group 1 (Control group):** The meningeal pia mater around the cerebral cortex contained a loose connective tissue with the presented of fibroblasts with blood vessels and appeared beneath it a pale colored Molecular layer that appeared to be spongy with a number of glial cells extending downward with the Granular layer as larger cells continuously connected with the pyramidal neuron layer (Fig.1).

**Group 2 (Pregnancy):** The cerebral cortex tissue is surrounded by the inner meningeal tissue (pia mater) with another outer membrane, Erachnoid membrane, where the presence of the Subarachnoid space in which the Cerebro-Spinal fluid occurs, the Molecular layer under the membranes of the meninges appeared pale due to the vaculation of many places Glial and neuron cells, especially with large numbers of glial cells in the lower layers of the cerebral cortex (Fig.2).

**Group 3 (Pregnancy):** The meningeal layer of the brain has damage and loss of continuity of the membrane to the pia mater as well as an increase in the penetration of the molecular and granular layer beneath it, as well as in the area of pyramidal neurons. Glial cells and nerve fibers swell around the glia and nerve cells, which degenerate and disintegrate, which showed frequent Vacuolation and Cavitation in brain tissue (Fig.3).
**Group 4 (Pregnancy):** The cerebral cortex has an extensive necrosis and necrosis that has extended to the deepest layers of the brain. This enlargement has surrounded all the supporting and nerve cells, extending from under the meninges that have lost the continuity of the coated surface of the brain to the deepest large nervous layers (Fig. 4). The middle of the brain contained nerve fibers in the form of degenerative bundles, missing continuity, i.e., disintegrated surrounding large numbers of inflammatory cells and debris of glial and neuronal cells in their midst and the lesion and cavitation regions of the cerebral cortex were surrounded by degenerated and degraded nerve fibers and there were large numbers of glial and neuronal cells that lost the cytoplasm as their nuclei appeared inside the cavitation sinuses (Fig. 5).

![Figure (1): Brain of the female white rat (control group): A - the meningeal membrane of the pia mater. B- Fibroblast. C-Molecular layer D-glial cells. H & E 40X.](image1)

![Figure (2): Brain section for female white rat in pregnant stage 20 day treatment the metronidazole medicine (250 mg/kg) as shown: A- inner Meningesmembrane. B- Arachnoid membrane. C-Bleeding in the subarachnoid space. D- molecular layer and thegranular layer and nerve layer in which vaculation. E-glial cells. H & E 40X.](image2)
Figure (3): Brain section for female white rat in pregnant stage 20 day treatment the metronidazole medicine (500 mg/kg) as shown: A- A rupture of the meninges membrane. B- vacuolation the molecular and granular layers. C- Glial cells hypertrophy. D- Degeneration of nerve fibers. H & E 40X.

Figure (4): Brain section for female white rat in pregnant stage 20 day treatment the metronidazole medicine (1000 mg/kg) as shown: A- Pia mater damaged. B- Degeneration of nerve fibers C- vacuolation around nerve cells and supporting glial cells. H & E 40X.
Discussion

Metronidazole crosses the blood-brain barrier, and its induction of cerebral cytotoxicity does not depend on how it is administered orally or intravenously (10). Several studies have been conducted on the neurotoxic mechanism of metronidazole, but until now the mechanism has not been clearly defined by the hypotheses developed by researchers (11). If many experiments were conducted on animals (rats), which showed the occurrence of neuronal modulation after treatment with metronidazole with damage to the cerebellum, metronidazole and its metabolic derivatives are associated with RNA in the nucleus of the neuron and inhibit the production of proteins and the occurrence of bulging and breakdown of the axon (12).

The results of the study showed the occurrence of cavitation and widespread cavitation in the brain tissue with the occurrence of a breakdown of the axons and the occurrence of hemorrhage, and this increased with the increase in the dose given. The concentration of metronidazole is high in the extracellular space in the brain that is likely to cause toxicity to the brain (15). This is consistent with what the researcher (16) found through histological microscopy, and it was found that the treatment of cats with metronidazole at a dose of 73.5-147 mg/kg for forty days, leaders lead to a loss of the medulla of some cranial nerve axons with necrosis and degeneration of some neurons, an increase in the number of glial cells and swelling of the axons with the presence of large macrophages in the Brainstem. Also, the treatment of rabbits with metronidazole at a dose of 20 and 40 mg/kg, and through microscopic histological examination of the brain and sciatic nerve, led to cavitations in the brain, spongy changes and degeneration of nerve bundles in the sciatic nerve with cell degeneration and the loss of Burkinji cells with severe congestion in the brain with loss of the covering Myeloma of the sciatic nerve axons (17), (18) also indicated that the treatment of male rats with metronidazole in doses of 135 mg/kg and 540 mg/kg for sixty days, and through histological examination found in brain tissue the occurrence of blood congestion within the blood vessels, hemorrhage, Burkinji cells necrosis and hemorrhage in the granular layer and epidermis around Supper neuron and glial cells Metronidazole metabolic products may be associated with DNA or RNA in neurons (19).

The association of metronidazole or its metabolic derivatives with RNA inhibits the construction of proteins and consequently breaks the axons in nerve.
fibers (20; 21; 6). Metronidazole also induces the oxidation of norepinephrine, dopamine, and all catecholamine derivatives to form nitro-ion roots that reduce tissue oxygen, the superoxide roots, which increase the water content causing swelling of the axons (22). It may also induce vascular spasm, which may result in a lack of localized oxygen, in which case it leads to any tissue breakdown.(23).

Reducing metronidazole as a result of metabolic processes produces a synthetic anti-inflammatory, thiamine, as metronidazole turns into a vitamin B1 analog, and therefore it can be a base substance for the enzyme thiamine, which leads to competition vitamin B1, so metronidazole is converted into a counterpart of thiamine. It leads to harmful feeding of the nerves, which causes neurological diseases. Vitamin B1 is a key coenzyme in the mitochondria of the alpha-ketoclutarite and pyrophite metabolites which are part of the biochemical pathway to produce ATP which is the most basic energy in the cell (25). In the lobule cells, the metabolic metabolites of metronidazole are associated with RNA instead of the deoxyribonucleic acid (DNA). Therefore, the construction of cellular proteins will be inhibited due to the metronidazole binding to the RNA and thus lead to the breakdown of neuronal modulators (26). Whereas (11) stated that the neurotoxicity of metronidazole occurs through its inhibitory effect of the-aminobutyric acid neurotransmitter.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

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**References**


An Analytical Study of Deviations of the Foot and the Way to Put it While Walking Using the Force Sensor

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Abstract

The importance of the research lies in knowing the deviations of the foot from the position of the gait and the extent of the relationship of these deviations and the conditions in the pain that occur at the top and bottom of the back, as the method of placing the foot on the ground and areas of strength centring is important and affects the human skeleton, especially the areas of the spine above and below the back, As for the research problem, it was represented by following and informing the researchers. Many people suffer from the pain that arises in the areas of the back. As a specialist in this field, the researchers decided to study and analyze the variables of a force-sensitive device for a sample of students from the College of Basic Education, if this device is through the results that It extracts it can contribute to the knowledge of the many problems that these individuals suffer from at the back level. The research aimed to identify the areas of strength and foot deviations through the force sensor in the research sample, where the researchers used the descriptive method in the survey method as the research community identified the students of the College of Basic Education At the University of Kufa, who are (170) students, and the researchers chose a sample of (20) students who suffer from back pain, and after the presentation and discussion of the results came the most important conclusions The results showed that the research sample rested while walking on the outer part of the foot, and the results showed that the rest of the strength areas of the force were uneven and few.

Keywords: Foot deflections, the force sensor; analytical studies; back pain.

Introduction

The importance of the research lies in the possibility of exploiting and benefiting from lactic acid during training in the speed of transfer of information to the brain because the presence of this substance in the body leads to the release of certain hormones that help in the speed of information transfer to the brain in knowing the deviations of the foot from the position of walking and the relationship of these deviations and conditions in the pain that occurs at the top and bottom of the back, as the way to place the foot on the ground and the areas of strength attachment is important and affects the human skeleton, especially the areas of the spine above and below the back, and the research problem was that the current scientific progress depends on techniques and modern method when applied in various aspects And the use of modern scientific devices, in order to access the scientific facts that serve this progress, therefore, through the follow-up and briefing of researchers, there were many people who suffer from pain that arises in the areas of the back and as a specialist in this field, the researchers decided to study and analyze the variables of a device that feels the strength of a sample of the students of the College of Basic Education, if this device, through the results it extracts, can contribute to knowing the many problems that it suffers from. Individual loyalty at the level of the back and the research aimed to identify

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areas of strength and foot deviations through the force sensor in the research sample.

**Practical Part:** The researchers used the descriptive method in the survey method on the students of the College of Basic Education at the University of Kufa, who are (170) students, and the researchers chose a sample consisting of (20) students who suffer from back pain.

**Field Research Procedures**

**Exploratory Experience:** The researchers conducted the exploratory experiment 12/20/2016 at ten o’clock in the morning on a group of students whose number reached (3) students outside the original sample in the College of Basic Education and were aimed at identifying work obstacles to avoid them in the main experiment, because “the exploratory experiment procedures lead to Avoid shortcomings, specifying the location, time and duration of the experiment.”

Through the exploratory experiment, the following observations were identified:

- The validity and working of the Dynafoot device.
- The extent of providing the necessary equipment and tools.
- The adequacy of the number of assistant team members and its role in performing its duties correctly.

**Main Experience:** The main experiment was conducted 1/5/2017 at ten o’clock in the morning in the College of Basic Education at the University of Kufa, where a device (Dynafoot) was used to extract its variables from the areas of strength and leg deviations.

**Strength sensor (Dynafoot)**: A system for measuring force changes on the ground during each running step, which is made up of four parts that are the data delivery base (a foot pedal that is placed in the shoe with a wired connection to the force calculator that connects to the leg of the laboratory) and the signal receiver device connects with the laptop and receives the signal. After 20 meters for closed halls and 10 meters for outdoor playgrounds, the system operates after placing the steps sensor in the player’s laboratory shoe and fixing the conveyor device to point on his leg and entering data about the player’s age, length, weight, and gender, and the device measures the highest strength, lowest strength, power distribution areas in the foot, and foot deviations And other variables.

**Statistical Means:** To identify the results of the study, the researchers used the Excel system to extract the following statistical method:

1. Arithmetic mean.
2. Standard deviation.

**Presentation, analysis and discussion of results:**

<table>
<thead>
<tr>
<th>Variants</th>
<th>Unit of measurement</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 The total force of the right leg</td>
<td>Newton</td>
<td>129.33</td>
<td>199.85</td>
</tr>
<tr>
<td>2 The total force of the left leg</td>
<td>Newton</td>
<td>116.17</td>
<td>23.913</td>
</tr>
<tr>
<td>3 The strength focal points of the right leg of the outer part of the foot</td>
<td>Newton</td>
<td>49.2</td>
<td>11.1</td>
</tr>
<tr>
<td>4 The strength focal points of the right leg of the inner part of the foot</td>
<td>Newton</td>
<td>22.15</td>
<td>5.55</td>
</tr>
<tr>
<td>5 Focal points of strength for the right leg of the instep</td>
<td>Newton</td>
<td>25.11</td>
<td>3.11</td>
</tr>
<tr>
<td>6 Focal points of strength for the right leg of the heel</td>
<td>Newton</td>
<td>31.03</td>
<td>4.51</td>
</tr>
<tr>
<td>7 The strength focal points of the left leg of the outer part of the foot</td>
<td>Newton</td>
<td>13.01</td>
<td>5.33</td>
</tr>
<tr>
<td>8 Right-fulcrum areas of the right leg of the inner part of the foot</td>
<td>Newton</td>
<td>44.4</td>
<td>8.41</td>
</tr>
<tr>
<td>9 Strength focal points for the left leg of the instep</td>
<td>Newton</td>
<td>15.22</td>
<td>5.21</td>
</tr>
<tr>
<td>10 Strength focal points for the left leg of the heel</td>
<td>Newton</td>
<td>18.2</td>
<td>3.12</td>
</tr>
<tr>
<td>11 Deflection of the right foot out</td>
<td>degree</td>
<td>7</td>
<td>0.5</td>
</tr>
<tr>
<td>12 Deflection of the left foot out</td>
<td>degree</td>
<td>2</td>
<td>0.3</td>
</tr>
</tbody>
</table>
Presenting, analyzing and discussing the results of the variables of the (Dina foot) device.

From Table (1), and through the results that have emerged, it is clear that the research sample was anchored while walking on the outer part of the right foot and also the deviation of the right foot to the outside side, and this action leads to the birth of the mother in the back at the sample since the force is supposed to be centred in the middle. The foot because the skeleton is an interconnected structure and any defect in one of its parts leads to pain and these pain due to the imbalance of this structure and the shedding of force in its correct place.

As for the left foot, most of the strength was concentrated in the inner part of the foot, due to the concentration of force in the right foot in the outer part, that is, it caused a malfunction in the position of the force, which led to its gathering in the inner part of the foot, and this resulted in a deviation of the foot by (2) degrees, which is less than the right foot, which it deviated by (7) degrees.

From the previous results, it becomes clear to the researcher that the basis of the pain experienced by the students is in the way of putting the foot on the ground and getting used to the wrong way of walking from a young age, which leads to an imbalance of the skeleton and an imbalance in one of its parts, which causes the pain.(10)

Conclusion

1. The results showed that the research sample rested while walking on the outside of the foot.
2. The results showed that the remaining areas of the force’s focus were mixed and few.
3. The results showed that the degree of right foot deflection was great.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

Conflict of Interest: Non

Funding: Self-funding

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Isolation and Diagnosis of Multi Drug Resistance *Pseudomonas Aeruginosa* from Wound and Burn patients in Baghdad City

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Abstract

**Background:** *Pseudomonas* is a common bacteria found all over the world; in soil, water, and plants, and it is one of the most common pathogens in hospital-acquired infections.

**Aims:** The aims of this study were isolation of *P. aeruginosa* bacteria from patients with inflammation of burns, Diagnosis and identification of *P. aeruginosa* using chemical tests and VITEK2 system and also study of antibiotic resistance in *P. aeruginosa* using the VITEK2 system.

**Method:** (206) swabs were collected from wounds and burns; (139) samples from burns and (67) samples from wounds; from different clinical cases for both sexes and ages (1-70) years, the patients coming and sleeping in Baghdad Teaching Hospital and Burns Hospital in the City of Medicine at Baghdad city; the duration from January to the end of March 2019. Samples were cultured on the variety of culture media (MacConkey agar, Blood agar and Cetrimide agar) in order to obtain the bacterial isolates of *P. aeruginosa* depending on their phenotypic characteristics. VITEK2 system were used for identification *P. aeruginosa* and to study their resistance to the antibiotics.

**Results:** Out of the 206 samples, 50 *Pseudomonas aeruginosa* were isolated from swabs. 31 (62%) isolates were isolated from burn and 19 (38%) from wound swabs. The isolates were subjected to a series of biochemical tests as diagnosed with Api 20E; and VITEK2 system to increase confirmation of isolation yield for *P. aeruginosa* bacteria. The results showed that the majority of isolates were (92%) resistant to Amoxicillin while the isolates differed between sensitive and moderate sensitivity and resistance to other types of antibiotics.

**Conclusion:** The study showed that the percentage of isolation of *Pseudomonas aeruginosa* bacteria from wound infections is relatively higher than the rate of isolation from burn swabs. Most of *Pseudomonas aeruginosa* isolates showed high resistance to most types of antibiotics used in the present study, especially the antibiotic Amoxicillin where the resistance rate was 92%.

**Keywords:** *Pseudomonas aeruginosa; VITEK 2 system; resistance to antibiotics.*

Introduction

*P. aeruginosa* is a Gram-negative and ubiquitous environmental bacterium. It is an opportunistic human pathogen capable of causing a wide array of life-threatening acute and chronic infections, particularly in patients with compromised immune defense. It has been of particular importance since it is the main cause of morbidity and mortality in cystic fibrosis (CF) patients and one of the leading nosocomial pathogens affecting hospitalized patients while being intrinsically resistant to a widerange of antibiotics(1).
This Gram negative bacteria structure includes a 0.5 – 0.8 μm by 1.5-3 μm rod shape, and has one flagellum for mobilization. Individualizing itself from most Gram-negative bacteria, P. aeruginosa is positive for an oxidase reaction. Moreover, it is permanently unable to ferment lactose. P. aeruginosa is found in water, plants, soil, and on the epidermis of animals. In nature, it is commonly found as a plankton swimming through water or as a biofilm, clusters of bacteria sharing the same phenotype and common chemical properties\(^2\). Uniquely, P. aeruginosa can thrive and survive in a variety of temperature and infrequent nutrition. The bacterium has been observed in previous studies to grow in distilled water giving P. aeruginosa an advantage in adapting to changing environments\(^3\). Being an opportunistic pathogen, P. aeruginosa requires a lack of immunity to infect its host\(^4\). Moreover, this is the explanation as to why P. aeruginosa is such a sizeable nosocomial threat for patients with ventilation machines, cancers, and burns. Colonization of P. aeruginosa in the respiratory tract is associated with sepsis and death. Any patient that is immunosuppressed or has experienced significant amounts of trauma are at risk for the colonisation of an infection. The mortality rate approximates 50% for said patients who obtain an infection\(^5\)(\(^6\)). The aims of this study were isolation of P. aeruginosa bacteria from patients with inflammation of burns, diagnosis and identification of P. aeruginosa using biochemical tests and VITEK2 system and also study of antibiotic resistance in P. aeruginosa using the VITEK 2 system.

Materials and Method

I. Collection of Samples: 206 swab samples were collected from clinical sources including 67 burns and 139 wounds from patients suffering from burns and wounds infections and under the supervision of a medical specialist at City Medicine Hospital/department of burns in Baghdad city, in the period beginning from January to the end of March 2019.

II. Identification of bacterial isolates:

A. Morphological examination: Blood agar, MacConkey agar and Cetrimide agar were used to study the phenotypes of P. aeruginosa colonies which including colonial form, shape and color, size, and aroma. Readymade media were used, Nutrient Broth, Mueller- Hinton agar medium, Brain heart infusion broth, Pseudomonas agar, Voges - Proskauer reagent, Urea agar medium, King A medium, King B medium and Indole test medium\(^7\).

B. Microscope examination: The Gram stain was used for identification of P. aeruginosa in the samples\(^8\).

C. Chemical Tests: The following biochemical tests were performed for the diagnosis of isolated P. aeruginosa bacteria: Catalase test, Oxidase test, Motility test, IMVIC test (Indole test, MR-VP, Simmons’ citrate agar, Citrate utilization test)\(^7\)(\(^8\)), and API 20E identification system.

D. API 20E identification system: API 20E is standardized system for identification the Enterobacteriaceae and other non- fastidious, by depending on using 20 biochemical tests. It was done according to the instructions of BioMerieux.

E. Determination of minimal inhibitory concentration of antibiotics using the VITEK2 compact system: The isolates were identified as P. aeruginosa by conventional method as well as by the VITEK2 system\(^9\). The VITEK2 is a fully automated system that performs bacterial identification\(^10\). In VITEK2 compact system, the Antibiotic Sensitivity Test Card (AST C) Supplement 2 was used to determine the values of the (MICs) for P. aeruginosa isolates. There are 18 to 20 antibiotics distributed over 64 holes in the Antibiotic Test Card. The device recorded the turbidity changes following the growth of the bacteria, this is done according to the instructions of BioMerieux.

F. Antibiotic susceptibility test (AST): The sensitivity of bacterial isolates to many antibiotics was studied according to the Kirby-Bauer method and WHO\(^11\)(\(^12\)).

Results and Discussion

The study included the collection of 206 swabs of burn injuries and wounds of both sexes, males and females, ranging in age from 1-70 years for the period from January to the end of March 2019, from burns hospital in the city of medicine and Baghdad Teaching Hospital. After the final diagnosis of samples obtained 50 isolates of P. aeruginosa (24.27%) were shown in Table 1.
Table 1: Number and percentages of *P. aeruginosa* isolates according to the source of isolation by using different culture media

<table>
<thead>
<tr>
<th>Number of <em>P. aeruginosa</em> isolates (%)</th>
<th>Number of samples (%)</th>
<th>Source of isolate</th>
</tr>
</thead>
<tbody>
<tr>
<td>19 (38)</td>
<td>67 (32.52)</td>
<td>Wounds</td>
</tr>
<tr>
<td>31 (62)</td>
<td>139 (67.47)</td>
<td>Burns</td>
</tr>
<tr>
<td>50 (100)</td>
<td>206 (100)</td>
<td>Total</td>
</tr>
</tbody>
</table>

On MacConkey agar, the bacterial colonies appeared pale yellow because they had not fermented lactose, and this compatible with the results of previous researches\(^{10}\). On Nutrient agar, the growing of *P. aeruginosa* colonies were identified depending on the pigments and odor production (grape like odor). On the blood agar medium, the bacterial colonies gave Beta-hemolysis (β). On the Cetrimide agar, the bacterial colonies appeared in greenish yellow, on the King A agar, they produced a blue and green pigment (pyocyanin), while all isolates grow on King B agar did not produce pyocyanin.

Microscopic examination showed that they were Gram negative bacilli. In the biochemical tests, all isolates showed positive results for Catalase test, which explained the bacterium’s ability to break down hydrogen peroxide into water and oxygen gas. The score IMViC tests was Indole (−), Methyl red (−), Voges-Proskauer (VP) (−), positive (+) result for Citrate consumption, as shown in Table 2. Kligler’s Iron Agar (KIA) have alkaline interaction (cannot ferment glucose and lactose), \( \text{H}_2\text{S} \) production (−). Growth temperature is 37°C and 42°C, and negative results were obtained for urease test; they were positive for motility test because the bacteria have flagella, these results corresponds positive for motility test because the bacteria have flagella, these results corresponds to\(^{11}\)(\(^{12}\)).

Table 2: Morphological, physiological and biochemical results for *P. aeruginosa* identification

<table>
<thead>
<tr>
<th>Tests</th>
<th>Test</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Microscopic</strong></td>
<td>Gram stain</td>
<td>-Ve, bacilli</td>
</tr>
<tr>
<td><strong>Growth</strong></td>
<td>MacConkey agar</td>
<td>Non Lactose fermented</td>
</tr>
<tr>
<td></td>
<td>Cetrimide agar</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>King A agar</td>
<td>pyocyanin</td>
</tr>
<tr>
<td><strong>Enriched media</strong></td>
<td>Blood agar</td>
<td>β-hemolysis</td>
</tr>
<tr>
<td><strong>Physiological</strong></td>
<td>Grow at 37 °C</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Grow at 42 °C</td>
<td>+</td>
</tr>
<tr>
<td><strong>Biochemical</strong></td>
<td>Catalase</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Oxidase</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Urease</td>
<td>+/- (V)</td>
</tr>
<tr>
<td></td>
<td>Indole</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Methyle red</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Voges proskauer</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Citrate utilization</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Kligler iron agar</td>
<td>k/k (slant and bottom)</td>
</tr>
</tbody>
</table>

+: positive; - : Negative; V: Variable; K: alkalin
All isolates of *P. aeruginosa* showed a clear variation in the resistance of the antibiotics used in this study. The resistance rate determined against Gentamicin was 81%, Ciprofloxacin was 79%, Tetracycline was 74%, and Nalidixic acid and Norfloxacin were 72%, Imipenem 66%.

Figure 1. The results showed that the minimum inhibitory concentration (MIC) of the antibiotic: the VITEK2 Compact system was used to determine the values of the lowest inhibitory concentrations (MICs) for 13 antibiotics namely Ticarcillin, Piperacillin/ Tazobactum, Ticarcillin/clavulanic acid, Pipracillin, Cefepime, Gentamicin, Imipenem, Meropenem, Tobramycinin, Cipodoxacin, Ciprofycin. The results showed that the value of the MIC of Ticarcillin antagonist is 32 µg/ml at 87%, anti-Pipracillin/Tazobactum 8-16 µg/ml at 85.5%, Ticarcillin/clavulanic acid 16-64 µg/ml at 85.5%, anti-Pipracillin ≥ 4 -16 µg/ml 85.5%, Anti-Cefepime 2-8 µg/ml 76.8%, Gentamicin ≤ 1-4 µg/ml 73.9%, Imipenem 0.5-2µg/ml 71%, and anti-Meropenem ≤ 0.25 µg/ml 63.8%, anti-Tobramycin ≤ 1-2 µg/ml 71%, anti-ciprofloxacin ≤ 0.5-0.25 µg/ml 68.1%, anti-Amikacin ≤ 8-2 µg/ml 60.9%, anti-ceftazidime 2 -8µg/ml 60.9% were shown in Table 3.

![Figure 1: Resistance of *P. aeruginosa* isolates to antibiotics](image)

Table 3: Minimum Inhibitory Concentration Values (MIC) (µg/ml) for some antibiotics used against *P. aeruginosa* bacteria isolated from wounds and burns using VITEK 2

<table>
<thead>
<tr>
<th>Antibiotics</th>
<th>Resistance</th>
<th>Intermediate</th>
<th>Sensitive</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of sample</td>
<td>%</td>
<td>No. of sample</td>
</tr>
<tr>
<td>Ticarcillin</td>
<td>30</td>
<td>87</td>
<td>0</td>
</tr>
<tr>
<td>Pipracillin/Tazobactam</td>
<td>29</td>
<td>85.5</td>
<td>1</td>
</tr>
<tr>
<td>Ticarcillin/Clavulanic acid</td>
<td>29</td>
<td>85.5</td>
<td>0</td>
</tr>
<tr>
<td>Pipracillin</td>
<td>29</td>
<td>85.5</td>
<td>1</td>
</tr>
<tr>
<td>Cefepime</td>
<td>26</td>
<td>76.8</td>
<td>1</td>
</tr>
<tr>
<td>Gentamicin</td>
<td>26</td>
<td>73.9</td>
<td>1</td>
</tr>
<tr>
<td>Imipenem</td>
<td>25</td>
<td>71</td>
<td>0</td>
</tr>
<tr>
<td>Meropenem</td>
<td>22</td>
<td>63.8</td>
<td>1</td>
</tr>
<tr>
<td>Tobramycin</td>
<td>25</td>
<td>71</td>
<td>0</td>
</tr>
</tbody>
</table>
Antibiotics | Resistance | Intermediate | Sensitive
--- | --- | --- | ---
Ciprofloxacin | 23 - 68.1% | 0 - 0% | 11 - 31.9%
Amikacin | 21 - 60.9% | 0 - 0% | 14 - 39.1%
Ceftazidime | 22 - 63.8% | 2 - 7.2% | 10 - 29%

A percentage (%) of the total isolates were calculated.*

The current results reports that the percentages of *P. aeruginosa* in both wounds and burns swabs are 50 isolates of (24.27%), and this result is higher than in other Iraqi results of researchers. Zainulabdeen in 2016\(^{(13)}\) recorded that the percentage of *P. aeruginosa* in patients suffering from burn and wound infections in AL-Samawah General and teaching Hospitals in the South of Iraq was (8.2%) between 2014 and 2015. Whereas, in the North of Iraq, Kirkuk governorate, the percentage of *P. aeruginosa* in burns was (32.55%)\(^{(14)}\).

The difference in isolation rate may be due to the degree of health care, which includes the arrival of the patient to the hospital before bacterial growth or the possibility that the patient had taken antibiotics in advance, and on the other hand may lead to a long hospitalization in the hospital increase the rate of isolation, especially in patients with burns. The intensity may increase to 20% within 72 hours as a result of an infection acquired from hospital infection and nosocomial infection directly as a result of contact with patients or indirectly through the use of contaminated surgical instruments and tools that help to spread these bacterial\(^{(14)}\). Also, the reasons for the difference in isolation rates are due to the difference in the sample source, number of samples, geographical location, and method of antisepsis of wounds or burns, frequency of antisepsis, as well as the common and random use of antibiotics which had a significant role in the emergence of resistance to these bacteria.

Recent study showed that *P. aeruginosa* isolates were 100% resistant to (Amoxicillin, Ampicillin), 93% to the (Cefotaxime, Carbenicillin and Imipenem)\(^{(15)}\); this compatible to the current results. In Baghdad city, AL-Shamaa et al. 2016 [16] were isolated 31 *P. aeruginosa* isolates from 111 burn and wound swabs. All isolates were resistance 100% to Carbenicillin, 61% Ticarcillin, and Colistin to 84%. In Pakistan, the most common bacterial isolate from burn patients was *P. aeruginosa*; it was 41 isolates (24.91%). All isolates showed highly resistance to different antibiotics including Augmentin, ceftazidime, cefotaxime, ceftriaxone, meropenem, and piperacillin+tazobactam \(^{(17)}\). In United States, most *P. aeruginosa* isolates had resistance to Penicillins, Cephalosporins, and Carbapenems\(^{(18)}\).

It is noted that the results of the present study recorded high resistance of bacterial isolates towards the group Penicillin- β-lactam including Ampicillin and Amoxicillin as these antagonists work to prevent the synthesis of the bacterial cell wall by binding to special sites in the bacterial cell and thus inhibits the work of the enzyme transpeptidase which forms peptide bridges in the peptidoglycan layer, which is an important component of the cell wall. The results of the present study showed that the resistance of *P. aeruginosa* bacteria to the antibiotic Ampicillin and Amoxicillin, which is a medium-spectrum antibiotic, was very high (92 and 89%, respectively), this ratio is high and this result is consistent with the result obtained by Al-Qasi, 2012\(^{(19)}\). The results of antibiotic resistance were consistent with those of Reishet et al., 1993\(^{(20)}\); it was 90.47%. In another study, all isolates of *P. aeruginosa* were resistant to penicillin and amoxicillin\(^{(21)}\). It is clear that the most important characteristic of *P. aeruginosabacteria* is their low sensitivity to antibiotics. In addition to the lowpermeability of the cellular membranes of bacteria and the ability of *P. aeruginosa* bacteria to develop their readily acquired resistance either by mutation in coded genes or by horizontal transmission of antibiotic-resistant gene markers. The multiple resistance of many antibiotics may be attributed to different virulence factors of bacterial isolates that increase resistance to different antibiotics\(^{(21)}\).

**Conclusion**

The study showed that the percentage of isolation of *Pseudomonasaeruginosa* bacteria from wound infections is relatively higher than the rate of isolation from burn swabs, reaching 28.35%. Most isolates of *P. aeruginosa* showed high resistance to most types
of antibiotics used in the present study, especially the antibiotic Amoxicillin where the resistance rate was 92%. Also Imipenem was the most effective antibiotics against isolates of P. aeruginosa bacteria with a resistance rate of 66% followed by Nalidixic and Norfloxacin with a rate of 72%.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

**Conflict of Interest:** Non

**Funding:** Self-funding

**References**


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Epidemiological Study of Common Cancer Cases in Baghdad City

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Abstract

Background: It is possible to notice the increase in the incidence of cancer during the recent years in Iraq, particularly in Basrah, Al - Anbar and Baghdad. Different types of cancers like Lung cancer, Breast cancer, Bladder cancer, Colorectal cancer and Pancreas tumors.

Objectives: The objective of the current research was to study the most common cancer cases in Baghdad city.

Method: The current study was conducted in the oncology teaching hospital/medical city/Baghdad, for the period from January 2019 until October 2019. The data of 139 patients were collected from official records in the hospital clinics which included gender, age and the types of cancer.

Results: The highest percentage of cancers was found in patients with breast cancer (54.67 %); followed by colon cancer (16.54 %), ovarian cancer (8.63 %), liver cancer (5.75 %) and prostate cancer (5.03 %). The highest incidence of breast cancer appeared in the age group (40 – 49) years with the percentage of 35.52%. Of the total number of studied cases, 80 (63.30%) of patients with different types of cancer suffered from chronic diseases.

Conclusion: Breast cancer most common types of cancers in Baghdad city, and increased cases in the last year, 2019. Both sexes suffered from cancers especially in age above 40 years.

Keywords: Breast cancer, colon, ovary, liver, prostate, epidemiology.

Introduction

Epidemiology of cancers is important to study the distribution and frequency of different types of cancer diseases among specific area⁵. There are different types of cancers in Iraq like breast; colorectal; lung; lymph nodes; ovarian and gastrointestinal cancers⁶.

The highest frequency of cancers are related with breast cancer. In Iraq, 855 patients with breast cancer were observed in 2016. Thirty-five percent of women with breast cancer was present in the 45 – 54 year age group⁷. Interpretation of cancer results indicates that there is a noticeable increase in cancer incidence in all regions of Iraq. The reason may be due to the weapons used during wars, as well as due to enormous environmental pollution and accumulation of waste of all kinds in the Iraqi environment, increased unemployment, poverty and eating unhealthy food and others⁸⁹.

In Tikrit, during (1995 – 2005), the prostate carcinoma recorded the third type of cancers in males. The most risk factors may be causing cancers are: aging,
smoking tobacco, drugs, radiation exposure, infection with some viruses and bacteria, alcohol drinking, genetic factors, immunosuppression and exposure to some environmental factors ex. Sunlight and heavy metals[4]. So, the objective of the current research is to study the common cancer cases in Baghdad city.

**Method**

The current study was conducted in the oncology teaching hospital/medical city/Baghdad, for the period from January 2019 until October 2019. The data of 139 patients were collected from official records in hospital clinics which included gender, age and the types of cancer.

**Ethical Approval:** This study has conducted with ethical approval from oncology teaching hospital/medical city/Baghdad, in order to facilitate the obtaining of information from the medical clinics arriving to it, a number of patients have different types of cancer.

**Results**

The total of 139 patients with different types of cancer were shown in (Table 1). The highest incidence rates were in breast cancer (54.67 %); followed by colon, ovary, liver and prostate cancers (16.54%, 8.63%, 5.75% and 5.03% respectively).

**Table 1: The percentage of patients with different types of cancer**

<table>
<thead>
<tr>
<th>Gall bladder cancer %</th>
<th>Lung cancer %</th>
<th>Colon cancer %</th>
<th>Breast cancer %</th>
<th>Lymph nodes cancer %</th>
<th>Rectum cancer %</th>
<th>Ovary cancer %</th>
<th>Bladder cancer %</th>
<th>Liver cancer %</th>
<th>Pancreas cancer %</th>
<th>Prostate cancer %</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (0.71)</td>
<td>3 (2.15)</td>
<td>23 (16.54)</td>
<td>76 (54.67)</td>
<td>2 (1.43)</td>
<td>3 (2.15)</td>
<td>12 (8.63)</td>
<td>1 (0.71)</td>
<td>8 (5.75)</td>
<td>3 (2.15)</td>
<td>7 (5.03)</td>
<td>139 (100)</td>
</tr>
</tbody>
</table>

According to table (2), the highest percentage of cancer appeared in women more than in men, as it was 112 (80.57%) and 27(19.42%) respectively. From the current results, it was found that the highest incidence of type of cancer in men was prostate cancer 7(100%), followed by colon cancer 6(26.08%). In women the highest percentage of one type of cancer was breast cancer 76(100%) followed by colon cancer 17(73.91%).

**Table (2): The percentage of patients with different cancers according to gender**

<table>
<thead>
<tr>
<th>Sex</th>
<th>Lung cancer %</th>
<th>Colon cancer %</th>
<th>Breast cancer %</th>
<th>Lymph nodes cancer %</th>
<th>Rectum cancer %</th>
<th>Ovary cancer %</th>
<th>Gall bladder cancer %</th>
<th>Bladder cancer %</th>
<th>Liver cancer %</th>
<th>Pancreas cancer %</th>
<th>Prostate cancer %</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>2 (66.66)</td>
<td>6 (26.08)</td>
<td>0 (0)</td>
<td>2 (100)</td>
<td>3 (100)</td>
<td>0 (0)</td>
<td>1 (100)</td>
<td>0 (0)</td>
<td>4 (50)</td>
<td>7 (100)</td>
<td>2 (66.66)</td>
<td>27 (19.4)</td>
</tr>
<tr>
<td>Female</td>
<td>1 (33.33)</td>
<td>17 (73.91)</td>
<td>76 (100)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>12 (100)</td>
<td>0 (0)</td>
<td>1 (100)</td>
<td>4 (50)</td>
<td>0 (0)</td>
<td>1 (33.33)</td>
<td>112 (80.57)</td>
</tr>
<tr>
<td>Total (%)</td>
<td>3 (100)</td>
<td>23 (100)</td>
<td>76 (100)</td>
<td>2 (100)</td>
<td>3 (100)</td>
<td>12 (100)</td>
<td>1 (100)</td>
<td>1 (100)</td>
<td>8 (100)</td>
<td>7 (100)</td>
<td>3 (100)</td>
<td>139 (100)</td>
</tr>
</tbody>
</table>

From table (3), the highest incidence of breast cancer appeared in the age group (40 – 49) years and in percentage of (35.52%); it is followed by ovarian cancer within the same age group with a percentage of (75%). While the highest incidence of prostate cancer was within the age group (70 – 79) years with the percentage of (71.42%). The results of liver cancer showed that it was almost evenly distributed across age groups (40 – 49), (50 – 59) and (60 – 69) years in percentages that ranged from 25%to 37.5%. As well as colon cancer, it was present in all age groups under study in almost equal percentages.
Table (3): Percentage of patients with different cancer types according to age

<table>
<thead>
<tr>
<th>Age (year)</th>
<th>Gall bladder cancer %</th>
<th>Lung cancer %</th>
<th>Colon cancer %</th>
<th>Breast cancer %</th>
<th>Lymph nodes cancer %</th>
<th>Rectum cancer %</th>
<th>Ovary cancer %</th>
<th>Bladder cancer %</th>
<th>Liver cancer %</th>
<th>Pancreas cancer %</th>
<th>Prostate cancer %</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-29</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 (2.87)</td>
</tr>
<tr>
<td>30-39</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20 (14.3)</td>
</tr>
<tr>
<td>40-49</td>
<td>1 (100)</td>
<td>2 (66.66)</td>
<td>5 (21.73)</td>
<td>1 (50)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>51 (36.7)</td>
</tr>
<tr>
<td>50-59</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24 (17.3)</td>
</tr>
<tr>
<td>60-69</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td>27 (19.4)</td>
</tr>
<tr>
<td>70-79</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13 (5.4)</td>
</tr>
<tr>
<td>Total %</td>
<td>1 (100)</td>
<td>3 (100)</td>
<td>23 (100)</td>
<td>76 (100)</td>
<td>2 (100)</td>
<td>3 (100)</td>
<td>12 (100)</td>
<td>1 (100)</td>
<td>8 (100)</td>
<td>3 (100)</td>
<td></td>
<td>139 (100)</td>
</tr>
</tbody>
</table>

The data of current study appeared that 88 (63.30%) of patients with different types of cancer have chronic diseases (Table 4). Thirty six patients (40.9%) suffered from diabetes mellitus only; 22 (25%) had hypertension; 30 (34.09%) suffered from diabetes mellitus and high blood pressure (hypertension).

Table (4): The number of patients with different types of cancer who also suffer from chronic diseases coinciding with their cancer

<table>
<thead>
<tr>
<th>Chronic disease</th>
<th>Diabetes mellitus only (%)</th>
<th>High blood pressure only (%)</th>
<th>Diabetes and high blood pressure (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>36 (40.9)</td>
<td>22 (25)</td>
<td>30 (34.09)</td>
<td>88 (100)</td>
</tr>
</tbody>
</table>

Discussion

The world is witnessing a large increase in the incidence of different types of cancer and this is due to various reasons. The most reasons include exposure to some microorganisms that cause genetic mutations such as infection with EBV; eating unhealthy food or genetically modified foods.

Breast cancers and other types of cancer may be happening as a result of aging and genetic factors. The possibility of infection increases if there are other patients in the same family who had cancer. Ali et al, found that the highest prevalence of cancer in Iraqi patients with different types of cancer was breast cancer. It was 33.1% in women attended in Al - Yarmook hospital whereas the bladder and colorectal cancers were 13.5% and 3.7% respectively. This is compatible with the current study; in which the breast cancer incidence was 76 (100%), followed by colon cancer 17 (73.91)%.

In Tikrit city, the prostate tumor recorded the third solid tumor in men. It was seen in 75 (9.1%) cases in a period from January 1995 to December 2005 which was diagnosed by histopathological method. The highest frequency appeared in men with age > 70 years. The result of the current study is compatible with the study of researchers in Tikrit. The prostate cancer recorded (5.03%) (Table 1) with age ranged (70 – 79) years with percentage 71.42% (Table 3).

The results of the current study relating with lung cancer is incompatible with the study of Al – Rahim in 2007. The researcher revealed that 71.8% of males
with a mean age of 63 years attended to medical city hospital at Baghdad had lung cancer\(^8\) and this does not match with the current research results in which the lung cancers recorded 2.15% (Table 1).

Other studies related with the distribution of breast cancer in different governorates of Iraq. The data obtained from the cancer registries at many hospitals in Basrah which containing the number cases of breast cancer in a period from 2009 to 2012. The incidence rate was 24.49/100000 females\(^9\). While the percentage of breast cancer in Karbala in (3634) suspected cases (suffering from nipple discharge and breast mass with presence of ulcers during the period from 2001 – 2005 was 9.5\(^{(10)}\).

A study in Erbil/Kurdistan showed that despite of facts related with the majority of women have a good knowledge of breast and cervical cancers; however, most women had an average knowledge of the importance of mammography, Pap smear and early breast cancer detection. Therefore, there is an urgent need to explain the screening program in primary health care hospitals and educational hospitals to raise awareness among women as well as in the media such as television, radio and newspapers\(^{(11)}\).

In 2017, the incidence of all types of cancer was higher in females than in males in a period from 2008 to 2015 in Karbala\(^{(12)}\) and this similar to the current study. The mortality rate according to infection with different types of cancer increase in Basrah governorate during the period from 2008 to 2016. Lung and bronchus cancer caused the death in 752 (13.2\%) from 5719 patients who suffered from different types of cancer, followed by breast cancer which lead to death 606 (10.6\%) of patients during 2008 – 2013\(^{(13)}\). In 2018, 75\% of Iraqi women with breast cancer, suffered from deficiency of vitamin D3 and calcium. So these two factors may have an impact on the incidence of cancer in women\(^{(14)}\).

Iraqi children, aged less than (15) years had acute lymphoblastic leukemia (ALL) in a percentage of 72.5\%, whereas acute myeloblastic leukemia in adult was 27.5\%(15). All types of cancer increased in the world. Breast cancer incidence ranged from 27 per 100000\^-2 in (Asia, Africa) and (Australia, North America and Europe) respectively\(^{(16)}\). In United States, the colorectal cancer incidence had spread in patients aged from (49–50) years in percentage 46.1\% (50 per 100000 of population)\(^{(17)}\).

**Conclusion**

Breast cancer most common types in Baghdad city and increased in the last year, 2019. Also, Female more than male suffered from Breast cancer, specifically in age between third and fourth decades years.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

**Conflict of Interest:** Non

**Funding:** Self-funding

**References**


Investigation of the Hydrolytic Enzyme Activities of *Candida Parapsilosis* Isolated From Milk Samples of Bovine Mastitis by API ZYM and Molecular Method

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**Abstract**

Two hundred and fifty milk samples were collected from cows suffering from mastitis, these samples were tested for mycotic mastitis using culture and conventional PCR method. The results showed 116 isolates of *Candida* spp. were recovered with a prevalence of (46.4%), hence *C. parapsilosis* was the dominating species 15/116 (12.9%). Fifteen isolates (100%) belong *C.parapsilosis* was confirmed by PCR using a species-specific primer for the 18S rRNA gene. Some randomly chose isolates of *C. parapsilosis* were used for detection of their hydrolytic enzymatic activity by API ZYM test and PCR. The method used to evaluate their enzymatic activity was API ZYM (BioMerieux). The highest activity was observed for leucine arylamidase, acid phosphatase, naphthol-AS-BI-phosphohydrolase and α-glucosidase as 10/10 (100%) for each, followed by esterase lipase (C8) 9/10 (90%), valine arylamidase and alkaline phosphatase 8/10 (80%) for both and esterase (C4) 7/10 (70%). Conventional PCR was done for partial amplification of sterol esterase, alkaline phosphates and alpha-glucosidase genes by specific primer sequences, The results of the PCR amplification of these genes was 8/10 (80%) for sterol esterase gene. Concerning the alkaline phosphatase gene, it was present in 10/10 (100%). Regarding alpha-glucosidase gene was present in 10/10 (100%). This work aims at evaluating enzymatic activities of *C. parapsilosis* isolated from cow’s milk with mastitis.

**Keywords:** Candida parapsilosis, Bovine mastitis, Hydrolytic enzymes, Conventional PCR, API ZYM test.

**Introduction**

Bovine mastitis is the most devastating state of the epidemic in terms of the worldwide economic losses. The etiological agents can vary from place to place depending on climate, animal species and animal husbandry, and include a wide variety of gram-positive and gram-negative bacteria and fungi(1). Mycotic mastitis had been documented to be caused by various genera of moulds and yeasts beside bacterial mastitis,

The most commonly observed fungi are *Candida* spp, *Aspergillus* spp, *Trichosporon* spp, *Cryptococcus* spp(2). Mycotic mastitis is classified into two large groups based on the moment of diagnosis, primary mycotic mastitis (bacterial preliminary mastitis) and secondary mycotic mastitis that often occur immediately without antibiotic treatment (3). For timely, effective management, early, rapid and accurate identification of the pathogenic fungus is important. In the clinical microbiology laboratory, traditional detection of pathogenic fungi is based on morphological and physiological tests that often take 3 days or more and may be inaccurate. A traditional PCR and multiplex PCR approach was developed in recent years to classify multiple fungal pathogens simultaneously in a single reaction(4). The fungi have virulence factors such as adapted cell morphology, adhesion factors, phenotypic switching, biofilm formation and enzymatic activity to
colonize, invade and evade host defence mechanisms. One particularly effective factor is the production of extracellular hydrolytic enzymes which facilitate the destruction of the cellular membranes and thus allow the host tissue to penetrate the fungal cells(5).

Material and Method

Sample Collection: Two hundred and fifty samples of bovine milk with mastitis according to California mastitis test from different areas of Basrah province, had been collected during the period from March 2018 up to September 2019.

Isolation and identification of Candida spp.: Milk samples were inoculated in Sabouraud’s Dextrose agar supplemented with 0.05 mg/ml chloramphenicol and then incubated at 37°C for 24h up to 1 week. Macroscopic and microscopic morphology tests have been performed after incubation yeast identification was conducted according to(6).

Detection of hydrolytic enzymes by API ZYM Kit: The enzymatic activity was measured using a semi-quantitative micromethod API ZYM test (BioMerieux, France) (API Laboratories and Analytab products). The substrate was available for 19 hydrolytic enzymes(7), for evaluating the followings: Alkaline phosphatase, esterase, esterase lipase, lipase, leucine arylamidase, valine arylamidase, cystine arylamidase, trypsin, α-chymotrypsin, acid phosphatase, naphthol – AS-BI-phosphohydrolase, α-galactosidase, β-galactosidase, β-glucosidase, α-glucosidase, α-mannosidase and α-fucosidase.

Specimen suspension was expected from culture media on Sabouraud’s dextrose agar in 2 ml of distilled water, then suspended in API medium the turbidity was concordant with McFarland tube No. 5. Inoculation of the strip using a pipette was done by dispensing 65 ml specimen into each cupule, the plastic lid was placed on the tray and incubated at 4 h for 37°C, the inoculated strip was not placed in bright light. One reduction of ZYM A, after incubation (tensioactive agent) and 1 reduction of reactive ZYM B (diazonium salt) was added to every cupule. Strips had been placed under a strong source of light (1000 W bulb) for about 10 seconds. Reactions were read and the results recorded on the result sheet. A value of 0-5 assigned corresponding to the established colours: 0 corresponds to a negative reaction; 5 corresponds to the maximum intensity; values 1, 2, 3, 4 are considered to be intermediate reactions depending on the intensity level.

Molecular identification of C. parapsilosis:

A. Primer Design: DNA extraction yeast culture was done with G-spin extraction DNA kit according to the manufacturer protocol identification of C.parapsilosis isolates were conducted by using conventional PCR for the amplification of a partial gene of 18S rRNA by specific primer sequences was used. The hydrolytic enzymes detected were of genes encoding sterol esterase, alkaline phosphatase and alpha-glucosidase. The PCR primers were designed and funded by the company (Macrogen, South Korea) using the NCBI- Gene Bank online database and primer design., table (1).

<table>
<thead>
<tr>
<th>No.</th>
<th>Gene (systematic name) primer</th>
<th>Oligonucleotide Primer sequence (3’-5’ Forward &amp; reverse)</th>
<th>Amplicon (bp)</th>
<th>Genbank Accession number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>18S rRNA</td>
<td>F  CTGCAGGAGGATCATTACAGA</td>
<td>507</td>
<td>FM172980</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R  TCCTCCGCTTATTGATATGCTT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Sterol esterase</td>
<td>F  TGTTGGCTCGAGAACCATACG</td>
<td>489</td>
<td>HE605208</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R  CTCTGGAGTCCACCTTGCAG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Alkaline phosphatase</td>
<td>F  GGGGCCACCTGCATTGTTTTCTTG</td>
<td>598</td>
<td>NC032089</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R  CATTGTGGTGTAAGCGCTGG</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Alpha-glucosidase</td>
<td>F  ATGCTCTCATGCGAGATGGA</td>
<td>550</td>
<td>NC032089</td>
</tr>
<tr>
<td></td>
<td></td>
<td>R  GTATCAACCGCGCGCAAATC</td>
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</tr>
</tbody>
</table>
B. DNA extraction: According to the manufacturer procedure, yeast genomic DNA from the milk samples was extracted using G-spin DNA extraction kit. Candida culture as 200 μl was pipetted into 1,5 ml sterile microcentrifuge tubes, then added 50 mg glass beads with 20 μl of proteinase K and homogenized for 5 min by cell disruptor vortex mixer. Then 200 μl of BL cell lysis buffer was added to each tube and mixed with a vortex mixer, all tubes were incubated for 10 min for 56°C with mixing every 3 min, 200 μl of absolute ethanol was applied to lysate and immediately mixed by shaking vigorously. Spin column put in a 2 ml collection tube and transferred the mixture (including any precipitate) to the column, and then centrifuged for 1 min at 13,000 rpm. The filtrate was discarded and the spin column was inserted into a new 2 ml collection tube, 400 μl W1 buffer was added to the spin column and centrifuged at 13,000 rpm for 1 min, the flow-through was discarded and the collection tube was reused. Six hundred μl wash buffer was applied to each column and centrifuged at 13,000 rpm for 1 min, the flow-through was removed, the column was put in a new 2 ml collection tube, then all the tubes were centrifuged at 13,000 rpm for 1 min to dry the column membrane. Spin column was placed in a new 1.5 ml tube, and 50 μl of the CE buffer was added directly to the membrane and incubated at room temperature for 1 min, then centrifuged at 13,000 rpm for 1 min. Instead all the tubes left stand for 1 min to ensure that the matrix absorbed the elution buffer, then centrifuged at 10,000 rpm for 30 seconds to elute the purified DNA. NanoDrop spectrophotometer was used to check the concentration of the extracted DNA according to the formula: 1OD260 = 50ng, purity = 260/280.

C. PCR amplification: PCR master mix reaction by using (Master mix PCR PreMix kit). The master mix was prepared according to company instructions by inserting 3 μl of template DNA, 1 μl of forward and reverse primers (10 pmol), and 20 μl of nuclease-free water was completed. Reactions were as follows: initial denaturation at 95°C for 2 min, followed by 30 cycles of denaturation at 95°C for 30 s, annealing at 57°C for 18S rRNA, 60.3°C for forsterol esterase, 59.3°C for each alkaline phosphatase and alpha-glucosidase for 30 sec, and extension at 72°C for 50-60 sec, with a final extension at 72°C for 5 min. Amplification products were separated by electrophoresis on 1.5 % agarose gel containing 3 μg/mL ethidium bromide using a 2000-bp ladder (Amersham Biosciences) as molecular weight marker. Tested on agarose gel electrophoresis for 1 hour (100V).

Results

1. Prevalence of C. albicans in dairy cows with mastitis: Out of 250 milk samples analyzed from cows with mastitis, 116 Candida isolates were recovered (46.4%). Based on cultural and morphological aspects, C. parapsilosis was the predominant 15/116 (12.9%).

2. API- ZYM enzymatic activities: Some random selected C.parapsilosis isolates were used for determination of 19 hydrolases activities. Regarding C. parapsilosis 10 isolates were generated highly activated leucine arylamidase, acid phosphatase, naphthol-AS-BI-phosphohydrolase, and α-glucosidase when the percentage was (100%), followed by esterase lipase nine isolates produce this enzyme strongly (90%) meanwhile only 1 isolate (10%) showed no activity of this enzyme. Eight isolates (80%) found to be producers for each of alkaline phosphatase and valine arylamidase with high activity and only 2 isolates (20%) produce alkaline phosphatase with moderate activity, while 2 isolates (20%) with no activity for valine arylamidase enzyme. In case of esterase, it was found that 7 isolates only (70%) produce this enzyme with strong activity, meanwhile, 2 isolates only (20%) produce this enzyme in moderate activity and only 1 isolate (10%) showed no activity at all, table (2).

<table>
<thead>
<tr>
<th>No</th>
<th>Enzyme</th>
<th>Strong activity</th>
<th>Moderate activity</th>
<th>Negative activity</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>No of isolates</td>
<td>%</td>
<td>No of isolates</td>
<td>%</td>
</tr>
<tr>
<td>1</td>
<td>Control</td>
<td>2</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Alkaline phosphatase</td>
<td>8</td>
<td>80</td>
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</tr>
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<td>3</td>
<td>Esterase (C4)</td>
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<td>70</td>
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</tr>
<tr>
<td>No</td>
<td>Enzyme</td>
<td>Strong activity</td>
<td>Moderate activity</td>
<td>Negative activity</td>
</tr>
<tr>
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</tr>
<tr>
<td></td>
<td></td>
<td>No of isolates</td>
<td>%</td>
<td>No of isolates</td>
</tr>
<tr>
<td>4</td>
<td>Esterase lipase (C8)</td>
<td>9</td>
<td>90</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>Lipase (C14)</td>
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<td>10</td>
</tr>
<tr>
<td>6</td>
<td>Leucine arylamidase</td>
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<tr>
<td>7</td>
<td>Valine arylamidase</td>
<td>8</td>
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<td>2</td>
</tr>
<tr>
<td>8</td>
<td>Cystine arylamidase</td>
<td>10</td>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td>9</td>
<td>Trypsin</td>
<td>10</td>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td>10</td>
<td>α-chymotrypsin</td>
<td>10</td>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td>11</td>
<td>Acid phosphatase</td>
<td>10</td>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td>12</td>
<td>Naphthol-AS-BI-phosphohydrolase</td>
<td>10</td>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td>13</td>
<td>α-galactosidase</td>
<td>10</td>
<td>100</td>
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<td>14</td>
<td>β-galactosidase</td>
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<td>15</td>
<td>β-glucuronidase</td>
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<tr>
<td>16</td>
<td>α-glucosidase</td>
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<tr>
<td>17</td>
<td>β-glucosidase</td>
<td>10</td>
<td>100</td>
<td>10</td>
</tr>
<tr>
<td>18</td>
<td>N-acetylo-β-glucosyloaminidase</td>
<td></td>
<td></td>
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<tr>
<td>19</td>
<td>α-mannosidase</td>
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<td>20</td>
<td>α-fucosidase</td>
<td>10</td>
<td>100</td>
<td>10</td>
</tr>
</tbody>
</table>

Enzymatic activity expressed in nanomoles A- Control no colour B- Strong activity represented in the level of intensity 5 C- Moderate activity in the level intensity of 1,2,3,4 D- Negative reaction corresponding 0.

3. **Molecular identification of C. parapsilosis:**

Molecular identification of *C. parapsilosis* in this study relied on conventional PCR for the amplification of a partial gene of 18S rRNA by specific primer sequences. This gene was present in fifteen samples of *C. parapsilosis* with PCR product size of 507 bp, as shown in figure (1). Using NanoDrop spectrophotometer, DNA concentration was ranging from (5.9 – 70.2) ng/ml with a purity of (1.8–2.08).

![Figure (1): Agarose gel electrophoresis shows PCR product analysis of pathogenic *C. parapsilosis*. Lane M Marker ladder (2000 bp), lane (1-7): 18S rRNA gene of *C. parapsilosis* isolate at 507 bp. Lane (NTC): None template (negative control).](image-url)
3. **Conventional PCR assay for enzyme production by *C. parapsilosis***: The results of PCR amplification of these genes was 8/10 (80%) for sterol esterase with a PCR product size of approximately 489 bp, as shown in figure (2). Concerning the alkaline phosphatase gene, it was present in 10/10 (100%) with a PCR product size of approximately 598 bp, as shown in figure (3). Regarding the alpha-glucosidase gene, it was present in 10/10 (100%) with a PCR product size of approximately 550 bp, as shown in figure (4).

![Figure 2](image2.png)

**Figure (2):** Agarose gel electrophoresis image shows PCR product analysis of pathogenic *C.parapsilosis*. Lane M Marker ladder (2000 bp), lane (1-7): Sterol esterase gene of *C.parapsilosis* isolate at 489 bp. Lane (NTC): None template (negative control).

![Figure 3](image3.png)

**Figure (3):** Agarose gel electrophoresis image shows PCR product analysis of pathogenic *C.parapsilosis*. Lane M Marker ladder (2000 bp), lane (1-7): Alkaline phosphatase gene of *C.parapsilosis* isolate at 598 bp. Lane (NTC): None template (negative control).

![Figure 4](image4.png)

**Figure (4):** Agarose gel electrophoresis image shows PCR product analysis of pathogenic *C.parapsilosis*. Lane M Marker ladder (2000 bp), lane (1-7): Alpha-glucosidase gene of *C.parapsilosis* isolate at 550 bp. Lane (NTC): None template (negative control).
Discussion

Yeasts are single-celled organisms that are ubiquitous in the environment and they are considered prospective pathogens of the mammary gland that produce disease when natural defense mechanism is lowered(8 and 9).

A total of 116 (46.4%) Candida isolates out of 250 milk samples were taken from cows with mastitis based on cultural, morphological aspects were carried out in various setting phenotyping identification tests for Candida spp. The highest percentage among isolated Candida spp was belong C.parapsilosis 15/116 (12.9%). In the present study, the percentage of C.parapsilosis was higher than those obtained in a study done in India (7.69%) isolated from cows with clinical mastitis(10). The presence of C. parapsilosis were also incompatible with those reported in Poland which was (45%) and in Turkey as (12.7%)(11 and 12). The geographical variation may be considered one of the reasons for the discrepancy in the distribution of species, or due to the number of included samples or may due to the differences in the method used for diagnosis.

In the present study C.parapsilosis (N=10) isolates and regarding hydrolases API ZYM test showed strong leucine arylamidase, acid phosphatase, naphthol-AS-BI-phosphohydrolase and α-glucosidase among 10/10 (100%), esterase lipase (C8) 9/10 (90%), valine arylamidase and alkaline phosphatase 8/10 (80%), and esterase (C4) in only 7/10 (70%). Hydrolytic leucine arylamidase enzymes was produced strongly in both tested species of Candida which similar to those reported in Poland by(7). And the isolates of C. parapsilosis examined did not produce trypsin, chymotrypsin, α-galactosidase, β-glucuronidase, α-mannosidase, and α-fucosidase which is similar to those reported by(13). In the current results and regarding the enzymatic activity of the isolated Candida spp. showed some differences from those detected by(14), who studied 12 enzymes of trypsin, α-chymotrypsin, α-galactosidase, β-glucuronidase, α-mannosidase, and α-fucosidase which is similar to those reported by(13). In the current study the reasons of choosing these enzymes out of the previously 19 studied ones is that the gene sequence of the other 16 enzymes are not found in gene bank i.e. the sequences of the three studied enzymes were obtained only. Furthermore, and concerning other studies in this field were not found as published research to compare the current results with them.

Conventional PCR was done for partial amplification of sterol esterase, alkaline phosphates and alpha-glucosidase genes by specific primer sequences. The results of the PCR amplification of these genes was 8/10 (80%) for sterol esterase. Concerning alkaline phosphatase, it was present in 10/10 (100%). Regarding alpha-glucosidase, it was present in 10/10 (100%).

In the current study the reasons of choosing these enzymes out of the previously 19 studied ones is that the gene sequence of the other 16 enzymes are not found in gene bank i.e. the sequences of the three studied enzymes were obtained only. Furthermore, and concerning other studies in this field were not found as published research to compare the current results with them.

Conclusion

1. This study proved the presence of C. parapsilosis in cow milk sample with mastitis in Basrah province.
2. API ZYM test is a good and more specific test than conventional PCR for detection of hydrolytic enzymes activities

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

Conflict of Interest: Non

Funding: Self-funding

Reference


Incidence of *Entamoeba Gingivalis* and *Trichomonas Tenax* in the Oral Cavity of Periodontal and Patients Under Chemotherapy, Confirmed with *in Vivo* Study

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Abstract

**Aim:** The study aimed to evaluate the impact of occurrences *Entamoeba gingivalis*, and *Trichomonas tenax* with periodontal in one hand and patients receiving chemotherapy on the other hand and compared to normal subjects. And evaluate the pathogenicity of these parasites *In Vivo*.

**Materials and Method:** A total of 80 patients, 30 with Periodontitis attending AL-Karama dentistry center, and 20 patients under chemotherapy referred to the national center of hematology- Mustanasiriyah University, Iraq, were involved in this study. And the last 30 subjects were considered as control with good oral condition. Scrapings of gums were taken and examined immediately microscopically, once by wet-mount smear, and the other stained with Giemsa-Romanowsky. The positive samples were cultured on special cultures for the experimental part and then spread on the gingival margins of three groups of rats (for each parasite), the first was given immunosuppressive drug, while the other two groups were not given it.

**Results:** The results show that the higher frequency of *Entamoeba gingivalis* in patients with Periodontitis 36.7%. Patients receiving chemotherapy showed higher frequency of *E. gingivalis* and *Trichomonas tenax* comparing with the control group 30% and 10%, 15% and 3.333% respectively. All rats which were dealt with *T. tenax* still alive and with healthy gingiva, in the other hand, all rats in the 1st group that dealt with *E. gingivalis* have been showed periodontal ulcers and two of them died after 10 days, while one rat of the 2nd group has been showed mild gingival inflammation with no death, and no ulceration, inflammation or death have been occurred in the control group.

**Conclusion:** These findings suggest that: 1- Periodontal patients showed higher frequencies of *E. gingivalis*. 2- Patients receiving chemotherapy showed higher frequencies than the normal control. 3- *In Vivo Entamoeba gingivalis* may become pathogenic in individuals under chemotherapy.

**Keywords:** Oral cavity; toxicity; patients; chemotherapy; *in Vivo*; health.

Introduction

Though the saliva contains low nutrient concentrations and antimicrobial defense systems, the human oral cavity is still a home to numerous microorganisms, oral hygiene alone has little effect on subgingival microflora in deep pockets. Periodontitis is a handicapping disease, WHO (world health organization) calculated that 0.132% of the world wide are disability-adjusted life years, a measure of disease burden as the loss of healthy life years (DALYs). Risk factors for this disease have been identified: alcohol consumption, poor mouth hygiene and smoking.
Trichomonas tenax and Entamoeba gingivalis are human buccal protozoan parasites. T. tenax is an anaerobic, commensal, and can live only in the mouth, they are most abundant between the teeth and gums and in pus pockets, tooth cavities and crypts of the tonsils. Transmission, then, is direct usually through kissing or common use of eating or drinking utensils\(^8\). There are studies that relate to its prevalence in patients with marginal chronic Periodontitis.\(^9\)

Entamoeba gingivalis lives on the surface of teeth and gums, in gingival pockets near the base of teeth, and sometimes in the crypts of tonsils. Because no cyst is formed, transmission most be direct from one person to another by kissing, by droplet spray, or by sharing eating utensils\(^8\). It has been noted in publication that the increased prevalence of *E. gingivalis* is connected with diseases of the oral cavity, and particular with periodontal diseases\(^10\). Chomize et al\(^11\) have, however, demonstrated the pathogenicity of *E. gingivalis* in the following groups of patients: those receiving immunosuppressive, with genetic diseases and with lowered body immunity.

**Materials and Method**

**Survey Part:** Study subjects: The present sample consists of 80 individuals aged 20-60 year, and comprised 35 females and 45 males. No of the study subjects were completely edentulous\(^12\). Thirty of patients were with advanced Periodontitis who referred to AL-Karama dentistry center, and 20 patient who are under chemotherapy were selected from the national center of hematology/Mustanasiriya university/Baghdad, Iraq. The rest 30 subjects were considered as control group with no systemic disease and with good oral condition.

**Samples Collection:** A temporary laboratory was set up in both sites of the study, identification of *E. gingivalis* and *T. tenax* are made by the finding of trophozoites in scrapings the gums and teeth with sterile swab rubbed. Samples are taken from deep pockets surrounding the teeth of patient.

**Microscopic Examination:** The deposit was suspended in a drop of physiological saline solution, and two slides were performed for each sample, light microscope examination by original wet-mount smear is performed immediately for presence of *T. tenax*, due to its motility\(^13\). And the other was stained with Giemsa-Romanovsky\(^14\) after the samples were fixed examined immediately under light microscope (40 x)\(^15\) to detect the *E. gingivalis*. The parasite of *T. tenax* was identified by their flagella and characteristic locomotion, while *E. gingivalis* was identified by its shape depending on the expansion of the pseudopodia formation and presence of vacuoles\(^16\).

**Experimental Study:**

**Parasites Culturing:**

1. **Entamoeba Gingivalis:** After the isolation of *E. gingivalis* from periodontal patients, the organism cultured on (Cleveland and collier medium) for 72 hour, filtered, washed with physiological normal saline for 3 times\(^17\).

2. **Trichomonas Tenax:** The samples that positive of *T. tenax* were inoculated in the broth selective Kupferberg, used for the growth of *T. tenax* (Kuperberg Trichomonas Broth), to which 0.1g of chloramphenicol was added to prevent the growth of bacteria and other microorganisms. Seeded culture media were taken to the oven at 37\(^\circ\)C for 72 hour.\(^18\)

**The Animals:** Two suspensions of *Entamoeba gingivalis* and *Trichomonas tenax* were prepared for experimental application by using 24 rats about (200-250 g/rat) provided by animal house of the Biological Chemical Pharmaceutical Control, the rats had normal teeth and periodontal tissue.\(^17\)

For each parasite, 12 rats are divided into three groups (4 rats for each). The first group injected with prednisolone acetate (0.25 mg/rat) daily for one week before animal test\(^19\), while the other two groups of rats are not given immunosuppressive drug. Parasites suspension spreaded on the gingival margin of the rats (first and second groups only), the third group is the control in which their gingival margins are spreaded by normal saline free from parasites\(^17\).

**Results and Discussion**

Cross sectional study designed of 80 subjects were selected as a study samples, 30 with advanced Periodontitis, 20 under chemotherapy, and the latest 30 were control group with no systemic disease and with good oral condition. Out of 30 Periodontal examined patients, 11(36.7\%) were infected with *E. gingivalis*, while 3(10\%) were harbored *T. tenax* as illustrated in table (1). In addition to that, results shows that occurrence of *E. gingivalis* and *T. tenax* in the 20 patients under chemotherapy are accounted 6(30\%) and 3 (15\%)
respectively, while their occurrence in the controlled group were 3(10%) and 1 (3.33%) respectively fig. (1).

Comparisons significant shows that with periodontitis group in light of positive E. gingivalis outcomes compared with controlled group recorded significant different at P<0.05, with more than three times occurrences (Cohort=3.375)\(^{20}\). In addition to that, with respect to T. tenax positive outcomes compared with controlled group, no significant different at P>0.05 was obtained, but it’s more informative for that result to be reported rather than simply that p-value was not achieved to 0.05, as well as under chemotherapy group with respect to T. tenax parasite are reported more than four times (Cohort=4.5) of positive outcomes compared with controlled group. And these results are the same as the findings of\(^{(23)}\), who revealed that when the immunity level decreases or when immunosuppressive drug is used the infection may occur in the oral cavity.

Finally, comparisons significant shows that with periodontitis and under chemotherapy groups in light of positive E. gingivalis outcomes, had no significant different at P>0.05, with a similar times occurred (Cohort=1.22). In addition to that, with respect to T. tenax positive outcomes, no significant different at P>0.05 was obtained, but according to related ratios (Cohort=0.667) of positive outcomes, it could be conclude that under chemotherapy group had one and a half times of reported positive outcomes more than those reported with Periodontitis group. Figure (1) represent graphically by cluster bar charts distribution of Entamoeba gingivalis and Trichomonas tenax sensitive to positive outcomes among studied groups (periodontitis, under chemotherapy, and control) groups.

**Table (1): Frequencies of Entamoeba gingivalis and Trichomonas tenax in the studied groups**
<table>
<thead>
<tr>
<th>Groups</th>
<th>Total number in each groups</th>
<th>E. gingivalis</th>
<th>T. tenax</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>+ve%</td>
<td>+ve</td>
</tr>
<tr>
<td>Periodontitis</td>
<td>30</td>
<td>36.7%</td>
<td>11</td>
</tr>
<tr>
<td>Under Chemotherapy</td>
<td>20</td>
<td>30%</td>
<td>6</td>
</tr>
<tr>
<td>Control</td>
<td>30</td>
<td>10%</td>
<td>3</td>
</tr>
</tbody>
</table>

C.S. (*)

<table>
<thead>
<tr>
<th>P-value</th>
<th>Periodontitis X Control</th>
<th>Under Chemotherapy X Control</th>
<th>Periodontitis X Under Chemotherapy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>P=0.016 (S)</td>
<td>P=0.002 (HS)</td>
<td>P=0.626 (NS)</td>
</tr>
<tr>
<td></td>
<td>For cohort</td>
<td>For cohort</td>
<td>For cohort</td>
</tr>
<tr>
<td></td>
<td>E. gingivalis = +ve</td>
<td>E. gingivalis = +ve</td>
<td>E. gingivalis = +ve</td>
</tr>
<tr>
<td></td>
<td>(3.375)</td>
<td>(14.5)</td>
<td>(1.222)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>P=0.071 (NS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>For cohort</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>T. tenax = +ve</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(3.00)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>P=0.136 (NS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>For cohort</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>T. tenax = +ve</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(4.50)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>P=0.594 (NS)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>For cohort</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>T. tenax = +ve</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(0.667)</td>
</tr>
</tbody>
</table>

(*) HS: Highly Sig. at P<0.01; S: Sig. at P<0.05; NS: Non Sig. at P>0.05; Testing based on Contingency Coefficient test and measuring ratio related rates (Cohort +ve)

Figure (1): Distribution of *Entamoeba gingivalis* and *Trichomonas tenax* sensitive at the studied groups

According to experimental part of this study, table (2) explains that, each of the twelve rats which were deals with *Trichomonas tenax*, and *Entamoeba gingivalis* reported the following results:

**Trichomonas tenax**: Dealing with *Trichomonas tenax*, twelve rats stilled a life and with healthy gingival, and that’s remained with the same responses in view of 2nd and 3rd groups.

**Entamoeba gingivalis**: Dealing with *Entamoeba gingivalis*, twelve rats had reversed behavior with their a life and with healthy gingival, and that’s given in each groups, as follows:

**First group**: All rats injected with immunosuppressive drug have been shown periodontal ulcers after 7 days of dealing with *E. gingivalis*, and two of them died after 10 days of dealing.

**Second group**: One of the rats has been shown Gingival Erythematous and swollen after 6 days of dealing with *E. gingivalis*. No periodontal ulcers and no death occurs to the rats.
Third group: All the 4 rats were still healthy, and no death occurs to them.

In addition to that, statistically, and comparing between Trichomonas tenax, and Entamoeba gingivalis, a significant different at P<0.05 are accounted according to test distribution of multiple ratio’s infections (+ve) in contrasts of different groups, and it could be indicating that Entamoeba gingivalis had reported the worst type of studied parasite resulted either with number of infection, or with dead status of rates. And these results are in agreement with (17).

<table>
<thead>
<tr>
<th>Parasites</th>
<th>No. of group</th>
<th>No. of rats</th>
<th>+ve Infection</th>
<th>+ve %</th>
<th>Dead rats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trichomonas tenax</td>
<td>1st With Chemotherapy and Parasite</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2nd With Parasite</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>3rd Without Chemotherapy and Parasite</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Entamoeba gingivalis</td>
<td>1st With Chemotherapy and Parasite</td>
<td>4</td>
<td>4</td>
<td>100%</td>
<td>250%</td>
</tr>
<tr>
<td></td>
<td>2nd With Parasite</td>
<td>4</td>
<td>1</td>
<td>25%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>3rd Without Chemotherapy and Parasite</td>
<td>4</td>
<td>0</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>C.S.(*)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>P-value</td>
<td></td>
<td></td>
<td></td>
<td>MZ=8.914</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>P&lt;0.05</td>
</tr>
</tbody>
</table>

(*) S: Sig. at P<0.05; Testing based on Multiple Z-test.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

Conflict of Interest: Non

Funding: Self-funding

References


Relation of Serum Level of Lipocalin 2 to Her2/neu in Women with Breast Cancer

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Abstract

Background: Breast cancer is the most common type of cancer worldwide, being one of the leading causes morbidity in the female.(1) Lipocalin is a neutrophil gelatinase-associated lipocalin (NGAL) or lipocalin 2 that is a 25 KDa glycoprotein, which was originally identified as a covalent complex with matrix metalloproteinase-9 (MMP-9) in human neutrophil.(2) Lipocalin acts as bone-derived hormone which crosses the blood brain barrier (BBB) and acts on the hypothalamus in the brain. The human epidermal growth factor receptor 2 (HER-2/neu), has shown to have a prognostic value for the treatment with the monoclonal antibody in breast cancer.(3)

Material and Method: This is a cross sectional, hospital based study. This study was carried out at the Oncology Center in Kirkuk City-Iraq from the 1st of November 2018 to the end of June 2019. Forty-two women with breast cancer were considered as a study group. Forty-four apparently healthy women without breast cancer (relative of patients) and with a negative family history for the first and second degree relatives of breast cancer were consider as a control group, their ages were from 23 to 70 year. By using a sterile disposable syringe 10 mls of venous blood sample was drawn from each woman at morning and was kept in a plain tube and allowed to clot at room temperature, then each sample was centrifuged at 6000 rpm to obtain serum. Serum of the patients and controls had assay for lipocalin 2 and Her2/neu by ELISA.

Results: The mean serum level of lipocalin 2 was significantly elevated in breast cancer women compared to control women (62.77 ± 6.1 and 23.98 ± 5.9 ng/l) respectively at a P value of 0.001. This study also reveals that the mean serum level of Her2/neu was higher in breast cancer women (33.96 ± 2.7 ng/ml) as compared with the control group (9.76 ± 1.6 ng/ml). This result was highly significant at a P value of 0.001. This study found that there was a moderate positive correlation between lipocalin with Her2/neu in breast cancer women (R: 0.33), which means that lipocalin 2 was proportionally elevated with increasing of Her2/neu level.

Conclusion: This study reveals that there was a significant positive correlation between lipocalin and Her2/neu in breast cancer women, the r value was 0.33.

Keywords: Breast cancer, lipocalin 2, and Her2/neu.

Introduction

Breast cancer is the most dangerous disease that threatens women lives in Iraq for the last twenty years ago.

Every year 1000-1200 new cases are recorded, 98% of which affect women, and 2% of which affect men. Breast cancer occupies 14% of the whole disease in different cancers and a rate of 1-6 of women are affected from every 100000 women.(4) It is important to distinguish the biochemical profiles of cells that have been transformed to malignant cells. Generally these cells, are different from that of normal, tend to concentrate almost upon growth by maximizing the anabolic processes and put down the catabolic functions.(5)
Lipocalin (LCN2), a member of the lipocalin protein family, is a secreted as a glycoprotein that transports small lipophilic ligands. The protein part of lipocalin are part of a group of more than 20 diverse proteins that exhibit limited amino acid sequence similarity but share a highly conserved 3D-structure. LCN2 is a prominent member of the lipocalin super family and was originally identified as a 25-kDa neutrophil glycoprotein based on its covalent binding to matrix metalloproteinase-9 (MMP-9) in human neutrophils.\(^7\),\(^8\) LCN2 has gained attention as a potential biomarker and a modulator of human cancer. LCN2 protein expression levels have been demonstrated to be increased in various human epithelial cancer types, including breast cancer.\(^10\),\(^11\)

The human epidermal growth factor receptor 2, is a transmembrane tyrosine kinase receptor. This protein is encoded by the HER2gene, which is located on the long arm of chromosome 17 (17q12–21.32). Clinically, HER2-positive breast cancer occurs in 15–20% of breast cancer patients and is characterized by the over expression of the HER2 receptor and/or HER2 gene amplification.\(^12\) HER2-positive breast cancer patients have a particular worse prognosis.\(^9\)

**Patients Materials and Method:**

A cross sectional, hospital based study. The protocol of this study was approved by the scientific committee of Tikrit University-College of Medicine, and the agreement of the attendance to Kirkuk Oncology Center to collect the sample from the patients was approved by the Kirkuk Health Directorate. This study was carried out at the Oncology Center in Kirkuk City- Iraq from the 1st of November 2018 to the end of June 2019. A verbal consent was taken from each women included in this study whether considered as a case or control. Forty-two women with breast cancer were considered as a study group, their ages were between 23 to 70 years, and they were from the center and periphery of Kirkuk City, while 44 apparently healthy women without breast cancer and with negative family history for the first and second degree relatives of breast cancer were consider as a control group, their ages were from 23 to 70 year.

By using a sterile disposable syringe 10 mls of venous blood sample was drawn from each woman included in this study at the morning and was kept in a plain tube and allowed to clot at room temperature, then each sample was centrifuged at 6000 rpm to obtain serum. The serum was aspirated then divided into aliquots in plastic tubes and stored at -20°C until the time of estimation. Serum of the patients and controls had assay:

1. Lipocalin 2 by ELISA.
2. Her2/neu by ELISA.

**Statistical Analysis:** All the date collected in this study were analyzed by using the student t-test, the mean, standard deviation, and P-value was also considered. The significance was considered at a P value of less than 0.05. While the correlation was considered as follow:

**Interpretation of R value (correlation coefficient)**
- 0.70. A strong negative correlation.
- 0.50. A moderate negative correlation.
- 0.30. A weak negative correlation.
- 0.3 < R < 0.3: no correlation.
+ 0.30. A weak positive correlation.
+ 0.50. A moderate positive correlation.
+ 0.70. A strong positive correlation.

Results

The total number of a subject that participate are 88 (42 patient and 44 control). The highest rate of breast cancer women (42.86%) was within the age group 41 - 50 years, followed by those within the age group of 51 - 60 years (21.44%). The least rate of breast cancer women (9.52%) was within the age group of more than 60 years, as see in the Figure 2.

![Figure (2): Relation of breast cancer with age.](image)

This study show that the mean of BMI was recorded in breast cancer women when compared with healthy women was 28.5±2.19 versus 24.12±0.99 Kg/m² at a P value P: 0.01, as shown in the following figure 3

![Figure 3: Relation of BMI to breast cancer](image)

The mean serum level of lipocalin 2 was significantly elevated in breast cancer women compared to control women (62.77 ± 6.1 and 23.98 ± 5.9 ng/l) respectively at a P value of 0.001.
Table (1): The mean and standard deviation (SD) of lipocalin 2 level in breast cancer women and the control group.

<table>
<thead>
<tr>
<th>Lipocalin 2 level (ng/L)</th>
<th>Breast cancer women</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>42</td>
<td>44</td>
</tr>
<tr>
<td>Mean</td>
<td>62.77</td>
<td>23.98</td>
</tr>
<tr>
<td>SD.</td>
<td>6.1</td>
<td>5.9</td>
</tr>
<tr>
<td>T. test: 29.4 P. value: 0.001 Highly Significant (HS)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This study also shows that the mean serum level of Her2/neu was higher in breast cancer women (33.96 ± 2.7 ng/ml) as compared with the control group (9.76 ± 1.6 ng/ml). This result was highly significant at a P value of 0.001, see the table 2.

Table (2): Determination of Her2/neu level in breast cancer women and the control group.

<table>
<thead>
<tr>
<th>Her2/neu level (ng/ml)</th>
<th>Breast cancer women</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>41</td>
<td>44</td>
</tr>
<tr>
<td>Mean</td>
<td>33.96</td>
<td>9.76</td>
</tr>
<tr>
<td>SD.</td>
<td>2.7</td>
<td>1.6</td>
</tr>
<tr>
<td>T. test: 35.15 P. value: 0.001 Highly Significant</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This study found that there was a moderate positive correlation between lipocalin 2 with Her2/neu in breast cancer women (r: 0.33), which means that lipocalin 2 was proportionally elevated with increasing of Her2/neu level, see the figure 4.

![Figure (4): Correlation of lipocalin 2 with Her2/neu in breast cancer women.](image)

**Discussion**

This study reveals that, he highest rate of breast cancer in women was within the age group 43 - 52 years and the least was within the age group of more than 63 years. Numerous results obtained by other studies were focused on the age of women with breast cancer, e.g. the study that carried by Ghanim H et al(13), who found that the mean age of breast cancer women was 42.2 ± 10.41 years, while the study by Armstrong K(14) who found that the mean age was 50.4± 12.45 years with range of 22 to 80 years.
The study showed that 76.19% of breast cancer women in this study were belonged to urban area comparing with 23.81% were from rural area, this finding could be attributed to that the majority of cases included in this study were from the urban area. Previous study found that malignant lesions of breast cancer were more common in rural areas as compared to urban. This could be due to poor medical aid in rural areas, lower socioeconomic status, and illiteracy. These studies not agree with the present study, this disagreement may be related to a non-homogenous samples.

Body mass index is known to be a modify risk factor for breast cancer. In current study malignant case with BMI > 30.0 kg/m² represent 50% of malignant tumor that agree with other studies. Epidemiological studies have shown that postmenopausal obesity causes an increase in the risk for breast cancer. Since obesity has a close relationship with increased levels of insulin and insulin like growth factors, although increased BMI, elevated blood glucose, dyslipidemia and hypertension are components of metabolic syndrome. Insulin resistance reduces sex hormone-binding globulin levels, causing an increase in free estrogen and androgen levels, hence increasing proliferation of breast epithelial cells.

In the present study the mean serum level of lipocalin 2 for patients with malignant tumor was higher than the control at a P value of 0.001. LCN2 has gained attention as a potential biomarker and a modulator of human cancer, its protein expression levels have been demonstrated to be increased in various human epithelial cancer types, including breast cancer. The finding of Hu et al. were in agreement with finding of this study, who found that there was a significant relation between LCN2 and breast cancer and provided strong evidence for the role of LCN2 in aggressive subtypes of breast cancer. Additionally, Yang et al. reported that lipocalin 2 promoted breast cancer progression, and found that LCN2 level was consistently associated with invasive breast cancer in human tissue. Ören et al. also demonstrated that LCN2 was highly related to breast cancer as compared with healthy women. Bratt also reported that level of LCN2 also significantly higher in breast cancer women than normal breast stroma.

The present study showed that the mean serum level of Her2/neu was higher in breast cancer women compared to the control women. Previous study performed on 64 women with breast cancer; 25 (39.1%) had elevated serum HER2/neu levels accompanied with increased tissue expression of HER2/neu receptors, their results was in a greement with the present study. These results suggest that the elevated in serum Her2/neu level was associated with a clinicopathological aggressive phenotype of breast carcinoma and was related to tissue Her2/neu overexpression. Therefore, serum Her2/neu may be useful for monitoring the course of the disease and response to treatment. Other studies found that, patients with distant metastases (liver, lung and ovary) had markedly elevated serum HER2/neu levels as compared to those without metastases.

The positive correlation between lipocalin 2 and Her2/neu, this finding could be attributed to that both of them were elevated in the sera of women with breast cancer.

**Conclusion**

There were an increase in serum levels of lipocalin 2 and Her2/neu in women with breast cancer.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

**Conflict of Interest:** Non

**Funding:** Self-funding

**References**


Estimation Some Antioxidants Enzymes in Stress Patients in Babylon City

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Abstract

Oxidative stress can be defined as an increase in oxidative parameters or a decline in antioxidant defense mechanisms. Superoxide dismutase (SOD) and catalase (CAT) are antioxidant enzymes. They are responsible for eliminating free radicals like superoxide and hydrogen peroxide, and they stand for antioxidant defense mechanisms. An entire of fifty patients and twenty-five control subjects were collected between April to August 2019. Several physiological parameters were calculable similar to (SOD, and CAT). The results of present study illustrated that the patients groups, had greater significant differences (P≤ 0.05) levels of SOD, and CAT in contrast with control groups result at significant differences (P≤ 0.05).

Conclusion: We found increased SOD and CAT levels were significantly increased in stress patients.

Keywords: Antioxidant, SOD2, stress, Oxidative; health; toxicity.

Introduction

Stress is a physical and a psychological state always present in a human being, and forming an integral part of his everyday life. An event may be perceived by an individual as stressful, whereas another individual may not see it as such, for example, the experience of travelling by plane may be perceived as marvellous whereas for somebody else it might prove to be severe and anxiety-causing(1).

On the other hand, the same person may find that the same event causes stress in one situation, whereas in another it causes little or no emotional involvement. There are, of course, situations affecting most people (e.g., unemployment, sudden death, earthquake, separation) but each person interprets and assesses every experience based on his subjective criteria and deals with it in his own, unique way(3).

Stress causing stimuli may be: biological (disease, surgery), chemical (drugs, toxic substances), microbial (viruses, bacteria, parasites), psychological (illness, death, separation, divorce, failure), developmental (premature birth, anatomical defects), socio-cultural (inharmonious interpersonal relationships, financial difficulties), environmental (unemployment, atmospheric pollution)(2).

Reactive oxygen species (ROS), reactive nitrogen species (RNS), other free radicals, and their related molecules are produced during many physiological and pathological processes taking place in different brain regions and in the periphery(4).

The main sources of ROS generation are environmental pollution, harmful ultraviolet rays, and metabolism, phagocyte cells etc. These sources generate free oxygen radicals and further the oxidative stress in the human body. The theory of oxidative stress suggests that the stress leads to cellular degradation which causes a cascade of apoptotic events and finally to the cell death. Oxidative damage caused by free radicals induce the generation of superoxide radical, peroxynitrite and many more radicals that are the major cause how we age and also age related disorders like Alzheimer’s,
Parkinson’s, neurodegenerative diseases and other related disorders (5).

SOD change superoxide (O2) to hydrogen peroxide (H2O2) and 3 isoformings are known. SOD1 (CuZnSOD) is current in red blood cells (RBCs), SOD2 (MnSOD) is first and foremost mitochondrial and SOD3 is extracellular (7).

Catalase (CAT) is an important endogenous antioxidant enzyme that catalyzes H2O2 detoxification. A number of CAT gene single-nucleotide polymorphisms (SNPs) and mutations have been associated with disease manifestations (8).

Material and Method

Sampling: Fifty blood samples were collected from patient under go stress disease and twenty five samples as control.

Determination of superoxide dismutase (SOD) activity: 50 ul of serum was mixed with 0.2 ml of 0.1 M EDTA [containing 0.0015% NaCN], 0.1 ml of 1.5 mM NBT and phosphate buffer (67 mM, pH 7.8) in a total volume of 2.6 ml. After adding 0.05 ml of riboflavin, the absorbance of the solution was measured against distilled water at 420 nm (6).

Determination of Catalase Activity: CAT activities were determined by measuring the decrease in hydrogen peroxide concentration at 230 nm by the method of Beutler (9). The assay medium consisted of 1 mol/L Tris HCl-5 mmol/L disodium ethylenediamine tetraacetic acid (EDTA) buffer solution (pH 8.0), 1.0 mol/L phosphate buffer solution (pH 7.0), and 10 mmol/L H2O2. CAT activity was expressed as U/mg protein.

Results

The data demonstrated that the patients groups, had greater significant differences (P ≤ 0.05) levels of SOD and catalase in contrast with control groups result as show in table (1) (2), (3).

Table (1): Main features of the study population.

<table>
<thead>
<tr>
<th>Variation</th>
<th>NO. %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td></td>
</tr>
<tr>
<td>Hypertension group</td>
<td>13 (17.33%)</td>
</tr>
<tr>
<td>Non hypertension group</td>
<td>62 (82.66)</td>
</tr>
<tr>
<td>11-40) years</td>
<td>42(56%)</td>
</tr>
<tr>
<td>(41-60) years</td>
<td>17 (22.66%)</td>
</tr>
<tr>
<td>61-80) years</td>
<td>16(21.33%)</td>
</tr>
<tr>
<td>Diabetes</td>
<td></td>
</tr>
<tr>
<td>Diabetic group</td>
<td>10(13.33%)</td>
</tr>
<tr>
<td>Non diabeteic group</td>
<td>65(86.66%)</td>
</tr>
<tr>
<td>Smoking</td>
<td></td>
</tr>
<tr>
<td>Smoking group</td>
<td>25(33.33%)</td>
</tr>
<tr>
<td>Non smoking group</td>
<td>50(66.66%)</td>
</tr>
</tbody>
</table>

Tables (2): Serum concentrations of physiological parameters in patients and control groups.

<table>
<thead>
<tr>
<th>Groups Parameter</th>
<th>Control (Mean ± S.E)</th>
<th>Patients (Mean ± S.E)</th>
<th>P-value of groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOD2</td>
<td>3.87±103.15</td>
<td>23.24±399.89</td>
<td>0.0001*</td>
</tr>
<tr>
<td>CAT</td>
<td>3.87±103.15</td>
<td>16.27±239.67</td>
<td>&lt;0.0001*</td>
</tr>
</tbody>
</table>

t-test.
*P ≤ 0.05.
S.E: Standard error
Table (3): The differences among of age, weight,sod and CAT in both gender of study groups

<table>
<thead>
<tr>
<th>Groups Parameter</th>
<th>Female (Mean ± S.E)</th>
<th>Male (Mean ± S.E)</th>
<th>P-value of groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>SOD2</td>
<td>18.86±354</td>
<td>25.89±405.46</td>
<td>0.05*</td>
</tr>
<tr>
<td>CAT</td>
<td>36.74±210</td>
<td>17.74±243.29</td>
<td>0.42</td>
</tr>
<tr>
<td>Age</td>
<td>4.00±35.40</td>
<td>2.61±40.00</td>
<td>0.07</td>
</tr>
<tr>
<td>Weight</td>
<td>1.20±71.60</td>
<td>1.43±80.97</td>
<td>0.029*</td>
</tr>
</tbody>
</table>

Discussion

The consequences of estimation physiological parameters (SOD, CAT) illustrated that the patients groups, had greater levels in contrast with control groups result at significant differences (P ≤ 0.05).

This study evaluated the SOD and CAT activity in patients with stress. The main finding of our study has indicated that there was an increase in SOD and CAT activity in men with stress compared to the female.

Oxidative stress is a condition associated with an increased rate of cellular damage induced by oxygen and oxygen-derived oxidants commonly known as reactive oxygen species(10). Reactive oxygen species (ROS) have been implicated in over a hundred of disease states which range from arthritis and connective tissue disorders to carcinogenesis, aging, toxin exposure, physical injury, infection, and acquired immunodeficiency syndrome11). The role of oxidative stress in infertility and method for counteracting its impact on reproductive tissues with antioxidants is still in its infancy.

SOD is the enzyme that catalyzes the conversion of superoxide anion radicals (O2•−) to hydrogen peroxide and molecular oxygen, functioning as a controller of cellular reactive oxygen species levels(12). Past reports denote increased SOD levels in patients with stress and anxiety; however, we found that SOD levels were significantly increased in stress and anxiety patients(13).

Oxidative stress plays a crucial role in the pathophysiology of stress. In addition, poor appetite, psychological stressors, obesity, metabolic syndrome, sleep disorders, cigarette smoking and unhealthy lifestyle may also contribute to it(14).

Catalase is a crucial enzyme for antioxidant mechanisms and decomposes hydrogen peroxide into water and oxygen.(15) Among stress people, CAT is reported to be increased in patients compared to controls(16).

Catalase guards the cells from hydrogen peroxide generated with in them. It plays a role in tolerance acquisition to oxidative stress in the adaptive response of cells. Lower catalase levels are seen in periodontitis(17).

There are some limitations of our study. First The sample size was relatively small, and future studies should be performed in larger samples. On the other hand, the homogeneity of groups is the main strength of our research.

In conclusion, we found increased and SOD and CAT levels were significantly increased in stress patients. These findings should be considered preliminary and needing verification by further studies. Our results should also be considered preliminary and needing confirmation by future studies.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

**Conflict of Interest:** Non

**Funding:** Self-funding

**References**

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17. C. Bogdan, M. Rollinghoff, and A. Diefenbach, “Reactive oxy-... gen and reactive nitrogen intermediates in innate and specific immunity,” Current Opinion in Immunology, 2000: (12): 604
Whole Genome Sequence and Development of a Transposon Mutagenesis System for *Pseudomonas Putida* sp.12

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Abstract

Nowadays, Heavy metal pollution is one of the most important environmental problems. All metals occurring in the biosphere originated in the earth’s crust; however, the toxic metal pollution of the biosphere has intensified rapidly since the onset of the industrial revolution, posing major environmental and health problems. Several studies have demonstrated the effect of metals on microbial diversity, biomass and activity. It is believed that metal Microbial activity is responsible for the bioremediation of the third elements in the periodic table. Selenium is an important trace element that required for in trace amounts for growth and metabolism but toxic at elevated concentration. The ability of a single mutant *Pseudomonas putida* sp.12 (mariner transposon) has been used to search for genes involved in the biotransformation of selenite to red elemental selenium. This study aims to develop a transposon mutagenesis system for the model *P. putida* sp.12 to investigate the gene(s) that involved in selenite reduction. The conjugative plasmid pSAM_R1 containing the mariner transposon was used for transposon mutagenesis. A single mutant reliably impaired in selenite transformation, found that the mutant clones, contained an inactivation within *pmoB*, one of two copies of the gene encoding the largest subunit of particulate selenite-reduction. Physiological analysis of this “white mutant” indicated that the selenite-reducing activity, which was located primarily in the cytoplasm of the cells, could be rescued by adding format as an alternative source of electrons.

**Keywords:** Whole genome sequences, Selenium reducing bacteria; transposon; Bioremediation.

Introduction

Microorganisms often keep metal haemostasis by pumping toxic metals out of cells using primary and secondary transporters [¹]. The best mechanism of avoiding an excess of metal ions is active transport by cation-transporting ATPases (Fig. 1). Selenium (Se) has both metallic and non metallic prosperities. It is an essential micronutrient for both prokaryotes and eukaryotes at low concentrations, but it can be toxic at higher levels. Se exists in nature in multiple organic and inorganic forms, Se can act as an antioxidant and protect against the cellular damage caused by oxygen radicals; however, an overdose of Se can disrupt the integrity of proteins and decrease the enzymatic activity, resulting in chronic or acute selenosis [²].

Many resistance determinants on chromosomes and mobile genetic elements encode a range of membrane transporters that transport specific toxic metals out of the cell. Some microorganisms use plasmid-encoded energy-dependent metal efflux systems to remove metals from the cell [³]. For instance, in response to exposition to toxic metals, metal resistance comes mostly in plasmid-encoded bacteria. Resistance genes encode genetic information of microorganisms that is charged by external or internal conditions [⁴].

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**Pseudomonas putida** sp. genetic manipulation has proven a challenge because of the natural transformable. Electroporation of *P. putida* sp. has been found effective only with small plasmids. There are slow growing means that some forms of antibiotic selection cannot be used and vectors used with *E. coli* are often not functional. An earlier work has shown that conjugation can be used to introduce plasmids into *P. putida* sp.12, and vectors have been developed to allow mutagenesis of the soluble methane monoxygenase (S) and heterologous protein expression. Because of *P. putida* sp.12 adaptability to toxic chemicals, the model soil bacterium *P. putida* sp. was developed via develop a transposon mutagenesis system for the model *P. putida* sp.and to use this to investigate the gene(s) involved in reduction and remediation of selenite to elemental selenium. The conjugative plasmid pSAM_R1 containing the mariner transposon, which was developed for transposon mutagenesis in the *Rhizobiaceae*. This study aimed to was chosen to construct a transposon library to enable screening for mutants altered in specific metabolic functions including reduction of selenite.

**Materials and Method**

**Bacterial strains and growth conditions:** The *Pseudomonas putida* sp.12 was obtained from the biotechnology laboratory of Diyala University. The strain was growth routinely in LB medium. M9 minimal medium, amended with carbon source was incubated at of 30 °C, while *E. coli* was grown at of 37°C.

The experiments were performed in 150 mL liquid cultures in 250 mL conical Quickfit® flasks cultures were incubated at the optimum growth temperature, on a shaker at 170 rpm, and allowed to grow to an OD600 of between 0.5-0.8. Under the conditions used in these experiments.

**DNA techniques, plasmid concentrations and Conjugation process:** To create the transposon library for *P. putida* sp.12, Plasmid pSAM_R1 has four unique restriction sites (*Nde*I, *Bam*HI, *Xba*I and *Xho*I) was obtained from *E. coli* DH5α using. The plasmid was extracted and digested using QIAGEN kit (Qiagen, MD, USA). Agarose gel analysis was used to confirm its integrity.

The conjugation was used following the method of Lloyd and co-workers. The progeny from the conjugation were resistant to kanamycin (15 μg/ml). Subsequent plating on LB medium also containing nalidixic acid (25 μg/ml final concentration) was performed in order to eliminated the donor *E. coli* strain.

**DNA Sequencing:** The mutants strains were grown on the LB agar with kanamycin (15 μg/ml), and *P. putida* sp.12 grown on separate plates of the same medium without antibiotic was used as a control. Plates were incubated at 30°C. The bacteria were harvested by scraping from the plates and sent for sequences. To detect the number of inserted DNA segments and the transposon position, Mauve sequence analysis package and Mauve Contig Mover (MCM) were employed to re-order contigs for each new draft genome based on comparison to *P.putida*KT2440genome from the Genbank (accession number NZ_JBOP00000000).
The position of the inserted transposon was detected in each contig and compared with the transposon sequence using BLAST to find the location of the transposon[11].

Characterization of mutant strains: The LB plates with 15 µg/ml final concentrations of kanamycin and 10 µg/ml of (Se selenite were used to re-grown white colonies carried the transposon library. The positive control was a kanamycin-resistant clone from the transposon library that gave red colonies on selenite-containing medium. The plates were incubated in 30°C for 24 hrs.

Results

To transfer pSAM_R1 into *P. putida* sp.12, the selected cells were plated on LB agar with kanamycin. Figure 2 confirmed the plasmid pSAM_R1 conjugation, presumably the conjugated plasmid showed antibiotic resistance; while the cells of *P. putida* sp.3 without conjugation (WT) did not grow and no colonies were observed (Fig 3). Around 500 colonies were obtained when the suspension (50 µl) of the conjugated cell was plated on the selective agar. However, non-conjugated cells were grown on medium without kanamycin which conformed strongly the conjugation theory of pSAM-R1 into *P. putida* sp.12 was successful.

![Figure 2. Positions of transposon insertions in the genome of *P. putida* sp.12](image-url)
Figure 3: Triplicate experiment to show selenite reduction by the “white mutant” (*P. putida* sp.12) (A1, A2, A3), wild-type *P. putida* sp.3 (B1, B2, B3) and the selenite reduction-positive (“red”) mutant (C1, C2, C3) in LB liquid media containing selenite (containing 10 g/mL of Se) and grown on c as the carbon and energy source.

**Whole Genome Sequencing:** To check the position of the transposon on the genomic DNA, nine samples were prepared: eight putative transposon mutants and one sample of wild-type of *P. putida* sp.3. The subjected sequences comparison to the reference genome displayed additional segments indicated that there was a region within the genomes from the putative transposon mutants that displayed no similarity to the reference genome. The added segments were conserved among all putative mutant draft genomes but were not present in the genome data obtained in parallel for the wild-type strains. BLAST searches of the added DNA present in the chromosomes of the putative transposon mutants were performed. The confirmed that the extra DNA was the mariner transposon.

**Gene involved in selenite reduction:** The “white” transposon mutant 2T5 (which is inactivated in one of the two copies of *pmoB*) must still be able to grow using carbon as growth substrate and may be impaired in the supply of carbon-derived electrons for reduction of selenite. If this were correct, it may be possible to restore selenite reduction in the mutant by supplying format, which the carbon can use as an electron source via format dehydrogenase.

**Discussion**

This study used transposon mutagenesis to identify the role of *P. putida* sp. in the remediation of selenite (*SeO₃²⁻*). To screen very large number of transposon
insertion clones (≥100,000), well-developed genetic systems have recently been used to obtain high coverage of the selected genome\(^{[12]}\). The mutant colonies are presumably able to assemble fully functional pMMO because the strain retains the other copy of the pMMO operon\(^{[13]}\). Similarly, study aimed to transfer transposon IS-O-Km/hah from *E. coli S17* to *Pseudomonas* strains Pph 1302A and 1448A to screen the progeny for their plant colonization ability\(^{[14]}\). Gene interruption by transposon in this mutant was one of the copies of *pmoB*, encoding the large subunit of pMMO\(^{[15]}\). However, in this study the appearance of selected colonies on LB agar plates could simply be the result of slow growth. Further analysis in liquid media after growth to OD\(_{600}\) with appropriate controls confirmed that the mutant was impaired in reduction of selenite. Earlier studies confirmed that the phenotype of mutants is not due to inactivation of an enzyme which is specifically involved in reducing selenite to elemental selenium, but due to a more general lesion in the metabolism of the methanotroph. When electrons were fed via another route from formate via formate dehydrogenase, reduction of selenite to red elemental selenium was restored, indicating that this route for feeding electrons into the reduction of selenite is also possible\(^{[16]}\). To conclude, transposon mutagenesis by using mariner transposon in pSAM_R1 has been used to impair the gene that is involved in remediation of selenite (SeO\(_3^{2-}\)).

**Acknowledgement:** Authors are thankful to authorities of Diyala University, College of Science for providing the necessary facilities to complete the work successfully.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

**Conflict of Interest:** Non

**Funding:** Self-funding

**References**


Evaluation of HPRT Gene mutation and Comet Assay in Some Breast Cancer Patients Undergoing Radiotherapy

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Abstract

Introduction: Radiotherapy is a toxic cellular treatment that destroys rapidly dividing cells such as cancer cells. The strategy for HPRT mutation examination in human’s cells was commonly used to establish in vivo history along with mutation rates in children and adults inhabitants subjected to experienced and unfamiliar external mutagens. As just a practical approach to human biosurveillance studies, the comet assay has been introduced over the past years as biomarker to identify ionizing radiation Consequences with Patients undergoing radiotherapy in breast cancer.

Materials and Method: This study was carried out on thirty Iraqi women patients with BC patients undergoing radiotherapy about 20-30 Gy locally gamma cells at Al-Amel National Hospital for cancer Management in Baghdad during time 2-13 years, non-smokers and non- alcoholic, aged (35-55 year), with stage (grade) I-III, as well as thirty apparently healthy individuals females collected randomly from population living Baghdad, Old age (35-55) Which are non-alcoholic non-smokers as group of control. Around the ongoing research comet-test and hprt mutation test could be applied to study damages in DNA for genetic two endpoints For patients with cancer throughout radiation therapy.

Results: The present study showed significant increase (p<0.05) in the HPRT gene mutation assay for the in breast cancer patients undergoing radiotherapy as compared with the control group. Also there were found that the values of comet tail moment and tail length was increased significantly (p<0.05) in the human lymphocyte in these for breast cancer patients undergoing radiotherapy as compared with the control group.

Conclusions: Present results revealed that there is a probability of utilizing human lymphocytes changes as useful biodosimetric markers for the detection of human exposure to ionizing radiation, the data gathered also demonstrated the utility of the HPRT gene mutation and (Alkaline) comet test as just a precise alternative biological marker for routine preventative care of cancer patients receiving radiation therapy.


Introduction

Approximately (1 million) reported cases diagnosed globally each year; breast cancer has become the most commonly reported cancer, accounting for about 20 percent of all new female cancers. Radiation is a functional therapy for cancer treatment but in 5%-10% of patients it results in extreme late radiation toxicity. In oncology Ionizing radiation has been effectively and widely used.

Recent developments in cancer radiation therapy have enhanced the diagnosis of cancer victims, but have led to health problems(1). Radiotherapy kills cells in the exposed position by destroys their DNA material.(2). Radiation therapy is still the most common technique
of treating cancers victims. About eighty percent of cancer sufferers receive radiation therapy at a certain time, either for therapeutic or curative reasons. Since radiation exposure neither distinguishes for either normal or even malignant cells, symptoms can grow in patients throughout therapy course for several weeks following treatment or months or years later. The exposure to radiotherapy causes more damage to cells of the body, particularly DNA, and the level of damage to cells relies on the dose of radiation received. Radiation therapy is among the most successful options for treatments of cancer. The prevalence of breast cancer becomes significant, but after several years of radiation treatment, most patients will again be cured or free of cancer indications.

Hypoxanthine guanine phosphoribosyl transferase (HPRT) is a purine rescue enzyme which induces the transformation of hypoxanthine and guanine onto the corresponding nucleotides 5'-monophosphate and 5'-monophosphate guanosine. Numerous in vivo studies of mutations HPRT gene in human cell cultured have presented evidence for, exposure level, age and genetic effect on mutation rate. Enhanced frequency of mutations with advancing age in healthy human individuals is typically demonstrated.

Comet test is really sensitive and needs a geneticist who is able to interpret the outcomes. This test is commonly performed in the search for DNA material damage. From the last few years; comet assay has been adopted as a valuable method for human biomonitoring analyses. Thus biomonitoring research using cytogenetic tools are restricted to distributing lymphocytes and include propagating cell population groups, Comet testing may be introduced to propagating and non-propagating cells as well as tissue cells which are the first hotspots for touch with mutagenic factor. The objective of the study is to use HPRT gene mutation and comet as a biological Markers to identify the negative impacts of ionizing radiation susceptibility in victims with breast cancer having receiving radiation therapy.

**Materials and Methodologies**

**Collection of subjects and blood samples:** During the period January 2018 till January 2019, this study was carried out on thirty Iraqi women patients with breast cancer after radiotherapy treatment, non-smokers and non-alcoholic, aged (30 - 59 year), with stage (grade) II, breast cancer patients treated at Al-Amel National Hospital for cancer Management in Baghdad during time 2-13 years, As well as thirty apparently healthy individuals females collected randomly from population living Baghdad, aged (30 - 59 year) which are non-smokers, non-alcoholic as control group, all of them (100 %) were females. Samples of Blood were obtained from healthy control and cancer sufferers previous to radiation therapy and upon progressive doses of radiation of 20-30 Gy. Locally gamma cells. Five ml of human peripheral blood from all select subjects were collected and placed into sterile plain tube that contained lithium heparin. The blood was placed in a cool - box under aseptic conditions and transfer to the laboratory.

**Assay procedure:** Mutation of HPRT gene test has been conducted as mentioned by Coa et al. The DNA (comet) test was operated as mentioned by Moller et al.

**Microscopic examination:** Binucleated as well as multinucleated cell types from each 1000 lymphocytes have been record under microscopy illumination in the two sets of cultures. Microscopy (magnification 1000X), the Mutant Hprt Gene Frequency “Mf-hprt” has been measured with the use of formulation below:

\[ \text{Mf-HPRT} (‰) = \frac{\text{binucleated and multinucleated cells for every 1000 lymphocytes while grown with 6TG}}{\text{binucleated & multinucleated cells for 1000 lymphocytes if grown without 6-TG}} \times 1000. \]

A maximum of 100 seemingly at random captured comets (100 of each slide) have been investigated using only a luminescent microscope linked to an image processing system via a camera. The following comet criteria have been examined to measure actually damage to DNA: the length of the tail (TL) and the moment of the tail.

Tail length (DNA migration size) is closely linked to the Dimensions of a fragment of DNA and is described In to the micrometers. This has been measured cell midpoint. The tail moment was measured as product of just the length of the tail and the comet-tail DNA portion.

**Data Analysis and Statistics:** The information for these research have been assembled in to the computerized database as well as the frequency. Distribution and statistical explanation (mean, SE) were
dissolved utilizing SPSS statistical program statistical tests of the variability (ANOVA) test as well as the least significant difference (LDS) test has been used with a likelihood of less than 0.05 (p<0.05) variability.

**Results and Discussions**

Mf-HPRT mutated gene frequent test has been conducted on blood lymphocytes cells which have been gained from 30 Iraqi breast cancer patients women, aged (30–59) year and duration of radiotherapy is more than 2-13 years, as well as 30 healthy individuals women as control group which age ranged (30-59 years). Table 1. showed (hprt) for 30 patients with cancer throughout radiation therapy for each patient Mf - hprt expanded with the dose of radiation therapy. mutation assay of MfHPRT gene was conducted according to explanation by (11). Mutant frequency of HPRT gene has been determined as (binucleated), (trinucleated) as well as (quadrinucleated) CB lymphocyte cells for each 1000 lymphocytes. In tissue culture with and without 6-thioguanine were identified by Giemsa staining (Fig. 1).

![Image](https://example.com/fig1.jpg)

**Figure (1): Human lymphocyte cell, blocked by Cytokinesis (A):binucleated (B): trinucleated and (C) qudrinucleated (1000X). genetically determined.**

The outcome of Mfs- HPRT gene mutation for breast cancer patients after radiotherapy and control can be seen in Table (1) The Mf-HPRT rate for patients with breast cancer and controls were 0.91–1.21 and 0.82–0.96, accordingly. Difference of MF- HPRT between patients of breast cancer after radiotherapy and controls has been significantly high (P.< 0.05). Result of HPRT gene analysis in breast cancer high frequency about 1.088 ± 0.0211 ‰ from control 0.890 ± 0.0089 ‰. Table (1) So the frequency of HPRT test had to identify the genetically hazard Among breast cancer survivors after radiotherapy into current Inquiries.

The findings of the HPRT assay in our study demonstrated a significant difference between patients with breast cancer as well as individual in control groups. In current study; breast cancer patients chronically affected to anticancer radiotherapy drag were studied cytogenetically to evaluate the frequencies of HPRT gene mutation, in comparison with control individuals.

<table>
<thead>
<tr>
<th>Studies groups</th>
<th>No. of samples</th>
<th>Ranges of Mutant Frequency-HPRT ‰</th>
<th>Mutant Frequency-HPRT (Mean ± SE)‰</th>
</tr>
</thead>
<tbody>
<tr>
<td>Radiation Workers</td>
<td>30</td>
<td>0.96–1.21</td>
<td>1.088 ± 0.0211 a</td>
</tr>
<tr>
<td>Control</td>
<td>30</td>
<td>0.82–0.96</td>
<td>0.890 ± 0.0089 b</td>
</tr>
<tr>
<td>LSD Value</td>
<td></td>
<td></td>
<td>0.0263</td>
</tr>
<tr>
<td>P Value</td>
<td></td>
<td></td>
<td>0.05</td>
</tr>
</tbody>
</table>

- The least significant difference (HPRT 0.05) = 0.0263
- The latter in the column (for comparison of study groups) means that there is no significant difference (p < 0.05).
There are many agents that damage gene and made somatic mutations, HPRT gene analysis widely test in many studies to know mutations frequency (MF) in vivo by T-lymphocytes culturing in media have 6-thioguanine if cell resistance and have colony that mean lymphocytes have mutant at the hypoxanthine-guanine ribosyltransferase (HPRT). HPRT used to understand radiotherapy effect in patients or radiations or any genotoxic factor that effect on populations and cancerpatients (11,16,17). HPRT gene is used in this work as a reporter for such mutations. If an appropriate reporter is present; its susceptibility to mutation initiation must be similar to the MF. HPRT gene essential to tumorigenesis (18).

The findings of this study indicate that perhaps HPRT lymphocyte test is a valuable biomarker For evaluating the possible carcinogenicity of radiation therapy as a cytotoxic cancer agents. Alkaline comet analysis was used as an application biomarker of exposure to assess genotoxic consequences of radiotherapy on peripheral blood cells of 30 Iraqi breast cancers Patients and control groups.

Figure 2 illustrates the usual ordinary and damaged DNACells examined underneath a fluorescent microscope. The results of the alkaline comet assay as tail length, tail moment and % DNA (Mean ± SE) in cancer patients during radiotherapy and control groups, illustrated in Table 2.

The median of comet tail lengths in breast cancer patients, via radiotherapy were 19.21 ± 0.7612 μm, when compared with the control were 16.410 ± 4.031 μm, the observed value was increased significantly in compared with the experimental control group (p < 0.05).

Table (2) Exhibits the findings of the tail moment in comet test for controls and breast cancer patients undergoing radiotherapy. Throughout the comet test, Damage of DNA in Lymphocyte has been shown by tail moment and tail length. The average tail moment (Mean ± SE) of breast cancer patients undergoing radiotherapy was 12.451 ± 0.551, And that was considerably higher than that (8.310 ± 0.281 of healthy controls (P < 0.05). Mean of comet Tail DNA % (Mean ± SE) of patients with breast cancer undergoing radiotherapy and healthy controls were 0.1120 ± 0.0061 and 0.00450 ± 0.0005, respectively. Moreover MCR mean for patients with breast cancer was higher significantly than healthy control. (P < 0.01). The percentage of DNA tail was high after radiation therapy in the BC patients compared to the healthy control group. (P < 0.05). According to the results obtained here, the breast cancer patients are highly significant (P < 0.05) compared with healthy control groups.

Victims suffering from breast cancer were exposed to radiotherapy, the therapeutically radiation genotoxic effects has been examined in lymphocytes that circulating across the body and verified as valuable biodosimeters in a number of radiation research (19, 20). Alkaline comet test this was chosen as a versatile tool for identifying the damage in DNA caused by proven or possibly genotoxic compounds (21).
The present work has shown that radiation therapy is followed by a marked increase in DNA destruction in the lymphocytes cells of patients with breast cancer, this finding was not unexpected as radiation therapy induces a wide range of DNA disruption, varying from double- and singled breaks in DNA strands (11).

Table 2: Statistical Assessments of Comet assay for patients receiving radiation treatment with control groups as measuring values of 100 comets for each subject.

<table>
<thead>
<tr>
<th>Studies groups</th>
<th>No. of samples</th>
<th>Comet Parameter valuated</th>
<th>Tail DNA % (Mean ± SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC patients</td>
<td>25</td>
<td>19.21±0.7612</td>
<td>12.451±0.551</td>
</tr>
<tr>
<td>Control</td>
<td>25</td>
<td>16.410±4.031</td>
<td>8.310±0.281</td>
</tr>
<tr>
<td>LSD Value</td>
<td></td>
<td>8.230</td>
<td>1.2314</td>
</tr>
<tr>
<td>P Value</td>
<td></td>
<td>0.05</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Close column letter (for contrast of study groups) indicates that there was no significant difference (p<0.05)-

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

Conflict of Interest: Non

Funding: Self-funding

References


Effect of addition of Magnesium Oxide Nanoparticles on surface hardness and tensile bond strength of denture soft liner

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Abstract

Background and objective: This study was aimed to determine the effect of addition of 3% of Magnesium Oxide Nanoparticles (MgONPs) on the surface hardness (SH) and tensile bond strength (TBS) of a silicone based denture liner at various time intervals.

Method: The SH and TBS of a silicone denture liner were studied after addition of 3% by weight of MgONPs. A total of 140 samples were constructed. The samples were divided into two main groups, control group and test group to which 3% of MgONPs were added.

Results: The SH of all the samples for both groups was significantly higher after a period of 6 months. For TBS the pattern was reversed in which there was a decrease in the mean of TBS for both control and test groups significantly. Conclusion: The addition of 3%(MgONPs) to Silicone denture liner causes a non-significant effect in the SH but significantly improves TBS.

Keywords: Soft liner, Nanoparticles, Magnesium Oxide.

Introduction

The resilient denture lining materials bonded to the removable dentures are usually used to decrease the amount of the forces transmitted to denture supporting tissues. These materials are able to form an absorbing layer on the part of the denture in contact with the oral mucosa and this allows less traumatic transmission of occlusal forces. The result is that wearing the prosthesis becomes more comfortable for the patient.

The resilient liners used for prosthetic purposes are available either as resin based or silicone based. Both types are present in autopolymerized or heatpolymerizedform.

Despite numerous advantages of this material, soft liners have some shortcoming such as high porosity that increases plaque accumulation, colonization of Candida strains and development of denture stomatitis.

Bacterial contamination continues to draw public attention. Generally, antibacterial agents can be categorized as organic or inorganic antibacterial agent. Organic antibacterial agents have low resistance to processing conditions, which limit their applications. As a result, inorganic antibacterial agents have attracted much interest for bacterial control. The main advantages of inorganic antibacterial agents over the organic antibacterial agents, are the improved stability under harsh processing conditions. In medicine, inorganic antibacterial agents such as MgO are used for the relief of heartburn, sore stomach, and for bone regeneration. Huang et al. demonstrated that MgONPs had an antibacterial effect they also determined that the antibacterial efficacy increased with decreasing particle size.

Material and Method

A total of 140 samples were constructed and divided into two main groups, control (n=70) and test (n=70).

The study was done to evaluate the SH and TBS of
a silicone denture liner after addition of 3% MgONPs depending on a pilot study which was done earlier in which different concentrations of MgONPs (2%, 3%, 4%, 5% and 6%) by weight were added to the soft liner and evaluated to determine which concentration provide best anti-microbial effect. Also a Scanning electron microscopic (SEM) evaluation was performed to determine the distribution of the (MgONPs).

**Preparation of the Samples:** Mollosil, which is a silicone based soft denture lining material is supplied in a two- pastes (base and catalyst), it is an auto polymerizing material, the material is mixed manually at ratio 1:1 base/catalyst according to manufacturer instructions. The base and catalyst parts were weighed by digital weight scale. Then the (MgONPs) was weighed and added in small trace amount to the base part of the material at concentration of (3%) by weight, and mixed together for one minute in a circular motion (120 cycles/minute), after that the catalyst part was added to them and mixed for 30 seconds according to manufacturer instructions all of the samples were made at a constant room temperature 25 °C.

**Hardness Test:** A total of 70 samples divided into two main groups, control n=35 and test n=35 were constructed using abrasion mold(diameter 45 mm, 6 mm thickness) according to ASTM: D-2240-5). The samples were further subdivided into five subgroups (n=7) according to the storage time in distilled water (24 hours, 1 week, 4 weeks, 3 months and 6 months), each subgroup was tested separately because the SH measurement test does not allow reusing the samples.

The SH was measured after 24 hrs, 1 w, 4 w, 3 m and 6 m of aging in distilled water at 37 ± 1 °C. The SH of every sample was measured at five measurement points, that were at least 5 mm away from the edge of each sample and spaced at least 3 mm away from each other’s and then the average was taken

The measurements were performed after 5 seconds of loading using a Shore A Digital Durometer under 1 kilogram.

**Tensile bond strength test:** The TBS was measured according to the ISO standard. 140 Heat-cured Polymethyl methacrylate (PMMA) acrylic plates (25mm X 25mm X 3.5 mm) were prepared(2 plates for each TBS sample).

The surface of acrylic plate coated with adhesive bonding agent supplied by the soft liner material manufacturer. The adhesive was applied to one surface of both acrylic plates simultaneously with a brush, the first acrylic plate was placed on flat floor. A polyethylene O-ring with an internal diameter of 10 mm and a thickness of 3 mm was placed in the middle of the acrylic plate. Next, the test material was poured into the O-ring by the use of disposable syringe to prevent air bubble intrusion. Then, the second acrylic plate was placed over the ring and the testing material.

A weight of 1 Kg was placed over the whole assembly, when the material was set the weight was removed, after that, the ring was removed gently by cutting it with a sharp surgical blade. Fig 1

Lastly, the prepared 70 specimens were conditioned in distilled water at 37 ± 1 °C for 24 ± 1 hour, 1 week ±1 °C, 4 weeks ± 1 h, 3 months ± 1 hour and 6 months ± 1 hour.

**Figure 1: TBS sample**

The specimens were tested using a software programmed universal testing machine. To ensure the specimen assembly pulled at a right angle to the denture base soft liner interfaces a specially designed metal
sample holders were used to grasp the specimens to the universal testing machine grip.

The holders have a 3 mm extension lip to ensure adequate grasping and prevent possible movement of the specimens during testing Fig 2.

Then the sample with the holders were secured into the testing device jaws and stretched at constant cross head speed 10 mm/min, the force which caused deboning was recorded.

![Custom made sample holder](image)

The values of TBS were calculated automatically as the force at debonding divided by a cross-sectional area of interface according to the following formula:

\[
\text{Tensile strength} = \frac{F}{A} \text{ (N/mm}^2\text{)}
\]

\(F = \text{force of failure. (N)}\)

\(A = \text{Original surface area of the cross section. (mm}^2\text{)}\)

**Results and Discussion**

The addition of MgONPs to the soft liner resulted in an increase in the mean SH but this increase was non-significant for all groups (table.1)

The test group was harder than the control group. This group is likely to have highly cross linked network in combination with the added MgONPs. A material with a very high cross link density produces a very dense and hard material, also adding the fillers which have a very small size and the uniform distribution within the material may increase polymer/filler interactions and therefore reduces the mobility of the polymer chains. Furthermore, as the particle size decreases the number of the boundaries of these particle increases, therefore the dislocation movements by these boundaries may cause an increase in the SH.\(^{13}\)

The control group showed lower SH value. This may be due to no MgONPs content, therefore increase polymer chain mobility between cross links. The results from the present study is in agreement with Aziz et al as they found the same result for maxillofacial silicon.\(^{14}\) also agreed with results of other studies on denture soft lining materials.\(^{15,16}\) furthermore, the increase in silicone SH of the modified group in the present study may be due to continued polymerisation and cross linking of this materials throughout the experiment.\(^{17}\) Also, may be due to formation of new bonds between the fillers and the polymer chains, or because of reduction in the interstitial spaces in the matrix of the polymer chain. It has been stated that silicone denture lining materials contain no plasticizer but contain filler\(^{18}\) and absorption of water by the filler could lead to decreased softness.
Table 1: The mean and standard deviation (SD) of SH at different time intervals

<table>
<thead>
<tr>
<th></th>
<th>24h</th>
<th>1 week</th>
<th>4 weeks</th>
<th>3 months</th>
<th>6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>20.57 (0.97)A,a</td>
<td>21.28 (0.85)B,b</td>
<td>25.21 (0.90)C,c</td>
<td>28.14 (1.18)D,d</td>
<td>30.57 (1.30)E,e</td>
</tr>
<tr>
<td>Test</td>
<td>20.71 (0.85)A,a</td>
<td>21.35 (0.89)B,b</td>
<td>25.28 (0.56)C,c</td>
<td>28.21 (1.07)D,d</td>
<td>30.64 (1.37)E,e</td>
</tr>
<tr>
<td>Total n=70</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
</tbody>
</table>

Note: Groups with the same uppercase superscript letters for each row and lowercase superscript letters for each column are not significantly different at the $p < 0.05$ level.

Aging process showed a significant effect on the SH of the material for both control and modified group, this result is in line with previous studies. This increase in the SH could be due to the gradual leaching of the soluble contents from the materials when undergoes aging for a long periods of time.

The TBS value among different studies vary occasionally owing to using different testing variables, the chemical formula of the tested materials influences the results. Also, the different specimen treatment method such as conditioning or storage before testing need to be standardized. Finally, the TBS values differ according to the specimen fixation method, alignment of loading points, and crosshead speed.

The TBS (table. 2) in this study were dropped from 1.087 MPa after 1 day to 0.446 MPa after six months for control group and 1.097 MPa to 0.462 MPa for test group respectively. Minami et al. obtained similar range values for another brand of silicone denture liner, using similar tensile test specimen assembly.

Table 2: The mean and SD of TBS at different time intervals

<table>
<thead>
<tr>
<th></th>
<th>24h</th>
<th>1 week</th>
<th>4 weeks</th>
<th>3 months</th>
<th>6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>1.087 (0.004)A,a</td>
<td>1.031 (0.003)B,b</td>
<td>0.987 (0.005)C,c</td>
<td>0.682 (0.006)D,d</td>
<td>0.446 (0.004)E,e</td>
</tr>
<tr>
<td>Test</td>
<td>1.097 (0.002)A,b</td>
<td>1.046 (0.003)B,e</td>
<td>1.003 (0.005)C,d</td>
<td>1.003 (0.005)D,e</td>
<td>0.462 (0.002)E,f</td>
</tr>
</tbody>
</table>

Note: Groups with the same uppercase superscript letters for each row and lowercase superscript letters for each column are not significantly different at the $p < 0.05$ level.

In this study, it was observed that within the same group, different soft liners showed difference TBS values. This was in agreement with the results obtained in other studies where similar test standardization was used in which their studies showed different TBS results for similar chemically silicone lining materials.

The lowest TBS values were shown by control group which was statistically significant when compared to test group at all period intervals.

This increase in the TBS for the modified group may be due to the low concentration and a very small size of MgONPs used which may have led to less tendency for agglomeration with in the matrix, or possibly the added MgONPs may have been increased the surface area of adhesion between the acrylic resin and the soft denture lining material.

On the other hand, the present study disagrees with the results of Sampaio when found that there is no difference in the TBS after sealant application to the tissue conditioner, this could be explanted by the use of different material formula, shape and size of the specimens or testing parameter in each study.
Finally, the SEM revealed a homogenous distribution without any agglomeration of the MgONPs within the matrix of the tested material, also the EDX revealed the presence of accurate concentration of MgONPs in the test group. Figure 3 and 4 shows the SEM of control and modified samples.
Conclusion

Addition of 3% MgONPs to Siliconedenture liner causes a non-significant effect in the SH, but significantly improves TBS.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

Conflict of Interest: Non

Funding: Self-funding

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Efficacy of Silymarin on Aflatoxin Residues in Eggs and Health Status of Laying Hens

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Abstract
The study aimed to evaluate the silymarin in reducing the aflatoxin (AF) residues in eggs and health status of laying hens. A total of 120 laying hens at the age of 240 days were randomly divided into three equal groups fed on diet with or without AF and 0.5% of silymarin. The residues of AF in the eggs were measured at the age of 260 and 280 days by using HPLC technique as well as, physiological tests. The results of the 3rd group showed a significant (P≤0.05) increase in RBCs, PCV% and Hb, AST, ALT concentrations and Ab titer against ND and IB diseases as compared with the 2nd group and the control. Also, there was a significant (P≤0.05) decrease in the concentrations of AF (B1) and (G1) in eggs at the age of 260 days as compared with the 2nd and the control.

Keywords: Aflatoxin residue, Silymarin, HPLC technique.

Introduction
The main problem in poultry industry represented via contamination with different mycotoxin(1). Aflatoxin (AF) contaminated grains are a worldwide problem that leads to immunosuppression and an altered response to vaccination programs in poultry. These effects result in a decline in animal performance and ultimately minor profitability(2). High levels of AF in feed results decrease in production performance, and the prevalence of residues in poultry meat and eggs(3). The toxicity of AF mainly depends on the quantity and duration of ingestion and immune status, as well as environmental factors(4).

Silymarin (SM) an extractededas of the kernels of milk thistle (*Silybum marianum*), is a composite of flavonolignans that has activity of free radical scavenging. Silymarin is affect positively on the digestibility in the birds that enhance the feed efficiency(5). Milk thistle seed has been identified as protective nutrient of poultry from adverse effects of AFB1(6,7) described that the supplementation of SM by 0.5% of feed had a positive effect to reduce negative effect of mycotoxins with improved of the performance and health status for broilers. Muhammad(8) reported that SM enhanced liver cell protein synthesis also inhibited oxidation of glutathione. The goal of the present study is evaluate the Silymarin to reduce the AF residue in eggs and health status of laying hens.

Materials and Method
A total of 120 hens (ISA Brown) were randomly divided into three equal groups at 40 hens aged 240 days old were obtained from commercial farm in Diyala province. All birds were offered feed adjusted at a rate of 4400 gm/day/group(9) (table 1) with water (*ad libitum*). The 1st group (control) was fed a diet free of mycotoxin. The 2nd group fed contaminated diet by aflatoxin (14.6 ppb) while the 3rd group fed the same diet with 0.5% of silymarin. At aged 242 the birds were vaccinated with attenuated IB(4/91) + ND Clone 30 viadrinking water.
Table 1. The compositions of the diets were prepared for this study

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Weight (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellowcorn</td>
<td>47.0</td>
</tr>
<tr>
<td>Soybean meal (45% crude protein)</td>
<td>22.0</td>
</tr>
<tr>
<td>Wheat by product</td>
<td>20.0</td>
</tr>
<tr>
<td>*Animal feed premix 2.5%</td>
<td>2.5</td>
</tr>
<tr>
<td>Sunflower oil</td>
<td>0.5</td>
</tr>
<tr>
<td>Limestone</td>
<td>6.5</td>
</tr>
<tr>
<td>**Dicalcium phosphate</td>
<td>1.0</td>
</tr>
<tr>
<td>Salt</td>
<td>0.5</td>
</tr>
<tr>
<td>Total weight (kg)</td>
<td>100</td>
</tr>
</tbody>
</table>

**Calculated chemical analysis**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crude protein %</td>
<td>16.60%</td>
</tr>
<tr>
<td>Metabolizable Energy (kcal/kg)</td>
<td>2711.21</td>
</tr>
<tr>
<td>Calcium (%)</td>
<td>2.718</td>
</tr>
<tr>
<td>Available phosphorus (%)</td>
<td>0.750</td>
</tr>
<tr>
<td>Methionine (%)</td>
<td>0.297</td>
</tr>
<tr>
<td>Lysine (%)</td>
<td>1.725</td>
</tr>
</tbody>
</table>

*Animal feed premix for hens (Laymix-2.5 W) Holland made. Inclusion rate: 2.50%. Chemical contains: Crude Protein 11%, Crude Fat 2.18%, and Crude Fiber 0.84. **Dicalcium phosphate Iraq made contains: Ca 23% and P 18%.

Blood samples were taken from each group for physiological tests\(^{10,11}\) at aged 280 days, as well as, the residues of AF in the eggs were measured at the age of 260 and 280 days by using high-performance liquid chromatography (HPLC) technique. The egg samples collected randomly to test in the laboratories of ministry of science and technology. Data was analyzed with SAS software\(^{12}\) using LSD and ANOVA to compare between treatments.

**Results and Discussion**

The results showed significant (P≤0.05) increased in RBCs of the 3\(^{rd}\) group as compared with the 2\(^{nd}\) and control (Table 1) whiles the count of WBCs recorded lower values in 2\(^{nd}\) group than other groups. The increasing of RBCs count may be Silymarin (SM) ‘s ability to keep blood cells from any damage caused by free radicals in the body that may be damaging to cell membranes and their internal components in the body by acting as an antioxidant. Silymarin has anti-oxidant ability as it works directly or indirectly for cracking and elimination of many compounds such as phenylglyoxylic also radical’sketyl\(^{13}\). Also, that explanation was similar with reported by\(^{14}\).

Table 1. Effect of Silymarin on blood picture of different groups at age 280 days (Mean ± SE).

<table>
<thead>
<tr>
<th>Groups Parameter</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC(Cell×103/ml)</td>
<td>83.47 ± 2.45B</td>
<td>83.12 ± 5.17B</td>
<td>90.1 ± 1.72A</td>
</tr>
<tr>
<td>RBC(Cell×106/ml)</td>
<td>1.7 ± 0.06B</td>
<td>1.28 ± 0.19B</td>
<td>2.8 ± 0.31A</td>
</tr>
<tr>
<td>Hb(gm/dl)</td>
<td>8.77 ± 0.65B</td>
<td>6.82 ± 1.03C</td>
<td>13.27 ± 1.64A</td>
</tr>
<tr>
<td>PCV%</td>
<td>24.57 ± 1.52B</td>
<td>18.17 ± 2.66C</td>
<td>36.88 ± 4.68A</td>
</tr>
</tbody>
</table>

Means in the same row with different letters differ significantly (P≤0.05).

Nazifi and Asasi\(^{15}\) concluded that Silymarin supplementation at percentage (0.5 and 1%) did not alteration the values of the studied hematological parameters (WBC, RBC) as compared to the control group.\(^{16}\) found that SM significantly helps to keep the blood cells and serum biochemical parameters in normal range. The results of total protein did not record significant differences (P≥0.01) among groups at 40 days of study (Table 2). While, the aspartate aminotransferase (AST) and alanine aminotransferase (ALT) dataenzymes activity of the 2\(^{nd}\) group was recorded significantly (P≤0.01) higher values as compared with those in the 3\(^{rd}\) and control groups. The increased AST and ALT activities detected via feeding polluted diets in the present study may be the effects of AF which cause hepatic degeneration and subsequent leakage of enzymes into circulation. The increasing in liver enzymes activity may be the most sensitive indicator of liver damage\(^{17,18}\) said that any liver enzymes disorder is evidence of stress. The results agreed with\(^{19}\) who referred to the
AF has hepatotoxic effects and the activity of AST and ALT might be increased. While the reduction in the liver enzymes activity may be due to the positive effect of SM in protect the hepatic cells from damage by AF. The antioxidant property of Silymarin against free radicals is what prevented hepatocytes from being damaged\(^{(20)}\). Silymarin as well promotes hepatocytes protein creation also declines the oxidation of glutathione \(^{(8)}\).

Table 2. Effect of Silymarin in total protein and liver enzymes for different groups at age 280 days (Mean ± SE).

<table>
<thead>
<tr>
<th>Groups Parameter</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>AST (U/L)</td>
<td>90.0 ± 17.3B</td>
<td>145.0 ± 30.0A</td>
<td>107.5 ± 37.7B</td>
</tr>
<tr>
<td>ALT (U/L)</td>
<td>50.6 ± 34.9B</td>
<td>145.0 ± 28.8A</td>
<td>102.5 ± 55.6B</td>
</tr>
<tr>
<td>Total Protein (g/L)</td>
<td>6.93 ± 0.9A</td>
<td>7.23 ± 1.1A</td>
<td>7.29 ± 1.2A</td>
</tr>
</tbody>
</table>

Means in the same row with different letters differ significantly (P≤0.01).

Anti-oxidative mediators are crucial for hens nutrition as they decline fat peroxidation, consequently increase the organoleptic features, in addition nutritional value of meathenegg, increased meat and egg shelf life\(^{(21)}\). The most well-known exogenous antioxidant substances like vitamin E\(^{(22)}\), Oligo-elements like, selenium, amino acids, glycine also flavonoids such as SM need been identified\(^{(23)}\).

By using ELISA test, the results of the mean titers of anti-ND and IB vaccines are non-significant (P>0.05) differences among groups at 20 days of study, but there was significant (P≤0.05) increase in Ab titers in the 3rd group as compared with the 1st and 2nd groups at 40 days of the beginning of the study (table 3). The increasing in Ab titer against ND vaccine may be attributed to the amelioration effect after feeding onration treated with the Silymarin which preserves the liver cells from aflatoxin damage, that action enhanced protein synthesis in the body which promotion the immune response of chickens. Humoral immune response was development after added of silymarin is in line with\(^{(8,20)}\). Moreover, the effect of hydrated sodium calcium aluminosilicate on the humeral immune response of quails diet on AFB1 polluted ratio was studied by \(^{(24)}\) also found decrease in the Ab titer induced by ND vaccine, due to AF, was relatively prevented. However, the lowering in Ab titer of the 2nd group attribute to contaminated diet with AF. \(^{(25)}\) take down resistance to diseases revealed that AF also inhibits with vaccine-inducing immunity in animals. Manegar\(^{(26)}\) established that AF destroy prime immune response aimed at ND also Gumboro disease as apparent via drop in the ELISA titers. Table 3 shows the Ab titers of 2nd group were significantly (P≤0.05) the lowers than the 3rd group. It is clear from our observations and those of other researchers that AF causes severe immunosuppression that might be due the depressed the phagocytic activity\(^{(27)}\). The results are supported through\(^{(28)}\) who informed the negative role of contaminated feed in the presence of immune suppressant AF in diet. Whilst feed addition of SM with AF contaminated ration in 3rd groups significantly (P≤0.05) improved the immune response of hens.

Table 3: Effect of Silymarin in Immunity against ND and IB for different groups at different age (Mean ± SE)

<table>
<thead>
<tr>
<th>Type of vaccine</th>
<th>Groups Parameter</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>ND</td>
<td>240 Days</td>
<td>21930.16 ± 2376.83</td>
<td>21930.16 ± 2376.83</td>
<td>21930.16 ± 2376.83</td>
</tr>
<tr>
<td></td>
<td>260 Days</td>
<td>24686.25 ± 1250.48</td>
<td>27877.50 ± 1757.52</td>
<td>24968.00 ± 3844.96</td>
</tr>
<tr>
<td></td>
<td>280 Days</td>
<td>13723.00 ± 482.00B</td>
<td>13205.83 ± 588.23B</td>
<td>17696.55 ± 778.41A</td>
</tr>
<tr>
<td>IB</td>
<td>240 Days</td>
<td>46388.50 ± 4711.85</td>
<td>46388.50 ± 4711.85</td>
<td>46388.50 ± 4711.85</td>
</tr>
<tr>
<td></td>
<td>260 Days</td>
<td>31506.50 ± 418.99</td>
<td>33756.80 ± 2614.56</td>
<td>33582.00 ± 336.99</td>
</tr>
<tr>
<td></td>
<td>280 Days</td>
<td>52614.00 ± 2511.66A</td>
<td>40944.33 ± 1979.30 B</td>
<td>47792.50 ± 3141.21 A</td>
</tr>
</tbody>
</table>

Means in the same row with different letters differ significantly (P≤0.05).
Moreover, Silymarin supplementation with AF contaminated diet can reduce the adverse effects of AF on performance and systemic immune response. These findings suggest that SM play as an antioxidant property via to prevent the negative effect on immune system. The researchers Friedman\(^\text{(29)}\) confirmed that estimation Ab titers in birds’ serum give good evidence to appointment immunity of birds against ND virus. Thus, the positive results indicated that the effect of SM in preservation of the immune cells and keep cellular membranes flexibility which have achieve a role in antigen diagnosis\(^\text{(30)}\).

In this study, the concentrations of AF B1 and G1 were evaluated by HPLC, figure 1 illustrates the standard chromatogram of the AF B1 and G1 at retention times from 4.5 to 5 minute.

The results obtained from the analysis the eggs samples of the 2\(^{\text{nd}}\) group during 20 days of the beginning of the study are represented in figure 2. The predominant AF for all analyzed samples was mixed B1 and G1. The test indicated that the transmission is relatively persistent during the processing of eggs formation. Trucksess\(^\text{(31)}\), the residues of AF didn’t seem eggs until the day 4 of feeding polluted diet. Dissimilar recorded by\(^\text{(32)}\), AF residues seem in the eggs when hens feeding with 5 mg/kg AF only also/or in mixture with Ochratoxin at 3 and 5 mg/kg. Also,\(^\text{(33)}\) watched AFB1 also the aflatoxin, in the layer hens eggs after feeding the diet polluted with AF. used immune-affinity column with HPLC.

Figure 1. Standard chromatogram of the AF B1 and G1

Figure 2: Chromatogram of total AF B1 and G1 residues in eggs of the 2\(^{\text{nd}}\) group
Hussain(34) is found direct link between AFB1 in the diet and residues in the eggs and muscles. AFB1 could contaminate the food manufactured from laying hens or eggs raised on AF polluted feed. According to the present study, it can conclude that silymarin reducing the aflatoxin residue in eggs and improving production efficiency and enhance health status of laying hens. So, the use of Silymarin at the level of 0.5% in feed during the production cycle seems to offer the best benefits.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

**Conflict of Interest:** Non

**Funding:** Self-funding

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Antitumor Activity of β-glucan Extracted from *Pleurotus Eryngii*

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**Abstract**

*Pleurotus eryngii*, a type of edible mushroom that exhibit various pharmacological properties, including antioxidant and anticancer effects. In the present study, extracted β-glucan from the *P. eryngii* was tested as an antioxidant and anti-tumor factor. β-glucan was extracted and analyzed by HPLC and FT-IR. Analytical results showed more than 90% similarity in chemical structure and purity. Potential antioxidant activity of β-glucan was examined using 2, 2-diphenyl-1-picrylhydrazyl (DPPH) and compared with ascorbic acid. β-glucan confirmed a potential scavenging activity. The anticancer activity of the β-glucan was assessed using different concentrations (6.25 to 400 µg mL\(^{-1}\)) on MCF-7 and HepG2 cell lines. *P. eryngii* β-glucan exerted a dose-dependent reduction in MCF-7 and HepG2 cell viability with an IC\(_{50}\) of 280.00 and 539.5 µg mL\(^{-1}\), respectively. At the same time, no significant effect was recorded on normal cell line WRL 68. The obtained results are expected that could be used to develop *P. eryngii* β-glucanas an antitumor drug.

**Keywords:** MTT, *pleurotus eryngii*, Cytotoxicity, β-glucan, Antioxidant, MCF-7, HepG2.

**Introduction**

Mushrooms have attracted a great deal of interest in many areas of food and bio-pharmaceutical research and are well known for their nutritional and medicinal values.\(^1\) Several major components with immunomodulatory and/or antitumor activity have been isolated from mushrooms. These include mainly polysaccharides, such as β-glucans, polysaccharo-peptides, polysaccharide-protein conjugates, and proteins. β-glucans have a wide range of biological activities. Mushroom β-glucan polysaccharides are fibers that mostly present as linear and branched chains with different types of glycosidic linkages, such as (1-3), (1-6)-β-glucans and (1-3)-α-glucans, others are heteroglycans containing glucuronic acid, xylose, galactose, mannose, arabinose or ribose.\(^2\)

*Pleurotus eryngii* is an edible mushroom, considered to be a health food not only for low fat and calories but also being rich in amino acids, vitamins, and dietary fiber.\(^3\) In addition, β-glucans of *P. eryngii* received an increasing interest for its bioactive properties including antitumor, immunomodulator, antioxidant and antiallergic activities. Studies have indicated that the polysaccharides isolated from *P. eryngii* were mostly β-glucans, which exhibited potential activities.\(^4\)

Chemically, β-glucans are heterogeneous, non-starch polysaccharides, which form the structural compounds of the cell wall of certain microorganisms, including yeast and algae, mushrooms, and grains, such as oats and wheat. β-glucans may be insoluble or soluble. Insoluble β-glucans fibers consist of β-(1-3/1-4)-D-linked glucose units, whereas soluble viscous β-glucans fibers consist of β-(1-3/1-6)-D-linked glucose.\(^5\)

Many chemical compounds identified as specific agents for inhibiting cancer cell proliferation were also showed significant toxicity toward normal cells, as well
as their side effects. Many potential anticancer drugs have considerable side effects\(^{(6)}\). Therefore, discovery of new safer drugs with potential activity against tumor has become an important goal of research in biomedical sciences. Polysaccharides from mushroom sources can stimulate immune cells, including macrophages, granulocytes, nature killer cells and monocytes to trigger cytokine production and thus stimulating the immune system\(^{(7)}\).

In same point, this study was conducted first to extract β-glucans from *P. eryngii*, and evaluate the cytotoxic activity of the extracted β-glucan against tumor cell lines HepG2 and MCF-7, as approach in developing a mushroom polysaccharides to use either individually or in combination with medicinal drugs combination in cancer treatment.

**Materials and Method**

**Mushroom Strain:** *Pleurotus eryngii* strain was kindly provided and authenticated by Dr. Ahmed A. Kareem, Department of Organic Farming, Ministry of Agriculture, Baghdad, Iraq.

**β-Glucan Extraction from *P. eryngii*:** β-glucan was extracted using a water extraction method\(^{(8)}\). In brief: dried fruit bodies of *P. eryngii* were powdered. The powder was mixed with ddH\(_2\)O in ratio of 1:20 (wt/v). The pH of the mixture was adjusted to 7.0 using 20% Na\(_2\)CO\(_3\). Mixture heated to 90°C for 6 h with shaking (100 rpm). After heating process, the mixture was centrifuged at 8000 rpm for 10 min at 4°C. The pellet was discarded, and the supernatant was transferred to new container and the pH was further adjusted to 4.5 using 2M HCl. The solution was centrifuged at 8000 rpm for 30 min at 4°C. Pellet which contained proteins was discarded and supernatant was mixed with absolute ethanol in a ratio of 1:1 and left for 12 h at 4°C to precipitate the beta-glucan. The mixture was centrifuged at 3000 rpm for 10 min at 4°C. Finally, the pellet was homogenized with absolute ethanol and then oven-dried at 60°C.

**β-Glucan Analysis by High Performance Liquid Chromatography (HPLC):** The samples and standard were analyzed by HPLC (SYKAM, Germany) supplied with S2100 quaternary gradient pump and fluorescence detector RF-20A (UV280). The condition analysis of β-glucan; mobile phase: dH\(_2\)O and orthophosphoric acid (90:10 v/v); column: C18–ODS (25cm x 4.6 mm); Flow rate = 0.7 mL min\(^{-1}\). Preparation of sample: 1 mg dissolved in 25 mL dH\(_2\)O and then 20 µL was injected into HPLC column for analysis. The separation occurred on liquid chromatography and, the eluted peaks were monitored by UV-Vis 10 A-SPD spectrophotometer.

**FT-IR (Fourier Transformed Infrared) Analysis:** The chemical structure of β-glucan was analyzed using FT-IR spectrometry (Shimadzu IR Prestige-21– Japan). The FTIR spectrum was utilized to detect the functional groups of glucan structure compared with the standard. This was done under FT-IR spectrometry in wavelength range 4000-400 cm\(^{-1}\) and at a resolution of 8 cm\(^{-1}\). This test involved mixing an equal volume of glucan sample and standard (2 mg) with potassium bromide (KBr) (100 mg), then grinding the mixture by special grinder until soft and fine powder obtained. The sample was loaded in target mold and analyzed\(^{(9)}\).

**Determination of Carbohydrate Content:** Carbohydrate content was calculated by multiplying the reducing sugar content which was determined depending on Fehling’s reducing method\(^{(10)}\). Briefly, 10 g sample was mixed with 20 mL sulphuric acid (0.5 M). Reflux was then performed in a sand bath for 2.5 hours. The residue was washed after filtration (Whatman filter No. 1) with warm dH\(_2\)O. The solution was then neutralized with Na\(_2\)CO\(_3\) powder and the mixture’s volume was completed to 100 mL with dH\(_2\)O. Titrations were performed using 5 mL Fehling’s solution (equal volumes of solution A and B) pipetted into a conical flask and aliquot of 5 mL dH\(_2\)O was added. The solution was then boiled for 15 seconds. Methylene blue indicator (a few drops) was then titrated with the solution until the color changed from blue to green. The carbohydrate content was then calculated according to following equation:

\[
\text{Carbohydrate Content (%) } = \frac{5 \times 0.005 \times 100 \times 100}{V \times 10 \times W} \times 0.9%
\]

Where \(V\) = volume of sample solution (titration volume) and \(W\) = weight of powdered sample.

**Antioxidant Activity**

Antioxidant activity of extracted β-glucans was detected using DPPH (Sigma Aldrich, USA) for free radical scavenging assay\(^{(11)}\). Scavenging potential of β-glucan against DPPH radicals was determined spectrophotometrically (Aquarius, Cecil, Italy). Colour change (from deep- violet to light- yellow) when DPPH reduced was measured at 517 nm. In our experiment, set of concentrations (12.5, 25, 50, 100 and 200 µg mL\(^{-1}\))
were used. Ascorbic acid was used as positive control. The inhibition (%) of radicals by β-glucan was calculated according to the formula:

\[
\text{Inhibition (\%)} = \frac{\text{Absorbance of } - \text{ve control} - \text{Absorbance of the sample}}{\text{Absorbance of the } - \text{ve control}} \times 100
\]

**Statistical Analysis:** Data were expressed as means±standard deviation (SD) and analyzed by a one-way analysis of variance (ANOVA) followed with Dunn’s test using GraphPad Prism(Graph Pad Software Inc.). A \( p \leq 0.05 \) was considered to indicate a statistically significant difference between groups.

**Results and Discussions**

Dried fruiting bodies of *P. eryngii* was subjected to β-glucan extraction which depended on heating-acid extraction steps. This method is characterized by its ability to extract glucan from mushrooms with significant quantities, limited use of organic solvents and time saving. The total yield of extracted glucan was 7.9%. Previously reported that the total yield of glucan extracted from *P. eryngii* was 6% (14). The advantages of this procedure were heating, and extensive acid treatment followed by ethanol application which leads to β-glucan precipitation and dissolve or remove most the proteins, mannan, nucleic acids and others. The impurities affect the physical and chemical properties of β-glucan and may cause reducing in its ability to be soluble in water (15). Furthermore, the carbohydrate content for the extracted β-glucan was 54%, indicating purity and method of choice for β-glucan extraction.

Regarding HPLC analysis, results in Fig. (1) revealed one major peak in the extracted β-glucan at retention time 3.16 min (487.633 mAU) with an overall area percentage of 90%, which indicated the purity of the extracted β-glucan by comparing with the standard which exhibited almost the same retention time at 2.94 min (377.215 mAU). Purity of 90% gave an indication for the successful β-glucan extraction method. HPLC was used for detecting the purity of polysaccharides including β-glucan extracted from mushrooms and yeasts (16).
FT-IR analysis of *P. eryngii* β-glucan with absorption range of 4000-400 cm\(^{-1}\) was compared with the resulted functional groups of the standard. Fig. (2A), shows that the band range of ~1027.99 cm\(^{-1}\) is a characteristic feature of polysaccharides and assigned for β-1,4 glucans\(^{(17)}\), the absorbance peak at this band represent the existence of C-O-C group\(^{(18)}\). In addition, hydroxyl groups and carboxyl groups were detected at band 2923.88 cm\(^{-1}\), these groups are features of carbohydrate structure\(^{(19)}\). Moreover, both sample and standard showed high degree of similarity with respect to overall spectra abortion.

Fig. 1: HPLC chromatogram for (Top) β-glucan standard and (Down) the test sample.
The scavenging activity of *P. eryngii* β-glucan was estimated using increasing concentrations of β-glucan. Results in Fig. (3) demonstrate a potential free radical scavenging capability of *P. eryngii* β-glucan with calculated IC₅₀ value of 39.3 µg mL⁻¹. By comparing with ascorbic acid (IC₅₀ 27.47 µg mL⁻¹), *P. eryngii* β-glucan showed no significant differences in the pattern of free radicals reduction among all the tested concentrations. β-glucan are the most abundant forms of polysaccharides which display many biological activities including antioxidant²⁰. Antioxidant activity of β-glucan is highly dependent on mushroom source and method of extraction. Our results are in agreement with Roncero-Ramos et al.,²¹ which described the antioxidant activity of β-glucan from different mushroom sources including *P. eryngii*. Another study involving edible mushrooms revealed that β-glucan exhibited antioxidant activity 64 to 93% reduction of DPPH²².

**Fig. 2: FT-IR Spectra of (A) extracted *P. eryngii* β-glucan sample (B) standard.**
Various concentrations of *P. eryngii* β-glucan were tested against MCF-7 and HepG2 tumor cells. In the present study we used the MTT assay, which is universally used to evaluate the cytotoxic potency of drugs *in vitro*\(^{12}\). Results in Fig. (4) shows that the more increasing in β-glucan dose the more reduction in MCF-7 and HepG2 viability. The effect of MCF-7 and HepG2 viability by *P. eryngii* β-glucan exhibited a dose dependent pattern of reduction with a calculated IC\(_{50}\) of 280.00 and 539.5 µg mL\(^{-1}\), respectively. On the other hand, *P. eryngii* β-glucan had slight toxic effect on the cell viability of normal cells WRL68.

The biological, immunological and pharmacological activities of glucans extracted from edible mushroom are mainly attributed to β-glucan\(^{23}\). The cytotoxic activity of *P. eryngii* β-glucan against different types of tumor cells indicated a significant dose-dependent inhibition of cell proliferation and exerted direct cytotoxicity after 24 h. Many reports indicated the anti-proliferative effect of β-glucan extracted from different mushroom
sources. The effect of β-glucan \textit{in vitro} against different tumor cell lines was well demonstrated \((23)\). In addition, previous finding indicated that the toxicity of β-glucan on human pigmented malignant melanoma (Me45) cell line increased by increasing β-glucan concentration with viability reduction reached up to 19%. Moreover, it was proved that glucans in nature have low toxicity on normal cells and well tolerated by patients treated with glucan combination\((24)\).

**Conclusions**

We can conclude that the extracted \(P. \text{eryngii}\) β-glucan exhibited strong antioxidant capabilities and promising anti-proliferative potential on tumor cells \textit{in vitro}, which needed more investigations regard the mechanism of β-glucan in inducing tumor cell viability reduction.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

**Conflict of Interest:** Non

**Funding:** Self-funding.

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The Effect of Multiple Glass Beads Sterilization Cycles on Cyclic Fatigue of AF Blue S One File

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Abstract

Introduction: Sterilization represent an important and essential aspect, now days Most of the dentists usually use the endodontic files for many times before they discard it, this could increase the need for reliable and fast sterilization method, but without affecting the physical properties of the endodontic files.

Aim of the Study: This study discusses an economic method of sterilization (glass bead) and its effect on the fracture resistance of the AF Blue S one file (Fanta) with multiple reuses of the system.

Method and Materials: A total of 75 AF BLUE S one NiTi Rotary files (FANTA) #25 size with 0.04 taper and 25 millimeter length, were used in this study, divided into three groups to test their cyclic fatigue resistance after multiple sterilization cycles.

Result: The results were statically analyzed using (SPSS) software, Anova test showed a statically high significant differences between the groups. Conclusions: Within the limitation of this study, it can be concluded that AF Blue S one file with 4 time glass bead sterilization cycle was the most fatigue resistant compared to zero and two sterilization cycle.

Keywords: Sterilization, Glass Beads, Endodontic Files; Toxicity; sterilization.

Introduction

Sterilization represent an important and essential aspect and it is a cornerstone in controlling the infection that could easily spread by various instruments which are used in the dental field.(1)

Dentists depends on files in performing root canal treatments, these files come in direct contact with the blood of the patient which can easily spread dangerous diseases like “AIDS and Hepatitis”. Most of the dentists usually use the endodontic files for many times before they discard it, this could increase the need for reliable and fast sterilization method, but without affecting the physical properties of the endodontic files.(2,3)

Wet sterilization as autoclave and dry sterilization as the oven and glass bead sterilizer are the mostly used by the dentists,(4) unfortunately autoclave causes dullness and decrease the sharpness and cutting efficiency of the endodontic files, on the other hand dry heat oven needs time that is long to perform sterilization “sixty minutes at 180ºC”, while glass bead sterilization is a variation of dry heat oven, needs only short time.(5,6)

Nickle Titanium (NiTi) files are appropriate instruments used for negotiation of the canals specially curved canals, The use of these files offers the reliability and possibility to provide a predictable root canal preparation, unfortunately these files are vulnerable to fracture.(7)

Many new NiTi files have been marketed by manufactures with the aim to offer safer and more...
effective file system. The thermomechanical treatment of NiTi alloy resulting in enhancement of the physical properties by changing the crystalline structure of the alloy, reducing the frequency of file fracture.

Repeated and prolonged usage of endodontic file has a negative effect on its physical properties which can lead to fracture. Some reports showed that the majority of file’s separation was due to cyclic fatigue. These files are used for many times by the dentists undergoing repeated cycles of sterilization.

This study discusses an economic method of sterilization (glass bead) and its effect on the fracture resistance of the AF Blue S one file (Fanta) with multiple reuses of the system.

Method and Materials

A total of 75 AF BLUE S one NiTi Rotary files (FANTA) #25 size with 0.04 taper and 25 millimeter length, were used in this study, divided into three groups to test their cyclic fatigue resistance after multiple sterilization cycles:

Group 1: 25 files undergo no sterilization (control).

Group 2: 25 files undergo two cycles of sterilization with ten minutes intervals.

Group 3: 25 files undergo four cycles of sterilization with ten minutes intervals.

Files sterilization was done using glass beads sterilizer for 15 seconds at 425-475 °F (218-246 °C).

In this study cyclic fatigue test has been done in custom made tapered stainless-steel artificial canals with regular (5 mm) radius and angles of curvature (90°), due to the limitation of obtaining standard result on using natural teeth associated with the wide variety of canal shape. The block has been designed according to the dimensions of the files which aimed to check out, Test was carried out in according to the manufacture recommended speed of rotary system (375) Rpm, with 2.6 N torques manipulate setting. The middle of the simulated curvature used to be (5-7) mm from the tip of the file which has been positioned at full working length (19 mm). The whole files have been new and the working section is 25 mm in length. Cyclic fatigue tested used to be conducted with the file rotating freely inside the tapered artificial canal which result in that reproducible simulation of the file restrained in the artificial curved canal.

The dental hand-piece has been mounted on wooden block that allowed manipulate of the hand-piece movement, and easy placement of every file inside the artificial canal, making sure 3-dimensional alignment and positioning the file to the identical depth for standardization. The artificial canal has been covered with transparent plastic sheet to forestall the files from slipping out and to enable the researcher observe the files while it works and when fracture has been occurs, so fracture was detectable due to the fact the files have been seen through the transparent plastic sheet window.

Stainless Steel block was once constant to the wooden block to forestall its movement and to make the relation between the steel block and the hand-piece almost constant. Glycerin has been stuffed totally to inside the artificial canal, earlier than each file to the exacted size (19 mm) inside a canal in order to minimize friction and heat generation. The files have been activated inside the canals by usage of (ENDOMAX PLUS) cordless endodontic hand-piece.

Video recording has been carried out simultaneously for more accurate work and to eliminate human error. This equation describe the (NCF) for every file.

“Number of cycles to failure NCF = Speed RPM X Time (T) to fracture in minute”

The armamentarium used in this study are showed by (fig.1)

Fig: Instruments used to perform the study.

Results

The means and standard deviations of (NCF) for the three groups are shown in (Table 1). The results were statically analyzed using (SPSS) software, Anova test showed a statically high significant differences between the groups (P < 0.001).
Intra group comparison using least significant difference test also showed a statically high significant differences between the means of the three groups (Table 2).

### Table 1 : The means and standard deviation of Number of Cycles to Fracture

<table>
<thead>
<tr>
<th>Groups</th>
<th>No. of Files</th>
<th>Mean</th>
<th>SD</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 (No Sterilization)</td>
<td>25</td>
<td>585.2</td>
<td>20.79</td>
<td>0.001</td>
</tr>
<tr>
<td>Group 2 (Two Cycles of Sterilization)</td>
<td>25</td>
<td>966.3</td>
<td>23.78</td>
<td></td>
</tr>
<tr>
<td>Group 1 (Four Cycles Sterilization)</td>
<td>25</td>
<td>1058.2</td>
<td>20.45</td>
<td></td>
</tr>
</tbody>
</table>

### Table 2 : The Least Significant Difference Test between groups

<table>
<thead>
<tr>
<th>Groups</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 V Group 2</td>
<td>0.001</td>
</tr>
<tr>
<td>Group 2 V Group 3</td>
<td></td>
</tr>
<tr>
<td>Group 1 V Group 3</td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

The control of infection that is spreading by various tools used in dentistry is of great importance as a preventive measure for cross infection.

During procedure of root canal treatment the endodontic files come in direct contact with pulp tissue, oral fluids blood and saliva, these files could be considered “reusable sharps “ making there sterilization as a must mandatory step.(17) several sterilization techniques utilized such as autoclave, dry heat oven, ethylene oxide gas and also glass beads sterilizer which provide dry heat with shorter exposure time (18,19)

Ni-Ti endodontic files are always having the risk of separation because of cyclic fatigue or torsional stress,(20,21,22) To reduce or overcome this mechanical failure, many method have been applied by manufacturers to improve the fatigue resistance of file like electro-polishing the surface of the file: (RaCe), twisting instead of machining: (TF), and geometric characteristics alteration such as asymmetric design (Revo-S). (10,23)

Today, thermal processing could be the main approach to develop the alloy metallurgy properties by affecting its transition temperatures and thus leading to alter the fatigue resistance.(24,25) Any Temperature changes will affect crystalline phases in NiTi alloy. These changes result in enhanced the file physical properties such as cutting efficacy has been increased and the fracture resistance also elevated.(26,27) However, sterilization in some studies has been showed that not necessarily effective on the cyclic fatigue of the files.(28)

The choosing of two or four cycle sterilization cycles in this study based on reports showed that NiTi file can be used to shape up to 10 curved root canals.(3,29)

In this present study statistically significant increase in the life time of the AF Blue S one file with the increase in the number cycle of glass bead sterilization in comparison with the cyclic fatigue of the file with zero and two cycle of glass bead sterilization. This result may be related to the heat treatment of the alloy and the wire intermediate face. A modified phase composition because of the changing transformation temperatures is the essential difference between the conventional NiTi and the thermomechanically treated alloy. As the conventional NiTi alloy contains austenite,(30) while, the thermomechanically treated NiTi alloy moreover contains varying amounts of R℃phase and martensite under clinical conditions(31,32,33). These modifications are supposed to lead to extra flexible endodontic files with a superior resistance to fracture which mean decrease the stress on the file during negotiating the canal which lead to increase fracture resistance(34), so thermomechanical treatments represent a modern technique of developing new endodontic file with enhance mechanical properties.(35)

This result may be similar to research of de Melo et al(36) and Zhao et al(37) showed that sterilization increased the fatigue life of rotary Ni-Ti instruments through the increase in hardness and torsional resistance of the material, also Khalil and Natto(38) in their study shows that cyclic fatigue increase with the modern heat treated file and thus exactly what the present research concluded. The result of this study may be related to the wire of the AF One Blue S file and the AR phase heat treatment of Ni-Ti alloy, While several research had
been shows disagreement with the result of this study as Mize et al.\(^{(39)}\) and Hilt et al.\(^{(40)}\) Also, AbuMelha\(^{(41)}\) and Alshwaimi\(^{(42)}\), which suggested that increase the number of autoclave sterilization of rotary files reduced their cyclic fatigue resistance.

**Conclusions**

Within the limitation of this study, it can be concluded that AF Blue S one file with 4 time glass bead sterilization cycle was the most fatigue resistant compared to zero and two sterilization cycle and so multiple cycles have significant alterations in the cyclic fatigue resistance of rotary AF Blue S one files.

**Recommendation:** According to the result of the present study it’s recommended to sterilize the NiTi files with glass bead before using them.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

**Conflict of Interest:** Non

**Funding:** Self-funding

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Influence Factors Utilization of Family Planning Services among Reproductive Age Women’s in Primary Health Care

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Abstract

Background: Family planning services as an essential component of primary health care and reproductive health, contributes to reducing maternal and newborn mortality and morbidity and transmission of HIV. Attitudes and knowledge towards family planning services are role play and consider influence factors on family planning services, assess to the means of fertility regulation and communication between husband and wife about desired family size and timing of pregnancy are essential for family planning.

Objective: To determine the influence factors on family planning services of women in reproductive age. Also to determine the association between influence factors of family planning of women in reproductive age and their demographic characteristic.

Materials of the Study: The study design a quantitative research by descriptive study, the sampling it is non-Probability “purposive” sample was a conducted on 150 females which attended with requirement health care services attained in primary health care centers at AL-Najaf city for period from September 7, 2018 to February 16, 2018 November. A questionnaire it has used as a tool of data collection to fulfill the study. A descriptive and inferential statistics was used to analyze the data.

Results: The study results indicate that the majority of study responses are age (30_37)years with 42.0%, duration marriage the most study sample (6_11)years with 44.0%. Related to number of children more half study sample (3_5) with 49.3%, Level of education most are higher secondary school with 28.0%,Occupation the majority study sample homemaker with 70.7% and live in urban. The study sample utilization of met family planning was oral contraceptive pills with 34.7%. In addition, the study sample are more than half their knowledge are poor and attitude negative about family planning.

Conclusion: The majority of the sample study used contraceptive pills and IUD due easy and do not need to procedures and knowledge. There is a significant relationship between knowledge, attitude and items of family planning. Some of demographic data effect upon knowledge and attitude because different in level of education and residence.

Keywords: Program of family planning services, types of contraceptive, Influence Factors utilization of Family Planning.

Introduction

The influence factors on family planning have women’s of reproductive age maybe know little or incorrect information about family planning services. Also when they know some names of contraceptives they don’t know where to get them or how to use it these women have negative attitude about family planning while some have heard false or misleading information.
The poor correspondence between knowledge and attitude of family planning services has drawn attention to women’s perception about the positive and negative aspect of modern contraception. So consider the factors effect for family planning are knowledge and attitude that use modern method stemmed from fear that uses might cause infertility, producing damaging side effect and forgetting to take contraceptives was a serious risk. Family planning is important and effective in improving the health of mothers and children (1). WHO defined family planning programs as (a program that allows individuals and couples to anticipate and attain their desired number of children and the spacing and timing of their births) (2).

Family planning as an essential component of primary health care center and reproductive health, contributes to reducing maternal and newborn mortality and morbidity and transmission of HIV. Through increase awareness and attitudes towards family planning services that lead to fertility regulation and communication between husband and wife about desired family size and timing of pregnancy are essential for family planning. Its cognitive decisions and behavioral practices that enable women to conceive a wanted pregnancy and avoid unwanted or badly timed pregnancy (3).

Although most people are aware of the benefits of family planning services, they complained that it was difficult to access family planning services as such services were provided by health facilities that were far from their homes (4).

The increase in teenage pregnancies and unsafe abortions as well as the maternal mortalities that occurred could have been prevented if uptake of family planning services were improved. The factors that influence the uptake of family planning services is imperative as very little is known about the factors that influence the decision of people to go for family planning services (5).

Family planning services can bring a wide range of benefit to women in Iraq. Before the Gulf war, Iraq underwent a rapid population growth therefore requested married women to limit their families to 4 offspring. And after the Gulf war Iraq insisted on maintaining a high population because of the total death caused by inflict and sanctions, since thus 1993 Iraq has a national policy on assuring assess to family planning and contraceptives. Consultative meetings and workshops were planned with the objective of strengthening and promoting family planning services in Iraq (6).

(6) that found several factors play an important role in the use of contraceptives among women of childbearing age. The identification of these factors is crucial to the planning and implementation of suitable family planning programmers. Many factors inhibit the use of modern contraceptives among adolescents and considered as barriers include poor knowledge and negative about contraceptive, fears and rumors about side effect, and unsupportive or negative influences of partners and family members.

The utilization that influence family planning services for contraceptives use by teenagers has also been found to be a factors of socio-economic status, knowledge about contraceptives, attitudes about issues related to contraceptives, residential area, educational status, counseling received about contraceptives, attitudes of the contraceptive providers, and cultural values, beliefs and norms (7).

Materials of the study: The study design was quantitative research through descriptive study, the sampling it is non-Probability “purposive” sample was a conducted on 150 females which requirement health care services attained in primary health care centers at AL-Najaf city for period from September 7, 2018 to February 16, 2018 November. A questionnaire it has used as a tool of data collection to fulfill the study, which consist of three parts, include demographic characteristics, types of contraceptive method or family planning method, and influence factors utilization of family planning services. A content validity, which is carried out through 13 panel of experts, while reliability use split half. A descriptive and inferential statistics are used to analyze the data through program spss version 21.

Ethical Consideration: The ethical clearance of the present protocol was obtained from the Health Ethics Committee of the university of AL-Ameed and health directorate in Karbala governorate. The individuals were included in this study were not undergone any invasive medical procedure or surgery. In addition, informed verbal consent was taken from all females client before study inclusion that attained to primary health care center.
**Results**

Table (1): Statistical distribution of the sample studied sample according to their demographic data.

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>Rating</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age/years</td>
<td>&lt;= 20</td>
<td>12</td>
<td>8.0%</td>
</tr>
<tr>
<td></td>
<td>21 - 29</td>
<td>54</td>
<td>36.0%</td>
</tr>
<tr>
<td></td>
<td>30 - 37</td>
<td>63</td>
<td>42.0%</td>
</tr>
<tr>
<td></td>
<td>38 and more</td>
<td>21</td>
<td>14.0%</td>
</tr>
<tr>
<td>Duration of marriage</td>
<td>&lt;= 5 years</td>
<td>35</td>
<td>23.3%</td>
</tr>
<tr>
<td></td>
<td>6 – 11 years</td>
<td>66</td>
<td>44.0%</td>
</tr>
<tr>
<td></td>
<td>12 – 18 years</td>
<td>29</td>
<td>19.3%</td>
</tr>
<tr>
<td></td>
<td>19 and more years</td>
<td>20</td>
<td>13.3%</td>
</tr>
<tr>
<td>Number of children</td>
<td>&lt;= 2</td>
<td>55</td>
<td>36.7%</td>
</tr>
<tr>
<td></td>
<td>3 - 5</td>
<td>74</td>
<td>49.3%</td>
</tr>
<tr>
<td></td>
<td>6 and more</td>
<td>21</td>
<td>14.0%</td>
</tr>
<tr>
<td>Level of education</td>
<td>unable to read and write</td>
<td>12</td>
<td>8.0%</td>
</tr>
<tr>
<td></td>
<td>Primary</td>
<td>39</td>
<td>26.0%</td>
</tr>
<tr>
<td></td>
<td>Secondary</td>
<td>35</td>
<td>23.3%</td>
</tr>
<tr>
<td></td>
<td>Higher secondary</td>
<td>42</td>
<td>28.0%</td>
</tr>
<tr>
<td></td>
<td>Graduate</td>
<td>22</td>
<td>14.7%</td>
</tr>
<tr>
<td>Occupation</td>
<td>Employment</td>
<td>44</td>
<td>29.3%</td>
</tr>
<tr>
<td></td>
<td>Housewife</td>
<td>106</td>
<td>70.7%</td>
</tr>
<tr>
<td>Resident</td>
<td>Urban</td>
<td>129</td>
<td>86.0%</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>21</td>
<td>14.0%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>150</td>
<td></td>
</tr>
</tbody>
</table>

This table shows that the most of the study samples are age (30 - 37) years within age groups and duration marriage the most study sample (6 - 11) years. Related to number of children are more half study sample (3 - 5) with 49.3%, Level of education most of the study sample higher secondary level with 28.0%, occupation the majority study sample are housewife with 70.7%. Regarding the resident, the most of study sample urban with result 86.0%.

Table (2): Statistical distribution of the sample studied sample according to Method of family planning.

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Method of family Planning services</td>
<td>Oral contraceptive pills</td>
<td>52</td>
</tr>
<tr>
<td></td>
<td>IUD</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Withdrawal</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Male condom</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Injection</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Female sterilization</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Calendar method</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Lactation amenorrhea</td>
<td>4</td>
</tr>
</tbody>
</table>

This Table depict the results among the method of family planning and the majority method are use of study sample oral contraceptive pills with 34.7%.
Table (3): Factors that influence the utilization of family planning services frequency distribution

<table>
<thead>
<tr>
<th>Factors</th>
<th>Rating</th>
<th>Frequency</th>
<th>Percent</th>
<th>M.S</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge factors</td>
<td>Poor</td>
<td>97</td>
<td>64.7%</td>
<td>1.34</td>
<td>Poor</td>
</tr>
<tr>
<td></td>
<td>Good</td>
<td>53</td>
<td>35.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude factors</td>
<td>Negative</td>
<td>101</td>
<td>67.3%</td>
<td>1.49</td>
<td>Negative</td>
</tr>
<tr>
<td></td>
<td>Positive</td>
<td>49</td>
<td>32.7%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cutoff: 1.5 (mean of score <= 1.5 Poor, Mean of score > 1.5 Good);
Cutoff: 1.5 (mean of score <= 1.5 Negative, Mean of score > 1.5 Positive)

This table shows the influence factors about utilization of family planning services that indicate the study results regarding knowledge of study sample about family planning more half of study sample is poor knowledge about family planning with 64.7%. also regarding attitude about study sample among family planning services are most for study sample is negative response 63.3%.

Table (4): Correlation among Knowledge, and Attitude, Items about family planning.

<table>
<thead>
<tr>
<th></th>
<th>Knowledge</th>
<th>Attitude</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Pearson Correlation</td>
<td>.551**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>0.0001</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>150</td>
</tr>
<tr>
<td>Attitude</td>
<td>Pearson Correlation</td>
<td>0.558**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>0.0001</td>
</tr>
<tr>
<td>N</td>
<td></td>
<td>150</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

This table shows correlation between knowledge, attitude that the indicate there is high significance within influence factors for family planning services at p. value (0.0001) within confidence interval 95% and p. Value less than or equal 0.05.

Table (5): Relationship between Knowledge Influence factors for family planning services and demographic data.

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>Chi-square (X²)</th>
<th>df</th>
<th>P-value (Sig.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge and demographic data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (Years)</td>
<td>10.951</td>
<td>3</td>
<td>0.012 (S)</td>
</tr>
<tr>
<td>Duration married</td>
<td>9.605</td>
<td>3</td>
<td>0.022 (S)</td>
</tr>
<tr>
<td>Number</td>
<td>17.677</td>
<td>2</td>
<td>0.0001 (HS)</td>
</tr>
<tr>
<td>Education</td>
<td>24.898</td>
<td>4</td>
<td>0.0001 (HS)</td>
</tr>
<tr>
<td>Occupation</td>
<td>10.282</td>
<td>1</td>
<td>0.001 (HS)</td>
</tr>
<tr>
<td>Residence</td>
<td>17.840</td>
<td>1</td>
<td>0.0001 (HS)</td>
</tr>
<tr>
<td>Method</td>
<td>26.713</td>
<td>7</td>
<td>0.0001 (HS)</td>
</tr>
<tr>
<td>Attitude and demographic data</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>age (Years)</td>
<td>15.521</td>
<td>3</td>
<td>0.001 (HS)</td>
</tr>
<tr>
<td>Duration of marriage</td>
<td>5.783</td>
<td>3</td>
<td>0.123 (NS)</td>
</tr>
<tr>
<td>Education</td>
<td>38.117</td>
<td>4</td>
<td>0.0001 (HS)</td>
</tr>
<tr>
<td>Occupation</td>
<td>7.949</td>
<td>1</td>
<td>0.005 (HS)</td>
</tr>
</tbody>
</table>
This table show the relationship between knowledge and their demographic data the result show high significant relationship between knowledge and (number of children, education level, occupation, resident and method of family planning) with p.value 0.001 and significant relationship between knowledge and (age, duration marriage) with p. value (0.12,0.22). Also attitude and their demographic data the result indicate is high significant.

**Discussion**

The findings of the study indicate demographic data of study participant was the mean age (30_37) years within age groups and all of the study sample were married who utilization of family planning they are period (6_11) year. These result support by(8) was the most percent 44.0% others result were(>=5 with percent 23.3%, 12_18 with 19.3%, and 19 and more with 13.3%. these result about 19.5% respondents had good knowledge of contraception, 76.4% respondents had average knowledge about contraception and 4% had poor knowledge about contraception.

The study finding indicate regarding have children for study sample were (3_5) children. There are authors (8) that found with 56% have 2 children with 36.7% and 6 and more with 14.0% and same of the study most of the study sample were marriage or couples (31.9%) had 3 children, 25.9% had 4 children, 17.1% had 5 children, 7.5% had 6 children, 10.3% had 2 children, and 2.5 had 1 child.

The women were asked about their level of education of the most 28.0% high secondary other results is unable to read and right was 8.0%, primary 26.0%, secondary 23.3%, and Graduate and housewife and employment most of them living in the city and the others lived in rural areas.

The majority of study sample use oral contraceptive pills with 34.3% other method were IUD 20.0%, withdrawal 18.0%, male condom 12.0%, injection 8.0%, female sterilization 1.3%, calendar method and lactation amenorrhea were 2.7%. These results are disagree with(9) that found the total number of condoms provided by international donors has been relatively low. Between 2000 and 2005, the average number of condoms distributed in Nigeria by donors was (5.9%) man, per year, and in 2002, 75 per cent of health services facilities visited in a survey did not have any condom or contraceptive supplies this in turn does not encourage the utilisation of family planning services due to lack of needed contraceptive method.

The study finding also supported by(10), oral contraceptive were the most predominantly recognized modern method (85.9%;116/135). However, only 28.1% (38/135) heard of implant and injections as modern contraceptive method.

Others studies are related to utilization for family planning is prevalence of contraceptive use in approaching 60% worldwide and in the less developing countries almost 53% of couples are using some form of contraception(11).

Studies done in many countries showed that the most commonly used method of contraception among women in southern Jordan were oral contraceptives, IUD, withdrawal and female sterilization was only used by 4.2% of women. Another study found that Jordan Muslims preferred IUD as contraceptive method and that the believed that the IUD had fewer side effect than oral contraceptive (12).

World health organization which showed that women in many underdeveloped countries don’t have enough knowledge about contraception(2).

The majority of women in this study were unfamiliar with the idea of family planning half of the study sample were poor knowledge about influence factors on utilization on family planning 64.7% percent. These study finding of our study is concerned with study done in Jordan about knowledge of women with 91.4% never heard about types and utilization of family planning services (13). Others study results is inconsistence with or study that indicate women has good knowledge about in duhaks showed that 82.4% of women know about family planning.

The sample of the study show negative attitude toward family planning method. Others studies done by researchers who found positive knowledge and attitude about family planning and family planning services in the district were; spacing of children and the desire of some women to prevent pregnancy and Sexual Transmitted Infections (STIs) due to increase their awareness and attitude about family planning services by (5).

The finding of the study that there is a relationship between influence factors utilization for family planning services and demographic data that indicate
high significant between knowledge and demographic data. These findings were agree with our study by (16), educational attainment and level of knowledge about family planning method were statistical significant to family use. the findings of the current study echoed in many other studies. Found that well educated women are more willing to engage in innovative behaviour than less educated women and in many developing countries, the use of family planning method remains innovative. Another researchers support for our study by (17), also reported a positive association between educational level of both women and their spouses and use of contraceptive method.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

**Conflict of Interest:** Non

**Funding:** Self-funding

**References**

7. T Kanku, R Mash. Attitudes, perceptions and understanding amongst teenagers regarding teenage pregnancy, sexuality and contraception in Taung. 2010; 52(6);563-572.
Preparation of Nano-Antigen for Brucella Abortus by Ultrasound Technique and Evaluate their Sensitivity by ELISA Technique

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Abstract

Background: The nanoparticle technology, or nanotechnology is the science that studies the treatment of matter on the atomic and molecular scale. Nanotechnology deals with measurements between 1 to 100 nanometers, i.e. deals with atomic clusters ranging from five atoms to a thousand atoms. They are much smaller than bacteria and a living cell palsy.

Method: In this study, it involved the production of a new technique for diagnosing infection with Brucella bacteria. This study included 45 samples of patients suffering from brucellosis (women and men), in addition to 36 samples from other Brucella. All were diagnosed Injuries by hospital medical advisory staff using various tests vitek, ELISA, API20C, Morphology, Brucella media test. The samples were examined using the new technique compared to the routine method of diagnosis. We found that the new technique gave a positive result to the samples infected with Brucella bacteria, while the rest of the samples without infection with Brucella bacteria gave a negative result.

Results: It was found that the tests of Elisa and API20C, Vitek were more sensitive 100% and specialized 100% for the diagnosis of Brucella bacteria than other method morpholgy with allergic 44% and specialized 86%, Brucella media Test, with allergy 88% And specialty 86%. The results of the ELISA kit test were the nano-labs (the new technique) in this study to diagnose more successful bacteria compared to normal system and more allergic and specialized because of the antigen-containing.

Conclusion: The new kit use in nanotechnology is more Sensitivity and Specificity for diagnosis to the brucella, Roads routine to diagnose brucella is not effective compared with API, Vitek and ELISA.

Keywords: Nanotechnology, Brucellosis, ELIZA Technology.

Introduction

Nanotechnology is a term used to deal with the scaling matter at atomic or molecular level. The word Nano means a one to one billion of the physical quantity. Considered one Nano unit length equivalent to one-billionth of a meter. When Nanomaterial’s are manufactured from bulk material. Nanoparticles have emerged as powerful tools to initiate and modulate immune responses due to their inherent capacity to target antigen-presenting cells (APCs) and deliver coordinated signals that can elicit an antigen-specific immune response. Nanotechnology is now a fast and interdisciplinary scientific field, through combining distinctive sciences like biology, physics, medicine, and chemistry with engineering, also removing the conventional borders between them.

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nano-technology has the capability of controlling and recognizing molecules and atoms, also dealing with the structures with sizes in range of (1-100nm), 1nm has been equal to billionth of meter. The majority of current nano-materials might be provided into 4 types(5-8): Carbon-based materials, Metal-based materials, Dendrimers Compounds Combine Nano-particles\(^9\)(10). Brucellosis is a bacterial infection caused by Brucella, which is transmitted from animals to humans. In most cases, people are infected by consuming raw or unpasteurized milk products. Sometimes, the bacteria that cause Brucellosis may be transmitted through the air or in direct contact with infected animals\(^11\).

**Material and Method**

The samples were collected from 45 patients. Blood samples and 36 other brucella individual (male and female) as control group. all samples were collected from Al-Kadhimiya Teaching Hospital & Baghdad Teaching Hospital during the period from October 2019–February 2020 and were investigation to diagnosis for Brucellaby many test [Culture, Brucella media Test, Vitek and API 20C].

**Preparing the blood agar:** The medium has been prepared based on the specifications that have been provided by the manufacturing company. 37.50g of the powder has been dissolved in 1 liter of the Distal water (DW), auto-calved for 15 minutes at 121C° (15psi), cooled to 50 -55C° and aseptically 5-7% v/v sterile human blood has been added.

Enterotoxin B Ab Preparation

Based on the manufacturing leaflet, 1ml of the DW has been added into 0.20mg of the enterotoxin B Ab. 500µl has been obtained from the enterotoxin B Ab. and diluted with 9500µl DW for obtaining the 10µg/ml concentration.

**Brucella Diagnosis using the vitek system:**

1. 3 colonies have been utilized for preparing the Brucella suspension in saline tubes (0.50ml). The suspension has been adjusted to McFarland standard (0.50) utilizing Vitek colorimeter (450nm filter, transmittance ranging between 45% and 55%).
2. After the labeling of the Brucella cards with marker, placed card at a transfer tube with filling stand which has been in Brucella suspension.
3. The card has been inoculated by the module of the filling.
4. The cards have been closed by the sealor module, and incubated afterwards, for 25hrs or 56hrs at 36C, according to type of the readings which have been provided by the instrument types.

**The destruction of the cell wall and the isolation of Ag**

- The *Brucella* has been cultured on the blood agar plates and incubated overnight at a temperature of 36°C.
- The growth has been harvested with the use of the microscopic slide via curettage.
- DW has been added into the growth of the bacterial for making 5 ml suspension.
- Brucella suspension has been treated by the lysis buffer (50ml of 50ml of 1% Acetate and 2% SDS). The resultant suspension has been incubated for 20min in the boiling water and vortexed vigorously afterwards.
- One bacterial suspension volume has been mixed with two chloroform volumes. Such suspension has been vigorously vortexed and exposed to the ultrasounds at 50C° for 30min.
- The suspension has been centrifuged 5min at 4,400rpm. Ten volumes of supernatant has been precipitated with the use of 1 saturated ammonium sulfate (NH4)2SO4 volume after that, it has been mixed at 40˚C on hot plate magnetic stirrer.
- The mix has been dialyzed with the use of the dialysis bag (14,000) against the sucrose for obtaining stock (i.e. the concentrated protein)

The dialysis is a commonly utilized approach, it is simple, yet, time consuming due to the fact that separation is dependent on the diffusion. The sample has been placed within a dialysis bag which has been prepared from a tube which is made from semi-permeable membranes. Relying on the dialysis tube which is available commercially, merely small molecules with sizes <10kDa has been eliminated from sample to the medium around. Which is why, this approach is typically utilized for removing the salts from the protein solution. Dialysis can be utilized to concentrate protein solutions as well. The molecules of the water are eliminated from the inside of the dialysis bag with the use of a hydrophilic polymer like the poly-ethylene glycol.
Purifying enterotoxin B using the gel filtration chromatography: 50ml of the sephacryl S300 has been packeted in the column (2.50cm diameter×78cm length, volume of the column: 379.90ml). 5 ml of the specimen which has been concentrated through the ammonium sulfate has been applied to the sephacryl S300 column.

The elution has been accomplished at a 5ml fraction flow rate with the use of the DW as buffer, each fraction’s absorbance has been measured at 280\(\text{nm}\). The peaks have been obtained and concentrated afterwards via the dialysis against the sucrose.

Detecting Ag using the ELISA kit:

**Principles:** The concept has been accomplished based on manufacturing leaflet. This immunoassay of the enzyme has been based on the immuno-capture concept for quantitatively detecting of the enterotoxin B Ag. The micro-well plate has been coated by anti-enterotoxin B Ab. Throughout the test, the sample has been added into the antibody coated micro-well plate and incubated after that. In the case where the sample includes the enterotoxin B Ag, it will be binding to antibody which is coated on micro-well plate for forming immobilized complexes of Ag-Ab. Following the first incubation, the micro-well plate has been washed for removing the unbound materials. Anti-enterotoxin B Ab has been added into micro-well plate and incubated afterwards. This antibody will be binding to complexes of Ag-Ab. The enzyme-conjugated have been added into micro-well plate and incubated afterwards. The enzyme-conjugated will be binding to the present immune complexes. The solution of the sulfuric acid has been added into the micro-well plate for stopping the reaction which produces a change of the colour from the blue to the yellow. The intensity of the color corresponding to the enterotoxin B Ag amount which is present in the sample has been measured by a micro-plate reader at 450/630-700\(\text{nm}\) or 450\(\text{nm}\).

**Process:**

**A-Ab. Coating:**
- To capture Ab. in the wells’ bottoms, 100\(\mu\)l of diluted enterotoxin B Ab. (10\(\mu\)g/ml) has been added into the 96 wells of micro-titre plate.
- The plate has been covered by sealer of the plate and then incubated overnight at room temperature.
- Every one of the wells has been washed three times by 100\(\mu\)l of the working wash buffer for each one of the wells, after that, the liquid has been washed away.

The micro-well plate has been turned upside down for few seconds on an absorbent tissue. Each well was entirely cleaned and dried.

**B-Blocking**
- To block the area in the wells’ bottoms, 100\(\mu\)l of blocking buffer has been added into the wells.
- The plate has been covered by sealer of the plate, then, incubated for 30min ± 2min at room temperature.
- Every one of the wells has been washed three times by 100\(\mu\)l of the working wash buffer for each one of the wells, the liquid has been washed away. The micro-well plate has been turned upside down for a few seconds on an absorbent tissue. Each well was entirely washed then dried.

**C- Assay process:**
- The serial dilutions for Ag have been produced: 0.50ml of Ag has been added into the first one of the eight tubes, every one of which contains 0.50ml DW, 0.50ml has been obtained from the first tube and added into second one, etc.
- Al has been left as a blank well.
- 50 micro-liter of every one of the dilutions has been added into assigned wells and carefully mixed through swirling micro-well plate for 30sec. on flat bench.

The micro-well plate has been covered by a plate sealer and incubated for 30min ± 2min at room temperature.
- Those assigned wells have been washed three times by 100\(\mu\)l of a working wash buffer for each one of the wells.
- 50 micro-liter of the diluted enterotoxin B Ab has been added into specified wells.
- The plate has been covered by the sealer of the plate and incubated for 30min ± 2min at room temperature.
- Those assigned wells have been washed 3 times by 100\(\mu\)l working wash buffer for each one of the wells, the liquid has been washed away.
The micro-well plate has been turned upside down on an absorbent tissue for seconds. Each well has been entirely washed and dried.

- 50 micro-liter of the conjugate has been added into specified wells with the exception of the blank one.
- The plate has been covered by sealer of the plate and incubated for 30min. 2min at a room temperature.
- Those assigned wells have been washed three times by 100µl of the working wash buffer for each one of the wells.
- 50 micro-liter of the TMB has been added into the specified wells.
- Two-three minutes later, 50µl of the stop solution has been added into those specified wells.
- Absorbance has been read at 450nm. The enterotoxin B Ag concentration has been specified through the comparison of absorbance to the Brucella curve (IgG Ab.) ELISA Kit.

Method

1. Isolatione of bacteria by culture of blood sample on Brucella media.
2. Add 0.5 ml from pure colony bacteria to 0.5 ml DW (Mix-bacteria)
3. Exposure Bacteria (Mix-bacteria) of Brucella antigen to ultrasound by sonication bath for (1 min, 5 min and 10 min 30 min). . . . . . . (R1) (this step to Cracking proteins into smaller particles due to collision of high frequency sound waves)
4. Add 100 Ml (10 M/dl concentration) from R1 to plastic wells ELISA (to coating of Ag on basic of plastic wells)
5. Add 100 Ml (10 M/dl concentration) from Bacteria of Brucella antigen without exposure of ultrasound (R2) plastic wells ELISA as control
6. Waiting for 24 h.
7. Add 100 Ml Conjugated reagent to R1 & R2 (Routine work for preparation of ELISA Kit)
8. Wash 3 time all wells by washing reagent
9. Add 100 Ml from TMB and waiting 10 min
10. Add 50 Ml from stop reagent (to Stop Interaction)
11. Read on 450 nm
12. Comparing between R1 & R2 of absorbance

Results

Isolation and Diagnosis of Brucellaisolation:
Table [1] and Figure (1) showed the comparison of some test types that are utilized in the Brucella diagnoses. It has been shown that Vitek and API 20-C of a higher sensitivity 100% and specificity 100% for diagnosing Brucella compared to other approaches (Colonial morphology “culture” 44 % and Brucella media test 88.0%), the Vitek test has been used to diagnose 32 isolates.

Table [1] Diagnostic test for Brucella

<table>
<thead>
<tr>
<th>Test</th>
<th>Sensitivity* TP/ (TP + FN)</th>
<th>Specificity** TN/(TN + FP)</th>
<th>Brucella</th>
<th>False Positive (FP)</th>
<th>False Negative (FN)</th>
<th>Other Brucella</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colonial morphology</td>
<td>44 %</td>
<td>86%</td>
<td>20</td>
<td>2</td>
<td>12</td>
<td>36</td>
<td>45</td>
</tr>
<tr>
<td>Brucella media Test</td>
<td>88 %</td>
<td>86%</td>
<td>28</td>
<td>2</td>
<td>4</td>
<td>39</td>
<td>45</td>
</tr>
<tr>
<td>Vitek</td>
<td>100 %</td>
<td>100%</td>
<td>32</td>
<td>0</td>
<td>0</td>
<td>47</td>
<td>45</td>
</tr>
<tr>
<td>API 20C</td>
<td>100 %</td>
<td>100%</td>
<td>32</td>
<td>0</td>
<td>0</td>
<td>47</td>
<td>45</td>
</tr>
<tr>
<td>ELISA[IgG]</td>
<td>100 %</td>
<td>100%</td>
<td>32</td>
<td>0</td>
<td>0</td>
<td>47[-]</td>
<td>45</td>
</tr>
</tbody>
</table>

*The sensitivity of a test is the ability of the test to identify correctly the affected individuals (111)

**The specificity of a test is the ability of the test to identify correctly non-affected individuals (111)
The results showed in Fig (2) and the figure a high absorbency for the samples that were prepared with nanotechnology and whose absorbance was measured as being more high than the samples prepared by traditional method.
Discussion

Samples have been gathered from 45 patients. Blood sample and 36 others brucella individuals (males and females) as the control group. Every sample has been taken from Al-Kadhimiyya as well as Baghdad Teaching Hospitals during the period from October 2019 – February 2020 and have been investigated by diagnosing for the Brucella by several tests [Culture, Brucella media Test, Vitek and API 20-C].

In Table (1) the results have shown that the percentage of sensitivity in the exams API, Vitek and ELISA were (100%), while the examinations of Morphology (44%) and (88) Brucella media test, respectively, while the Specificity rate (100%) for API, Vitek and ELISA were (100%), while its percentage was lower (86) for the Brucella media test and Morphology test. This is because the tests were dependent on the external appearance, color difference, and morphology of the microorganisms. The results proved that the best way to diagnose bacteria is by means of API 20-C, Vitek and ELISA. This is consistent with the findings of Mahdi[12].

The results proved that the extracted and purified antigen by Nano-technique method was more effective than the purified antigen in the routine way because in the event that the large molecule of the antigen is broken, which contains multiple epitopes on the surface of the large molecule where the precise cracking of the large molecule allows to distribute the space of the epitope more widely and publish it accurately and broadly. When using standard antibodies manufactured specifically for specialized isolates of Brucella by the Nano scale method, the results showed a high correlation with the Nano antigen and was detected by absorbance measurements on wavelength 450 nm. Whereas, there was no reaction interaction between antibodies and normally made antigens, this is consistent with the findings of Kishimoto, Maldonado[13].

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

Conflict of Interest: Non

Funding: Self-funding

References

Creative Thinking and its Relationship to the Quality of Life for Physical Education Teachers in Najaf

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¹Prof., University of Al-Hamdaniya/IRAQ, ²Assistant Lecturer, ³Prof., University of Kufa/Faculty of Education for Girls/Department of Physical Education and Sports Sciences/IRAQ

Abstract

This type of thinking is considered important for the individual and society, because of the creative outcome that is achieved as a result of the presence of individuals with the ability to be creative in various areas of life, if the individual has the appropriate environment for the growth of his creative thinking, which can be one of the reasons that play a role in assessing the quality of life for education studies Of sports in the province of Najaf, and the research aims to identify the level of reasoning thinking and the level of quality of life for female teachers of physical education affiliated to the director of education for the province of Najaf, and to identify the relationship between the level of creative thinking and the level of quality of life for teaching women Of sports in Najaf governorate, and the researchers assume that there is no correlation between the level of creative thinking and the level of quality of life among the teachers of physical education in the province of Najaf, the researchers used the descriptive method in the survey method and the correlations of its relevance to the nature of the research problem on the studies of physical education in the province of Najaf for the academic year 2019-2020, and the number (35) female teachers belonging to the Directorate of Education in the province of Najaf and were chosen in a simple random manner.

The researchers concluded that the level of creative thinking and the quality of life for physical education teachers in the middle level, and the existence of a significant correlation between creative thinking and quality of life, and the development of creative thinking was reflected in the quality of life for physical education teachers.

Keywords: Creative thinking, quality of life, physical education teachers.

Introduction

The quality of life is of great importance for identifying each person who does not benefit the individual to develop his psychological and mental energies, and the level of quality of life for teachers depends on several variables, including psychological and mental ones that directly affect him in his public life, “it is the individual’s feeling of satisfaction and happiness and his ability to satisfy his needs of During the richness of the environment and the advancement of services that are provided to him in the health, social, educational and psychological fields with good management of time and benefit from it “(1)

And that the quality of life is the satisfaction of the individual with his ability in life and a feeling of comfort and happiness, as well that the quality of life is the individual’s feeling of contentment and happiness and his ability to satisfy his needs through the richness of the environment and the improvement of services that are provided to him in the health, social, educational and psychological fields with good management of time and benefit from it, as well as It, consists of a set of variables that aim to satisfy the individual, and subjective

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indicators that measure the degree of saturation with objective indicators that measure the flowing capabilities of the individual, and subjective indicators that measure the amount of satisfaction achieved, and the mental capabilities of the individual have a role in the perception of life and one of these variables A mindset is creative thinking, which is creativity. Not only is mental preparation, but there is a large side that is controlled by environmental and social factors, as it can be developed, taught, and learned, according to the appropriate conditions for its development and creativity. It is not limited to a specific number of people. Rather, the justice of God Almighty required the distribution of creative energies over All his creation, and if every person searches himself, he will find that he can be creative with something (2).

This kind of thinking is of importance for the individual and society, because of the creative outcome that is achieved as a result of the presence of individuals who can be creative in various fields of life if the individual has the appropriate environment for the growth of his creative thinking (3).

Which can be one of the reasons that play a role in assessing the quality of life for physical education teaching in the province of Najaf and the research aims to identify the level of performance thinking and the level of quality of life among the teaching of physical education affiliated to the director of education in the province of Najaf and identify the relationship between the level of creative thinking and the level of Quality of life for physical education teachers in Najaf, and researchers assume that there is no correlation between the level of creative thinking and the level of quality of life among physical education teachers in Najaf.

Practical Part

Field research procedures: The researchers used the descriptive approach to surveying and correlation, as it suits the nature of the research problem on the teaching of physical education in the province of Najaf in the academic year 2019-2020, and the number (35) teaching belonging to the Directorate of Education in the province of Najaf and were chosen in a simple random manner.

Measurements used in the research:

The level of the variables used in the research has been identified according to the following:

First: The creative thinking scale for physical education teachers: After examining the researchers’ several tests related to creative thinking. They found that the Bernstein World Scale (1989) is the most appropriate for research, as the world designed this scale, which originally consists of (74) paragraphs aimed at measuring creative thinking among individuals and the answer to them is through three alternatives (I agree, hesitant, do not agree) As the overall scale of the scale ranges from (74 -222) degrees and the scale was prepared by (Zainab Najeh Hasan) () which is of (48) paragraphs and the answer is on a triple scale so that the highest degree on the scale is (144) and the lowest degree is (48) degrees.

Second: The measure of the quality of life for physical education teachers: After examining the researchers on several tests related to measuring the quality of life, the researcher used a measure of the quality of life for the researcher (confident that the servants are slaves), which consists of alternatives with a five-year scale (it applies to him very much, applies to him to a large degree, applies to him on an average degree, applies to him To a lesser degree, it applies to it to a very small degree) and the number of its paragraphs is (22) items, with the highest degree on the scale (66) degrees and the lowest degree (22) degrees.

Scientific coefficients of the scale:

1. Verify the scale: Researchers used the sincerity of (experts), although the two scales enjoy a high degree of honesty and consistency, but the researchers deliberately carried out a number of scientific transactions for the scale, among which (the sincerity of experts) for the two scales, which is one of the types of honesty and means “the extent to which the test represents the content to be measured as paragraphs were presented The two standards are based on a number of experienced masters in the field of psychological sciences, the field of measurement and evaluation, and sports psychology, as they were asked to express an opinion on the validity of the fields and paragraphs of the scale for their evaluation, and to judge the suitability of the field for which it was set, and to make appropriate adjustments through (delete or return s Adding or adding some fields or a number of paragraphs) to suit the research community who are physical education teachers in Najaf Province, as well as mentioning the validity of the alternatives to the answer, or adding and identifying alternatives
to the answer they see as appropriate for the scale, as (Oweis) indicates that “we can prepare The test is valid after presenting it to a number of specialists and experts in the field that the test measures, and if the experts acknowledge that this test measures the behavior that was set to measure it, the researcher can rely on the experts 'judgment, and after analyzing the responses and observations of the experts, the experts’ sincerity was extracted By percentage of expert agreement h For the validity of its paragraphs, as was accepted paragraphs agreed (75%) or more of their views, as “the researcher to obtain a ratio of agreement to experts in the validity of paragraphs, and the possibility of making adjustments by not less than 75%.”

Exploratory experiment

After developing the instructions for the two scales, the researchers conducted the pilot study to discover the following:

1. To ensure clarity of instructions and paragraphs of the two scales.
2. Knowing the time taken to answer each scale.
3. Knowing the circumstances of applying the two standards and the accompanying difficulties.
4. Ensure that the two scales are clear of the sample.
5. Researchers will have practical training to determine for themselves the negatives and positives that are encountered during the conduct of the main test.
6. Extraction of the scientific basis for the scale.

Statistical Means: The researchers used the Statistical Package for Social Sciences (SPSS).

Results and Discussion

This axis included displaying the results of statistics after statistically processing them and in line with the goals.

View, analyze, and discuss test results for individuals in the research sample.

Table (1) shows the mean, the standard deviation, the calculated correlation coefficient value, and the statistical significance of the measure of creative thinking and quality of life.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Unit of measure</th>
<th>Mean</th>
<th>STD. EV</th>
<th>Correlation coefficient</th>
<th>The significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creative thinking</td>
<td>Degree</td>
<td>98.25</td>
<td>9.47</td>
<td>0.69</td>
<td>Moral</td>
</tr>
<tr>
<td>Quality of life</td>
<td>Degree</td>
<td>46.32</td>
<td>4.23</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It is clear from Table (1) that the mean of the measure of creative thinking was (98.25) degrees and the standard deviation was (9.47), the mean of the quality of life scale was (154.32) and the standard deviation (4.23), while the calculated correlation coefficient value reached (0.69), which is a value less than (0.05), and this indicates a significant correlation between the two measures.

Discuss the results of the relationship between the creative thinking scale and the quality of life scale: Through the findings of the researchers, Table (1) shows that there is a significant correlation between the criteria of creative thinking and quality of life, and the researchers see the reason for this moral relationship between the moral relationship between creative thinking and the quality of life for physical education teachers, the research sample, where their creative thinking affects their sense of the quality of life in the academic field, where it becomes clear to us that the higher their creative thinking, the more satisfied they are with life, its quality and its requirements, as the quality of life represents the basic pillar in building society and its progress in general and the teaching field for teachers in particular, and that it provides elements c The life of female teachers through achieving the dimensions of the scale, namely the quality of public health, the quality of family life and emotions, the quality of social relations, the quality of time management and administration and self-care, has led to an increase in the motivation of female teachers towards a quality of life balanced with the reality in which you live(4-6), as well as a feeling Female teachers generally have a good quality of life, and (Ahmed Al-Mash’ani, 2066)(5-7) emphasized that “the quality of life is the extent of personal satisfaction with life and the individual’s sense of quality, and a
reflection of this on the different requirements of life, including education.”(8-12)

**Conclusion**

The researchers reached the following conclusions:

1. The level of creative thinking and quality of life for physical education teachers was at the middle level.
2. There is a significant correlation between creative thinking and quality of life.
3. The development of creative thinking was reflected in the quality of life for physical education teachers.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

**Conflict of Interest:** Non

**Funding:** Self-funding

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Comparative Study to Compare the Prevalence of Aspergillus Flavus in Iraq and Some Neighboring Countries

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Abstract

Aspergillus is a fungus and toxins produced by fungi that negatively affect patients’ lives, and recent research has focused on the relationship between different diseases caused by inhaling portions of fungi or fungal spores. There are some complete reports that fully reveal the relationship of Aspergillus fungi by determining the percentage of toxins produced by this type of fungi or their frequency in feed, food, or even clinical specimens, as well as the effect of toxins secreted by fungi on people who have been exposed to these fungi. It was purified from clinical samples, which included sputum, edema, wiping, tissue parts of the lung and other samples such as serum. As an immunological study, in addition to samples of cereals, nuts and homemade cheeses, as well as some other foods and vegetables. In this review, research in scientific research engines was conducted through four science-based data bases using the following keywords (Aspergillus fungi and the toxins they produce) (diseases associated with Aspergillus fungi). Scientific criteria were adopted in this review, and 41 subjects were selected. The results were compared in these articles regarding the presence of mushrooms in Iraqi governorates such as Najaf, Dhi Qar and Basra, as well as the frequency of mushrooms in Iraq and some neighboring countries such as Turkey, Saudi Arabia and Egypt.

And Syria during the period 2009-2018 these results were compared with the WHO reports and the permissible proportions in food and feed. It was found that the highest rate of fungi was in Iraq at approximately 89.5%, while in Syria the frequency of fungi was 86.6% isolated, and in Egypt and Jordan it was 70.67% 77.6%, respectively, while in Saudi Arabia the Arabian Peninsula was 50.56% less frequent. The high rate of fungi frequency in Iraq may be due to black storage of foodstuffs, which has led to a high rate of fungi frequency and an increase in the proportion of foodstuffs or in clinical samples, according to the materials under study.

Keywords: Aspergillus fungi, a comparative study; clinical; disease toxicity.

Introduction

Aspergillus is a type of pathogenic fungicide that is spreading all over the world. And in food, feed, stored grains and nuts. It can be found in an environment characterized by humidity and high and medium temperatures[1,2]. A. flavus is an opportunistic fungus of humans and animals. It causes diseases in immunocompromised individuals[3,4]. In general, conditions of increased humidity and elevated temperatures for storage grains and legumes increase the occurrence of mushroom toxins.[5,6] Aspergillus flavus They are distinguished by their complexity in the form, which is classified into two strains based on the size of the resulting hardness in the figure. Both the L and S strains can produce the most common aflatoxins (B1 and B2). As for the type S, it is characterized by its ability to produce aflatoxin of type G1 and G2, which is not usually produced by A. flavus. The L strain is more aggressive than the S strain, but produces less aflatoxin[7]. Aspergillus flavus AF36 is a non-carcinogenic and

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Aflatoxin-free strain and is used as an active and essential ingredient in pesticides. [8]. As suggested by [9,10] and [11] Aspergillus is found outdoors and in other environments, which may affect human health, outside the natural clinical features of Aspergillus. Or there may be Aspergillus fungi along with other fungi in the body such as Alternaria, Bipolaris, Cladosporium, Curvularia, Fusarium, Pseudallescheria, Rhizopus, Saccharomyces, Stemphylium, and Trichosporon. [12,13]. An acute fungal toxicity outbreak was reported in developing countries with frequent outbreaks in Kenya in 2001, 2004-2006, and 2008 [14,15,16]. In the period 2004-2005, more than 150 deaths were reported amongst the population due to consumption of maize contaminated with A.flavus S strain [17,18]. It was found that aflatoxin was associated with the components of grains and corn in dog food containing up to 600 mg 1 kg of a type of aflatoxin (B) group 34-40. The permissible limits for aflatoxin in feed according to the Food and Drug Administration were 60 mg-kg of aflatoxin B1 in dog food and about 20 ppm in poultry feed [19,20,21]. This study comes as a comparative study of fungi and their recurrence in Iraq and countries bordering Iraq, which included Saudi Arabia, Turkey, Egypt, the Emirates, Qatar and Syria. Samples that were made compared to the percentage of the presence of fungi contain nuts and grains as in Table No. 3 and comparison of the percentage of fungi in blood samples, sputum, faeces and vagina as in Table No. (4). The percentage of fungi in Iraq and countries was compared as shown in the study and the allowable percentage by the World Health Organization.

**Materials and Method**

The first step was to conduct an electronic research to collect a set of research related to Aspergillus fungi. I collected 41 articles on Aspergillus fungus, and these articles diversified around the diseases caused by fungi, which ranged from being in food and the cause of skin diseases, in addition to having blood in the blood and supplies of the sick group under study in the above-mentioned materials. The percentage of mushrooms in Iraq was compared first, which included a group of governorates (Kufa, Basra, Qadisiyah, and Babil). The samples included food samples as a first comparison of the percentage of the fungi that occurs according to the above mentioned materials as shown in Table No. 1, and then studied the percentage of the fungus. In the clinical samples of the same governorates above as in Table 2, another comparison of Aspergillus fungi was performed as a comparative survey in Iraq and other countries bordering Iraq, which included Saudi Arabia, Turkey, Egypt, the Emirates, Qatar and Syria. Samples that were made compared to the percentage of the presence of fungi contain nuts and grains as in Table No. 3 and comparison of the percentage of fungi in blood samples, sputum, faeces and vagina as in Table No. (4). The percentage of fungi in Iraq and countries was compared as shown in the study and the allowable percentage by the World Health Organization.

**Results**

Table No. (1) shows the frequency of the Aspergillus in different samples of foodstuffs, which include (seeds of leafy plants, milk and local cheese) for some governorates of Iraq, which extended the study period from (2009_2018). While in Dhi Qar Governorate, the frequency of Aspergillus fungi in dairy was 65.8% for the year 2015, while the frequency of local cheese fungi in the same governorate was about 75% for the year 2014. As for canned foods, the frequency of fungi in Al-Qadisiyah Governorate was 56.7% and Babel until 86.6% 2014. For cereals and seeds stored for foliar plants, the frequency of fungi in Karbala Governorate was 9.3% while in Kufa 11.5% for the same year. While in Qadisiyah, the percentage of fungi recurrence in leafy plants, which included lettuce, fennel and fennel in Qadisiyah Governorate in 2017, was 53.3%, while in dried fruit samples of figs and apricots 31% for 2018.

**Table 1**: Frequency of *Aspergillus flavus* in some governorates of Iraq

<table>
<thead>
<tr>
<th>N.</th>
<th>Sample Type</th>
<th>Governorates</th>
<th>Frequency Ratio of Fungus%</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Canned grain</td>
<td>Kufa, Qadisiyah</td>
<td>11.5%, 56.7%</td>
<td>2009, 2015</td>
</tr>
<tr>
<td>3</td>
<td>Dairy</td>
<td>Qadisiyah, Dhi Qar</td>
<td>74.4%, 65.8%</td>
<td>2011, 2015</td>
</tr>
<tr>
<td>4</td>
<td>Local cheese</td>
<td>Dhi Qar</td>
<td>75%</td>
<td>2014</td>
</tr>
<tr>
<td>5</td>
<td>Canned Food</td>
<td>Babylon</td>
<td>33.3-86.6%</td>
<td>2015</td>
</tr>
<tr>
<td>6</td>
<td>Seeds of leafy plants</td>
<td>Basrah, Qadisiyah</td>
<td>9%, 53.37%</td>
<td>2011, 2017</td>
</tr>
<tr>
<td>7</td>
<td>Dried fruit</td>
<td>Qadisiyah</td>
<td>31%</td>
<td>2018</td>
</tr>
</tbody>
</table>
While the results of Table [2] belong to the biological samples that were included between the samples of blood and sputum where the blood samples were collected from males and females and the recurrence rate of *A.flavus* was 10.3% for females and 13.8% for males in Najaf for 2010 when the samples were collected for respiratory patients in Qadisiyah Governorate in 2015, males were 18.7% and females were 12.14%. In Thi-Qar, 42.4% of males, while females were 33.4%.

Table [2]: Frequency of *A.flavus* in blood samples and ulcers for males and females during the years 2010-2017 in some governorates of Iraq

<table>
<thead>
<tr>
<th>Governorates</th>
<th>Samples</th>
<th>Males</th>
<th>Females</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Najaf</td>
<td>Blood</td>
<td>13.8%</td>
<td>10.3%</td>
<td>2010</td>
</tr>
<tr>
<td>Qadisiyah</td>
<td>Sputum</td>
<td>18.7%</td>
<td>12.14%</td>
<td>2015</td>
</tr>
<tr>
<td>Dhi Qar</td>
<td>Sputum</td>
<td>42.6%</td>
<td>33.4%</td>
<td>2017</td>
</tr>
</tbody>
</table>

Table [3] shows the frequency of *A.Flavus* in different food samples between the governorates of Iraq and neighboring countries during [2009-2017]. It was noted that the *A.flavus* in Syria and Saudi Arabia showed a noticeable increase in nuts such as pistachios, walnuts and others, Saudi Arabia with 78.5% in some seeds, while the percentage of recurrence of fungus in Iraq was higher than the rest of the countries where it reached 71.2% in some food for stored stocks and cereals. The rate of recurrence of *A.flavus* in some types of grain stored and feed in Syria increased by 20% in grain while it was about 16% of pulses either in 2013 has increased the frequency of *A.flavus* in Saudi Arabia in the seeds of wheat plant by 56.3% We note from Table 3 that The frequency of the fungus was 86.3% in nuts for 2015 in Syria and 25% in Jordan for the same year. The peanuts of the nuts in the UAE had a share of this fungus infection, with an average recurrence rate of 63.1% in the United Arab Emirates. While the highest frequency of fungi in corn and wheat grains was very high at 97.3% in Turkey in 2015. In 2017, the frequency of fungus in sunflower seeds increased by 60% in Egypt in 2017. In Iraq and the same year, the percentage of recurrence of *A.flavus* to some seeds of leafy plants was 53.37%. For dairy products, Egypt in 2010 was 86.7%, while in Iraq canned food was 47.8% for the year 2015 and 73.9% for dried food in Lebanon.

Table [3]: Shows the frequency of *A.flavus* between Iraq and some countries:

<table>
<thead>
<tr>
<th>N.</th>
<th>Sample</th>
<th>Frequency Ratio of Fungus% in Iraq</th>
<th>Frequency Ratio of Fungus% in Countries</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>% Countray</td>
<td>% Countray</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Nuts</td>
<td>49.8%</td>
<td>80%</td>
<td>2009</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>86.2</td>
<td>2015</td>
</tr>
<tr>
<td>2</td>
<td>Grain</td>
<td>--------</td>
<td>20%</td>
<td>2009</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Syria</td>
<td>56.3%</td>
<td>2013</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Saudi</td>
<td>97.3%</td>
<td>2015</td>
</tr>
<tr>
<td>3</td>
<td>Legumes</td>
<td>--------</td>
<td>15-16%</td>
<td>2009</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Syria</td>
<td>63.1%</td>
<td>2015</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Emirates</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Seeds</td>
<td>--------</td>
<td>15-16%</td>
<td>2009</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Syria</td>
<td></td>
<td>2009</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Saudi</td>
<td></td>
<td>2009</td>
</tr>
</tbody>
</table>
Table[4] shows a comparison of some samples showing the frequency of $A.\text{flavus}$ in some neighboring countries and Arab countries in the study during the academic year 2019, where found the frequency of $A.\text{flavus}$ in samples vaginal fluids in females up to 49.7%, but in blood samples found the frequency of fungus in females were 52.1% in Jordan and 49.7% in Yemen. In the blood samples, the frequency of female fungal infection was found to be 24.21% for males, 25% for Iraq, and 1.06% for Egypt for 2016. For samples Ulcer has been found that the $A.\text{flavus}$ appeared in some respiratory patients recurrence rate of 47.6% for the year 2015 in Egypt rate of recurrence of mushrooms in 2017 rose to 78%. We note from Table (4) that the rate of recurrence of $A.\text{flavus}$ in skin samples infected with fungal ulceration was 67.7% in the United Arab Emirates. As for the exit samples of some intestinal inflammatory patients in the Kingdom of Saudi Arabia, the rate of recurrence of the $A.\text{flavus}$ reached 96.5% in 2018.

Table [4]: Shows the comparison of the frequency of $A.\text{flavus}$ in some samples in Iraq and other countries:

<table>
<thead>
<tr>
<th>N.</th>
<th>Sample</th>
<th>Frequency Ratio of Fungus% in Iraq</th>
<th>Frequency Ratio of Fungus% in Countries</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>% Country</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Sputum</td>
<td>47.6% 75%</td>
<td>----</td>
<td>2015</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>----</td>
<td>2017</td>
</tr>
<tr>
<td>2</td>
<td>Blood</td>
<td>24.2% 1.06%</td>
<td>Egypt 25%</td>
<td>2010</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2016</td>
</tr>
<tr>
<td>3</td>
<td>Stool</td>
<td>----</td>
<td>Yemen 31.8%</td>
<td>2015</td>
</tr>
<tr>
<td></td>
<td>Saudi</td>
<td>69.5%</td>
<td></td>
<td>2018</td>
</tr>
<tr>
<td>4</td>
<td>Vaginal fluids</td>
<td>----</td>
<td>Jordan 52.1%</td>
<td>2009</td>
</tr>
<tr>
<td></td>
<td>Yemen</td>
<td>49.7%</td>
<td></td>
<td>2018</td>
</tr>
<tr>
<td>5</td>
<td>Skin</td>
<td>----</td>
<td>Emirates 67.7%</td>
<td>2018</td>
</tr>
</tbody>
</table>
Conclusions

The purpose of this study is to conduct a survey of the frequency of fungi Aspergillus in a group of Iraqi governorates, and to compare the frequency of fungicides in Iraq and the group of countries neighboring Iraq in food and clinical samples. Scientific standards were adopted in this review. The results were compared in these articles regarding the presence of mushrooms in Iraqi governorates such as Najaf, Babil, Dhi Qar and Basra, as well as the frequency of mushrooms in Iraq and some countries such as Turkey, Saudi Arabia and Egypt and Syria during the period 2009-2018 these results were compared with the WHO reports and the permissible proportions in food and feed. It was found that the highest rate of fungi was in Iraq at approximately 89.5%, while in Syria the frequency of fungi was 86.6% isolated, and in Egypt and Jordan it was 70.67% 77.6%, respectively, while in Saudi Arabia the Arabian Peninsula was 50.56% less frequent. The high frequency of fungi in Iraq may be due to black storage of foodstuffs, which has led to a high rate of fungi frequency and an increase in the proportion of foodstuffs or in clinical samples, according to the materials under study.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

Conflict of Interest: Non

Funding: Self-funding

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11. Roth, H.J. What makes mushrooms “magical”: Use and abuse of natural indole; Deutsche Apotheker Zeitung, 2019: 159 (43), 54-59


Serum Levels of Alanine Aminopeptidase and Aggrecan in Women with Breast Cancer: A Comparative Study

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2Dr. Professor of Clinical & Medical Biochemistry/Pediatrician-College of Medicine–Tikrit University/Iraq

Abstract

Background: The term “breast cancer” refers to a malignant tumor that has developed from cells in the breast and is a major public health problem in women throughout the world. It is the most common cancer among women both in developed and developing countries.1 The aminopeptidases (AP) constitute a group of enzymes with closely related activities.2 Aminopeptidases catalyze the cleavage of amino acids from the amino terminus of protein or peptide substrates. The enzyme exhibited low molecular weight of 58,000 by gel chromatograph.3 Aggrecan is a proteoglycan, or a protein modified with large carbohydrates hormone; the human form of the protein is composed from 2316 amino acids long and can be expressed in multiple isoforms due to alternative splicing.4

Materials and Method: This study was designed as a cross-sectional, hospital based study. Forty-two women with breast cancer were included in this study, their ages were from 24 to 70 years, and they were from the center and the periphery of Salah Al-din Governorate. Forty-four apparently healthy women with negative family history of breast cancer were included in this study as a control group, they ages were of a comparable age. By using a sterile disposable syringe, 10 mls of venous blood sample was drawn in a plain tube from each women included in this study for the serum measurement of alanine aminopeptidase and Aggrecan by using ELIZA technique.

Results: The mean serum level of alanine aminopeptidase was elevated in breast cancer women comparing with the control group (71.73±1.5 versus 15.29±0.9 ng/ml). The result was highly significant at a P value of less than 0.01. While the mean serum level of aggrecan was found among women with breast cancer (41.81±11.5 ng/ml) compared to control group which was 7.27±3.6 ng/ml. The result was highly significant at a P value of less than 0.001. This study also found that there was a moderate positive correlation between S. AAP activity and S. aggrecan in breast cancer women (R<0.7).

Conclusion: There were an increase in serum levels of both the alanine aminopeptidase and aggrecan in women with breast cancer.

Keywords: Breast cancer, alanine aminopeptidase, and aggrecan.

Introduction

Breast cancer is the most common malignancy in women, with incidence rates generally increasing throughout the world and this increase being attributed to socio-economic and demographic changes.5,6 It carries a high incidence and mortality from 27 types of major cancers and for all cancers combined since 2012 and are now available in the Series of the International Agency for Research on Cancer with 1.67 million patients in the world.7 Breast cancer is the most dangerous disease that threatens women lives in Iraq, every year 1000-1200 new cases are recorded, 98% of which affect women, and 2% of which affect men. Breast cancer occupies 14% of the

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whole disease in different cancers and a rate of 1-6 of women are affected from every 100000 women.(8)

Alanine aminopeptidase (AAP) is one of exopeptidase, it is composed of 967 amino acids.(9) Alanine aminopeptidase its function is to release the N-terminal amino acid residues from polypeptides and protein, isolated in a highly purified state from human liver, kidney, and pancreas were investigated with regard to their different electrophoretic mobility. While the molecular weights are identical, different isoelectric points were found.(10) Alanine aminopeptidase may hydrolyze several biologically active peptides. It’s activity was significantly higher in males than in females. (11) Alanine aminopeptidase spreads in various regions of mammalian body, because it is responsible for many physiological functions inside the human body, like kidney, pancreas, liver,(12) and intestine specially in duodenum. (13)

Aggrecan (ACAN) is a proteoglycan that present in all cellular and tissue compartments. It is one of the major structural component of cartilage therefore it is known as cartilage-specific proteoglycan core protein (CSPCP) or chondroitin sulfate proteoglycan 1 (may have >100 chondroitin sulphate chain) which are key to its function in the maintenance of a hydrated, compression-resisting matrix. (14,15) Aggrecan has a molecular mass more than 2,500 kDa. (16) The core protein (~300 kDa), (17) and has around 100 GAG chains attached to it. (18) It is consists of two globular structural domains (G1 and G2) at the N-terminal end and one globular domain (G3) at the C-terminal end, separated by a large extended domain chondroitin sulfate (CS) heavily modified with GAGs. The two main modifier moieties are themselves arranged into distinct regions (N-G1-G2-CS-G3-C), a chondroitin sulfate and a keratin sulfate region. The three globular domains, G1, G2, and G3 are Involved in aggregation, hyaluronan binding, cell adhesion, and chondrocyteapoptosis. Along with type-II collagen, aggrecan forms a major structural component of cartilage, particularly articular cartilage. It’s play an important role in function of joints. (18)

Patients, Materials, and Method

This study was designed as a cross-sectional, hospital based study. The protocol of this study was approved by the scientific committee of Tikrit university college of medicine, and the agreement to collect the samples from patients was approved by the Salah Al-din Health Directorate. The study was carried out at the Gynecology Outpatient and Oncology Unit in Samarra General Hospital-Samarra City-Iraq, from the 14 of November 2018 to the end of June 2019. A verbal consent was taken from each women included in this study whether considered as a case or control. The diagnosis of breast cancer was according to discussion of both the gynecologist and the histopathologist. The total number of women with breast cancer were 42, and their ages were form 24 to 70 years, and they were from the center and the periphery of Salah Al-din Governorate. Forty-four apparently healthy women with negative family history of breast cancer were included in this study as a control group, their ages were comparable to that of the women with breast cancer and they were also from the center and the periphery of Salah Al-din Governorate.

By using a sterile disposable syringe, 10 mls of venous blood sample was drawn in a centrifuge from each women included in this study after morning and allowed to clot at room temperature, then the tubes were centrifuged at 3000 rpm and the supernatant serum was used to estimate the levels of alanine aminopeptidase and aggrecan by ELIZA method.

Statistical Analysis: All the date collected in this study were analyzed by using the student t-test, the mean, standard deviation, and P-value was also considered. The significance was considered at a P value of less than 0.05.

Results

This study showed that the peak age of women with breast cancer was between 44–53 years and its percentage was 35.71%, while the least age group was above 63 years and its percentage which was found to be 9.52%, see table (1).

| Table (1): Distribution of breast cancer women according to age. |
|---------------------|-----|---------|
| Age groups (years)  | No. | Percentage |
| 24-33               | 5   | 11.91   |
| 34-43               | 8   | 19.05   |
| 44-53               | 15  | 35.71   |
| 54-63               | 10  | 23.81   |
| >63                 | 4   | 9.52    |
| Total               | 42  | 100     |
Table (2): Residence distribution of breast cancer women.

<table>
<thead>
<tr>
<th>Residence</th>
<th>No.</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural</td>
<td>11</td>
<td>26.19</td>
</tr>
<tr>
<td>Urban</td>
<td>31</td>
<td>73.81</td>
</tr>
<tr>
<td>Total</td>
<td>42</td>
<td>100</td>
</tr>
</tbody>
</table>

This study also showed that maximum rate of breast cancer was 73.81% where from the urban area, while 26.19% of breast cancer women was from rural area, see table 2.

This study demonstrated that the BMI was significantly higher at a P value of 0.001 in breast cancer women compared to control group (34.55±0.21 versus 29.91±0.44 Kg/cm²), as shown in table (4.3).

Table (3): Comparison between women with breast cancer and the control group regarding body mass index (BMI).

<table>
<thead>
<tr>
<th>BMI (Kg/cm²)</th>
<th>Breast cancer women</th>
<th>Control group</th>
<th>T. test</th>
<th>P – value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. 42</td>
<td>44</td>
<td>13.9</td>
<td>0.001</td>
</tr>
<tr>
<td>Mean±SD</td>
<td>34.55±0.21</td>
<td>29.91±0.44</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

P. value <0.01: highly significant.

As shown in table 4, the mean serum level of alanine aminopeptidase was elevated in women with breast cancer comparing with the control group (71.73±1.5 versus 15.29±0.9 ng/ml). The result was highly significant (P <0.01).

Table (4): Serum alanineaminopeptidase activity in women with breast cancer and the control group.

<table>
<thead>
<tr>
<th>Study groups</th>
<th>No.</th>
<th>Alanine aminopeptidase activity (ng/ml) (Mean±SD)</th>
<th>T. test</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast cancer women</td>
<td>42</td>
<td>71.73±1.5</td>
<td>29.8</td>
<td>0.001</td>
</tr>
<tr>
<td>Control group</td>
<td>44</td>
<td>15.29±0.9</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The mean serum level of aggrecan was found among women with breast cancer (41.81±11.5 ng/ml) compared to control group which was 7.27±3.6 ng/ml. The result was highly significant at a P value of P - 0.001, as shown in the following table.

Table (5): Level of aggrecan in women with breast cancer and the control group.

<table>
<thead>
<tr>
<th>Study groups</th>
<th>No.</th>
<th>Aggrecan level (ng/ml) Mean ± SD</th>
<th>T. test</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breast cancer women</td>
<td>42</td>
<td>41.81±11.5</td>
<td>18.8</td>
<td>0.001</td>
</tr>
<tr>
<td>Control group</td>
<td>44</td>
<td>7.27±3.6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This study reveals that there was a moderate positive correlation between serumalanine aminopeptidase activity and serum aggrecan in women with breast cancer (R<0.7), figure (1).
Discussion

This study reveals that the peak age of women with breast cancer was between 44-53 years; this finding was in agreement with AL-Hashimi et al. (19) who reported that the median age at diagnosis was 49 and the mean age was 52 years, also this study was in agreement with Majid et al. (20) who reported that the breast cancer increased in post-menopausal Iraqi women, and the rate of incidence in Arabs and its Kurdish region were generally stable between 2000 to 2009.

This study also shows that the breast cancer was more common in women from urban area more than rural as seen in the table (2). This result was agreement with Majid et al. (20), that found in his study that the urban exceeding the rural rate by 2:1, for both Kurdish and Arabic women. This finding could be attributed to the migration of some peoples in Iraq from the rural to the rural area in the last decades.

Body mass index consider one of the modifying risk factor for breast cancer. (21) In the present study it was found that there were an increase in the weight of women with breast cancer more than that of the control group. The mean of BMI in breast cancer women that show in table (3), this finding was consistence with Platel N. et al. (22) and Rebbeck R. et al. (23) who reported a high prevalence of overweight and obesity in women with breast cancer. Epidemiological studies have shown that postmenopausal obesity causes an increase in the risk of breast cancer, (24) since the obesity has a close relationship with increased levels of insulin and insulin like growth factors.

This study show that there was a significant difference between breast cancer women and the control group concerning serum level of alanine aminopeptidase which was found to be significantly higher in women with breast cancer comparing with the control. These results were in agreement with Martinez et al. (25) who found an increase in the activity of this enzyme in neoplastic tissue when compared with unaffected tissue. Also these results were in agreement with Mina-Osorio et al. (26) and Taylor et al. (27) who found an increased AP activity in breast cancer tissue vs surrounding normal tissue. Wickstrom et al. (28) and Bauvois B. et al. (29) noticed an increased APN activity in the serum of women with breast cancer vs its activity in serum of healthy women. These findings could be attributed to that tumors usually
associated with a rapid overgrowth of cells along with cell destruction.

The finding of a significant difference between BC women and the control group concerning serum aggrecan level at a P value of less than 0.01. This result was in agreement with the finding of Nikitovic et al.\(^{(30)}\) who reported that the proteoglycans are important constituents of the intracellular or extra cellular matrix, that have been associated with cancer pathogenesis. These findings could be attributed to that tumors usually associated with a rapid overgrowth of breast cells along with increase production of this hormone.

The positive correlation between alanine aminopeptidase and aggrecan in this study, could be attributed to that both of these biochemical parameters were increased in serum of women with breast cancer in this study.

**Conclusion**

This study reveals an increase in serum levels of alanine aminopeptidase and aggrecan in women with breast cancer.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq

**Conflict of Interest:** Non

**Funding:** Self-funding

**References**


Using Bioluminescence Assay to Detect Snps Cause Drug Resistant of *Mycobacterium Tuberculosis* in Iraq

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¹Institute of Genetic Engineering and Biotechnology for Postgraduate Studies, University of Baghdad, Iraq, ²AL- Khwarizmi Engineering College/Biochemical Engineering department/University of Baghdad, Iraq

Abstract

In this search, a new bioluminescent technique was proved for pyrophosphate which was employed to single- nucleotide polymorphism (SNP) diagnosis using one-base extension reaction. Four *Mycobacterium tuberculosis* genes were chosen (*Rpob, InhA, KatG, GyrA*) genes. Fifty-four specimens were used in this study fifty-three proved as drug-resistant specimens by The Iraqi Institute of Chest and Respiratory Diseases in Baghdad., also one specimen was used as a negative control.

The procedure of this assay was as follows. A specific primer within each aliquot owning a short 3-OH end of the base of the target gene was hybridized to the single-stranded DNA template. Then, (exo-) Klenow DNA polymerase and one of either α-thio-dATP, dTTP, dGTP, or dCTP were supplemented and incubated for 1 min. Pyrophosphate freed by DNA polymerase is altered to ATP by pyruvate phosphate dikinase (PPDK), and the amount of ATP is measured using the firefly luciferase reaction. This technique, which does not demand expensive equipment, can be applied to rapidly monitor one-point mutation in the gene that causes drug resistant in *mycobacterium tuberculosis*. The results showed a high variation in values of ATP formation through matching and mismatch bases added. So, this assay (which required only five minutes), enable to find the gene SNP causes resistant for the specific drug.

Keyword: SNPs, pyrophosphate, ATP, Bioluminescent, genes, drugs.

Introduction

*Mycobacterium tuberculosis* constitute a serious threaten to world, this threaten increase when drug resistant of this bacteria occurred.¹(1).

Traditional method used to detect drug resistant such as Drug Susceptibility test (DST) culture method required long period, of at least two months, that waste time effect on patient treatment²(2). Also other method used to detect SNPs such as electrophoresis of single-strand DNA conformation polymorphism (SSCP)³(3), cleavage fragment length Polymorphism (CFLP), which combined the restriction enzyme and SSCP⁴(4), the TaqMan PCR technique⁵(5), amplification refractory Mutation system (ARMS) method⁶(6), the invaders method⁷(7), and the DNA probe method⁸(8) are used. but, there is a problem with these method in that the procedure is complicated and generally demands electrophoresis apparatus, also special analytical apparatus⁹(9-15).

Material and Method

**Sampling:** Through the study interval (April 2018-May 2019), with the aid of the Institute of Chest and Respiratory diseases in Baghdad, it was received 2945 patients with suspected pulmonary and extrapulmoary TB lesions 1820 (61.7%) males and 1125 (38.2%) females, with age range from (1 year – 85 years). Fifty-four specimens which symboled with (S) letter (from S1 to S54 except S26) confirmed as drug resistant were applied in this study, one specimen(S26) was used as negative control.

**DNA Extraction:** Samples which proved as resistant were isolated and processed with DNA extraction using sonicate bath extraction apparatus¹³(13).

**Optimization:** Four genes and five SNPs (*rpoB, InhA, gyrA C94, gyr A C95*) and *katG S315T* were optimized, the gradient annealing was done by a thermal cycler apparatus⁹(9).
Primer Design:

- Primers were designed for genes (\textit{rpoB}, \textit{inhA}, \textit{katG} and \textit{gyrA}).
- \textit{gyrA} gene had two SNPs at codon C94 and codon C95 as illustrated in Table (1).

Table (1): Primers design according to terminal mismatch nucleotide for four genes and five SNPs.

<table>
<thead>
<tr>
<th>Name of gene</th>
<th>Primer sequences</th>
<th>Company</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>\textit{rpoB} gene</td>
<td>5-TGA CCC ACA AGC GCC GAC TGA-3'</td>
<td>Macrogen</td>
<td>(14)</td>
</tr>
<tr>
<td>\textit{inhA} gene</td>
<td>5-CGG AAT CAT CAC CGA CTC GTC G-3</td>
<td>Macrogen</td>
<td>(15)</td>
</tr>
<tr>
<td>\textit{katG} gene</td>
<td>5-CGG TAA GGA CGC GAT CAC CAGT-3</td>
<td>Macrogen</td>
<td>(22)</td>
</tr>
<tr>
<td>\textit{gyrA} gene C94</td>
<td>5-ACG GCG ACG CGT CGA TCT ACC-3</td>
<td>Macrogen</td>
<td>(16)</td>
</tr>
<tr>
<td>\textit{gyrA} gene C95</td>
<td>5-GCG ACG CTG CGA TCT ACG ACT-3</td>
<td>Macrogen</td>
<td>(16)</td>
</tr>
</tbody>
</table>

Material and Method

The procedure was included preparation three solutions M1, M2 and bioluminescent solution (PPDK-luciferase solution) as follow:

1. **Preparation of mixture1 (M1):** 1µ of specific primer (75 µM) hybridized to 1 µl of DNA template (1.50 pmol) in 8 µl of 10 mmol/L Tris-acetate buffer containing 2 mmol/L (CH$_3$COO)$_2$Mg.

   The process was included denaturation at 94°C for 20 Sec., then Annealing at 65°C for 2 min$^{(17)}$.

2. **Preparation of mixture 2 (M2):** Four µl of (Mix1) was added to another tube containing 2 µl of 100 mmol/L NEB buffer containing 5mmol/L (CH$_3$COO)$_2$Mg and 1.6 µl of klenwo DNA pol. And 4 µl of one substrate of either ($\alpha$- dATP- s, dTTP, dGTP, or dCTP) mixed and incubate for 1 min.$^{(15)}$

3. **Preparation of Pyruvate, phosphate dikinase (PPDK)- luciferase solution:** The composition of solution was contained 2.3 U/ml PPDK,0.2 mM luciferin ,5.5 U/ml luciferase, 0.0125mM Adenosine monophosphate (AMP), 0.04mM Phosphoenolpyruvic acid (PEP), 0.005U/ml apyrase, 0.05mM Dithiothreitol (DTT), 5% trehalose, 1mM Ethylenediaminetetraacetic acid (EDTA), 7.5 mM MgSo4, 30 mM Beryllium sulphide (Bes). The added (AMP) incorporated with pyrophosphate (ppi) group to form ATP.$^{(18)}$

   Using Biolumenescent Assay to Diagnosis \textit{Rho}p Gene SNPs: The results showd it was possible to clearly

Method

**Bioluminescence technique Steps:**

1. Hybridization reaction: in this reaction primer hybridize to single stranded DNA of target gene, the first base after hybridized was represented target base, for example adenine base (A). This reaction included denaturation at 94°C for 20s and then annealing at 65°C for 2 min$^{(26)}$ by added M1 solution to PCR tube, thermal cycler was used for this purpose.

2. Bases added reaction: one substrate of either dATPa-S, dTTP, dGTP, or dCTP. $\alpha$-dATP-S was added to M1 solution in present (exo) Klenow enzyme, the composition form M2 solution. $\alpha$ -dATP-S was used rather than dATP to diminish nonspecific luminescence $^{(10)}$.

3. Bioluminescent reaction: the reaction occurred by added MIX2 (extension assay solution) to 10 µl of bioluminescent solution (PPDK- luciferase solution) and 80 µl Luciferin substrate.

Results and Discussion

The new Bioluminescent Assay for Detection Snps Cause Drug Resistant

The results showed very high variation between amount of ATP between the matching base and mismatching one. These results agree with$^{(10)}$ foundaton.

**Optimization of primer optimum temperature for hybridyzation:** The optimum temperature of genes hybridization for (\textit{rpoB}, \textit{gyrA} C94 \textit{gyrA} C95, \textit{Inh A} and \textit{Kat G} ) genes were 60°C,62°C, 58°C, 60°C, 60° C respectively.

Using Biolumenescent Assay to Diagnosis \textit{Rho}p Gene SNPs: The results showd it was possible to clearly
determine the wild type containing C and mutant type containing T at the identical position of the mutation site as shown in Table (2). The results of this assay were rapidly shown in the screen of Glomax illuminator after five minutes of insert microplate 96 wells in Glomax apparatus. The output data represented a relative light unit (RLU), which indicated to Adenosine triphosphate compound (ATP)\(^9\).

The higher ATP amount was with match base sample S16, the value was (198), while the less value was with mismatch sample S20. The variation between the higher amount and less amount is more than 100 units, this variation enables diagnosis easily to detect the wild base or the mutant one. The negative control (sample S26) shows normal wild type TCG codon, subsequently, the wild amino acid is serine, while mutant samples express leucine amino acid because of wild codon converted from TCG to TTG. The (RLU) value of blank control which represented luciferase enzyme only was read indicating the clear ATP in this blank.

### Table (2): Values of ATP amount for each matching and mismatch bases for \(rbop\) gene demonstrated high variation in values. Amino acid was expressed in each case.

<table>
<thead>
<tr>
<th>Amino acid</th>
<th>Converted base</th>
<th>Wild type →mutant type</th>
<th>ATMTP amount</th>
<th>Samples No.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Add A</td>
<td>Add G</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>T</td>
<td>C</td>
</tr>
<tr>
<td>Leucin</td>
<td>C to T</td>
<td>TCG →TTG</td>
<td>122</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>153</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>183</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>174</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>151</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>165</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>114</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>121</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>178</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>186</td>
<td>2.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>103</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>119</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>163</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>178</td>
<td>1.2</td>
</tr>
<tr>
<td>Serine</td>
<td>C</td>
<td>TCG</td>
<td>0.6</td>
<td>114</td>
</tr>
<tr>
<td>Leucin</td>
<td>C to T</td>
<td>TCG →TTG</td>
<td>198</td>
<td>2.1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>126</td>
<td>2.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>147</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>210</td>
<td>1.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>163</td>
<td>0.4</td>
</tr>
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<td></td>
<td>179</td>
<td>1.8</td>
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<td>106</td>
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</tr>
<tr>
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<td>C</td>
<td>TCG</td>
<td>1.6</td>
<td>119</td>
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<td></td>
<td></td>
<td></td>
<td>0.4</td>
<td>126</td>
</tr>
<tr>
<td>Leucin</td>
<td>C to T</td>
<td>TCG →TTG</td>
<td>137</td>
<td>0.3</td>
</tr>
<tr>
<td>Serine</td>
<td>C</td>
<td>TCG</td>
<td>186</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.6</td>
<td>192</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1.7</td>
<td>164</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.9</td>
<td>187</td>
</tr>
<tr>
<td>0.0</td>
<td>0.0</td>
<td></td>
<td>0.0</td>
<td>0.0</td>
</tr>
</tbody>
</table>
**RpoB** genes of DNA Specimens showed an opposite curve when added match and mismatch nucleotide at the same time of bases added as shown in Figure (1).

![Bioluminescent assay curve](image)

**Fig. (1):** The bioluminescent assay showed variation in relative light unit (RLU) through matching incorporation and mismatching bases added at the same time of process.

**Using Bioluminescent Assay to Diagnosis Isoniazid Resistant SNPs:** Two genes play significant roles in Isoniazid resistant *inhA* and *katG* genes\(^{(19)}\). 49.05\%(26/53) of all resistant specimens were diagnosed with the bioluminescence assay. The results showed that 53.84\%(14/26) had snps mutation at codon 21 within *inh* gene region, and 34.61\%(9/26) had mutation with *katG* gene region, 15.38\%(4/26) of specimens had no mutant within *inh A* or *katG* gens regions. only one sample 3.84\%(1/26) exhibited both snps mutation within *inh A* or *katG* gens regions this sample(S3) had XDR behavior\(^{(20)}\). *inhA* gene codon 21 ATG converted to GTC, so the amino acid alters as a result from Leucine to Valine, also within *katG* gene region of codon 315 AGC alter to ACC, then subsequently convert amino acid from serine to therionin\(^{(11)}\). As shown in Table (3). The amount of ATP formation with *inhA* gene demonstrated higher sensitivity than that with *rpoB* gene that disagree with \(^{(21)}\).

<table>
<thead>
<tr>
<th>Amino acid</th>
<th>Present nucleotide</th>
<th>Bioluminescent</th>
<th>Samples no.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Add C</td>
<td>Add T</td>
</tr>
<tr>
<td><strong>Valine</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>A to G</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>210</td>
<td>0.4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>190</td>
<td>1.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>280</td>
<td>2.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>189</td>
<td>0.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>230</td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>190</td>
<td>0.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>214</td>
<td>0.9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>186</td>
<td>1.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>210</td>
<td>1.7</td>
</tr>
<tr>
<td></td>
<td></td>
<td>194</td>
<td>0.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>226</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>186</td>
<td>0.7</td>
</tr>
</tbody>
</table>

**Table (3):** Values of ATP amount for each matching and mismatch bases for *inhA* gene and amino acid which expressed in each case.
As shown in Table (4), the reverse result was obtained. In this manner, SNP analysis for the dGTP gene can be identified clearly and easily by comparison of the luminescence patterns obtained with the addition of dGTP and dCTP, the light released when matched nucleotide incorporate with target base\textsuperscript{(10)}.

**Table (4): Values of ATP amount for each matching and mismatch bases for katG gene and amino acid which expressed in each case.**

<table>
<thead>
<tr>
<th>Amino acid</th>
<th>Present nucleotide</th>
<th>Add G</th>
<th>Add C</th>
<th>Samples no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Therionin</td>
<td>T to G</td>
<td>112</td>
<td>0.4</td>
<td>S3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>145</td>
<td>0.6</td>
<td>S4</td>
</tr>
<tr>
<td>Serine</td>
<td>T</td>
<td>1.3</td>
<td>117</td>
<td>S7</td>
</tr>
<tr>
<td>Therionin</td>
<td>T to G</td>
<td>151</td>
<td>1.2</td>
<td>S8</td>
</tr>
<tr>
<td>Serine</td>
<td>T</td>
<td>1.8</td>
<td>130</td>
<td>S9</td>
</tr>
<tr>
<td>Therionin</td>
<td>T to G</td>
<td>176</td>
<td>1.7</td>
<td>S10</td>
</tr>
<tr>
<td>Serine</td>
<td>T</td>
<td>1.5</td>
<td>189</td>
<td>S11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.7</td>
<td>114</td>
<td>S12</td>
</tr>
<tr>
<td>Therionin</td>
<td>T to G</td>
<td>104</td>
<td>0.3</td>
<td>S13</td>
</tr>
<tr>
<td>Serine</td>
<td>T</td>
<td>0.6</td>
<td>134</td>
<td>S15</td>
</tr>
<tr>
<td>Therionin</td>
<td>T to G</td>
<td>116</td>
<td>2.1</td>
<td>S16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>107</td>
<td>0.4</td>
<td>S17</td>
</tr>
<tr>
<td></td>
<td></td>
<td>101</td>
<td>0.2</td>
<td>S19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>167</td>
<td>1.3</td>
<td>S23</td>
</tr>
</tbody>
</table>

Using Bioluminescent Assay to Diagnosis Fluoroquinolones Resistant SNPs: gyrA codon 94 wild type contained G while mutant type contained C at the identical position of the mutate site of gyrA codon 95 as shown in Table (5). GyrA codon 94 wild type GAC express to Asparginin the mutant GGC produced Glycin, also the mutant with codon 95 convert wild codon AGC to mutant type ACC, subsequently Serin amino acid altered to Therionin\textsuperscript{(12)}, 28.30% (15/53) of specimens established as resistant to
Fluoroquinolones drug by bioluminescent assay, 66.66% (10/15) of specimens had gyr A snps within codon 94, (15/15) of specimens had gyr A SNPs within codon 95, also 10 of specimens shared both SNPs within C94 and C95.

Table (5): Values of ATP amount for each matching and mismatch bases for gyrA codon 95 and codon 94 and amino acid which expressed in each case.

<table>
<thead>
<tr>
<th>Amino acid expressed</th>
<th>Bioluminescent Amount of ATP as RLU</th>
<th>Wild and Mutant type C94</th>
<th>Amino acid expressed</th>
<th>Bioluminescent Amount of ATP as RLU</th>
<th>Wild and Mutant type C95</th>
<th>Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glycine</td>
<td>108 1.6 0.4 112 0.6 115 0.3 131 2.2 197 1.8 117 0.3 102 2.9 210</td>
<td>A toG</td>
<td>therionin</td>
<td>190 0.6 0.3 104 0.1 111 0.3 135 0.6 120 1.3 130 0.1 154 0.6 142</td>
<td>G to C</td>
<td>S3 S7</td>
</tr>
<tr>
<td>Asparagine</td>
<td>0.5 116 1.7 103 1.3 118 0.5 104 1.2 113 0.9 141 0.4 162</td>
<td>A</td>
<td>Serine</td>
<td>0.6 142 1.2 177 132 0.7 167 0.5 143 1.8 123 1.6</td>
<td>G</td>
<td>S26 S27 S30 S31 S32 S34</td>
</tr>
<tr>
<td>Glycine</td>
<td>183 0.8 162 1.4 0.4 119 189 1.5 142 0.5</td>
<td>A toG</td>
<td>therionin</td>
<td>176 0.6 162 1.7</td>
<td>G to C</td>
<td>S36 S37</td>
</tr>
<tr>
<td>Asparagine</td>
<td>136 1.7 151 0.3 178 1.4 0.3 193 117 1.2 104 0.7</td>
<td>A</td>
<td>therionin</td>
<td>189 0.6 132 1.3 145 0.6 113 0.9 164 0.3 123 1.9 122 0.7 135 1.5 103 0.1</td>
<td>G to C</td>
<td>S40 S41 S44 S47 S49 S50 S51 S52 S53</td>
</tr>
</tbody>
</table>

**Conclusion**

The study proved strongly that bioluminescent assay can dependable in detection of SNPs cause drug resistant in mycobacterium tuberculosis genome, rapidly and without need to electrophoresis process as other technique, in addition other method demand time and expensive equipment in contrast with new method. The time factor plays a crucial role in treatment of tuberculosis patients, so new method such as bioluminescent assay required urgently in such disease.
**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Funding:** Self-funding

**References**

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17. Riet J, Ramos LRV, Lewis RV, Martins LF. Improving the PCR protocol to amplify a repetitive DNA sequence. Genetics and Molecular Research. 2017; 16; (3), gmr16039796.


Assessment of Caregiver Knowledge Related to the Physiological Changes and Health Problems in Government Geriatric Home at Baghdad City

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Abstract

Population aging can lead to a larger number of individuals with physical and emotional disorders, which increase demand for caregivers, there is a high prevalence of functional disability in older adults and a variability between the genders, with a 42.8% rate among women and 39.6% among men. A quasi-experimental study, Analytical, cross-sectional, non-probability convenient study done with sampling of 20 caregivers was conducted in the Geriatric Care Home in Baghdad City (the governmental geriatric home) for the period from 12th of October 2018 to 20th of January 2019 to asss their knowledge about physiological changes and health problems. A questionnaire was used to collect caregiver’s data which consist of two parts: The first part is concerned general information of the study Geriatric home, and the second part involves two domains involving items concerning caregiver’s knowledge about physiological changes and health problems and their knowledge about emergency care for elderly persons.

Results: the study presents that a high percentage (60%) of the study sample was nurses as caregivers in AL- Rashad Geriatric Care Home and (80%) of the study sample are males, (60%) of the caregivers were graduated from college in AL- Cyelakh, All caregivers in the study of geriatric homes was married, with barely sufficient income .The study shows that,(90%), (70%) of caregivers in all geriatric care homes have (1-10) year of experiences respectively,(80%) of caregivers in geriatric home answers that they have emergency cases at their work time, (85%) of the emergency cases was saved in all geriatric care homes.

Conclusions: The researcher recommends to increase training courses inside and outside Iraq and encourage employees to use safety measures to avoid injuries of the elderly, and prepare the advanced medical facilities to promote saving lives. As well as a medical test and evaluation of all elderly in geriatric care home to identify their health problems which lead to emergencies.

Keywords: Health; medical treatment; emergency; patients; physiological changes.

Introduction

Population ageing can lead to larger number of individuals with physical, emotional disorders, which increases demand for caregivers. In Brazil, there is high prevalence of functional disability in adults and variability between the genders, with (42.8%) rate among women and (39.6%) among men. Functional incapacity among older adults directly interferes in their family, since their dependence Activity of Daily living (ADL) requires presence of caregiver(1).

The elderly are old age, World Health Organization considers the age of elderly begins at oldness of sixty-five and above usually the activity of individuals at this
stage and their bodies are weak and consider themselves unpleasant after they were basis for tender. All things reflected negatively on their health and mental state, begin the stage of anxiety, thinking about the future and what contains(2).

The percentage of elderly, in world population is predictable to increase rapidly from 9.5% in 1995 to 20.7% in 2050 and 30.5% in 2150. Amongst the elderly, number of people aged 80 and more will increase rapidly over time. According to projections, number of those aged 80 and above will rise seventeen fold from 61 million in 1995 to 1054 million by 2150.(3).

Elderly people at higher risk of cardiac complications in short and long terms. Common morbidity (including diabetes and osteoporosis) forms treatments. Supportive care plays key role, it is suggested to use promoter factor to colonize granule more often than younger patients. Quality of life and maintenance status may be important than survival without progress(4).

Dizziness and imbalance among most common complaints of elderly, they are growing concern for public health because they put elderly at great risk of falling. Although causes of dizziness in older people are multiple factors, peripheral vestibular weakness is one of the most common causes. Benign neoplasm is most common form of vestibular weakness in the elderly, followed by mental disease.(5)

Malnutrition is common but under-diagnosed condition in elderly associated with physical and mental weakening, decreased quality of lifecycle, and mortality. Malnutrition disproportionately affects elderly, results from combination of changes related to aging, comorbidities, medications, and environmental factors(6).

Method

In order to obtain an accurate data and representative sample, purposive Non – probability “ sample consists of (20) caregivers men and women are considered, selected purposively from geriatric care homesat government geriatric care home; (10) caregivers men and women are from Al Cyclakh; (10) caregivers men and women from AL-Rashad (governmental elderly care home) .The instrument constructed according to subject (knowledge) which concerned physiological changes and health problem for elderly to achieve the aims of study, the instrument was deal of four parts.

First part: General information about geriatric home: Its include which the (Name of the House . Location (Kark, and Rusafa) . Number of caregiver. Specialty of caregiver (doctor, nurse, social worker, psychologist).

Second part: General information about caregiver

This part is concerned the with General information for caregiver which consist of

Third part : Knowledge of health caregivers about Health problems of elderly: Part four concerned the with Knowledge of health caregivers about Health problems of elderly consist of (10) items it was rated according to Likert scale which a: know (3), not sure (2), Not know (1) score. Included (constipation, visual impairment, and chronic health conditions such as (diabetes, blood presser, cancer), malnutrition, impaired hearing, sensory disability, lost their balance because of muscle weakness, urinary incontinence, Inactivity due to arthritis and loss of muscle tone and elasticity, memory loss (Alzheimer’s).

Statistical Analysis: Statistical programs SPSS (Statistical Package for Social Science) version 20 and Excel application were used to analyze the data. Frequencies, Percentages and Mean of Scores were used in tables in order to get the total results of the sample and to make a comparison between the variables.

1. \( \% = \frac{\text{Frequencies}}{\text{Sample size}} \times 100 \)

2. Arithmetic Mean (\( \bar{x} \))
   \[ \bar{x} = \frac{\sum xi}{n} \]

3. C. SD : Stander Deviation
   \[ S^2 = \sum \frac{x^2 - \mu^2}{2n} - 1 \]

4. Pearson correlation coefficient was used to find out the relationship between two variables and to determine the direction as well as the strength of this relationship.
   \[ r = \frac{n(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{[n(\Sigma x^2) - (\Sigma x)^2][n(\Sigma y^2) - (\Sigma y)^2]}} \]
Results and Findings

This presents the research subject which is explained in details through the analysis of its variables’ data and organized systematically in tables in a form to be compatible with the research objectives.

Table (1): General Information of the Study Geriatric Home No=20

<table>
<thead>
<tr>
<th>Variables</th>
<th>AL-Cyelakh/N O. =10</th>
<th>AL- Rashad/N O. =10</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>%</td>
</tr>
<tr>
<td>Specialty of caregivers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctor</td>
<td>2</td>
<td>20%</td>
</tr>
<tr>
<td>Nurse</td>
<td>4</td>
<td>40%</td>
</tr>
<tr>
<td>Social worker</td>
<td>3</td>
<td>30%</td>
</tr>
<tr>
<td>Psychologist</td>
<td>1</td>
<td>10%</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>100%</td>
</tr>
<tr>
<td>1- Cooperation with a health institution, hospital or health center</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>2- Is there an ambulance dedicated to the house</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>3- Is there a carsalveor or a police station nearby</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>4- Is there a hospital near to the house</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>5- Are the medical supplies available</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>6- Does the house provide any financial support</td>
<td></td>
<td>√</td>
</tr>
<tr>
<td>7- Is there a specialist doctor who periodic visits the house</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>8- Do you have visits from civil society organizations or voluntary charity campaigns</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>9- Is there a home pharmacy in the house</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td>10- Are there night guards or police members at the entrance to the building (24 hours)</td>
<td>√</td>
<td></td>
</tr>
</tbody>
</table>

Table (1): presents that a high percentage (60%) of the study sample was nurses as caregivers in AL- Rashad Geriatric Care Home, (40%) of caregivers in AL- Cyelakh (government geriatric care home) were nurses, (20%) were doctors work in AL- Cyelakh GCH,(10%) were doctors work in AL- Rashad GCH.

Table (2): General Information of Caregivers in Geriatric Home No=20

<table>
<thead>
<tr>
<th>Variables</th>
<th>Classification</th>
<th>AL- Cyelakh</th>
<th>AL-Rashad</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>%</td>
</tr>
<tr>
<td>Year of experiences</td>
<td>1-10 years</td>
<td>9</td>
<td>90.0</td>
</tr>
<tr>
<td></td>
<td>11-20</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>21-30</td>
<td>1</td>
<td>10.0</td>
</tr>
<tr>
<td>Training course related to first aid</td>
<td>Yes</td>
<td>3</td>
<td>30.0</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>7</td>
<td>70.0</td>
</tr>
<tr>
<td>Have you got emergency cases</td>
<td>Yes</td>
<td>7</td>
<td>70.0</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>3</td>
<td>30.0</td>
</tr>
<tr>
<td>More common emergency Cases (yes only)</td>
<td>Dyspnea</td>
<td>5</td>
<td>71.4</td>
</tr>
<tr>
<td></td>
<td>Chocking</td>
<td>2</td>
<td>28.6</td>
</tr>
<tr>
<td></td>
<td>Fainting</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Falls</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fracture</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table (2) shows that, (90%), (70%) of caregivers in the study in all geriatric care homes have (1-10) year of experiences respectively, high percent of them not trained for first aid in all geriatric care homes, high percent (70%), (80%) of caregivers in geriatric home answer have emergency cases that occurred at their work time, in AL-Cyelakh, AL-Rashad, geriatric care homes respectively, and the more common emergency cases which happened were (71.4%) in AL-Cyelakh was Dyspnea, (25%) of cases was dyspnea, choking, fainting, and falls in AL-Rashad geriatric care home, the percentage of dealing the emergency cases was saved in all geriatric care homes which were (85%).

Table (3): Knowledge of Health Caregivers about Physiological Changes and Health Problems of Geriatrics

Table (3): Shows The valuation of caregiver Knowledge about physiological changes and health problems of geriatric which presented that the level of caregiver knowledge was moderate according to total mean which (1.5) for AL-Cyelakh, AL-Rashad geriatric care homes respectively.

Discussion of the Study Results

1. Discussion of the Information of the Study Geriatric Home which are included in present study (Table 1): The researcher included geriatric care homes in Bagdad City which are AL-Rashad and Al Cyelakh in AL-Rusafa, The information of
homes was (60%) of the study sample was nurses as caregivers in AL- Rashad Geriatric Care Home, (40%) of caregivers in AL- Cycelakh (government geriatric care home) were nurses, (20%) were doctors+ work in AL- Cycelakh GCH, (10%) were doctors work in AL- Rashad GCH. Moreira, et al(1) stated in their study which was conducted on (60) caregivers to evaluate the effectiveness of an learning intervention on knowledge-attitude and practice of elderly caregivers in Brazil, they present a study that the nurse can be a key element for a comprehensive care for elderly persons and a confident effect on the care.

2. Discussion of General Information of Caregivers in Geriatric Home (table 2): High percent of caregivers who working in geriatric care home in the present study have shown that, (90%), (70%) of caregivers in the study in all geriatric care homes have (1-10) year of experiences respectively, high percent of them not trained for first aid in allgeriatric care homes, high percent (70%), (80%) of caregivers in geriatric home answer have emergency cases that occurred at their work time, in AL-Cyelakh, AL- Rashad, geriatric care homes respectively, and the more common emergency cases which occurred were (71.4%) in AL- CyelakhitwasDyspnea, (25%) of cases was dyspnea, chocking, fainting, and falls in AL-Rashad geriatric care home, the percentage of dealing the emergency cases was saved in all geriatric care homes which were (85%), (87.5%), respectively, in all geriatric care homes was saved emergency cases , and the number of emergency cases which occur in geriatric care home study was (1-2) cases at four study homes.

The researcher believes that the saving emergency cases of elderly due to found ambulance in geriatric home to transport the elderly to emergency unite to near hospital .

Close, J. et al,(7) stated in their report, that the incidence between 2012-2013 of adults older than 65 who sought emergency care was 12 per 100 persons for injury and 36 per 100 for illness, according to the CDC. The most common complaints that bring elderly patients to emergency departments are falls, abdominal pain, difficulty breathing, fever, chest pain, confusion or other cognitive issues, according to experts.

Vieira, et al(8) stated in their study that (28-35%) of elderly people (≥65 years) fall each year worldwide and prevalence increases with age process. Falls are the chief cause of injury, injury related frailty, and death in elderly people. The severity of subsequent injuries varies, and (40%-60%) of falls result in major lacerations, fractures, or traumatic brain injuries. A longitudinal study found that (68%) of people who fall reported approximately injury; healthcare was wanted in (24%) of cases, functional weakening was reported by(35%), and social and physical activities were reduced for more than (15%). Close to (95%)of completely hip fractures are caused by falls.

Kramarow, et al,(9)stated in their report that 55% of all unintentional accidental deaths among adults aged 65 years or over were caused by falls, and the mortality rate of age-adjusted falls in 65-year-olds more than doubled from 29.6 per 100,000 to 56.7 per 100,000.

3. Discussion of the Knowledge of Health Caregivers about Physiological Changes and Health Problems of Geriatrics (Table 3): Through the evaluation of caregivers’ knowledge about physiological changes and health problems of geriatrics, the researcher found the caregiver have moderate knowledge about physiological changes and health problems of geriatrics, which clear through the total mean which of (1.5), (1.5) for AL- Cyelakh, AL- Rashad geriatric care homes respectively.

Barbara, et al,(10) stated in their study that the knowledge and skills of caregivers, is basic for caregivers to do correct decisions solve problems, and consider the foundation for developing and improving their skills.

Soraas, et al,(11)and Goyal, P.et al(12) reported that geriatric care home persons are at height risk of adverse events. These individuals are predominantly vulnerable due to their age, cognitive impairment, complex several diseases, and non-specific performance of illnesses. There is also an increased risk of fall injuries and errors due to many medication and potential drug interactions, and they originate that the use of eight or more drugs is recurrent in Norwegian geriatric care homes, leading to increased danger of drug-drug interactions, which in turn may lead to falls, cognitive impermanent, medication-related problems, and even increased death . In geriatric care homes, physicians frequently recommend drugs without a proper clinical evaluation of the elderly and staff may not be alert of this.

The researcher believed that the caregivers who did
not participate in the training course related to geriatric care is may be caused for low knowledge.

**Conclusions**

After reviewing the interpretation of the study findings, the study can conclude that:

Most of the caregivers who work in geriatric care home in the present study have years of experience between (1-10) years; High percent of the caregivers did not participate in training courses for being related to first aid for emergency cases; High percent of emergency cases occurs in in AL- Rashad, in AL- Cyelakh GCH; More common emergency cases which occurs in all geriatric care homes were: dyspneafalls, fracture, and fainting; Majority of emergency cases which occur in geriatric care homes is saving; and One to two emergency cases occur in the all geriatric care homes.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

**Conflict of Interest:** Non

**Funding:** Self-funding

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Study the Glucose Transport, Angiogenesis and Apoptosis Behavioral through Chemotherapy Treatment According to Receptors Status in Women with Breast Cancer

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Abstract

Background: Glucose transporting into cells, angiogenesis, and apoptosis are the main factors that inducing the progression of many types of cancers including breast cancer. BC progression was seen as a multi-step process involving progressive changes from normal to hyperplasia with and without atypia, carcinoma in situ, invasive carcinoma, and metastasis.

Aim: Assessment the role of glucose transport-1 (GLUT-1), vascular endothelial growth factor (VEGF), and cluster of differentiation factor (CD44) as a glucose transporting into cells, angiogenesis, and apoptotic factors in women with BC whom receiving chemotherapy.

Method and Subjects: 120 women with BC included in this study as a patients group as well as 120 apparently healthy women as control. The women with BC is divided into sub-groups depending on chemotherapy treatment status. GLUT-1, VEGF, and CD44 were investigated by ELISA method.

Results: This study suggested that highly significant differences in the mean and standard division of GLUT-1 and VEGF in all cases of women with BC compare to control group (P-Value< 0.05). The levels of GLUT-1 was highly significant difference between two subgroup have Her-2 positive and negative (p < 0.001), and the levels of VEGF, and CD44 in patients subgroups were significant (p< 0.05).

Conclusion: The following up of the progression and responding to chemotherapy treatment may be more easy by estimation the glucose transporting, angiogenesis, and apoptotic markers in women with BC.

Keywords: Breast cancer; glucose transport, angiogenesis, apoptosis.

Introduction

The plasma membranes of most mammalian cells, except those of the proximal kidney and small intestine, have a passively mediated transport system for glucose. Facilitative entry of glucose into the cell is controlled by GLUTs, structurally related proteins that are encoded by a gene family and are expressed in a tissue-specific manner⁴,⁵. Most cells contain at least one glucose transporter isoform, and many contain more than one. In most cell types, GLUTs mediate a net uptake of glucose⁶. GLUT1 is the most ubiquitously distributed of the transporter isoforms. It is found in virtually all tissues of the fetus and in many tissues and cell types of the adult⁶. GLUT1 has a very high affinity for glucose⁵. VEGF actions are mediated through binding to two receptor tyrosine kinases, VEGFR-1 and VEGFR-2. Activation of these receptors by VEGF triggers the phosphorylation of a multitude of proteins that are active in signal transduction cascades⁶. VEGF expression is increased in the majority of cancers examined to date. The list is

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extensive and includes hematological malignancies(7); colorectal cancers(8); hepatocellular carcinoma(9); lung, thyroid, breast, gastrointestinal tract, kidney, and bladder cancers; ovary and uterine cervix carcinomas(10). CD44 is a family of non-kinase, single span trans-membrane glycoproteins expressed on embryonic stem cells and in various levels on other cell types including connective tissues and bone marrow(11,12). CD44 expression is also up-regulated in subpopulations of cancer cells and is recognized as a molecular marker for cancer stem cells (CSC)(13). In Iraq, breast cancer ranks the first among the top ten malignant neoplasms affecting the community; comprising 19.5% of total (4996 cases) and 34.3% of female cancers (4922 cases)(14). During 2016, 897 women died from that disease which is the registered as the first cause of cancer related mortality among Iraqi females (23.6%) and the second overall among males and females (12.1%) after bronchogenic cancer(15). The aim of this study to investigate the role of glucose transport-1 (GLUT-1), vascular endothelial growth factor (VEGF), and cluster of differentiation factor (CD44) as a glucose transporting into cells, angiogenesis, and apoptotic factors in Iraqi women with BC whom receiving chemotherapy.

Materials and Method

Specimens collection: This study was performed during the period from Dec 2018 to May 2019 in biochemistry laboratory, collage of medicine, Babylon university. One hundred and twenty patients were previous diagnosis with BC and receiving chemotherapy in oncology center in Merjan Teaching hospital.

Estimation of GLUT-1, VEGF, and CD44 by ELISA: GLUT-1, VEGF, and CD44 levels were estimated by sandwich ELISA depending on the instructions of the manufacture provided with kits (Sunlong/China).

Statistical analysis: Statistical analysis for assessment of GLUT-1, VEGF, and CD44 in different groups was performed by ANOVA test with using SPSS software. Significant differences were established at p < 0.05.

Results

The receptors status of women with BC included in this study is shows in table-1:

Table 1: Estrogen, progesterone, and Her-2 status of patients group

<table>
<thead>
<tr>
<th>Receptors status</th>
<th>Number (%) N=120</th>
</tr>
</thead>
<tbody>
<tr>
<td>ER status</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>55(46)</td>
</tr>
<tr>
<td>N</td>
<td>65(54)</td>
</tr>
<tr>
<td>PR status</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>66(55)</td>
</tr>
<tr>
<td>N</td>
<td>54(45)</td>
</tr>
<tr>
<td>Her-2 status</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>36(30)</td>
</tr>
<tr>
<td>N</td>
<td>84(70)</td>
</tr>
</tbody>
</table>

The levels of GLUT-1 was highly significant difference between two subgroup have Her-2 positive and negative (p< 0.001), and the levels of VEGF, and CD44 in patients subgroups were significant (p< 0.05).

Table 2: Levels of GLUT-1, VEGF, and CD44 in all patients and control groups

<table>
<thead>
<tr>
<th>No</th>
<th>Parameters</th>
<th>Women with BC mean± SD (N=120)</th>
<th>Women without BC mean± SD (N=120)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GLUT-1 (ng/ml)</td>
<td>121±9.3</td>
<td>67±5.1</td>
<td>0.0001</td>
</tr>
<tr>
<td>2</td>
<td>VEGF (ng/ml)</td>
<td>23.2± 3.8</td>
<td>11.3± 2.7</td>
<td>0.0001</td>
</tr>
<tr>
<td>3</td>
<td>CD44 (ng/ml)</td>
<td>217± 5.9</td>
<td>239.5± 4.1</td>
<td>0.0004</td>
</tr>
</tbody>
</table>

This results of patients whom receiving chemotherapy depending on receptors status are illustrate in figure-1 and table-3:
Fig. 1: Expression levels of GLUT-1, VEGF, and CD44 (ng/ml) in patients group

Table 3: Levels of GLUT-1, VEGF, and CD44 in patients group depending on receptors status

<table>
<thead>
<tr>
<th>No</th>
<th>Receptor status</th>
<th>GLUT-1 Mean± SD</th>
<th>VEGF Mean± SD</th>
<th>CD44 Mean± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ER P</td>
<td>119± 2.7 *</td>
<td>57± 1.9</td>
<td>215± 7.7</td>
</tr>
<tr>
<td></td>
<td>ER N</td>
<td>114± 1.9</td>
<td>56± 1.5</td>
<td>211± 8.8</td>
</tr>
<tr>
<td>2</td>
<td>PR P</td>
<td>117± 2.6 *</td>
<td>55± 1.3</td>
<td>217± 9.2</td>
</tr>
<tr>
<td></td>
<td>PR N</td>
<td>112± 1.6</td>
<td>53± 1.2</td>
<td>214± 6.9</td>
</tr>
<tr>
<td>3</td>
<td>Her-2 P</td>
<td>119± 2.5 **</td>
<td>57± 1.5*</td>
<td>217± 5.6*</td>
</tr>
<tr>
<td></td>
<td>Her-2 N</td>
<td>111± 1.3</td>
<td>51± 1.4</td>
<td>210± 7.4</td>
</tr>
</tbody>
</table>

*significant  
**highly significant

Discussion

Worldwide, BC is the most common cancer in women. The new cases of women with breast cancer in 2018 were more than 250 000 in the USA, and breast cancer will be diagnosed in 12% of all women in the USA over their lifetimes\(^{(16)}\). Globally, about 2.1 million women were estimated with breast cancer in 2018\(^{(17)}\). Breast cancer is a heterogeneous disease with results from a series of genetic and epigenetic events that lead to dys-regulation of cell growth, circumvention of apoptosis, and development of the ability to invade the underlying tissue through the basement membrane\(^{(18)}\).

In the present study, we investigated the levels of GLUT-1, VEGF, and CD44 as glucose transporter system, angiogenesis, and apoptotic marker, respectively. The results showing highly significant differences in the mean and standard division of GLUT-1 and VEGF in all cases of women with BC compare to control group. GLUT-1 is multi-pass protein located in the cell membrane and it essential for interring the glucose molecules into cells to complete metabolism such as glycolysis to provide energy for cancers cells\(^{(19)}\). GLUT1 is responsible for the low level of basal glucose uptake required to sustain respiration in all cells. Expression levels of GLUT1 in cell membranes are increased by reduced glucose levels and decreased by increased glucose levels. The levels of this protein was found to be more expressed in women with BC compare to control and this increase the supporting hypothesis that say of “the cancers cells fed on sugar”. Through the angiogenesis process, the cancer cells building a new blood vessels and increase the expression of VEGF\(^{(20)}\). The results suggested that highly expression of VEGF in patients group and this increase the probability of building a these vessels and promoting the neovascularization and in results increase the proliferation of tumors and cancer progression. The association between a gradual increase in CD44 isoform expression and tumor progression
from less malignant stages to more advanced stages is another indirect indication of CD44 involvement in the malignant process. This concept is perhaps best illustrated by a report describing CD44 expression in colorectal cancer patients. This study suggested that the expression of GLUT-1 and VEGF in positive status of ER and PR was highly significant in subgroups of patients with breast cancer (BC) whom receiving chemotherapy and the expression of VEGF and CD44 not appear in these subgroups. This indicates that the cells having ER, PR were more suitability to incidence of breast cancer more than negative status. Other finding was obtaining from the results suggested that increasing the proliferation and tumor progression were more in women with Her-2 positive status because it highly expressed of GLUT-1, VEGF, and low expression of apoptotic marker, CD44. In conclusion, the following up of the progression and responding to the chemotherapy treatment may be more easy by estimation the above markers in women with BC.

Acknowledgement: We thanks all women participated in this study and the staff of oncology center in Merjan teaching Hospital.

Ethical Clearance: The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq.

Conflict of Interest: The authors declare that they have no conflict of interest.

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Histopathological Change and Gene Expression of Heat Shock proteins (Hsp90 & Hsp70) in Snail *Pomacea canaliculata* (Lamarch, 1822) Exposed to Stress by the Pesticide Lannate

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The current study aimed to investigate the snail’s pathological changes and their relationship with the amount of gene expression of heat shock proteins HSP90 & HSP70 under the influence of lannate pesticide. *P. canaliculata* were collected during the period between 5ᵗʰ-10ᵗʰ May 2018. The laboratory generation snails were divided into 2 groups, the first was exposed to a concentration of 10 µg/L of the pesticide, as the lethal concentration of the pesticide was 12.6 µg/L, and the second was left as a control group. After that, three snails from each group were dissected by the end of the following intervals (10mins, 1hr, 8hrs, 24hrs, 3days, 7days, and 15day). The gene expression was studies using qPCR method. Results of the genetic analysis for the abundance of the HSP70-HSP90 showed a clear effect of the pesticide on the treated snails during the above interval.

On the other hand, the results of the histological study of the gills showed that the pathological changes varied in their intensity during the intervals, while there was no clear effect to variation of concentrations. These changes involve loss of cilia in the epithelial cells, infiltration of granulocytes in the cilia loss regions, hyperplasia, degradation and necrosis of cells as well as the accumulation of non-living brown and grey materials within the epithelial cells. Moreover, it was noticed that the mucous materials secreted from cystic cells has increased.

**Keywords:** *Pomacea canaliculata*, Heat shock proteins, HSP70, HSP90, Lannate.

**Introduction**

As a matter of fact, *Mollusca* has a wide variety of species, including Gastropoda.¹ *P. canaliculata* feeds on aquatic plants and can destroy rice and other aquatic or semi-aquatic plants as in Southeast Asia.²

Subsequently, this snail has spread steadily through its leakage through irrigation and drainage canals until it became an important part of the ecosystem in Taiwan. Hence, its rapid growth in Southeast Asia has turned it into a serious pest that threatened rice fields and inflicted heavy economic losses.³ In 2000, *P. canaliculata* was considered one of the 100 worst pests that invaded the world. This was in terms of the International Union for Conservation of Nature and Natural Resources (IUCN) classification. Such abundance may be attributed to the lack of its enemies in the environments in which it lives and, in most cases, to its exceptional ability to adapt to the environments with high temperatures drought, lack of food sources and water pollution.⁴

As a result of these features, the snail was capable of conquering several countries. It was recently registered in the Iraqi environment for the first time by Al- Abbad in 2015.⁵ It is a pest of multiple botanical species and is viewed as one of the most serious pests on rice in Iraq if it spreads in planting zones.⁶

In 1962, so-called stress proteins or Heat Shock Proteins (HSPs) were discovered. These are one of the stress-affected proteins.⁷ Afterwards, they have been known as Molecular chaperon. They play an active role in preserving the functions of proteins as well as stimulating immune responses against pathogens. In addition, they take part in preserving cellular functions by folding the newly formed amino acid chains into their correct protein forms. They also prevent wrong protein
folding and help the cell get rid of damaged proteins. Moreover, they protect proteins and accompany them on their way to combine with their escorts. They also fulfill a very important function to the immune system, as they act as a presentation antigen to show antigens of the immune system cells in order to weaken or eliminate.\(^{(8)}\) HSPs are normally expressed and their expression increases at stress conditions such as high temperatures, exposure to chemical toxic compounds, heavy metals, infections, and diseases.\(^{(9)}\) They have been classified into several species based on their molecular weight, including HSP100, HSP90, HSP70, HSP60, and HSP40.\(^{(9)}\) This study tried to investigate the snail’s pathological changes and their relationship with the amount of gene expression of heat shock proteins HSP90 & HSP70 under the influence of lannate pesticide.

**Materials and Method**

One hundred 100 *Pomacea canaliculata* snails (Lamarck, 1822) were collected manually from the eastern bank of the Shatt al-Arab in the Salihya area in the Governorate of Basra in southern Iraq between 5\(^{th}\)-10\(^{th}\) of May 2018. The snails were then transported to the breeding laboratory in the animal house of the Department of Biology. They were left in the breeding basins to obtain a laboratory generation. After hatching, newly-hatched snails were left under laboratory conditions. Three months later, the laboratory snails were divided into two groups of equal weights of approximately 21g. Next, histological changes were studied especially in the snails subjected to concentration 10 \(\mu\)g/L for the intervals (24hs, 7days, and 15days). 6 snails were taken from each interval, 3 of which were treated and 3 were untreated. Accordingly, histological sections were prepared according to the Humason method (1972).\(^{(10)}\) Thus, 3 snails from each group were dissected after the end of the following intervals (10mins, 1hr, 8hrs, 24hrs, 3days, 7days, and 15days). Then, 20\(\mu\)g of the soft parts of the body (gastrointestinal gland and kidney) were taken for the extraction of RNA according to the method mentioned in the extraction tools SV Total RNA Isolation System of Promega Company. The concentration of RNA was determined with the use of Nanodrop Technologies. After that, the cDNA was formed using the transformation tools GoTaq® 2-Step RT-qPCR System from Promega company. Moreover, the starters for the HSP90 & HSP70 genes were used.\(^{(11)}\)

Afterwards, SPSS program was adopted in the statistical analysis of results. Finally, the significance of the differences between gene expression for genes and periods were tested using the T test at a significant level of \(p\leq 0.05\).

**Results**

The results of the microscopic examination ME of the tissue sections of the gills of *P. canaliculata* treated with lannate showed the presence of various histopathological effects on most of the components of the gill plates but basically are centered on the epithelial cells lining them. It was also noted that there was no effect of the pesticide concentration on the type and severity of these pathological effects, as the pathological changes in each of the two concentrations \(\mu\)g/L (10 and 5) were similar.

After 24 hours of the experiment: The results showed the presence of histopathological changes in the gills of treated *P. canaliculata* compared to the control group samples (Figure 1). These changes were represented by loss of cilia from the epithelial cells lining the plates. The specific study of the successive histological sections showed that the losses were in small areas distributed on different locations of the single placenta plate. An accumulation of granulocytes was also observed in these small areas. That accumulation followed a pattern, as the microscopic examination showed that granular cells are abundant in the base of the epithelial cells lining the gill plate that lost their cilia or are burst into the epithelial cells, but it was not noticed in the epithelial cells lining the gill plates that still maintain their cilia (Figure 1).
After 7 days of the experiment: The results showed the persistence of conjugation of the immune granulocyte cells in the areas that suffer the loss of cilia in the gill plate. In addition, the accumulation of non-living brown color substances was observed in the epithelial cells. These substances usually accumulate as an oval or spherical mass in the cytoplasm directly above the oval nucleus (Figure 2).

The examination also revealed the presence of hyperplasia in the vertical epithelial tissue lining the gill plates and the appearance of epithelial tissue similar to the papilla, as the cells at the top of the hyperplasia lose their polarity. On the other hand, the original cells still maintain their polarity and have vertical shape. Furthermore, their basal surface resides on the basement membrane. In addition, hyperplasia cells are seen as smaller than the mother cells and their large nuclei. Hyperplasia also presses on the tops of adjacent cells, causing their decline (Figure 2). The degeneration of ciliated epithelial cells has been observed too.

After 15 days of the experiment: Results showed the extension of the area of cilia loss accompanied by the loss of the immune granulocyte infiltration. It was also noticed that in some areas of the granulocyte infiltration, these cells form a cyst-like structure as a result of their aggregation in one area under the lining tissue of the gill epithelium, which leads to the rush of the epithelial tissue outward towards the gill fissure, and sometimes eruption of the epithelial tissue leads to pressure on the adjacent gill epithelial cells and, consequently, changes their vertical shape. It was also noticed that there was an accumulation of non-living brown substances in the cytoplasm of the epithelial cells of the gill plate (Figure 3).
There were also instances of hyperplasia in the form of multiple papilla. In this respect, the histological examination showed the emergence of a number of vertical epithelial cells for the gill plate which suffered from cytoplasm degeneration, so it seemed faded or nonabsorbent to the pigment (Figure 3).

**Gene expression abundance analysis of Heat shock protein:** The results of the genetic analysis for the abundance of heat shock genes HSP70-HSP90 of the control group snail samples showed that each of the two genes is expressed in the natural conditions at different degrees. In this respect, the statistical analysis revealed that there are noticeable differences between the two genes as the gene expression of HSP90 was highly significant, of about 5,000 times more likely than that of HSP70 at a probability level of $P \leq 0.05$.

**Discussion**

High abundance of these genes means an increase in the amount of the production of HSPs, usually at the
expense of the rest of the necessary cell proteins.\(^{(12)}\) This may reveal the causes for the appearance of some histopathological changes in the gills and kidneys of the snail, such as degeneration and necrosis. Therefore, the low gene expression in the intervals (8 hours -3 days -7 days -15 days) may be under those regulatory mechanisms, as the high intensity of HSP after ten minutes may have provided the cell with sufficient amounts of protein necessary to adapt to the stress experienced during this interval.

The gills are the most affected organs by the surrounding environment. Being in direct contact with the surroundings, it is expected that they may experience histopathological effects faster than other organa’s.\(^{(13,14)}\) They provide a very large space for direct and continuous contact with pollutants and toxins in water.\(^{(15)}\)

The results have also showed the high toxicity of the lannate on the organs of \textit{P. canaliculata}. The pathological changes were observed during the snail’s exposure to the pesticide in both groups exposed to a concentration of 10 µg/l and 5 µg/l of the lannate. These changes have increased with the increase of the time of exposure to the pesticide. In this respect, it is worth mentioning that the current study is in line with a previous study that showed the relationship between the intensity of changes occurring in different organisms and the length of time of exposure to toxic substances.\(^{(16)}\) The nature of the synthesis of the pesticide may play a role in that, or perhaps the cell receptors in the snail tissue respond with the same degree in different concentrations to urge the cells to react against the pesticide.\(^{(17)}\)

Perhaps this explains the speed of their infiltration and accumulation in some areas of the epithelial connective gill tissue, as they have infiltrated from the first day of the snail’s exposure to lannate. So, when these substances or free radicals act on the oxidation of fats in the plasma membranes, causing a change in the permeability of those membranes, a swelling for the cells may appear and liquids may accumulation inside.\(^{(18)}\) This was observed in the histological sections of epithelial tissue cells.

It is known that a change in the permeability of membranes or their damage can finally lead – with the continued presence of the causing factor- to greater damages that may contribute to the death of cells.\(^{(19)}\) This explains the large number of tissue areas in the organs which suffer from necrosis and degeneration in the members of the studied snails in all intervals. This indicates the speed of divisions and overgrowth triggering the possibility of cancer with the continued exposure to the pesticide,\(^{(20)}\) as previous study indicated that lannate could be carcinogenic.\(^{(21)}\) Hyperplasia in the organism is a form of reaction to exposure to pathogens. This may lead to cancer with the organism’s continued exposure to these pathogens.\(^{(22)}\)

Increasing the reproduction of cystic cells in the epithelial tissue plate is a primary defensive means for the snail against environmental stress exerted by the pesticide in order to the increase mucous material, this may lead to lessen the area exposed to the water polluted with the lannate.\(^{(17)}\) Mucous material is produced for defensive action in order to protect cells from pollutants

**Conclusion**

The study concluded that the intensity of histopathological changes increases in the gills and kidneys of snails with an increase in the extension of the period of exposure to the pesticide more than the increase in the concentration of the pesticide itself. It became evident that there was a direct relationship between the increase in the intensity of histopathological changes and with increased genetic expression of heat shock proteins during the chronic period upon exposure For the pesticide.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Funding:** Self-funding

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A Comparative Study between Rosuvastatin and Pitavastatin Toxicity on Liver and Kidney in Albino Rats

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2M.Sc. Department of Pharmacology and Toxicology, 3Assistant Prof. Dr. College of Veterinary Medicine, University of Kerbala, Kerbala, Iraq

Abstract

Statins are group of drugs utilized to large degree as therapy of hypercholesterolemia, that is a substantial hazard in evolving cardiovascular diseases, like myocardial infarction, this achieved by competitive inhibition of three-hydroxy-three-methyl glutaryl coenzyme A reductase (HMGCR), three-Hydroxy-three-methyl glutaryl coenzyme A (HMG-CoA) reductase inhibitors. Statins are applied widely to control serum cholesterol in an attempt to lower mortality and morbidity related to atherosclerosis.

Method: This study was conducted on 18 Sprague dawley male rats. They were separated into three groups each group consist of six animals each as the following:

- **Control group:** Drenched normal saline for 30 days.
- **Rosuvastatin group:** Drenched 15 mg/kg/day of rosvastatin, for 30 days.
- **Pitavastatin group:** Drenched 0.8 mg/kg/day of pitavastatin for 30 days.

Objective: To determine the hepatic and renal toxicity, and safety of rosvastatin compared with pitavastatin in rats.

Results: Results has revealed considerable rise in serum and ALP in rosvastatin group, while for pitavastatin group the results revealed significant difference in serum ALP and no significant increase in serum ALT and AST.

Also there is significant difference in the serum level of creatinine in pitavastatin group and rosvastatin group when compared between the three groups. and no significant increase in serum TSB and urea in both rosvastatin and pitavastatin groups.

Conclusions: The study concluded that the pitavastatin is more safely used in patients with liver and kidney diseases and the pitavastatin is safer than rosvastatin.

Keywords: Rosuvastatin, Pitavastatin toxicity, liver, kidney.

Introduction

Anti hyperlipidemic drugs (Statins) Statins have excessively utilized in treating hypercholesterolaemia through competitive inhibition of three-hydroxy-three-methyl glutaryl-coenzyme A reductase (HMGCR) that is cholesterol rate limiting enzyme in cholesterol synthesis, intracellular cholesterol shortage is caused by statins, there by prompting activating element bounding proteins by activating photolytic sterol, low density protein receptor expression causing plasma concentration of LDL cholesterol reduction caused by hepatocellular uptake increment1.

Statins are recognized to decrease atherosclerosis catastrophes and minimize morbidity and mortality2. Also statins evince different biological impacts that are designated pleiotropic actions including anti-
inflammatory\(^3\) and antioxidant effects\(^4\), suppression of Platelet derived growth factor, stimulate propagation and up regulation of Tumor Growth Factor-B messaging in cardiac cells cultures and renal mesangial cells\(^5-^6\).

**Pitavastatin:** The construction of Pitavastatin reserves upgraded pharmacokinetics, comprising typical action as inhibition of HMG-CoA reductase and superior medicine imbibition. Pitavastatin is effectively superior to other statins in LDL receptor expression and minimize serum LDL cholesterol level through boosting liver uptake from circulation\(^7\).

**Pharmacokinetics of pitavastatin:** Pitavastatin has been pretended to have elevated bioavailability reaching of 80% at a dose of 1 mg/kg\(^8\) where it is selectively dispersed and metabolized by liver cytochrome P450\(^9\).

**Adverse Effect of Pitavastatin:** Muscle, back and joint pain, diarrhea, constipation, skin rash, headache, flu symptoms\(^10\).

**Toxicity of Pitavastatin:** Temporary and little increase in serum aminotransferase without symptoms in about 1% of patients is seen in pitavastatin treatment, although results exceeding three times upper normal values are rare and absence of case reporting of obvious clinical hepatitis\(^11\) although manufacturers has extradited records of hepatic failure, hepatitis and jaundice compromising lethal conditions\(^12\), otherwise obvious acute hepatic insult appear after using other statins for one to six months with rise of serum liver enzymes in hepatocellular or cholestatic manner\(^13\). Allergic signs that have not confirmed yet in pitavastatin like eosinophilia, rash and fever are rare, hence autoimmune picture appear in few conditions comprising chronic hepatitis and production of autoantibodies proved in hepatic histopathology and clinical improvement after treatment with corticosteroids\(^14\).

**Rosuvastatin:** Rosuvastatin is another drug of statins having antilipemic and active antineoplastic effects. Rosuvastatin is blocked and bound to liver hydroxymethyl-glutaryl coenzyme A reductase in as selective and competitive manner causing distribution of LDL cholesterol into liver after decreased liver cholesterol values. Moreover, rosuvastatin, similar to else statins, shows varied actions on neoplasms as growth inhibition, pro_apoptotic, and pro_differentiation bounce\(^15\).

Rosuvastatin presented lipid mitigation impacts in both in vivo and in vitro researches via rise the number of liver cell surface of LDL receptors promoting raise in uptake and catabolism of LDL\(^16\).

**Pharmacokinetic of Rosuvastatin:** In man clinical researches peak serum, summit plasma concentrates of rosuvastatin were extended to three to five hours pursuing parenteral dosing. The ultimate rosuvastatin bioavailability is nearly twenty percent\(^16\).

Rosuvastatin is mainly bound to plasma albumin reaching eighty-eight percent that is not permanent and unconditional to its plasma level\(^16\).

**Metabolism:** The metabolism of rosuvastatin is restricted as nearly ten percent of dose is get metabolite. N-desmethyl rosuvastatin is the main metabolite that is emerged chiefly via cytochrome P450 2C9 that is about one sixth to half the blocking effect of HMG-CoA reductase of founder component, meaning more than ninety percent of efficacious plasma HMG-CoA reductase inhibitory activity is expounded by original compound\(^16\).

Rosuvastatin and related metabolites are taken out mainly in feces about ninety percent after oral dosing at a nineteen hours half life, next to parenteral potion about twenty eight percent of whole body clearance through kidney and seventy tow percent via liver expel\(^16\).

**Materials and Method**

This study was conducted on 18 Sprague dawley rats of male sex weighting between 270-370 g. They were separated into three groups each group consist of six animals maintained in the animal house of pharmacy college of Karbala university with open assess to water and food ad libitum, as the following:

- **Control group:** drenched normal saline for thirty days.
- **Rosuvastatin group:** drenched fifteen mg per kg per day of rosuvastatin for thirty days.
- **Pitavastatin group:** drenched 0.8 mg per kg per day of pitavastatin for thirty days.

The study was conducted after obtaining approval from the ethics committee of college of pharmacy / University of Karbala.

Rosuvastatin is used orally at a dose of fifteen mg per kg per day, and pitavastatin is used orally at a dose
of 0.8 mg per kg per day. Monitoring of the animals in their cages was achieved to elucidate clinical signs each day. Termination of the work time is done by analyzing serum enzymes aspartate amino transferase (AST), alanine amino transferase (ALT), alkaline phosphates (ALP), total serum bilirubin (TSB), serum creatinine and blood urea, and liver and kidney histopathological slides were prepared.

**Statistical Analysis:** SPSS version twenty in one-way analysis of variances; ANOVA was used to experiment and check difference between drugs groups and control group and results were demonstrated as mean ± SE. (ANOVA). Differences were dealt to the level P < 0.05.

### Results

Impact of the antihyperlipidemic drugs on the blood level of liver enzymes in rats:

The output values reveal significantly raise (p<0.05) in serum level of ALP and ALT (except AST) in rosuvastatin group when compared with control groups, while for pitavastatin group the results revealed no significantly raise (p>0.05) in serum values of AST and ALT (except ALP) when matched with control group, also serum level pf ALP in pitavastatin group is significantly different (p <0.05) when matched with control group as in table (1).

### Table (1): Shoo the impact of rosuvastatin and pitavastatin on the serum values of ALT, AST and ALP in comparison with control group

<table>
<thead>
<tr>
<th>Groups</th>
<th>Parameters</th>
<th>ALT (U/L) Mean ±SD</th>
<th>AST (U/L) Mean ±SD</th>
<th>ALP (U/L) Mean ±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td></td>
<td>61.20± 4.597&lt;sup&gt;a&lt;/sup&gt;</td>
<td>101.80 ± 17.707&lt;sup&gt;a&lt;/sup&gt;</td>
<td>210.40 ± 20.144&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Rosuvastatin mg/kg</td>
<td></td>
<td>81.40 ± 7.846&lt;sup&gt;b&lt;/sup&gt;</td>
<td>116.20 ± 6.272&lt;sup&gt;a&lt;/sup&gt;</td>
<td>555.60 ±90.147&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Pitavastatin mg/kg</td>
<td></td>
<td>70.20 ± 1.959&lt;sup&gt;a&lt;/sup&gt;</td>
<td>101.20± 2.437&lt;sup&gt;a&lt;/sup&gt;</td>
<td>421.20 ±49.396&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

*The mean difference is significant at the 0.05 level. SD: standard deviation, ALT: Alanine amino transferase, AST: Aspartate amino transferase, ALP: Alkaline phosphates.
Results with superscripts (a, b) between study groups were considered significantly different. (P < 0.05)

### Figure (1): Serum level of Alanine amino transferase in control, rosuvastatin & pitavastatin in rats.
Effect of the antihyperlipidemic drugs on the serum level of kidney enzymes in rats: The results showed no significant increase (p>0.05) in serum level of TSB and urea (except creatinine) in rosuvastatin group when compared with both control groups and pitavastatin group, also there is no significant difference (p>0.05) in the serum level of TSB and urea in pitavastatin group when compared with both control groups and rosuvastatin group between the three groups, also there is significant difference (p<0.05) in the serum level of creatinine in pitavastatin group and rosuvastatin group when compared between the three groups, as in table (1).
Table (2): Show the impact of rosvastatin and pitavastatin on the serum levels of urea, creatinine and TSB in comparison with control group.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Parameters</th>
<th>TSB (mg/dl) Mean ± SD</th>
<th>Urea (mg/dl) Mean ± SD</th>
<th>Creatinine (mg/dl) Mean ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td></td>
<td>0.40±.054&lt;sup&gt;a&lt;/sup&gt;</td>
<td>35±.707&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.38±0.033&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Rosuvastatin mg/kg</td>
<td></td>
<td>0.50±.031&lt;sup&gt;a&lt;/sup&gt;</td>
<td>36.20±.979&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.58±0.058&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Pitavastatin mg/kg</td>
<td></td>
<td>0.52±.037&lt;sup&gt;a&lt;/sup&gt;</td>
<td>36.60±1.392&lt;sup&gt;a&lt;/sup&gt;</td>
<td>0.38±0.038&lt;sup&gt;ac&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

The mean difference is significant at the 0.05 level. SD: standard deviation, TSB: Total serum bilirubin

Results with superscripts (a, b, c) between research groups that they were conceived significantly different (p < 0.05)

Discussion

Statins are sort of medicine utilized to lower levels of lipid in circulation including whole cholesterol and especially<sup>22</sup>. HMG Co A reductase enzyme inhibition is controlling factor for cholesterol product and the prime function of statins. Hence decreasing the availability of cholesterol and in addition they rise the synthesis of the harmful LDL cholesterol receptors that facilitate to refine circulation from LDL cholesterol and assist hepatic cells to comprehend from circulation further LDL cholesterol as it cross in<sup>21</sup>. The evolving output is a decreasing whole cholesterol LDL cholesterol and triglycerides. On the other hand, the advantageous high density lipoprotein C, HDL C, is raised<sup>24</sup>. Serum levels of ALT and ALP except AST reveal significant increment that p < 0.05 in rosvastatin group when they were compared with control group, furthermore ALT is significantly raised in rosvastatin group when they were compared with pitavastatin group. these are due to rosvastatin that is taken up by hepatocyte more selectively and more efficiently than other statin therefore it is considered a prime variable associated with the hepatotoxic potential of rosvastatin<sup>24</sup>.

Functional and structural modulations in liver are assessed by efficacy of ALP, ALT and AST in the circulation. The values of mentioned aminotransferases in blood are realized to raise in every hepatic illnesses and it is conspicuous that an extremely elevated level exceeding one thousand units could be detected in acute hepatitis<sup>25</sup>. We identified a clear temporal relationship
between initiation of rosuvastatin therapy and the elevation of liver enzymes.

While for pitavastatin group the results revealed no significantly increased p < 0.05 in serum levels of ALT and AST except ALP when they were compared with the group. So from all these consequences, pitavastatin is related to suave, non-symptomatic and temporal serum transaminase raises through management though it is comparatively recent evolved statin where it still has restricted use that could be related to the clear acute hepatic damage

**Conclusion**

People are vastly using statins for hypercholesterolaemia, that is a distinctive part of growing risk of clusters of diseased related to cardiovascular system, so that the chronic use of these drugs made the patients exposed to adverse and toxic effects of it, and by making comparison of both rosuvastatin and pitavastatin to evaluate their toxic effects by measuring biochemical and histological alterations which showed significant findings for liver and kidney.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the College of Pharmacy and all experiments were carried out in accordance with approved guidelines.

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Knowledge and Attitude for Sterile Women Regarding Infertility in Thi-Qar Fertility Centers

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1Instructor, Thi-Qar University, College of Nursing, Maternity and New Nate Department,
2Instructor Dr. Al Muthanna University, College of Nursing, Pediatrics Nursing Department

Abstract

Objective of Study: To explore knowledge and attitudes about Infertility for sterile women.

Methodology: A descriptive cross-sectional study of (100) sterile women selected randomly who visited in thi-Qar fertility center for the period from 3rd October 2019 to 15th January 2020. Validity and reliability of questionnaire are determined through pilot study. Used descriptive statistical procedures deductive data analysis, and data was collected from couples through predesigned interview questionnaire and attitude scale, data was analyzed by SPSS version (20). Descriptive and inferential statistic was used.

Results: The result showed in the age series (25-30 years) was for the elevated proportion from the pattern. General knowledge of sterile women was (44.34 per cent), knowledge of sterile women’s risk factors was (30%). The sterile women’s attitude to infertility was negative (28.6 percent).Women’s strategies in this study were weak (26.3 percent).Women’s age and duration of infertility were significantly correlated (PV=0.01).

Recommendation: Promote education programs to raise knowledge rates and improve infertility behaviors, and promote improving infertility coping strategies.

Keywords: Knowledge, attitude, Sterile Women, Infertility.

Introduction

Infertility is a global phenomenon affecting between 60 million people worldwide and 168 million people. This affects between 13 and 15 percent of the world’s couples5. Infertility is the inability to conceive after a year of unhealthy sexual relationships2. The cause is known in 90 percent of cases and successful treatment in 50 percent of cases may result in pregnancy. Infertility is a reproductive disease that affects both men and women at nearly equal rates1. The World Health Organization (WHO) describes infertility as: a major health problem that has resulted in 15% of couples worldwide suffering emotional, social and financial implications. While infertility as a source of stress that threaten infertile mental health, the severity of its effects depends on personal coping behavior’s. (WHO, 2013) WHO has labeled infertility as a global public health issue which deserves no attention, Reports suggest that infertility in the developed world in 1990 and 2010 is equivalent to 1.9% of women seeking children aged 20-44 years who reported primary infertility and 10.5% secondary infertility, but in developing countries, including the Middle East, the prevalence of infertility was maximum4. In many parts of the world awareness about infertility is insufficient. A global survey of approximately 17,500 women (mostly of childbearing age) from ten countries showed poor knowledge of fertility and reproductive biology. Most women have little knowledge about the time of the month they are most fertile and when to seek treatment. Apart from the low level of knowledge, there are a variety of myths around the world concerning infertility.5

Coping is the cognitive and behavioral effort to control and handle stressful life experiences and most of the time will mitigate the negative impacts of stressful situations. The stress level is correlated with coping strategies for infertility. Psychological treatment of infertile people, depression, and anxiety and rehabilitation services to deal with the infertility crisis may improve the quality of life. But we need to
identify predictor factors to manage the agitations and stresses caused by infertility and plan to promote coping strategies in infertile couples. Couples’ beliefs and attitude towards infertility, which are based on social and cultural factors and their inner desires, that affect the ability of the couple to deal with the crisis of infertility.

But these valuations and their impact on the adaptability of individuals to the issue of infertility would grow in the cultural, social and religious spheres.

Infertility is a stressor that often taxes a couple of personal and social capital so that coping strategies are a natural outcome of the experience. When men and women are in an unfamiliar situation, they consider other ways of coping with infertility. 6

Infertility epidemiology in the Gezira District, Central Sudan, consisting of 200 infertile pairs identified with infertility to the primary health care units. The results were that 79.5 percent had primary infertility and 20.5 percent had secondary infertility. Infertility due to husbands was only 20 percent, which was 37.5 percent due to wives alone and 31 percent due to both couples, while those with unknown etiology were 11 percent. Sexually transmitted diseases (STDs) were not imposed as an etiological factor for infertility 7

Methodology

Design of the Study: A descriptive cross-sectional study of (100) sterile women selected randomly who visited in Thi-Qar fertility center for the period from 3rd October 2019 to 15th January 2020.

Settings of the Study: The present study is conducted in Thi-Qar Governorate; Thi-Qar fertility center

Sample of the study: which include:

1. Inclusion Criteria are: A purposive” Non-probability” sample of (100) sterile women had referred to the infertility center seeking treatment for infertility

Instrument that Used for Data Collection: Data was collected from sterile women by a questionnaire which had been collected by direct interview; A questionnaire was designed for the purpose of the study which included the following:

Socio-demographic data:

1. Knowledge about infertility
2. Coping regarding infertility
3. Attitude toward infertility.

In this study we conceded the score of knowledge:

1. Less than 50% was poor or limited
2. 50% to less than 74% was fair
3. 75% and more was good.

Attitude score: Less than 50% conceded as negative attitude and more than 50% was positive attitude.

For coping score: Less than 50% conceded as weak coping and more than 50% was strong coping

Results

As for the level of education, the highest percentage (47 percent) of the study sample was secondary, and the lowest percentage (22 percent) of the study sample was primary.

In terms of employment, the highest percentage (65 percent) of the study sample is housewives, whereas the lowest percentage (35 percent) is employee The highest percentage (26 percent) of the study sample is resident in urban areas, whereas (74 percent) is resident in rural areas.

With regard to the socio-economic status, the highest percentage (74%) of the study sample is of sufficient socio-economic status and (26%) is of the view that they are not sufficient.

Table 1: Distribution of the sterile women according...
Table (1) shows the most common menarche (10-13) year by 46% and irregular by 68% and primary infertility was 96%.

Table (2): Distribution of the sterile women according to source of information about infertility (n=100).
Table (2) appear that we find that source of information most common Health personal was 47%.

**Table (3): Distribution of the sterile women according to their knowledge regarding definition, types and risk factors of infertility (n=100)**

<table>
<thead>
<tr>
<th>Knowledge about infertility</th>
<th>% of correct answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Definition of infertility is inability of couple to become pregnant after one year of sexual life</td>
<td>40%</td>
</tr>
<tr>
<td>2. Definition of primary infertility couple who don’t have any children</td>
<td>3%</td>
</tr>
<tr>
<td>3. Definition of secondary infertility is a inability of the couple to have second child</td>
<td>25%</td>
</tr>
<tr>
<td>4. What is unexplained infertility is a cause for infertility is not found even after all tests</td>
<td>2%</td>
</tr>
<tr>
<td>5. Risk factors of infertility such as age, weight gain, smoking, alcohol, sexual transmitted infection (gonorrhea and Chlamydia) and diabetes.</td>
<td>30%</td>
</tr>
<tr>
<td><strong>Total of mean</strong></td>
<td><strong>20%</strong></td>
</tr>
</tbody>
</table>

The table appears (3) the total mean of knowledge was 20%.

**Table (4): Distribution of the sterile women according to their knowledge regarding common misconceptions factors that affect fertility (n=100)**

<table>
<thead>
<tr>
<th>Items</th>
<th>% of correct answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Abnormal menses (Ovulatory factors)</td>
<td>50.3%</td>
</tr>
<tr>
<td>2. Blocked tubes factor affect infertility</td>
<td>88%</td>
</tr>
<tr>
<td>3. History of infections of the genitourinary tract in women</td>
<td>82.1%</td>
</tr>
<tr>
<td>4. History of infections of the genitourinary tract in men</td>
<td>75.8%</td>
</tr>
<tr>
<td>5. Smoking</td>
<td>72.1%</td>
</tr>
<tr>
<td>6. Previous use of intrauterine devices</td>
<td>66.8%</td>
</tr>
<tr>
<td>7. Previous use of contraceptive pills by female.</td>
<td>75.1%</td>
</tr>
<tr>
<td>8. Psychological problems</td>
<td>63%</td>
</tr>
<tr>
<td>9. Endocrine problems</td>
<td>53.8%</td>
</tr>
<tr>
<td>10. Diabetes mellitus</td>
<td>67.2%</td>
</tr>
<tr>
<td>11. Extremely Regular exercise</td>
<td>64.7%</td>
</tr>
<tr>
<td>12. Being obese</td>
<td>65.2%</td>
</tr>
<tr>
<td><strong>Total of mean</strong></td>
<td><strong>68.675%</strong></td>
</tr>
</tbody>
</table>

The total mean of common misconceptions factors was 67.2%

**Table (5): Overall knowledge regarding infertility (n=100).**

<table>
<thead>
<tr>
<th>Items</th>
<th>% of total mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Knowledge regarding definition, types and risk factors of infertility.</td>
<td>20</td>
</tr>
<tr>
<td>2. Knowledge regarding common misconceptions factors that affect fertility</td>
<td>68.675</td>
</tr>
<tr>
<td><strong>Total of mean coping</strong></td>
<td><strong>44.34%</strong></td>
</tr>
</tbody>
</table>

Table (5) appear the total mean of overall knowledge was 44.34%

**Table (6): Distribution of the sterile women according to attitude toward infertility (n=100).**

<table>
<thead>
<tr>
<th>Attitude to infertility</th>
<th>Strong agree</th>
<th>Agree</th>
<th>Nutrient</th>
<th>Disagree</th>
<th>Strong disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think that infertility is a handicap</td>
<td>12</td>
<td>46</td>
<td>11</td>
<td>47</td>
<td>6</td>
</tr>
<tr>
<td>I think that if a couple conceives once, they might have no problem conceive again</td>
<td>23</td>
<td>55</td>
<td>7</td>
<td>25</td>
<td>7</td>
</tr>
</tbody>
</table>
Table (6) appear the total mean of attitude correct answer was 28.6%

Discussion

This research showed that the majority of sterile women are between (25-30) years of age, who are more likely to be pregnant and seek medical help along the study in Kuwait that showed the age of dominant women (20-29) (Human Fertilization and Embryology Authority, 2013).

Many sterile women have an abnormal period (68%) that is vulnerable to infertility because of erratic hormones. In this sample, primary infertility in sterile women was (96%), which was almost the same with the study in Gezira, central Sudan, which found (79.5%) primary infertility couples.7

Menarche among study population occurs at less than 15 years of age between (10-13) years, this result is similar to the study they reported, most study samples have menarche (about 15 years of age).8

In this report, the causes of infertility caused more by sterile women and both couples followed by women (42 percent) (25 percent) respectively, which is conflict with the Gezira study, which found infertility caused more by wives followed by couples (37.5 percent and 31 percent). (American Urological Association, 2012).

A global study of 17,500 women (mostly of childbearing age) from 10 countries found that knowledge of fertility and reproductive biology was low (44.34 percent), respectively, (WHO, 2013) and Saudi Arabia Research aimed at evaluating awareness, behaviors and infertility practices. Reveals the awareness is usually poor (59 per cent) 1

In this sample, the sterile women’s attitude to infertility was negative among sterile women (28.6 percent) respectively, disagreeing with other studies that found positive attitude (76 percent) to infertility among Saudi Arabia couples.1

In this report, coping strategies in sterile women were poor (26.3 per cent) with no significant differences, which are inconsistent with the study that found men and women with significant differences in coping strategies (Caren & Tracey, 2016).

Conclusion

Awareness of infertility sterile

womnnwas limited; infertility attitude was Negative and infertility coping

Strategies were poor

Commendation: Media can play a role in
enhancing awareness about infertility. Encourage education programs to increase knowledge levels and change attitudes with respect to infertility. Encourage sterile women’s health promotion guides and education programmes. Encouraging information online offers ways to disseminate pair infertility information of good quality. Encourage improved infertility coping strategies.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Nursing and all experiments were carried out in accordance with approved guidelines.

References
Cross Sectional Study of the Correlation between ESR, RBCS and WBCs with Disease Duration in Iraqi Patients with Systemic Lupus Erythematosus Disease (SLE)

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Abstract

Systemic lupus Erythrematosus disease (SLE), is an autoimmune multisystemic disease, and is associated with the considerable morbidity. The hematological abnormalities might be the initial indicator. Disease duration may have an impact on the hematological parameters.

Method: This research has been conducted in the Renal Transplant Center, Medical City, Baghdad/Iraq. Total of 50 female patients, aged 31.15±9.11 years and 40 females aged 35.10±10.92 as controls. Total counts of RBCs, WBCs, and ESR has been valued by automated hematology analyzer.

Results: Results of ESR has been shown a significant increase (p<0.001) in patients with SLE as compared with the control group. And a significant decrease in RBCs, WBCs counts (p<0.001) in SLE patients when compared with those of control. Correlation analysis for RBCs and WBCs has been shown a significant negative correlation with the duration of disease in patients with SLE, and positive correlation has been found between ESR and the duration of disease.

Conclusion: RBCs and WBCs has been changed in SLE patients, and they were related to the duration of disease.

Keywords: ESR, RBCS, WBCs, Systemic lupus Erythematosus disease.

Introduction

Systemic lupus erythrematosus (SLE), is an autoimmune disease where cells and organs undergoing damages and initially mediated by a tissue-binding autoantibodies. These antibodies were form an immune complexes that might contributed to the formation of all the clinical and laboratory signs(1).

All tissues and cells in the body were could be involved in SLE. Involved systems were muscular, hematological, cutaneous, skeletal, renal, vascular, nervous, gastrointestinal, pulmonary and ocular. The hematological manifestations were more frequent once because blood and the blood vessels together were contain a various numbers of antigens than any other organs in the body(2). These principal hematological abnormalities were include leukopenia and anemia. The causes of these abnormalities in SLE patients may be due to the presence of chronic inflammation(6), autoantibodies(3), immunosuppressive drugs and the marrow suppression(4).

The majority of patients were present with hematological abnormalities as an initial manifestation. The duration of disease may have an impact on their hematological parameters. White blood cells and
red blood corpuscles counts parameters are an ideal biomarkers which were easily measured and they were sensitive to changes during disease activity.

The previous studies were reported an association among leucopenia and anemia, with the duration of disease\(^{(4-8)}\) but facts was not adequate in Iraq to establish that association. Therefore, the current study has been designed to discern the relationship between WBCs, RBCs and ESR with the duration of disease in patients with SLE\(^{(5)}\).

**Method**

This research has been conducted in the Renal Transplant Center, Medical City, Baghdad/Iraq. Total of 50 female patients who fulfilled the American College of Rheumatology (ACR) criteria\(^{(9)}\), aged 31.15±9.11 years and were selected from the same center, and 40 age matched females (35.10±10.92) as controls. Total counts of RBCs, WBCs, and ESR has been valued by automated hematology analyzer. the duration of disease>5 years were considered in this study.

Patients having history of renal diseases, liver diseases (other than SLE), ankylosing spondylitis, rheumatoid arthritis, psoriasis and malignant disease inflammatory bowel disease, history of taking anticoagulant, biological or chemotherapy and recent history of blood transfusions were excluded from this study. 3.6 ml of blood was collected from all subjects. Total count of RBCs, WBCs and ESR were estimated by using an Automated Hematology Analyzer, (Sysmex XT-2000). Data were expressed as mean and standard error (mean ± SE). Unpaired Student’s ‘t’ test, and Pearson’s correlation coefficient, (r) test were performed as an applicable. \(p\) value <0.05, was accepted as level of significance. The statistical analyses has been performed by using the computer based statistical program SPSS.

**Results**

Age, BMI and blood pressure (Systolic and Diastolic BP) of all subjects in study and control groups. They were almost similar and statistically has no significant differences among them (Table 1).

**Table 1: General characteristics of the Controls and SLE patients (N=90)**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Control (n=50)</th>
<th>SLE Patients (n=40)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>31.15±9.11</td>
<td>35.10±10.92</td>
</tr>
<tr>
<td>BMI (kg/m2)</td>
<td>20.34±1.27</td>
<td>21.91±1.45</td>
</tr>
<tr>
<td>Systolic BP (mmHg)</td>
<td>122.30±12.50</td>
<td>123.60±13.25</td>
</tr>
<tr>
<td>Diastolic BP (mmHg)</td>
<td>79.67±8.90</td>
<td>81.67±9.13</td>
</tr>
<tr>
<td>Duration of disease(months)</td>
<td>-</td>
<td>28.97±16.85</td>
</tr>
</tbody>
</table>

Data were displayed as mean ± SE. Statistical analysis was done by Unpaired Student’s ‘t’ test. SLE= Systemic lupus erythematosus, BMI= Body mass index, BP= blood pressure

In the present study, the mean RBCs, WBCs counts were significantly (\(p<0.001\)) lower, and the mean ESR was significantly (\(p<0.001\)) higher in SLE patients than that of controls (Table 2.)

**Table 2: RBCs, WBCs counts and ESR of the Controls and SLE patients (N=90)**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Control (n=30)</th>
<th>SLE Patients (n=30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ESR (mm/h)</td>
<td>9.47±3.31</td>
<td>47.60±14.14</td>
</tr>
<tr>
<td>RBC count (x 106/μl)</td>
<td>4.22±0.51</td>
<td>3.40±0.94***</td>
</tr>
<tr>
<td>WBC count (x103/ μl)</td>
<td>8.35±1.85</td>
<td>5.90±3.11***</td>
</tr>
</tbody>
</table>

Data were displayed as mean ± SE. Statistical analysis was done by Unpaired Student’s ‘t’ test. SLE= Systemic lupus erythematosus, RBCs, red blood corpuscles, WBCs, white blood cells, ESR, erythrocyte sedimentation rate.

Correlation analysis has been shown a positive correlation among, RBCs, WBCs and ESR with the duration of disease among patients with SLE, and these were statistically significant except that of ESR (Figures 1, 2, 3).
Figure 1: Correlation between ESR and the disease duration in SLE patients presenting the positive correlation. ESR, Erythrocyte sedimentation rate.

Figure 2: Correlation between RBCs count (x 106/μl) with the disease duration in SLE patients presenting the negative correlation. RBCs, Red blood cells.
Figure 3: Correlation between WBCs count (×103/μl) with the disease duration in SLE patients presenting the negative correlation. WBCs, White blood cells.

Discussion

In the present study, the ESR level was significantly higher, and RBCs, WBCs counts were significantly lower in patients with SLE patients if compared with controls. These findings were matched with the observations of some groups of authors(6-7).

Quite the reverse, Kanfir et al. and Hassan has been found no significant changes in WBCs counts in SLE patients(8). This disagreement might have occurred due to the demographic variations and the different methodology that were used in those studies. Correlation analysis of RBCs and WBCs with the disease duration in patients with SLE has been shown a significant negative correlation. Some researchers were found the same significant negative correlation between the RBCs count with the duration of disease, but there was no association found with the other hematological factors(9-15). Though the explanation of these changes in RBCs and WBCs counts and ESR levels of SLE patients was not known, but the literature reviews suggests that the increased ESR level maybe due to the chronic inflammatory response with the polyclonal increase in immunoglobulins(10). Some studies were reported that the genetic and the environmental factors results in an abnormal activation of the immune cells, T and B lymphocytes, and the ineffective regulatory CD4+ and CD8+ T cells(11). Therefore, the sustained auto antibodies were formed in SLE(13). These excess productions of the auto antibodies were cause an activation of the natural killers (NK) cells. These cells were binded with the antibody coated target cells and origins alysis of the target cells. Hematopoietic system is a very much vulnerable target to these effects. Thus the autoantibodies might causes a destruction of the circulating bloods cells and resulting incytopenia(7-19-20).

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Science for Women and all experiments were carried out in accordance with approved guidelines.

References


Evaluation of the Cleaning Efficiency of 2 Shape, Hyflex EDM and Pro Taper GOLD Systems Using Digital Image Morphometric Analysis (An in Vitro Study)

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Abstract

Aim of the Study: To measure and compare the cleaning efficiency of 2 Shape, Hyflex EDM and Protaper GOLD rotary systems in removing debris and compare the percentage of remaining debris at three different levels of root canal by using digital image morphometric analysis.

Material and Method: Total 60 freshly extracted human maxillary first molar with single straight palatal roots were selected were disinfected in a solution of 1% Thymol for 1 day then the palatal roots were sectioned at a length of 12 mm from the apex and randomly divided into three groups of twenty teeth: Group A: Was prepared by 2 Shape file system (Full rotary technique). Group B: Was prepared by Hyflex EDM file system (Full rotary technique). Group C: Was prepared by Protaper GOLD system (Full rotary technique). All systems were used according to the manufacture instructions and roots prepared to an apical preparation corresponding to size 40 K-file. Sodium hypochlorite (3%) was used as an irrigant for all groups.

Conclusions: 2 Shape system was significantly less effective than Hyflex EDM and Protaper GOLD systems in eliminating debris from root canals at all levels. There were no differences in the cleaning efficiency between Hyflex EDM and Protaper GOLD systems at all levels of root canals.

Keywords: 2Shape, Hyflex EDM, ProTaper GOLD, cleaning efficiency, Digital image morphometric analysis.

Introduction

The Successful endodontic treatment that depends on sufficient biomechanical preparation of the root canal space. The goals are consists of cleaning of root canal and removing most of debris and shaping of canal. The cutting efficiency is one of the basic properties of nickel–titanium (NiTi) endodontic instruments. Instrument design may be a factor that affects the efficacy of remnant debris removal and for smear layer production. The revolution in the manufacturing of root canal instruments leads to a great variety of these endodontic instruments. The cleaning capabilities of different NiTi rotary systems varies because of the different cross-sections and blade designs of each system. That’s include variable tapering along of the cutting blades, modifying the instrument’s design of cross-section, and the manufacturing process or by the use of new alloys that produce better mechanical properties. Recently introduced 2Shape file system that consist of TS1 (25/.04) and TS2 (25/.06) files at 300 rpm and 1.2 Ncm The 2Shape system (Micro-Mega) in continuous rotation and two finishing files, F35 size (35, .06) and F40 size(40, .04). The 2Shape system has undergone a thermomechanical proprietary process not disclosed by the manufacturer. The files have a special cross-section with a modified triple helix blade. One of the three blades is off-centred and is 0.06 mm shorter than the two others. Hyflex EDM is made by a thermo-mechanically treated alloy (CM-Wire), and it has three different horizontal cross-sections: quadratic in the apical third, trapezoidal in the middle and triangular in the coronal. The file has a 10.10 mm tip diameter and 5% constant taper. The ProTaper Gold system was manufactured by (M-wire) treated to gold wire with a triangular cross-section.
section with variable progressive taper. This design of file with progressively tapered that improve cutting efficiency and safety and more durability for ProTaper Gold system.\textsuperscript{11,12}

**Material and Method**

Sixty freshly extracted human maxillary first molar teeth. Immediately after extraction, bone, calculus and soft tissue on the tooth surface were removed manually with cumine scaler. Teeth was disinfected in 3\% of (NaOCl) for 30 minutes then wash and maintained with distilled water at room temperature with 0.1\% thymol crystal until use and in saline solution during the experiment.

The palatal root length was standardized for all samples (12 mm). The length was determined from anatomical apex to bifurcation area by using digital caliper and marked on the root using permanent marker.

The crown of the tooth was grasped with metal vice and a double-faced diamond disc mounted on a straight handpiece and water as coolant. The sectioning of the palatal root was perpendicular to the long axis of the root to facilitate straight line access during root canal procedure, and to establish a flat coronal surface that served as a stable reference position to facilitate length measurement of the canal, instrumentation, and penetration of irrigation needle.

The Pulp tissue was extirpated by using barbed broach followed by irrigation with 5ml distilled water. The k-file #15 was inserted in the canal until it appear from apical foramen to check the patency of the canals\textsuperscript{13}. The correct WL was established by subtracting 1mm from root length.

Only roots with initial file size 20 K-file were included in the study. Each sample was embedded in silicone rubber base impression material (putty consistency) that placed inside a mold To facilitate handling of the sample during instrumentation procedure.

The specimens Will be randomly divided into three groups (n=20) according to the type of instrumentation systems used. The canal was irrigated with 2 ml of 3\% freshly prepared NaOCl, and the final irrigation was done with 3mL of normal saline after root canal instrumentation.

In this study The gradation of root canal preparation used were performed according to the manufacturer’s instructions of the file system by electrical motor endomate used for each group. First, the silicon stopper was set on the instrument at full of W.L for all types of files and all root canals were instrumented to master apical file to size 40. For standardization all samples were fixed by a small bench vice during instrumentation.

**2Shape:**

Teeth (n = 20) were prepared with 2Shape system. All canals were prepared by:

1. TS1 (25/.04), at speed 350 rpm and 1.2 Ncm torque until a resistance can be felt.
2. TS2 (25/.06), at speed 350 rpm and 1.2 Ncm torque until a resistance can be felt
3. F40 (40/.04), at speed 350 rpm and 1.2 Ncm torque until a resistance can be felt

Each file use movement in three waves (3 up-and-down movements) with upward circumferential filing movement.

Each new instrument was used to prepare only two canals (Staffoli., et al, 2018). Remove the file from the root canal, clean the flutes and irrigate the root canal until reach to file size (40/0.04).

**Hyflex EDM:** Teeth (n = 20) were prepared with Hyflex EDM was used until reach to finishing file size (40/0.04). Each file was discarded after being used in two canals\textsuperscript{14}.

**ProTaper GOLD:** Teeth (n = 20) were prepared with ProTaper GOLD files.. The instrumentation was started with shaping files (S1 & S2) were use with a brushing action on the withdrawal stroke: S1 (18/.02) was used to 3/4 of W.L then, to full WL (speed: 300 Rpm and torque: 3.0 Ncm). S2 (20/.04) (shaping file # 2) was used to 3/4 of W.L then, to full WL (speed: 300 Rpm and torque: 1.0 Ncm).

while the finishing files were used with non-brushing motions (pecking motions) until reaching the full WL: F1 (20/.07), (speed: 300 Rpm and torque 1.5 Ncm). F2 (25/.08), (speed: 300 Rpm and torque 2.0 Ncm). F3 (30/.09), (speed: 300 Rpm and torque 2.0). F4 (40/.06) (speed: 300 Rpm and torque 2.0 Ncm).the canal was completed in crown down manner by gentle in and out motion. The canal was instrumented to MAF # F4/.06. One set of instruments was used for the preparation of two canals\textsuperscript{15}. 
Finally after final irrigation the canal was dried with absorbent paper points and the access opening was sealed with moist cotton pellet and temporary filling to block the entry of debris during sectioning and prevent contamination of the root canal space\textsuperscript{16,17}.

After removed the teeth from the impression material and before sectioning, a permanent blue marker was used to draw guiding line longitudinally on the tooth surface parallel to the long axis of the roots. A metal saw was used to make longitudinal groove along root, a short blast of air was used to remove any remaining dust then the root was splinted by placing a surgical chisel on the grooves and with small mallet applied with slight pressure. The longitudinal section root with most visible part <180 degree was selected for the study (because >180 degree possibly interfere with visualization during photography\textsuperscript{18-21}. (Fig. 1).

![Figure 1: Split root](image)

All images of split roots were taken by using a Nikon D5300 professional digital camera with macro lens(105) at 1:1 setting with electronic macro flash. The images was saved at computer with maximum resolution of 6000×4000 pixels. The camera position selected according to the optimum focusing without blurred vision. Sectioned root was placed over a gridding paper under lens for measurement.\textsuperscript{16}

All Images were saved and opened into Adobe Photoshop CC 2018 and magnified 100 times with the digital zoom tool. The root canal area was divided into three equal thirds (Apical, Middle and Coronal) by superimposed lines above canals after discarded 2mm coronally avoidance any remnant of temporary filling at 1, 4, 7 and 10 mm from the measured working length (1 mm shorter from the apical foramen).

by using special software tool (magnetic lasso tool) that allow traced The remaining debris in canal and the total number of pixels occupied by the debris was reported by using the histogram function in the software program.

Percentage of remaining debris will be calculated for the 1-4 mm (apical), 4-7 mm (middle) and 7-10 mm (coronal) areas for each canal

\[
\text{Percentage of Dentine Debris at each third} = \frac{\text{The Pixels of Dentine Debris at each third}}{\text{Total Pixels of entire canal area of third}} \times 100
\]
Figure 2: Digital image analysis magnified at (X 33.33) of one root section that instrumented by 2SHAPE system with using Adobe Photoshop CC 2018. pink arrows referred to some of dentin debris.

Figure 3: Digital image analysis magnified at (X 33.33) of one root section that instrumented by Hyfex EDM system with using Adobe Photoshop CC 2018. blue arrows referred to some of dentin debris.
Results

Data were tested for normality using the Shapiro-Wilk test. Kruskal-Wallis test showed a significant difference (P ≤ 0.05) between groups for the remnant of dentin debris at all levels (Apical, Middle, and Coronal).

The median values of the remnant of dentin debris for different groups and different levels. At the apical level, group A showed the highest remnant (2.79%) followed by a group B (0.40%) while the lowest remnant was found at group C (0.35%).

At the middle level, the highest remnant was found at the group A (1.32%) followed by group C (0.42%), and the lowest remnant was found at group B (0.39%). At the coronal level, the highest remnant was found in group A (0.95%) followed by group B (0.5553%), and the lowest remnant was found at group C (0.35%). (Figure 5).

For all groups and thirds, the highest remnant was found at the apical level of group A and the lowest remnant was found at middle of group B and coronal thirds of group C. (Figure 6)

Figure 4: Digital image analysis magnified at (X 33.33) of one root section that instrumented Protaper GOLD system with using Adobe Photoshop CC 2018. Yellow arrows referred to some of dentin

Figure 5: Median of percentages of remnant of dentin debris at different levels and groups.
Mannwhitney with bonferroni correction test showed a significant difference at apical and middle levels between group A and group C and also found significant difference at apical and middle levels between group A and group B.

Discussion

The most important objective of root canal therapy is to decrease the number of microorganisms and pathologic debris in root canal systems to prevent or treated apical periodontitis. Grossman (1976) described mechanical cleaning as the most important part of root canal therapy.

The result shows significant difference between (2Shape at all levels with no significant difference between Hyflex EDM and ProTaper Gold). The cause of a significant difference between groups and levels may be related to two reasons: the first one the instruments design and second one metallurgical properties (alloy processing). Endodontic instruments vary in their debris removal efficacy and their smear layer production.

In this study the 2Shape file produced the highest amount of debries among the tested file system. Also the 2 Shape file has a significant difference between levels (apical - middle) and (apical-coronal) most of remnant diagnosed apically.

Manufacture done by applied the thermal treatment which as the (T.wire) 2Shape files are exposed to multiple thermal cycles to transition the crystalline phase of nickel-titanium. The Hyflex EDM file system shows second least amount of debris. Hyflex EDM is the first endodontic instrument that is manufactured an electrical discharge machining (EDM) process creates a ‘rough spark-machined’ That creates a hard and rough surface of the file, resulting in superior fracture resistance and improved cutting efficiency.

Conclusions

Within the limitation of this in vitro study, None of the experimental instrumentation systems used were able to achieve completely clean canal from debris; 2 Shape system was significantly less effective than Hyflex EDM and Protaper GOLD systems in eliminating debris from root canals at all levels and There were no differences in the cleaning efficiency between Hyflex EDM and Protaper GOLD systems at all levels of root canals.
Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Dentistry, and all experiments were carried out in accordance with approved guidelines.

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Zingiber Officinale Effect on Immune Event Against Newcastle Disease Virus with Productive Performance of Broilers

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Abstract

Study the effects of different concentration of Zingiber officinale or called ginger (GG) on productive performance, blood biochemistry as White blood cells (WBC), Red blood cells (RBC), Packed cell volume (PCV), haemoglobin (Hb) and immune status against Newcastle disease (ND) virus of broilers. These experiment used (180) broilers chicks of one day age type Hubbard. All chickens vaccinated against ND on day 7 the chicks, which divided randomly into (4) groups and each group of (45) chicks. The study showed the effects of different concentration of (GG) given in 2g/kg, 4g/kg and 6g/kg with feed Groups of T0, T1, T2, T3, T0 as control and T1, T2, T3, as treatment. Parameters of body weight, weight gain, feed consumption and feed conversion. Statistical significant (P < 0.05) increased value of body weight, weight gain, feed consumption and feed conversion was observed in T3, then T2. A non-significant value was observed in T1 (2g/kg of GG) as compared to T0 (control). Significant (P < 0.05) increases in the WBC, RBC, PCV and Hb. The ginger additives groups showed significant (P < 0.05) increases in hemagglutination inhibition (HI) titer against ND virus. In conclusion, 4 - 6 g/kg of GG additives to broiler chicks feed, enhanced growth performance, enhance WBC, RBC, PCV, Hb and showed significant (P < 0.05) increases in hemagglutination inhibition (HI) titers against ND virus, while group T1 had less significant effects compared to the other groups.

Keywords: Zingiber officinale, Newcastle virus, Feed Additives, broilers.

Introduction

The growth and laying performances of birds are frequently improved by using growth promoters or feed additives that have a positive impact on the growth and immune responses. Among these substances antibiotics are no longer used as feed additives, because they are associated with residues in eggs and meat products, and their use has been restricted in many countries1. The beneficial effects of natural products are greater than those observed with antibiotics2, including a lower cost of production and reduced toxicity hazards3. Pseudofowl pest or Newcastle disease (ND), a devastating disease of poultry seen in chickens and turkeys, caused by Newcastle disease virus (NDV). The signs of disease are high mortality, hemorrhagic intestinal lesions, severe respiratory distress, decrease of egg production, and nervous disorders4. The NCV injected in embryonated eggs could grow in cells lining the allantoic cavity.

The virus grows in these cells, destructs them and is then released in the allantoic fluid reaching high titers in approximately 24 hours. If virulent NDV strains are inoculated, most of the embryos die two days after inoculation. Injected NCV causes remarkable histopathological changes in dead or alive embryos4. Vaccination programs can provide protection against NDV outbreaks, but they are not sufficient because infections by NC virus have remained frequent around the world in the recent years5. There is no known specific treatment for NDV, like other viral diseases. Several antiviral drugs are known to treat mammalian viruses, however their use in avian disease are limited because these agents may be toxic for the host cells. Although there is little documentation, there has been experimental evidence regarding the ability of several plants to treat numerous diseases6. Zingiber officinale Roscoe, belonging to the Zingiberaceae family,
popularly known as ginger, is a monocotyledonous herbaceous plant and one of the most common food-flavoring spices used worldwide. In recent years, several pharmacological properties of ginger, such as an inflammatory, analgesic, gastrointestinal regulating agent, antioxidant and antimicrobial properties have been identified. Live microbial feed preparations such as probiotics, prebiotics, or symbiotic play an important role in increasing the resistance to disease by improved immune response, thereby reducing the use of antibiotics. Some probiotic microorganisms have been reported to produce different types of bacteriocins, organic acids and reuterin which act by preventing pathogen growth. Furthermore, probiotics supplements can affect the intestinal environment by increasing desirable microbial growth. In parallel, there are few studies evaluating the performance and health-related traits of broilers receiving either ginger (Z. officinale) or particular mixtures of probiotics cultures to verify the possible beneficial effects of natural feed additives as substitutes of probiotics.

Materials and Method

Plant material and preparation: GG (Zingiber officinale) rhizomes were purchased from a local market in, Babylon, Iraq to be used in dietary treatment.

Experimental Animals: This study was conducted at the period for (42) days started from February-June 2019 in physiology department of veterinary medicine of AL-Qassim green university. One hundred eighty broilers chicks one day old age type Hubbard chicks, were divided randomly into (4) groups, (45 chicks per group) treatment had three replicates (15 birds) and received various treatments during the experimental period (6) weeks. Chicks were given starter diet (7-21) days and a finisher diet (22-42) days, GG was purchased from a local market, sundried, ground to a fine powder, and stored in an airtight polyethylene bag until required for use, as shown in Table (1). The additives were mixed with basic feedings to form the following parameters:

- **T0**: Control group chicks fed the standard diet.
- **T1**: Chicks fed standard diet plus 2g/kg GG.
- **T2**: Chicks fed standard diet plus 4g/kg GG.
- **T3**: Chicks fed standard diet plus 6g/kg GG.

A room was used inside the field controlling its thermal conditions at (32-35)°C. It was washed with soap and water, then fumigation with formalin and potassium permanganate. It was sprayed with wood sawdust and supplied with a number of feeders and fountains. The chicks and feed were weighed by one-sided balance. Body weight, weight gain, feed intake and feed conversion ratio were included within the experiment period. Hemagglutination inhibition (HI) six blood samples were collected from each group at 21, 28, 35 and 42 days old. The blood samples were centrifuged to separate the serum and estimate the antibody titer against the NC using a hemagglutination inhibition test, according to.

Haemotological Assay: On the 43th day of study, blood samples were randomly collected from groups of treatment. The blood samples were collected via the wing veins using sterile needles and syringes. The blood samples for hematological parameters were collected into well-labeled and sterilized bottles containing ethylene diamine tetra acetic acid (EDTA), as anticoagulant. The samples were investigated for the following hematological parameters as white blood cell (WBC), red blood cell count (RBC), haemoglobin (Hb) and packed cell volume (PCV).

Vaccination of chicks: The birds were vaccinated against infectious bronchitis day 1 and 14 day, ND day 1 and day 7, avian influenza day 1 and infectious bursal disease day 21.

Statistical Analysis: The statistical analysis was carried by using the mean differences between the averages of the studied traits were determined at the probability level of (0.05) using the Duncan test. Statistical data were analyzed using the (SAS, 2010).

<table>
<thead>
<tr>
<th>Ingredients (%)</th>
<th>Starter (7-21) days</th>
<th>Finisher (22-42) days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yellow corn</td>
<td>35</td>
<td>40</td>
</tr>
<tr>
<td>Wheat</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>Soybean meal (44 %)</td>
<td>25</td>
<td>25</td>
</tr>
</tbody>
</table>
Table 2: Effect of different levels of *Zingiber officinale* with feed on broiler on body weight g/time period

<table>
<thead>
<tr>
<th>Ages</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial weight (gm)</td>
<td>42.58 ± 0.22 A</td>
<td>42.40 ± 0.27 A</td>
<td>42.12 ± 0.20 A</td>
<td>42.99 ± 0.41 A</td>
</tr>
<tr>
<td>7 day</td>
<td>136.170 ± 0.66 A</td>
<td>133.200 ± 0.26 B</td>
<td>133.700 ± 0.69 B</td>
<td>135.880 ± 0.45 A</td>
</tr>
<tr>
<td>14 day</td>
<td>288.640 ± 0.80 B</td>
<td>287.500 ± 0.60 B</td>
<td>289.710 ± 1.23 B</td>
<td>293.620 ± 0.60 A</td>
</tr>
<tr>
<td>21 day</td>
<td>539.334 ± 0.58 C</td>
<td>539.894 ± 0.58 C</td>
<td>544.456 ± 0.77 B</td>
<td>548.160 ± 0.50 A</td>
</tr>
<tr>
<td>28 day</td>
<td>841.216 ± 0.71 C</td>
<td>842.660 ± 0.66 C</td>
<td>850.640 ± 0.66 B</td>
<td>855.360 ± 0.91 A</td>
</tr>
<tr>
<td>35 day</td>
<td>1260.570 ± 0.68 D</td>
<td>1263.350 ± 0.25 C</td>
<td>1275.530 ± 0.51 B</td>
<td>1282.530 ± 0.67 A</td>
</tr>
<tr>
<td>42 day</td>
<td>1678.32 ± 0.59 C</td>
<td>1684.58 ± 0.31 C</td>
<td>1697.29 ± 0.35 B</td>
<td>1705.39 ± 0.54 A</td>
</tr>
</tbody>
</table>

The trait which carried out different letters horizontally indicates significant differences at 0.05.

Table 3: Effect of different levels of *Zingiber officinale* with feed on some productive performance parameters on broilers

<table>
<thead>
<tr>
<th>Parameters</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average feed intake (g)</td>
<td>2902.47 ± 0.59 C</td>
<td>2905.16 ± 0.55 B</td>
<td>2908.00 ± 0.52 A</td>
<td>2915.72 ± 0.52 A</td>
</tr>
<tr>
<td>Average weight gain (g)</td>
<td>1636.11 ± 0.45 C</td>
<td>1642.97 ± 0.71 C</td>
<td>1658.28 ± 0.70 B</td>
<td>1665.36 ± 0.58 A</td>
</tr>
<tr>
<td>Feed conversion ratio (FCR)</td>
<td>1.774 ± 0.01 A</td>
<td>1.768 ± 0.01 B</td>
<td>1.753 ± 0.06 A</td>
<td>1.750 ± 0.08 A</td>
</tr>
</tbody>
</table>

The trait which carried out different letters horizontally indicates significant differences at 0.05.

Table 4: Effect of different levels of *Zingiber officinale* with feed on the blood parameters (White blood cells (WBCs), red blood cells (RBCs), haemoglobin (Hb), packed cell volume (PCV)) of the broiler chickens

<table>
<thead>
<tr>
<th>Parameters</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBCs (103)</td>
<td>19.82 ± 0.63 A</td>
<td>20.08 ± 0.59 A</td>
<td>21.14 ± 0.54 B</td>
<td>21.22 ± 1.15 B</td>
</tr>
<tr>
<td>RBCs (106)</td>
<td>1.93 ± 0.02 A</td>
<td>1.94 ± 0.94 A</td>
<td>2.11 ± 0.03 B</td>
<td>1.93 ± 0.8 B</td>
</tr>
<tr>
<td>Hb (g)</td>
<td>6.54 ± 0.33 A</td>
<td>6.75 ± 0.25 B</td>
<td>6.75 ± 0.21 B</td>
<td>6.77 ± 0.95 B</td>
</tr>
<tr>
<td>PCV%</td>
<td>24.66 ± 2.89 A</td>
<td>26.66 ± 2.08 B</td>
<td>28.20 ± 2.23 C</td>
<td>30.19 ± 3.04 D</td>
</tr>
</tbody>
</table>

The trait which carried out different letters horizontally indicates significant differences at 0.05.

WBC: White blood corpuscles, RBC: red blood corpuscles, Hb: haemoglobin, PCV: packed cell volume
Table 5: Effect of different levels of *Zingiber officinale* with feed on mean antibody titer (log2) against the Newcastle Disease virus in all groups

<table>
<thead>
<tr>
<th>Age of birds (Days)</th>
<th>T0</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
</tr>
</thead>
<tbody>
<tr>
<td>21</td>
<td>3.38±0.22 A</td>
<td>4.01±0.50 A</td>
<td>3.94±0.37 A</td>
<td>3.97±0.31 A</td>
</tr>
<tr>
<td>28</td>
<td>3.15±0.17 A</td>
<td>3.55±0.55 A</td>
<td>3.73±0.37 A</td>
<td>3.84±0.34 A</td>
</tr>
<tr>
<td>35</td>
<td>3.26±0.30 A</td>
<td>4.56±0.25 B</td>
<td>4.98±0.00 B</td>
<td>4.74±0.23 B</td>
</tr>
<tr>
<td>42</td>
<td>2.16±0.27 A</td>
<td>4.18±0.52 B</td>
<td>466±0.22 B</td>
<td>4.53±0.45 B</td>
</tr>
</tbody>
</table>

The trait which carried out different letters horizontally indicates significant differences at 0.05

**Result and Discussion**

The parameters of growth performance, were examined in the current study, these parameters are good indicators of the improvement effect of ginger supplementation at different levels on broiler performance. In the present study, final body weight, body gain, feed intake and feed conversion ratio improved after supplementation of ginger at levels of 4 g/kg - 6 g/kg, while diet. The GG had significant effects (P < 0.05) on total body weight, feed intake, weight gain and feed conversion ratio. There were significant differences in all performance traits (Table 3, 4). Chickens on T2 and T3 better than those in T1 and T0 groups. The results showed significant effects (P < 0.05) on the growth performance of broilers, the advanced may be due to stimulatory effect of ginger extract on digestive juices, microflora and nutrient absorption in digestive tract. The present results are in agreement with the findings of who observed that active compounds of ginger (shogaols, gingerdione, gingerol, phenolic and gingerdiol). Similar results were observed by who observed that ginger acts as stimulant for feed digestion and conversion which increase body weight gain. Its active compounds which improves feed digestion and stimulates enzymes thus enhancing feed conversion ratio which lead to an increase body weight. Ginger contains volatile oils like borneol, camphene, citral, eucalyptol, linalool, phenllandrene, zingibaine, zingiberol, gingerol, zingironand, shogaol and resin. Ginger’s have medicinal properties are chemicals responsible for the taste, the most noteworthy being gingerol and shogaol. Ginger speeds digestion, and enhances by a protein digesting enzyme, zingibaine found in ginger. It has antibacterial and anti-inflammatory actions. This observation however, disagree with the reports of who reported that the inclusion of ginger did not improve the weight gain of broilers, also reported that no significant difference among birds fed on 0.5%, 1% and 1.5% ginger powder on feed conversion ratio examined the effect of processed ginger with different size on growth performance and showed that the ginger additive had no significant effect on the feed efficiency. There was significant increase (P < 0.05) in the WBC, RBC, PCV and Hb, of birds on the ginger T2 and T3 than T0. reported that the number of erythrocytes (RBC) in chicken is influenced by the conditions of the animal. The increase in PCV, Hb, and RBC contents of the blood of birds fed the test ingredients is an indication of improved oxygen carrying capacity of the cells which translated to a better availability of nutrients to the birds consequently affecting their well-being. stated that The inclusion of ginger in broiler diets in the current study did not affect the haematological parameters of the chickens except for the total WBC and percentage of neutrophils. There was a significant increase in the total WBC as the ginger level increased in the diet reported that there are significance increase was found among the groups but 2% ginger treated birds show relatively high PCV with least standard deviation and other hematological parameters are almost similar as positive control.

**Conclusion**

Conclusion Based on the current findings, dietary supplementation of different levels of ginger powder at level up to 6 g/kg diet plays a role in enhance broiler growth performance and improving of WBC, RBC, PCV and Hb. Moreover, inclusion of ginger up to level 6 g/kg diet contributed to improvements of the immune response. This improvement on growth and health may be due to the biological activities of this plant to improve growth or that may be due to its role as enhanced digestibility, anti-oxidant, and anti-microbial, activities and properties and the prevention of gastric toxicity.
Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Veterinary Medicine and all experiments were carried out in accordance with approved guidelines.

References
processed to different particle sizes on growth performance, antioxidant status, and serum metabolites of broiler chickens. Poultry Science. 2009; 88: 2159-2166


Violence Towards Nurses Staff at Teaching Hospitals in Mosul City

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Abstract

Background: Defining violence is one of the most common types of abuse at work in health care systems. The U.S. The Emergency Nurses Association found that workplace violence in the health service (3.8) is greater than privacy abuse, and also that the emergency room was especially susceptible.

Objectives: To determine the violence against nurses in (ED) at teaching hospital in Mosul city/Iraq

Method: To accomplish the study a retrospective research approach (2 years) was used. Sample study (218) nurse, (100) female, while male (118). The instrument developed by (Brislin, 1970) The questionnaire consist of (3) parts: part I includes demographic characteristics (6) variable such as (age, sex, qualification, working place, experience years and experience of ED). Part II: includes the main causes of the physical violence (eight items). Part III: include nonphysical violence (eight items).

Results: The study found more than one-third of nurses was subject to physical abuse almost (37.61%), most of them exposure to nonphysical violence (73.3%). That mean the assault direction nurses in ED are widespread.

Conclusion: The researcher concluded that the assault direction nurses who work in ED are widespread epically nonphysical violence, the most of the perpetrators of the assault direction the nurses in the EU are the relatives.

Keywords: Violence, Nurses staff, emergency department.

Introduction

Violence is one of the most popular types of violence at work in healthcare systems. The U.S. The Emergency Nurses Association found that workplace violence in the health service (3.8) is greater than privacy abuse, and also that the emergency room was especially susceptible. The CDC as an organization stated that abuse has long been known as an occupational hazard for many patients as the front door to the hospital, particularly, the assault experience frequently occurs in the emergency room due to urgent patients’ needs. Throughout recent decades, aggression in all its manifestations has risen significantly across the globe. Concerns about workplace abuse against health workers are now common. The problem in health care violence is not new it was possible always part of nursing. The emergency department is open 24 hours a day, and the nurse is at the front of the patient’s service delivery. As a result, the high incidence of attack among nurses was not reduced, which was the main reason for the job loss. Nurses work in emergency departments are at high risk of workplace violence as nurses meet and communicate with patients or families, thus offering more treatment than most other treatment professions. Patients and their families may use violence against nursing staff in response to stress caused by injuries or illness, and a range

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of official studies, newspapers, stories and international initiatives have focused attention on the problem around the world (5). Violence in healthcare, from illness or relatives of the patient in the form of verbal abuse or beatings has increased significantly in recent times (6). In particular, this violence presents a significant challenge to healthcare workers in the delivery of services to patients or related individuals and adversely affects the delivery of healthcare services (7). Workplace violence incidents have become a growing problem for various professions, but nursing is known as one profession where the violent incidents rise e.g. beating nurses and insulted him verbally has become a big trouble that affects nurses everywhere (8). The health sector in Iraq suffered abuse, especially after the invasion of Iraq by the US due to the lack of protective means and the absence of legal legislation to prevent infringement on health care providers. And there is no clear database for determining the prevalence of violence toward nurses in Iraq’s emergency services, especially the city of Mosul. The study aimed to identify the prevalence of violence towards nurses staff at teaching hospitals in Mosul City.

Methodology

A retrospective study design for two years was used to achieve the study. The study carry out from emergency departments in the following teaching hospitals in Mosul city includes Al-Slam Teaching hospital, Al-Zahraoe Teaching hospital, Al-Kanssa teaching hospital and Ibn-Alatheer teaching hospital). The period of this study was extend from 1/1/2017 end to the 1/1/2019 (retrospective) and the data were collected from 1/1/2020 to 29/1/2020. Random sample use involved (218) nurse (100) female, and (118) male who working in emergency departments in deferent Mosul teaching hospital minted before. The instrument developed by (Brislin, 1970) consist of closed ended items to assess the abuse at work against nurses working in ED. Questionnaire consist (3) parts: part one includes demographic characteristics (6) variable such as (age, sex, qualification, working setting, experience years in health sector and experience of ED). Part two: includes the main causes of the physical violence (8 items) multiple choose question. Part Three include nonphysical violence (7 items) multiple choose question. The data of the study were collected by interview technique and all items in questionnaire was quickly explained with all participants. Data were collected for each nurse was transferred into code sheet and data entry was done using computer. Descriptive statistics e.g. number, %, mean of score and SD were calculated for nominal level data such as demographics date and individual items within the questionnaire.

Results

Table 1: Test distribution according to their demographic variables.

<table>
<thead>
<tr>
<th>Hospital</th>
<th>No.</th>
<th>%</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Al-Zahrawee teaching hospital</td>
<td>56</td>
<td>25.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ibn-Atheer teaching hospital</td>
<td>16</td>
<td>7.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Al-Kanssa teaching hospitals</td>
<td>71</td>
<td>32.4</td>
<td>2.75</td>
<td>1.19</td>
</tr>
<tr>
<td>Al-Salam teaching hospitals</td>
<td>75</td>
<td>34.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>218</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age group</th>
<th>No.</th>
<th>%</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>(20-25)</td>
<td>71</td>
<td>32.75</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(26-30)</td>
<td>67</td>
<td>30.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(31-35)</td>
<td>35</td>
<td>16.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(36-40)</td>
<td>26</td>
<td>11.8</td>
<td>2.39</td>
<td>1.41</td>
</tr>
<tr>
<td>(41-45)</td>
<td>6</td>
<td>2.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>46 or more</td>
<td>13</td>
<td>5.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>218</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>No.</th>
<th>%</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital</td>
<td>No.</td>
<td>%</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>------------------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Male</td>
<td>118</td>
<td>54.12</td>
<td>1.46</td>
<td>0.49</td>
</tr>
<tr>
<td>Female</td>
<td>100</td>
<td>45.88</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>220</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Qualification</th>
<th>No.</th>
<th>%</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparatory nursing</td>
<td>80</td>
<td>36.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diploma</td>
<td>82</td>
<td>37.6</td>
<td>1.90</td>
<td>0.78</td>
</tr>
<tr>
<td>Bachelor</td>
<td>56</td>
<td>25.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post graduate</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>218</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Experience years</th>
<th>No.</th>
<th>%</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5 years</td>
<td>77</td>
<td>35.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5-10 years</td>
<td>94</td>
<td>43.1</td>
<td>1.87</td>
<td>0.74</td>
</tr>
<tr>
<td>More than 10 years</td>
<td>47</td>
<td>21.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>218</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Experience in emergency departments</th>
<th>No.</th>
<th>%</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 6 months</td>
<td>70</td>
<td>32.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-12 Months</td>
<td>77</td>
<td>35.3</td>
<td>2.10</td>
<td>0.98</td>
</tr>
<tr>
<td>More than 1-4 years</td>
<td>48</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 years or more</td>
<td>23</td>
<td>10.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>218</td>
<td>100%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Distribution of the sample analysis according to periods of exposure to abuse

<table>
<thead>
<tr>
<th>No. of exposition to the abuse</th>
<th>Physical abuse</th>
<th>Non-physical abuse</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Never</td>
<td>136</td>
<td>62.38</td>
</tr>
<tr>
<td>Once</td>
<td>61</td>
<td>27.87</td>
</tr>
<tr>
<td>2-3 times</td>
<td>16</td>
<td>7.33</td>
</tr>
<tr>
<td>4 or more</td>
<td>5</td>
<td>2.92</td>
</tr>
<tr>
<td>Total</td>
<td>218</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 3: Distribution of the study sample according to source of violence from

<table>
<thead>
<tr>
<th>Source of violence from</th>
<th>Physical violence</th>
<th>Non-physical violence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>From patient</td>
<td>7</td>
<td>8.1</td>
</tr>
<tr>
<td>From relative</td>
<td>70</td>
<td>80.6</td>
</tr>
<tr>
<td>From coworkers</td>
<td>6</td>
<td>6.9</td>
</tr>
<tr>
<td>From others</td>
<td>4</td>
<td>4.4</td>
</tr>
<tr>
<td>Total</td>
<td>87</td>
<td>100%</td>
</tr>
</tbody>
</table>
Table 4: Distribution of the sample of the study based on the need for treatment with violence

<table>
<thead>
<tr>
<th>Receive treatment after the incident</th>
<th>Physical violence</th>
<th>Non-physical violence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Yes, I receive treatment</td>
<td>24</td>
<td>29.3</td>
</tr>
<tr>
<td>No needs for treatment.</td>
<td>47</td>
<td>57.3</td>
</tr>
<tr>
<td>I need treatment, but did not receive</td>
<td>8</td>
<td>9.7</td>
</tr>
<tr>
<td>Self-treatment</td>
<td>3</td>
<td>3.7</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table (5): Distribution the main causes of incident according the nurses opinion.

<table>
<thead>
<tr>
<th>Causes of incident</th>
<th>Physical violence</th>
<th>Non-physical violence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Waiting for Services</td>
<td>23</td>
<td>28</td>
</tr>
<tr>
<td>Failure to fulfill the patient’s needs with her or his companions</td>
<td>11</td>
<td>13.4</td>
</tr>
<tr>
<td>Mental health/psychiatric health</td>
<td>37</td>
<td>45.1</td>
</tr>
<tr>
<td>Form of staff dealing with the patient</td>
<td>6</td>
<td>7.3</td>
</tr>
<tr>
<td>Medication unavailability or patient care needed</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Fear or stress</td>
<td>6</td>
<td>7.3</td>
</tr>
<tr>
<td>Lack of tools to avoid a staff attack</td>
<td>7</td>
<td>8.5</td>
</tr>
<tr>
<td>Impact of disease/pain</td>
<td>8</td>
<td>9.7</td>
</tr>
<tr>
<td>Influence of alcohol/drugs</td>
<td>9</td>
<td>10.9</td>
</tr>
<tr>
<td>Do not know the reason</td>
<td>10</td>
<td>12.2</td>
</tr>
<tr>
<td>Another reason</td>
<td>11(p-death)</td>
<td>13.4</td>
</tr>
<tr>
<td>Total</td>
<td>82</td>
<td>100%</td>
</tr>
</tbody>
</table>

Discussion

Important findings relating to physical and non-physical abuse are discussed in the Mosul TH, with regard to the study questions. Table (1) indicates that there are the most nurses working in Al-Salam teaching hospitals (35%), and the highest of them aged between (20-25 years), (32.3) with Diploma (37.3%). The high number of them with experience as a nurse (5-10 years), (42.7%), and their most of them (6-12) months experience in emergency department. The expertise and experience of nurses play an significant role in the prevention of violence; thus, less experience and inexperience nurses do not have enough knowledge to deal with the aggressor or to meet the disease’s needs quickly, and they are more vulnerable to abuse (10, 11).

Table (2) indicated that more than one-third of nurses was subject to physical abuse almost (37.61%), most of them exposure to nonphysical violence (73.3%). That mean the assaults against nurses in ED are widespread. Research contrasts with research (Darawadet.al., 2015) in Jordan nearly (91.4%) in this study exposure to work place violence among nurses in government hospitals (12). Although exposure to workplace violence was lower among those younger than older respondents, reversal trend seen in other studies (13). Table (3) revealed that the most of the perpetrators of the assault towards the nurses staff in the EU are the relatives, physical violence (80.6%) and Non-physical violence (74.2%). Hence in this study, patient families were the primary source of abuse. Research agreement with the Chinese research by (Jiao, 2015) which reported that nurses were subjected to violence from relative clients approximately (93.5%) and comparable to that in Iran (15). This table (4) indicated that most of those affected by the incidents of violence did not require interference to treat their condition. Physical (57.3%), and nonphysical (72.9%). The present study suggested that the key reason for not
disclosing the incident of violence was that they found it to be unimportant (74.3%), higher than the studies published in Iran\textsuperscript{(15)}. Table (5) indicated that the most causes of the physical violence are mental health and psychiatric health (45.1%) while the main causes of nonphysical violence are waiting to receive services, (27.6%). The popular forms of physical violence are pushing, punching, kicking and slapping, whereas verbal violence was the kind of non-physical abuse has been impact nurses (Fuadad,2016). Another risk factor listed by 28.6 per cent of respondents as significant in precipitating violence towards them was the lack of resources required to avoid harassment or violence against healthcare workers. Reinforced by\textsuperscript{(11)}, which found less of violence reduction approaches and resources to be a contributing factor in cases of harassment.

**Conclusion**

Based on the study finding the researcher concluded that the assault against nurses who work in ED are widespread epically nonphysical violence, the most of the perpetrators of the assault against the nurses in the EU are the relatives. While that most incidents of violence occurred in the treatment room.

**Recommendations:** The researcher suggested that the advanced practice nurse help define evidence-based treatment practices that can be integrated into healthcare systems to minimize the level of assaults in the workplace, improve safety, Provide guidance and preparation for advanced-practice nurses to serve as educators and advocates for staff members and provide them with critical strategies to better prepare them to deal with abuse at work.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Faculty of Nursing and all experiments were carried out in accordance with approved guidelines.

**References**


Effectiveness of an Educational Program on Nurses’ Knowledge and Practices Concerning Nursing Management of patients’ with Vascular Access in Dialysis Centers at Baghdad Teaching Hospitals

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¹M.Sc., Academic Nurse, ²Assistant Professor, Adults Nursing Department, College of Nursing, University of Baghdad, Iraq

Abstract

Objective(s): The aim of a present study is to determination the effect of an Educational Program on Nurses’ Knowledge and Practices Concerning Nursing Management of patients’ with Vascular Access in Dialysis Centers.

Method: A quasi-experimental (two –group pre-post -test) design was conducted at Baghdad teaching hospitals, at 14th October 2018 to 25 December 2019. Non-probability “purposive” sample of (80) staff nurse who have been working at hemodialysis units were selected from Baghdad teaching hospitals which include Al-Yarmook teaching hospital, Baghdad Teaching Hospital, and Al-Kindy Teaching hospital, Al-Karama Teaching Hospitals, Imamein-kadhimein Teaching Hospital, Surgical Specialties Hospitals. Nurses were divided into two groups, study groups consist of (40) nurses exposed to the nursing education program, and control group consist of (40) nurses.

Results: The results of the study indicated that The majority of staff nurses are female, and they graduated from high school nursing within the age group (23-27) years. The study indicates the nurse knowledge and practices Concerning Nursing Management of patients with Vascular Access in Dialysis was poor level. While posttest results showed that the nurse knowledge and practices was improved to high level which as the positive effect of program.

Keywords: Nurses’ knowledge and practices, Vascular Access, Complication of VA and management for patient with vascular access in hemodialysis.

Introduction

The kidney disease at the end of stage of global health concerns. In 2013, it was nearly 3.2 million people receiving treatment worldwide. Bringing the number of people who develop ESRD Pal by an estimated 6% each year ¹. Dialysis is the treatment of chronic maintenance for the life of the savior of patients with kidney disease at the end of the stage. Renal disease final depends on the availability of efficient access hemangioma, and requires the establishment and use of the arrival of the blood vessels arterial successful access coordinator and educated multi-disciplinary team to ensure optimal blood vessels for each patient.² The nurses play an important role in the therapeutic success and outcome of the patients because they minimize the patients risk factors for infections through maintaining strict aseptic technique, changing the (HD) Catheter dressing, inspecting the solution for signs of contamination. Monitoring the patients closely before, during, and after an exchange and recording his vital signs.

Methodology

A quasi-experimental (two–group pre-post-test) design, at 14th October 2018 to 4th July, 2020 to find the effect of an Educational Program on Nurses’ Knowledge and Practices Concerning Nursing
Management of patients’ with Vascular Access in Dialysis Centers at Baghdad Teaching Hospitals. Non-probability “purposive” sample of (80) staff nurse who have been working at hemodialysis units were selected from Baghdad teaching hospitals which include Al-Yarmook teaching hospital, Baghdad Teaching Hospital, and Al-Kindy Teaching hospital, Al-Karama Teaching Hospitals, Imamene-kadhimein Teaching Hospital, Surgical Specialties Hospitals. The researcher constructed a questionnaire format based on a program in order to reach the objectives of the study, the questionnaire is composed of three main parts (demographic characteristics of the staff nurses It consists of (7) items which included: age, gender, marital status, level of education, Number of years in employment, Number of years in the hemodialysis units, number of training sessions, and the second part include knowledge of nurses’ concerning Management of patients with Vascular Access (35) items, and the third part include observational check list for nurses’ practices concerning Management of patients with Vascular Access (25) items. the researcher used SPSS version 23 to analyze the data. A pilot study was carried out between the periods it was conducted at Baghdad Teaching Hospitals during the period from 3th March to 1 March 17th 2018 on (10) nurses who work at hemodialysis units in Baghdad Teaching Hospital to determine the reliability of the questionnaire and content validity was carried out through the 26 experts. Reliability of the observational checklist was determined through the use of the inter-rater reliability method. Descriptive statistical analysis procedures (frequency, percentage, mean of score) and inferential statistical analysis procedures (Chi-square and t-test) were used for the data analysis.

Result

Table (1): Comparison Between Nurses’ Knowledge (Pre–Post) Test in the Study and Control Groups About the General Information of Anatomy and Renal Failure and Hemodialysis

| List | Items | Study Group N= 40 | | | | | | Control Group N= 40 | | | | | Pre-test | Post-test | Pre-test | Post-test |
|------|-------|------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | The location of the kidney | 18 | 22 | 1.45 | F | 39 | 1 | 1.98 | P | 30 | 10 | 1.75 | F | 23 | 17 | 1.58 | F |
| 2 | The location of liver in | 9 | 31 | 1.23 | F | 34 | 6 | 1.85 | P | 20 | 20 | 1.50 | F | 17 | 23 | 1.43 | F |
| 3 | Length of kidney in human | 11 | 29 | 1.28 | F | 38 | 2 | 1.95 | P | 12 | 28 | 1.30 | F | 13 | 27 | 1.33 | F |
| 4 | The kidney contain | 5 | 35 | 1.13 | F | 29 | 11 | 1.73 | P | 4 | 36 | 1.10 | F | 8 | 32 | 1.20 | F |
| 5 | Nephron is | 13 | 27 | 1.33 | F | 33 | 7 | 1.83 | P | 14 | 26 | 1.36 | F | 14 | 26 | 1.35 | F |
| 6 | The kidney work to filter | 5 | 35 | 1.13 | F | 34 | 6 | 1.85 | P | 2 | 38 | 1.05 | F | 6 | 34 | 1.15 | F |
| 7 | The renal failure not happen | 5 | 35 | 1.13 | F | 34 | 6 | 1.85 | P | 6 | 34 | 1.15 | F | 9 | 31 | 1.23 | F |
| 8 | In renal failure the amount | 10 | 30 | 1.25 | F | 29 | 11 | 1.73 | P | 2 | 38 | 1.05 | F | 6 | 34 | 1.15 | F |
| 9 | Causes of Chronic Renal | 2 | 38 | 1.05 | F | 30 | 10 | 1.75 | P | 8 | 32 | 1.20 | F | 10 | 30 | 1.25 | F |
| 10 | The general principle of | 5 | 35 | 1.13 | F | 33 | 7 | 1.83 | P | 10 | 30 | 1.25 | F | 11 | 29 | 1.28 | F |

Table (1) presents Nurses’ knowledge in the study and control groups before and after the implementation of the educational program which shows clearly that Nurses’ knowledge in the study group is high level (good) when compared between pre and post tests, while there are no differences from the control group with respect to the total mean of score.
Table (2): Comparison Between Nurses’ practices (Pre – Post) Test in The Study and Control Groups About Nursing care through Hemodialysis.

<table>
<thead>
<tr>
<th>List</th>
<th>Items</th>
<th>Study Group N= 40</th>
<th>Control Group N= 40</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pre-test</td>
<td>Post-test</td>
</tr>
<tr>
<td>1</td>
<td>Monitoring of vital signs</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>Monitor the patient, connections</td>
<td>-</td>
<td>23</td>
</tr>
<tr>
<td>3</td>
<td>Monitoring the patient in the case of bleeding</td>
<td>-</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>Blood monitoring in the venous, arterial..</td>
<td>-</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>Follow-up of area in the blood – creatinine</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>0</td>
<td>48</td>
</tr>
</tbody>
</table>

M = mean, Ass.= assessment, Level of assessment: (1-1.66) = Poor; (1.67-2.33) = Fair; (2.34-3.00) = Good

Table (2): presents Nurses’ practices ‘ in the study and control groups before and after the implementation of the educational program, it shows clearly that the Nurses’ practices in study group is a high level (good) when compared between pre and post tests, while there are no differences to the control group with respect to the total mean of scores.

Table (3): Significant Differences between Knowledge and Practices among Nurses with regard to their Age Group.

<table>
<thead>
<tr>
<th>Age Program</th>
<th>Study group (N=40)</th>
<th>Control group (N=40)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chi-square</td>
<td>Df</td>
</tr>
<tr>
<td>Knowledge</td>
<td>66.308</td>
<td>5</td>
</tr>
<tr>
<td>Practices</td>
<td>59.522</td>
<td>10</td>
</tr>
</tbody>
</table>

df: Degree of freedom, P: Probability value, Sig: Significance, N.S: Not significant, S: Significant, H.S: High significant

This table (3) indicates that there is no significant association between nurses’ knowledge with their age group among the study and control group. But the findings show that there is significant association between nurses’ practices and their age group among both groups at p-value 0.024 and 0.008

Table (4): Significant Differences between Knowledge and Practices among Nurses with regard to their Educational Level.

<table>
<thead>
<tr>
<th>Education Program</th>
<th>Study group (N=40)</th>
<th>Control group (N=40)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chi-square</td>
<td>df</td>
</tr>
<tr>
<td>Knowledge</td>
<td>21.764</td>
<td>3</td>
</tr>
<tr>
<td>Practices</td>
<td>31.358</td>
<td>6</td>
</tr>
</tbody>
</table>

df: Degree of freedom, P: Probability value Sig: Significance, N.S: Not significant, S: Significant, H.S: High significant
This table (4) indicates that there is no significant association between nurses’ knowledge and practices with regard to their level of education among the study group at p-value ≤ 0.05.

The findings among the control group show that there is significant association between nurses’ Knowledge with their level of education at p-value=0.019, while there is no significant association between nurses’ practices with their educational level.

Discussion

Table (1) demonstrates the total mean of score for Nurses’ knowledge which assigned that there is high level knowledge (1.98) good, for Nurses’ after implementing the educational program to the study group while no alteration is found of Nurses’ knowledge in the control group from pre to the post-test with consideration to the total mean of scores.

This outcome supported by 6 suggested that the majority of nurses surveyed had satisfactory knowledge of hemodialysis description, and more than half had satisfactory knowledge about pre-dialysis assessment of patient condition.

This outcome confirmed by 7 showed that most nurses do not have adequate information about early detection of AKI, so there is a need to establish and implement training programs with the goal of developing skills and competencies to prevent and detect early AKI.

This study supported by 8 that stated the knowledge of nurses about renal failure and hemodialysis, it was found that the majority of nurses (83.3 per cent) had a high level of awareness relevant to child care undergoing hemodialysis. This can be explained by the many years of experience that most nurses have had. These agree with 9 who reported the nurses who studied were better in their overall information percentage ratings.

Table (2) Demonstrates the total mean of scores for Nurses’ practices which indicate that there are high level practices (2.00) for Nurses’ after implementing the educational program in the study group while no change is found concerning Nurses’ practices in the control group in the pre and post tests with respect to the total mean of scores.

This result supported by 3 who show in their study that the majority of nurses reflect a fair knowledge about of nurses’ knowledge toward providing care to patients with Vascular Access Hemodialysis and These finding show that the nurses who were working in HD units need to develop their knowledge to be up-to-date of any knowledge related to vascular access.

This finding was reinforced by 10 who found in their experiment that by contrasting the degree of awareness between staff nurses and nursing students, staff nurses had an acceptable level of knowledge relative to nursing students about hemodialysis patient treatment.

This table (3) indicates that there is no significant association between nurses’ knowledge with their age group among the study and control group. But the findings show that there is significant association between nurses’ practices and their age group among both groups at p-value 0.024 and 0.008.

This research coincides with 8 It indicates that the finding in this study indicated that there is a significance of statistical between the age of nurses surveyed and the standard of practice at p-value (0.001). This research conflicts with (Mahmood, 2016). 3 It indicates that there is a substantial association between the expertise of nurses and their age at p ≤ (0.01) level.

This table (4) indicates that there is no significant association between nurses’ knowledge and practices with regard to their level of education among the study group at p-value ≤ 0.05.

The findings among the control group show that there is significant association between nurses’ Knowledge with their level of education at p-value=0.019, while there is no significant association between nurses’ practices with their educational level.

This result is supported by 3 It shows that there is was a significant relationship at p ≤ (0.05) level between nurse’s knowledge and their level of education. This finding coincides with Bakey’s (2008) study, which reported that there was a strong association between the expertise of nurses and their level of education.

Conclusion

There is a modification in nurses’ means before and after the appliance the educational program. The educational program has special effects on all age groups in both genders, and all learning levels, and all groups in marital status and all years in experience groups.
Recommendation:
1. Continuous nursing educational and work-related to training programs of dialysis unit concerning vascular access must be well organized within Baghdad teaching hospitals and prepared with the essential educational facilities and resources necessary to promotion the knowledge and skills of practicing nurses, which will be revealed on better result and service for the patients.

2. The multidisciplinary approaches will be used in the care of patients needing dialysis in the long term. Patients, the families of patients, the nurse and other dialysis workers, the renal dietitian, the nephrologists, the social worker and the psychologist should be included.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Adults Nursing Department and all experiments were carried out in accordance with approved guidelines.

References
8. Abd-Alfatah AH, Ahmad AR, Mohamed FZ. Assessment of Nurses’ Knowledge and Practice Related to Nursing Care of Children Undergoing Hemodialysis at Assiut City, Thesis.Faculty of nursing, Pediatric nursing department, Assiut University. 2012.
9. Abd-Alfatah AH, Ahmad AR, Mohamed FZ. Assessment of Nurses’ Knowledge and Practice Related to Nursing Care of Children Undergoing Hemodialysis at Assiut City, Thesis. Faculty of nursing, Pediatric nursing department, Assiut University. 2012
10. Antony L, paramjyothi B. A Study to Assess the Knowledge Regarding Care of Patients Undergoing Hemodialysis among Staff Nurses and Nursing Students in Narayana Medical College Hospital, Nellore. Imperial Journal of Interdisciplinary Research (IJIR). 2016; 2(6).
Study Effects of Nigella Sativa Seeds Oil in Some Physiological Parameters in Experimental Heart Failure Induced by Ivabradine in Male Rats

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Abstract

Aim of this study was to investigate the effects of Nigella Sativa Seeds oil in some physiological parameters against heart failure induced by Ivabradine in rats. A total of 60 male rats were used in this experiment, the rats were divided into three groups: control rats (n = 20); IBD (n = 20); IBD+ N. sativa oil (n = 20). The first group (G1) was a control group. The second group (G2) was given 10 mg/kg of IBD, while the third group (G3) was injected with 10 mg/kg IBD + oral dosage of 2.5 mg/kg N. sativa oil for three months. After three months, the blood was withdrawn from the heart to measure the concentration of ANP, BNP, NE, A-II, ALDO, ACE, MDA, SOD, TNF-α and IL-6. The results revealed that levels of BNP, NE, MDA, IL-6 and TNF-α were significantly increased in G2 rats, with no significant difference observed in ANP in rats in G2 compared to G1 rats. The level of ACE, A-II, SOD and ALDO in G2 rats had significantly decreased compared to that observed in G1 rats, oral administration of Nigella Sativa seeds oil (G3) showed no significant difference in ANP, BNP, NE, A-II, ALDO, ACE, MDA, SOD, TNF-α and IL-6 compared with G1 group.

Keywords: Nigella Sativa, heart failure, Ivabradine, male, rats.

Introduction

Ivabradine (IBD) is a commonly used medication lately used to alleviate the pain and treatment of patients with chronic angina pectoris, chiefly applied to the Patients who suffer from sinus rhythm who cannot treated with beta blockers. Many of studies have proved that treatment with ivabradine can enhance the function of global left ventricular and decrease accumulation of cardiac collagen in congestive heart failure in rats. Other studies have been reported that IBD can acts under the control of autonomic nervous system, thus it can reduce unsuitable sinus tachycardia. Moreover, IBD has been found used as cardioprotective drug that used in regulating myocardial ischemic injury. IBD has been utilized for lowering risk of hospitalization and cardiovascular death rate in chronic heart failure patients. In spite of there are little data about the mechanisms that make IBD used as benefit drug for chronic heart failure there was many studies demonstrated that many drugs like IBD, ranolazine can decrease the sodium influx in heart muscle, decrease the size of myocardial muscle, increases the function of left ventricular, decreases arrhythmias and thereby improves myocardial ischemic injury. Nigella sativa (N. sativa) belong to Ranunculaceae Family. This plant is vastly used over the world as herbal medicines. N. sativa is considered as one of the most widely used plants for treatment or preventing of many diseases. The seeds and oils of this plant are also used in diverse of traditional systems of herbal medicine. The seeds and oils of N. sativa are also used as a good food components in many of systems such as food preservative and spice. Many studies revealed that, both seeds and oils have several biological effects such as anti-inflammatory, anticancer, antioxidant, antimicrobial, diuretics, antihypertensive, analgesics, anti-diarrheal and appetite stimulant, thus the N. sativa seeds can be used as effective food components. Therefore, in this study, our first focus was to investigate the effects of IBD on cardiac system and study the effects of N. sativa seeds oil against heart failure that induced by IBD.
Materials and Method

Experiment Design: A total of 60 male rats were used in this research, the rats were equally divided into three groups: control (n = 20); IBD (n = 20); IBD+N. sativa seeds oil (n = 20). The first group (G1) was given normal saline and considered as a control group. The second group (G2) was given intraperitonealy with 10 mg/kg of IBD as described by 1 while the third group (G3) was injected inerperitonially with 10 mg/kgIBD+ oral dosage of 2.5 mg/kg N. sativa seeds oil for three months. After three months, 5 ml of blood was withdrawn from the heart. to measure the following parameters: concentration of atrial natriuretic peptide (ANP), brain natriuretic peptide (BNP), Noradrenaline (NE), angiotensin- II (A-II), aldosterone (ALDO), angiotensin converting enzyme (ACE), malondialdehyde (MDA), Superoxide dismutases (SOD), tumour necrosis factor-alpha (TNF-α) and interleukin-6 (IL-6) Plasma concentration of ANP, BNP, NE, A-II, ALDO, ACE, SOD, TNF-α and IL-6were measured by ELISA using commercially available kits. The concentration of MDA was measured according to thiobarbituric acid (TBA) reaction by Muslih et al (2001) 12

Plant material and extractions: The Nigella sativa seeds utilized in this study were obtained from the local market of kerbala, Iraq. The seeds were manually checked up to eliminate bad ones. The oil from N sativa seeds was extracted by Soxhlet apparatus for 12 h and petroleum ether (60-80°C boiling range) was used as a solvent according to the method described by AOCS 13. Later that the solvent was evaporated and finally the oil was obtained and stored -4°C.

Statistical Analysis: SPSS program was used to analysis the results and we tested the correlation coefficient by means of the analysis of variance by complete randomized design (CRD). We used the least significant difference (L.S.D.) to show the significance of the results 14.

Results and Discussion

Effects of Ivabradine and N. sativa seeds oil on level of ANP, BNP, NE, ACE, A-II and ALDO: Levels of BNP and NE were significantly higher among rats in G2, While no significant difference was observed in ANP in G2 compared to that observed in G1 rats (table 1). The level of ACE, A-II, and ALDO in G2 rats had significantly reduced compared to that observed in G1 rats, the rats in G3 showed no significant difference in all above parameters (table 1).

<table>
<thead>
<tr>
<th>Parameters</th>
<th>(G1)</th>
<th>(G2)</th>
<th>(G3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANP</td>
<td>1.68</td>
<td>1.92</td>
<td>1.71</td>
</tr>
<tr>
<td>BNP</td>
<td>1.39</td>
<td>2.46</td>
<td>1.43</td>
</tr>
<tr>
<td>NE</td>
<td>6.45</td>
<td>6.73</td>
<td>6.48</td>
</tr>
<tr>
<td>ACE</td>
<td>1.68</td>
<td>1.39</td>
<td>1.66</td>
</tr>
<tr>
<td>A-II</td>
<td>5.48</td>
<td>4.56</td>
<td>5.41</td>
</tr>
<tr>
<td>ALDO</td>
<td>11.31</td>
<td>8.93</td>
<td>11.27</td>
</tr>
</tbody>
</table>

Mean ± standard error, *= significant difference

Our data prove IB caused chronic heart failure (CHF) and amplifies the concentration of BNP and NE in plasma. This results suggest the Malfunction in left ventricle may stimulate elevation of plasma concentration of BNP and NE.

The plasma concentration of BNP and NE have been investigate as a marker for diagnosis, prognosis, screening, and monitoring treatment of CHF patients the secretion of both of these parameters(NE and BNP) which under the control of sympathetic nerves was elevated with the development of CHF 15. Many of studies demonstrated that BNP level in patients with HF are associated with alters of its plasma level 16. Thus, in this study, we measured the plasma level of BNP and NE in rats that administrated with IBD.

In this study we also observed that the ivabradine therapy caused a reduction in sympathetic overdrive in rats showed by reduction inplasma levels of renin–angiotensin–aldosterone system (RAAS) components, proved by reduction inplasma levels of ACE, A-II, and ALDO. The continuation of sympathetic overdrive and long activation of RAAShave been accounted amain mediators of developing HF by developingnecrotic, fluid retention, apoptotic cell death and vasoconstriction.
This may be proved by increased uptake of Ca$^{2+}$ with ivabradine administration could have also participated to improve the diastolic function of ivabradine.

N. Sativa have many effects on cardiac system including cardiac depressant effect, diuretic effect and calcium channels blocking effects. As well as, N. Sativa was improving the inflammatory effects in many organs and protect many organs from any lesion, and we have been found that the daily use of NS with diet can protect the body from exposure to the sepsis. Thymoquinone(TQ), the active components of Nigella sativa found in its seeds, is the active quinone used in pharmacology, which play a vital role chiefly as anti-inflammatory and analgesic factor. Many studies has been reported that thymoquinonealso act as a powerful antioxidant which protects many of body organs from oxidative injury in various studies in rats and protects cell membrane from lipid peroxidation in many tissues. In addition, N. Sativa seed has a many of actions such as antioxidant, calcium channel blocker effects, anti-eicosanoid and a regulate the level of intracellular calcium in mast cells. NS have also myocardial protective effect which could be due to its protective activity of its components such as thymoquinone, thymohydro-quinone, thymol, dithymoquinone, 4-terpineol, carvacrol and tanethole.

Effects of Ivabradine and N. sativa seeds oil on Myocardial Cytokines and Oxidative Stress: The results of Table 2 showed a significant increase ($P < 0.05$) in the level of serum MDA and significant decrease in SOD in the rats injected with ivabradine (G2) the level of IL-6 and TNF-α. Were significantly increased in G2 compared with control group (G1), oral administration of 2.5 mg/kg of Nigella Sativa seeds oil lead to enhance the level of SOD, with no significant difference was observed in level of MDA, IL-6 and TNF-α in G3 compared with G1 group.

Several studies have indicated that there was many effects of ivabradine on cardic system especially inflammation. Lately, some of studies proved that IBDean reduce the level of inflammatory cytokines in mice. And can modify the gene expression of inflammatory cytokine while elevate the activity of endothelial nitric oxide synthase (eNOS) in rats. Other studies suggested that, treatment with ivabradine can promote the function of left ventricle, with modifying in cytokines expression mainly TNF-α and IL-6. This cytokines are responsible for any defect in cardiac system. Especially TNF-α and IL-6 which stimulate cardiac dysfunction. In this research, we found that ivabradine caused cardiac inflammation by increased levels of IL-6 and TNF-α.

<table>
<thead>
<tr>
<th>Table (2): Effect of Ivabradine and N. sativa seeds oil at the level of MDA, SOD, TNF-α, and IL-6 in serum of male rats</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groups</td>
</tr>
<tr>
<td>MDA</td>
</tr>
<tr>
<td>SOD</td>
</tr>
<tr>
<td>TNF-α</td>
</tr>
<tr>
<td>IL-6</td>
</tr>
</tbody>
</table>

**Conclusion**

The results suggest that injection with Ivabradine can induce heart failure and oral administration of Nigella Sativa Seeds oil has protective effects against heart failure Induced By Ivabradine.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the College of Education for Pure Science and all experiments were carried out in accordance with approved guidelines.

**References**


Relation of Endometrial Hyaluronic Acid with Female Infertility in Women Undergoing Ovarian Stimulation Protocol

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Abstract

A comparative prospective study was conducted in the High Institute of Infertility Diagnosis and Assisted Reproductive Technologies, Al-Nahrain University, from September 2019 to March 2020. The aim of the study was to evaluate the level of hyaluronic acid (HA) in endometrial fluid at day of trigger in infertile women whom undergoing ovarian stimulation protocol. The study included a total of 60 women who were selected from those attended the High Institute of Infertility Diagnosis and Assisted Reproductive Technologies. All couples subjected to a full history taking, complete general examination, complete gynecologic examination and infertility workup including: husband’s semen analysis, hormonal analysis, uterine cavity and tubal patency was performed. Different ovulation induction programs were used evaluation of endometrial thickness, pattern, size and number of mature follicles was performed by transvaginal sonography in the 2nd of menstrual cycle and cycle day 11-14 before HCG injection. In this study basal hormonal analysis were performed to the female in the 2nd or 3rd day of the menstrual cycle and study included aspiration of endometrial fluid for determination of hyaluronic acid level by ELISA technique. The study showed that mean of hyaluronic acid was elevated significantly in women received letrozole plus FSH (158.7±19.7 pg/ml) followed by women received Clomid plus FSH (160.8±13.5 pg/ml) and the lowest mean was recorded in the control group (146.1±26.2 pg/ml). The study showed positive correlation between hyaluronic acid and LH at day of triggering of ovulation in women received Clomid plus FSH (group B). The study showed positive correlation between hyaluronic acid and progesterone at day of triggering of ovulation in women received letrozole plus FSH. The study showed positive correlation between hyaluronic acid and number of follicles in women after receiving letrozole plus FSH. The study revealed that HA mean was elevated significantly (P< 0.05) in women who became pregnant after stimulation protocol compared with women who failed to be pregnant (164.2 vs. 152.1 pg/ml) as shown in Figure 4). The study also revealed that HA was significantly elevated in women who became pregnant after receiving letrozole + FSH (164.2 pg/ml) as compared with non pregnant women (152.1 pg/ml) while HA level was non significantly related with pregnancy occurrence after administration of Clomid+FSH. It was concluded that, hyaluronic acid was elevated significantly in women received ovulation simulation drugs and letrozole was superior to clomiphene as a treatment for anovulatory infertility in women

Keywords: Hyaluronic acid; Female infertility; Letrozole; Endometrial.

Introduction

Infertility is a disease of the reproductive system, defined by the failure to achieve a pregnancy after at least one year of regular unprotected sexual intercourse in women < 35 years not using contraception and after six months in women > 35 years. The causes of infertility can be generally classified into four groups: male, female, combined (both male and female) and unexplained. Some additional factors that may contribute to female infertility are behavioural factors such as diet, exercise, smoking, alcohol and drug use(1,2). Combined infertility arises from the combination of male and female causes and it may be that each partner is independently fertile but the couple cannot conceive together without assistance. Nowadays,
progress in assisted reproductive technology (ART) has enabled the clinicians to treat many types of infertility\(^3\). Endometrial receptivity is defined as a temporary unique sequence of factors that make the endometrium receptive to the embryonic implantation\(^4\). It is the window of time when the uterine environment is conducive to blastocyst acceptance and subsequent implantation\(^5\). Hyaluronic acid (HA) has also a significant role in establishing the cellular microenvironment conducive to the development of proliferative processes\(^6\). The lack of HAS regulation genes causes abnormal production of HA and promotion of abnormal biological processes such as metastasis and pregnancy loss. An increasing number of reports suggests a role of hyaluronan (HA) in female reproduction and interest in its application in assisted reproduction is rising. However, there are contrasting data about the effectiveness of adding HA to the embryo-transfer medium on improving pregnancy rates\(^4\). The aim of the study was to evaluate the level of hyaluronic acid (HA) in endometrial fluid at day of trigger in infertile women whom undergoing ovarian stimulation protocol.

**Patients and Method**

A comparative prospective study was conducted in the High Institute of Infertility Diagnosis and Assisted Reproductive Technologies, Al-Nahrain University, from September 2019 to March 2020. The study included a total of 60 women who were selected from those attended the High Institute of Infertility Diagnosis and Assisted Reproductive Technologies. All couples subjected to a full history taking, complete general examination, complete gynecologic examination and infertility workup including: husband’s semen analysis, hormonal analysis, uterine cavity and tubal patency was performed. Different ovulation induction programs were used evaluation of endometrial thickness, pattern, size and number of mature follicles was performed by transvaginal sonography in the 2\(^{nd}\) of menstrual cycle and cycle day 11-14 before HCG injection. Pregnancy outcome was used as a main comparative parameter between selected groups. 40 patients undergone with one of two of ovulation stimulation programs [clomid + gonadotropin and letrozole + gonadotropin] had been chosen for each patient according to her age, history and hormonal assay. In this study basal hormonal analysis were performed to the female in the 2\(^{nd}\) or 3\(^{rd}\) day of the menstrual cycle and study included aspiration of endometrial fluid for determination of hyaluronic acid level by ELISA technique.

**Results**

In this study, majority of women enrolled in this study were belonged to rural area and below 30 years, parity below 1 and infertile between 2-4 years, as shown in Table 1.

**Table 1: General characteristics of studied cases.**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>No. (Total: 40)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Residence</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>24</td>
<td>60%</td>
</tr>
<tr>
<td>Urban</td>
<td>16</td>
<td>40%</td>
</tr>
<tr>
<td><strong>Age Groups (Years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;30</td>
<td>22</td>
<td>55%</td>
</tr>
<tr>
<td>≥30</td>
<td>18</td>
<td>45%</td>
</tr>
<tr>
<td>Mean±SD</td>
<td>29.5±4.52</td>
<td></td>
</tr>
<tr>
<td><strong>Parity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>21</td>
<td>52.5%</td>
</tr>
<tr>
<td>1</td>
<td>10</td>
<td>25%</td>
</tr>
<tr>
<td>2-3</td>
<td>7</td>
<td>17.5%</td>
</tr>
<tr>
<td>4-5</td>
<td>2</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Duration of infertility (years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-4</td>
<td>23</td>
<td>57.5%</td>
</tr>
<tr>
<td>5-7</td>
<td>13</td>
<td>32.5%</td>
</tr>
<tr>
<td>&gt;7</td>
<td>4</td>
<td>10%</td>
</tr>
<tr>
<td><strong>BMI</strong></td>
<td>26.14±4.31</td>
<td></td>
</tr>
</tbody>
</table>

The study showed that mean of hyaluronic acid was elevated significantly in women received letrozole plus FSH (158.7±19.7 pg/ml) followed by women received Clomid plus FSH (160.8±13.5 pg/ml) and the lowest mean was recorded in the control group (146.1±26.2 pg/ml), Table 2.
The study showed positive correlation between hyaluronic acid and LH at day of triggering of ovulation in women received Clomid plus FSH (group B) (Figure 1).

The study showed positive correlation between hyaluronic acid and progesterone at day of triggering of ovulation in women received letrozole plus FSH (Figure 2).

**Table 2: Level of hyaluronic acid in the studied groups**

<table>
<thead>
<tr>
<th>Hyaluronic acid (pg/ml)</th>
<th>Women under ovulation stimulation programs</th>
<th>Control Group</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group A (received Letrozole + FSH)</td>
<td>Group B (received Clomid + FSH)</td>
<td>(Group A &amp; B)</td>
</tr>
<tr>
<td>N</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>(Mean±SD)</td>
<td>158.7±19.7</td>
<td>160.8±13.5</td>
<td>146.1±26.2</td>
</tr>
</tbody>
</table>

![Graph showing correlation between hyaluronic acid and LH in group B](image)

**Figure 1: Correlation between hyaluronic acid and LH of group B at day of follicles triggering**

![Graph showing correlation between hyaluronic acid and progesterone in group A](image)

**Figure 2: Correlation between hyaluronic acid and progesterone of group A at day of follicles triggering**
The study showed positive correlation between hyaluronic acid and number of follicles in women after receiving letrozole plus FSH (Figure 3).

![Hyaluronic acid vs No. of follicles in group A](image)

**Figure 3: Correlation between hyaluronic acid and number of follicles in group A**

The study revealed that HA mean was elevated significantly (P< 0.05) in women who became pregnant after stimulation protocol compared with women who failed to be pregnant (164.2 vs. 152.1 pg/ml) as shown in Figure 4). The study also revealed that HA was significantly elevated in women who became pregnant after receiving letrozole + FSH (164.2 pg/ml) as compared with non pregnant women (152.1 pg/ml) while HA level was non significantly related with pregnancy occurrence after administration of Clomid+FSH.

![Hyaluronic acid (Mean), (pg/ml)](image)

**Figure 4: Relation of HA with stimulation outcomes**

**Discussion**

In this study, majority of women enrolled in this study were belonged to rural area and below 30 years, parity below 1 and infertile between 2-4 years. These findings were close to that reported Ahmeid(7), who found that mean age of women under IVF was 30.36 year, his study also found that the mean of BMI was 25.9 (kg/m²). Hameed and Ahmeid(8) in recent study included 45 women who enrolled in ART programs in infertility center for in-vitro fertilization (IVF) and
found that the mean age of infertile women was (31.80 ± 5.38 years), his study also found that the mean of BMI was 25.36 ± 1.99 (kg/m²). Al-Dujaily et al(9) also found that the mean age of infertile women (31.0 year) and BMI 25.3 (kg/m²) Due to body mass index (BMI) has an adverse effect on reproduction, overweight women have a higher incidence of menstrual dysfunction and anovulation, possibly because of altered secretion of gonadotropin releasing hormone, sex hormone binding globulin, ovarian and adrenal androgen, and luteinizing hormone and also because of altered insulin resistance (10). The study showed that mean of hyaluronic acid was elevated significantly in women received letrozole plus FSH (158.7±19.7 pg/ml) followed by women received Clomid plus FSH (160.8±13.5 pg/ml) and the lowest mean was recorded in the control group (146.1±26.2 pg/ml).Thus, studies on the distribution of HA are important to understand the histophysiological and pathological mechanisms underlying events of the female reproductive tract, such as endometriosis, tumors, and infertility (11). There was very little declared studies regarding the relation of hyaluronic acid with infertility and no previous studies done about the levels of HA in women who received letrozole plus FSH and who received Clomid plus FSH. A study done by Santos Simões et al(12) indicated that there was an elevated concentration of hyaluronic acid in women endometrium in proliferative phase and higher HAS1 and HAS2 reactivity when compared with normal women. In addition, Nagyova (13) indicated that HA levels were increased in the endometrial stroma during the secretory phase of the menstrual cycle and fall to very low levels at menstruation, suggestive of a role in implantation.

In different study, Gomes et al(14) in study the immunoexpression of hyaluronic acid (HA) in the uterine horns of the mouse throughout the estrous cycle phases, their data showed that the highest concentration of HA in uterine horns occurred during diestrus compared with other phases. Moreover, Fouladi-Nashta and coworkers reported spatiotemporal expression of RHAMM protein in mouse endometrium during the oestrus cycle and peri-implantation period, suggesting its possible role in endometrial receptivity (15). HA has also been shown to improve the cryotolerance of blastocysts, which then leads to increased birth rates in cows (13). Moreover HA was detected in oviductal fluids collected by catheterisation during the oestrus cycle in heifers and cows and was shown to be highest at ovulation (16). In addition, Transcripts for HAS2 and HAS3 have been found in the oviducts of several animal species (17). Synthesis of HA is increased significantly in the uterus of mice on the day of implantation (18), and HA differential expression in the human endometrium during the menstrual cycle implies its involvement in implantation. In the human uterus, peak expression of HAS and CD44 is in the mid-secretory stage (19). There is a plethora of data suggesting the beneficial roles for HA in human embryo implantation (20). Artificially, Franik et al.,(21) in previous study indicated that the supplementation of Whitten’s medium with hyaluronic acid improves the development of 1- and 2-cell porcine embryos to the blastocyst stage

Conclusions

It was concluded that, hyaluronic acid was elevated significantly in women received ovulation simulation drugs and letrozole was superior to clomiphene as a treatment for anovulatory infertility in women.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Kirkuk health directorate and all experiments were carried out in accordance with approved guidelines.

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21. Franik S, Eltrop S. Aromatase inhibitors (letrozole) for subfertile women with polycystic ovary syndrome. Cochrane Database of Systematic Reviews. 2018; (5).
DNA Fingerprinting and its Role in Improving the Murder Crime

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Abstract

The scientific development that was brought by modern civilization has left its clear imprints in the field of biology, which is directly reflected on the living cell and its relationship to genetics and formation. That it has recorded many scientific discoveries in the field that provided a wide opportunity to reveal some of the secrets of the human cell. The science of cell study (cytology) is no longer limited to a purely descriptive study, but rather extended to the experimental study with the help of experimental embryology and analytical studies of the fertilization process, until the development of the scientific increases in the awareness of the major fundamental issues that are related to cytological genetics which are the nature of the human gene and self-reproduction and how to perform his work in a report about these attributes, also this development has extended to include the treatment of some genetic diseases, as this science has extended to the field of legal evidence (criminal and civil), this is because the traditional means which are used in evidence and improving may not achieve the justice or be insufficient to achieve them.

Keywords: Improving, murder crime, DNA fingerprinting.

Introduction

Dr. (Alec Jeffrey) is considered the first who addressed the term of the human fingerprint of the human being in 1985 as he continued to conduct his research until he was able to reach that the DNA is the characteristic of each individual and there can be no similarity between two people except in the case of identical twins and of the same gender.

In order to know the scientific meaning of the genetic fingerprint, it is necessary to know the genetics and the genetic guidance because it is the two specialized sciences1 in it, as Genetics is defined as: A branch of biology that studies the similarities and heterogeneities in successive generations of all living things, that is, it is interested in studying that similarity and the difference between children on the one hand and parents and relatives on the other hand2. The science of human genetics is a container of information of an individual and social nature at the same time, which affects the human race due to its ability to amend, change and transfer.3 The DNA is found in the nucleus of the cell, with the exception of red blood cells that do not have cell chromosomes, that the human body in general contains trillions of cells, each of these cells embraces a nucleus which is responsible for the life and function of the cell, each nucleus embraces the genetic material starting from the common characteristics to all human beings or between closely related strains and ending with the specifics of a particular individual and distinguishing it by itself, so that it does not match another individual of the people, as the genetic material that is found in the nucleus of the cell forms strings or tapes in a tight spiral form and is called ((chromosomes)) and they number (46) chromosomes as these chromosomes mate so that twenty three pairs appear from the father and the other is from the mother4. The genetic fingerprint was known from a practical point of view as (it is a genetic pattern formed by repeated sequences during the unknown function of the DNA, these sequences are what distinguishes each person from the other, as the reason for this is some enzymes that break down the
DNA in limited, unchanging and fixed places, as DNA is of two types: non-functional DNA (Non-Fontionnelle) and functional DNA (Founctionnelle) important here is DNA non-functional because it can be used as a scientific evidence, as for the enzymes, they are proteins, but not all proteins are enzymes, that every step of the biological reactions requires a specific enzyme which stimulates them. The proteins are either synthetic or functional that include enzymes and protein hormones. The genetic fingerprint was also defined: as two-pronged chemical units carried from the genes distributed in a way that accurately distinguishes each individual from the other and the reason for this specificity is due to the nature of the formation of the genetic fingerprint itself, as it is made up of two parts of the genes, one is that inherits from his father while the other one inherits from his mother to form a new formula, hence, the map of the presence of genes on the DNA strip is described as a fingerprint, as it carries characteristics that would reflect the personal and subjective elements that a person is unique to and from other people of his own race.

The legal meaning of the DNA: Despite the regulation of some criminal laws for the genetic fingerprint, such as the French Penal Code, where these laws have been permitted to be applied in the courts as evidence of proof and denial in civil and criminal fields, as they have not set a specific definition for them, or define a concept, leaving the matter in this regard to the legal jurisprudence in carrying out that task, which is also not the fingerprint of it has a full and comprehensive definition of it which has been defined by one of them as (pure information pertaining to a person that distinguishes him from others in a biological means to determine the personality and to identity the individual).

Another one is defined it as (it is a fixed original identity for every human being, which is required by genetic analysis and allows the identifications of individuals with almost complete certainty) It is also known as (the material that carries the genetic factors and genes in living organisms)

Second: Genetic fingerprint properties and ways of showing them: The genetic fingerprint is characterized by a set of characteristics that make it distinct in comparison with other forensic evidence, as this is proven by medical experiments. Each person has a genetic fingerprint that differs from the other person, as there are no two people who are similar to them except for identical twins from one egg, as more than half of the nitrogenous chemical bases present in chromosomes. The living cell is not suitable for the use in the genetic fingerprint technology, given its similarity among all people of the same type, while the rest of these rules and what they contain of DNA, they differ from one generation to another and from one person to another, which is used in the analysis of the genetic fingerprint. The genetic fingerprint is also distinguished by the diversity of its sources, as the genetic fingerprint can be obtained from any of the biological sources, whether the samples are liquid such as blood, saliva, semen, mucus or tissues such as flesh, bone, skin and hair. This characteristic of the genetic fingerprint may obviate the fingerprint in the case that there are no traces of fingerprints of criminals at the crime scene.

Also, the genetic fingerprint appears in the form of wide lines, which makes it an easy to read, save and store as it is saved on the computer until needed, one of the most important characteristics of the genetic fingerprint is that it is present in all cells of the human body except red blood cells, moreover, they are identical in all cells of the body as they do not change and do not substitute over time over them as the DNA remains constant until after the death of the human.

Crime is often committed in secret and surrounded by some ambiguity, this prompted the investigation men to pay attention to the remnant material, which is considered to be on the scene of the crime in order to benefit from it by following the criminals and identifying the characteristics that distinguish them from others by taking the remnant and transferring it to the laboratory and conducting the analysis and obtaining information that helps them in identifying the criminals or contributing significantly to show the innocence of the accused that the biological samples found differ with the variables committed crime, as we mentioned above and whatever its type, taking it requires the presence of a criminal photographer who is filming at the scene of the accident with the DNA fingerprint expert. By using a video camera to explain the crime scene as well as the relative dimensions of the crime scene and how the samples are located in that place. That there are several method for analyzing the genetic fingerprint, but there are two method that are considered one of the most common method in this field, which are the genetic packages method and the Polymerase Chain Reaction (PCR) method.

The second method: The serial polymerization
method (PCR), which means enlarging and copying the small part in the blood of the DNA that was found at the crime scene to give new copies until the number of generations that produce thirty generations of DNA which was presented in a drop of blood at the head of a needle more than a billion times during those three hours by raising the temperatures as this rise in temperatures will lead to an increase in the absorbed rays, instead of separating the orders that relate the nitrogenous bases, as if the temperature is preserved, these commands return to correlation with what it completes of the sequences (23). It is clear from the above that taking one of these two methods depends on the amount of the sample which presented at the accident scene, so if the quantity is big, using the genetic beams method and if the quantity is few it uses the method of polymerase chain reaction (PCR). It is worth noting in the field of biological resources that are necessary to conduct the DNA analysis. There are steps that must be taken into consideration when finding the sample, which are: calling the photographer to conduct video photography and make a sketch of the sample in order to determines its relative dimensions to each other before it is raised by the DNA fingerprint expert. The scattered samples must also be kept separately as an independent sample. When the sample is sent to the criminal laboratory, it must be sent, sealed with the stamp of the forensic medicine department, guarded by a police officer without mentioning any information which are related to the name of the sample, its type, size and date on a tube and it must be mention in special records in order to preserve its biography.

Third: Conditions for accepting the DNA as a proof:

The DNA analysis is described as a scientific guide in forensic evidence. It requires two conditions:

The first condition: Ensure the reliability of the DNA result

The certainty of the value of the DNA analysis depends entirely on the quality of the research method and the accuracy in interpreting the results of this analysis, which requires a highly efficient laboratory (24) because this test is described as a complex process as it requires an advanced laboratories and scientific devices as well as many chemical compounds also it requires extensive experience and accurate specialization.

It can be concluded from the above that the condition to verify the reliability of the result of the DNA analysis and its dependence as a scientific evidence in forensic evidence must be ensured that the value of the DNA test depends entirely on the quality of the research method and the accuracy in interpreting the results that resulted from it, so this quality and accuracy in the analysis requires extensive experience, a high-level specialization, a high-efficiency laboratory, as well as a laboratory that performs genetic testing. That the rules must be established to preserve samples and the information that results from this analysis as the strength of the fingerprint in the evidence depends on the method of sample collection, condition, quantity, laboratory efficiency and quality of tests.

Fourth: The authority of the forensic judge to take evidence of the DNA: The DNA analysis is presented by the people of expertise, whether it is laboratories or specialized departments in that, Especially if the matter related to the criminal case which is pending before the court is related to some of the issues that require knowledge and science to enter, given that it needs special knowledge that is not available to the forensic judge, so he seeks the assistance of an expert in order to provide advice that helps him to settle the case, as it is not permissible for a judge to replace himself with the expert in a specific matter that requires the use of specialists, as he can not reach the truth in the case except by resorting to the people of experience. However, the procedural law gave the judge the freedom to decide for himself the truth that he is convinced with it.

Fifth: The role of the DNA in proving the crime of murder: The word jurisprudence differed on the possibility of relying on the genetic fingerprint of the crime of murder to judge a conviction, so a side of the criminal jurisprudence sees that it is not permissible to rely on these clues to judge conviction and to accomplish and reinforce the evidence thereof because it is evidence that is suspected of suspicion, therefore, it is not suitable for itself to be the basis for the sole provisions that it should be based on certainty, He drew suspicion that the conclusion is not similar, but may be interpreted in more than one way that benefits more than one possibility, therefore it is not sufficient alone for conviction, if it is sufficient to take some measures of inception and preliminary investigation, it is permissible to rely on the judicial presumption in ruling the conviction if it is reinforced by other evidence, also it is not permissible to rely on it alone, so this is because of this presumption, regardless of its significance, is incomplete because it is indirect in the proof.
Conclusion

After we finished our humble research (the DNA and its role in proving the crime of murder), it became clear to us that every person has a unique genetic pattern in the genetic structure within every cell in his body that no person in the world shares in it. This pattern is called the genetic fingerprint, as it is a detailed structure that indicates the identity of each individual with a sample. The genetic fingerprint is characterized by a set of characteristics as it is numerous and varied its sources, which makes it possible to make this fingerprint from any liquid human waste such as blood, saliva, semen or tissues such as bone, flesh, skin and hair, as this feature obviates the absence of traces of fingerprints of the criminals at the crime scene as it resists decomposition, rot and other climatic factors from heat, cold and drought for long periods, so that the genetic fingerprint can be obtained from both ancient and modern relics, so the genetic fingerprint is considered to be one of the scientific physical evidence that has an effective role in forensic evidence for murder or other crimes for which the fingerprint has a role in proving it.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under College of Biotechnology and all experiments were carried out in accordance with approved guidelines.

References

Preventive Effect of Glycine on 5-FU-Induced Oral Mucositis in Rats (Histological and Immunohistochemical Study)

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Abstract

OM is the most popular side effects of chemotherapy and it’s commonly caused by 5-Fluorouracil (5-FU). This study was aimed to assess the impact of glycine as a new option of treatment on experimentally induced oral mucositis in adult male rats.

Thirty two male rats (Rattus novergicus) were divided at random in to control group (8 rats), 5-FU untreated group and 5-FU-glycine treated group (12 animals each). OM model induced by chemotherapy was instituted by intraperitoneal injection of 5-FU (60 mg/kg body weight) on days 0, 5, 10, 15 and the dorsal tongue was scratched (days 3, 4) by needle with gauge 18 to induce mucositis. The rats in treated group were received a 2mg/g intraperitoneal injection of 5% glycine daily (day 0-20). All rats were scarificed at day 21, dorsal tongue mucosa sample was removed, prepared and examine by using histological and immunohistochemical (PCNA and BCL-2 immunostining) analysis. Glycine can protect the dorsal tongue mucosa from 5-FU induced cytotoxicity and alleviated the associated damage. In 5-FU/glycine group, both of the PCNA and BCL-2 immune expression was significantly increased (p≤0.05) in comparison with 5-FU untreated group.

Glycine provides protection toward 5-Fluorouracil induced tongue mucositis. It show fast epithelial propagation and wound healing through its antioxidant, anti-inflammatory and cytoprotective features.

Keywords: Glycine, 5-FU, Oral mucositis, PCNA, BCL-2.

Introduction

Oral mucositis (OM) is describe as mucosal barrier damage as result of desolation of its mucosal epithelium or suppression of its growth leading to change of the safety and function of oral cavity. It may become visible anyplace within the mouth but are regularly determine on cheeks, interior of lower lip or on the sides or base of the tongue. It can induce many complexity via extremely painful for the patients and limiting their ability to eat, drink, talk and swallow problems to sever pain of ulcer more than infection. Lastly menacing to life style of patients because of lower their dietary status with elevated their financial burden and exacting to their hospitalization. Several factors can induce OM like 5 fluorouracil (5-FU) is one of the most debilitating side effects of chemotherapy remedy as well as, radiotherapy and various forms of shock as chemical and mechanical incitation of mucosa. 5-Flourouracil (5-FU) is an anti-metabolite cytotoxic drug labor by blocking fundamental biosynthetic processes or by way being integrated in to macromolecules, including RNA and DNA. The mechanism action of its cytotoxicity has been attributed to the misincorporation of fluoronucleotides in to RNA and DNA and to the suppression of thymidylate synthase enzyme, a critical enzyme in nucleotide metabolism.

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5-FU is broadly indicated for remedy of malignant tumors, particularly of the breast, colon, hepatic, pancreatic, gastric, ovarian and bladder carcinomas. The employ of 5-FU is one of the most popular causes of oral mucositis. Glycine, a simple amino acid, is providing a new selection in the treatment of mucositis. It has been demonstrated to have anti-inflammatory, immunomodulatory and cytoprotective effects in various experimental models. Protective effect of glycine on inflammatory lesions has been shown in different trial models. For instance, glycine is a potent restraint of resident liver macrophages and acts through a glycine-gated chloride channel. Furthermore, administration of glycine in a rat model of ischemic-reperfusion damage resulted in down regulation of cell apoptosis and the expression of pro-apoptotic genes. So, glycine has shown to have affirmative impacts on numerous of the paths concerned in the pathogenesis of OM. for this reason, the present study was designed to evaluate the impacts of glycine on experimentally induced oral mucositis in rats model. Histopathological and immunohistochemical fulfillments were used to elucidate its effect on cellular proliferation and cell apoptosis.

**Materials and Method**

Thirty two adult male rats (Rattus norvegicus) with weight about 200-250 g were provided and care in the animal house of college of Science, Basra University, Iraq. The animals were kept below a typical laboratory conditions, pallat common nutrition and water ad libitum with a 12/12 hrs light \dark cycle.

Induction of OM: Oral mucositis was induced according to protocol suggested by Sonis et al. In brief, 60 mg/kg of chemotherapy drug 5-FU (Sigma-Aldric, UK) was injected intraperitoneal (IP) to each animal study on days 0, 5, 10 and 15. The tongue mucosa was irritated by external superficial scratches with tip of an 18-mesure needle on days 3, 4.

**Group B: (5-FU group):** Untreated group extradited normal saline intraperitoneally.

**Group C: (5-FU treated with glycine):** The animals were received a 2 mg/g of body weight IP injection of glycine (BDH, England), diluted in saline 5%. Treated with glycine was started on day 0, with usage once time\day in the morning until the end of experiment on day 20. All rats were sacrificed at day 21; cross section of dorsal surface of tongue mucosa was removed and designed for histological examination and immunohistochemical analysis by PCNA and BCL-2 immunolabeling.

**Light microscopic method:** Dorsal surface of rats tongue mucosa samples fixed in 10% formalin for 24 hours, and then the specimens were regularly processed for embedding in paraffin by typical paraffin embedding method. Sections were cut at 5 μm, processed and then stained with Hematoxylin and eosin staining (H & E). Another sections positioned on top of positively charged slides for immunohistochemical revealing of anti-proliferating cell nuclear antigen (PCNA) and BCL-2.

**Immunohistochemical studies:** Immunohistochemical staining for revealing anti-proliferating cell nuclear antigen (PCNA), which was achieved by a monoclonal Mouse anti-PCNA clone pc 10, Dako, Denmark, and a monoclonal Mouse anti-Human BCL-2 Oncoprotein Clone 124 Code No. 1587 prepared to use N-series primary antibody, for employ with Dako EnVision TM, EnVision TM double staining and LASAB TM 2 systems. The staining method sections follow the directives included with all detection system used. Negative and positive controls were used through the study and run concurrently with all biopsy samples. PCNA positive cells expressing were recognized by brown nuclei, whereas BCL-2 positive cells expressing were showed brown cytoplasmic staining.

For analysis, 5 sections were randomly selected for each animal. About 1000 cells from cell population were counted by two watchers to make certain the topicality of analysis at a magnification of 400 X (Olympus, Japan). Finally, the percentages of PCNA and BCL-2 positive cells were calculated. The level expression of PCNA and BCL-2 was estimated depending to the scoring system of Seleit et al (16). The appliance of this system gives a score ranging from 0-3 for each degree of positivity.
stained cells as (negative: < 1%, mild: 1-10%, moderate > 10-50%, strong: > 50%). For statistical analysis Anova one way test was employed to compare the results, P value less than or equal to 0.05 (P≤0.05) was considered statistically significant.

Results

Histological Results: Microscopic observation of dorsal tongue of the control rats (group A) showed normal form and organization. The dorsal surface of tongue displayed conical, slender filiform papillae cornified with tapers tips, normal connective tissue within papillae and smooth keratinized epithelial covering, the section revealed to well define fungi form papillae with test bud. The tongue composed mainly from interlacing bundles of striated muscle fibers that run in different directions and cross one another (fig. 1). In 5-FU untreated group (group B), the dorsal surface of tongue revealed hyperkeratosis, sever atrophied of most filiform papillae with degenerated fungiform papillae, beneath few shallow epithelial rete ridges that invaginated deeply within the mucosa, sever inflammatory cells in the lamina propria, basal layer and supra basal with vacuolated cells specially that surrounded the papillae with shown no clear boundaries and atrophied of most muscle fibers (fig. 2). In 5-FU group treated with glycine (group C), the epithelial layer revealed to an increase in the thickness with re-epithelization of stratified squamous epithelium and vacuolated keratinocytes observed. Also, some of filiform papillae restored the normal shape with tapers tips and cornified, well developed fungi form and circumvallate papillae observed with test buds. Restoration of most normal rete ridges and inflammatory characteristics were still notable in the lamina propria (fig. 3).

![Figure 1](image-url)
Figure (2): Section of dorsal tongue of rats from (group B) showing hyperkeratosis ( ), sever damage in filiform papillae ( ), shallow rete ridges ( ), sever inflammatory cells (head arrow) and atrophied muscle fibers ( ) (H & E x10).

Figure (3): Section of dorsal tongue mucosa of rats from group C showing re-epithelization ( ), some of filiform papillae restored the normal shape ( ), well developed fungiform ( ) and circumvallate papillae ( ), still mild inflammatory cells ( ) with strand of irregular striated muscle fibers ( ) H & E, x100
Immunohistochemical detections: The photograph of dorsal surface of rats tongue in group A (control group) showed strong positive immune expression to PCNA was observer in the nuclei of basal and supra basal layers within tongue mucosa (fig.4). While, the immunoexpression of PCNA in group B was revealed mild immune reactivity reserved at the basal cells within nucleus and some of keratinocytes at surface layer (fig. 5). As for group C, it was recognized that PCNA immunostaining was moderate immune reactivity comprising the whole basal layer cells of tongue epithelium; also few positive cells of connective tissue were noticed (fig. 6). Furthermore, the immunoexpression of BCL-2 protein in normal rat tongue mucosae (group A) showed mild cytoplasmic reactions of some epithelial cells at surface of epithelium. In group B, the immunoexpression of BCL-2 revealed negative immunoreactions in the whole of epithelial cells. Also, the cells of lamina propria showed negative BCL-2 immunolabeling. The immunoexpression of BCL-2 of group C showed that positive immunostaining of BCL-2 was greatly than the control limited to keratinocytes of epithelial surface layer and also some cells of basal and Para basal layer.

Figure (4): Section of dorsal tongue mucosa of rats from group A showing strong brown PCNA positive nuclei in the basal and suprabasal layers of the tongue epithelium (arrow) (immunohistochemistry. X400).
Figure (5): Section of dorsal tongue mucosa of rats from group B showing mild staining to PCNA at basal cells with missing the positive cells in some basal layer cells (arrows) (immunohistochemistry X400).

figure (6): Section of dorsal tongue mucosa of rats from group C showing positive staining cells of basal layer (arrows) (immunohistochemistry X400).
Regarding to Statistical analysis, the immune expression of PCNA in the control group was showed 16.32±0.16 while BCL-2 in the same group 7.27±0.10. ANOVA test was showed a significant decrease (P=0.000) of mean immune expression in the 5-FU treated group in both of PCNA and BCL-2 were 4.71±0.08 and 0.07±0.05 respectively, in comparison with control group. The treatment with glycine causes a significant increase in the number of PCNA and BCL-2 positive cells 10.85±0.08 and 3.21±0.07 respectively, in comparison with the 5-FU treated group (p≤0.05).

**Discussion**

Oral mucositis is a complex process started through damage to cells in the basal epithelium and fundamental tissue of oral mucosa and has recurrent painful obstacles related with mucosal damage 17. As well, this complex process comprising not only direct cell damage happened by chemotherapy or radiotherapy, but also a complex cascade of biological proceedings 18. Administration of 5-FU has been accomplished like a technique to trigger oral mucositis in rats and the initiation of lesion appeared through five to seven days of their administration, so the mouth becomes prepared for entry of microbes. Therefore, the oral mucosa becomes vulnerable to an increased risk of infection and ulceration 19,20. Different histological changes as hyperkeratosis, flattening of rete ridges, sever inflammatory cells in lamina propria and severe atrophied in papillae were seen associated with use of 5-FU, perhaps because of the mechanism of suppression of epithelial proliferation by cytotoxic effect of 5-FU. Also, administration of 5-FU was joined by a significant reduction in PCNA and BCL-2 positive cells. Reactive oxygen species is generated by chemotherapy which is harmful to the DNA of epithelial cells and reduce the metabolism in progenitor cells and give rise to inhibition of mitosis and raise of apoptosis 21. These results were clarified and supported the findings of some investigators 22, were reported that nutritional supplementation with 5% glycine has accelerated the process of wand healing, recover the weight gain, antioxidant ability and immunity. The anti-inflammatory impacts of glycine are supposed to be mediated, because of its method of action in the cell membrane where it stimulates the chloride channel that stabilizes the membrane possible 23. Furthermore, glycine prevents the raise of intracellular calcium which stimulates the forming of the cytokines by suppressing cells that activate the inflammatory method through preventing stimulation of TNF-α and NF-κB and therefore reducing the production of free radicals and additional toxic mediators 24. PCNA is localized in the nucleus and is related with cell proliferation 25.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the College of Science and all experiments were carried out in accordance with approved guidelines.

**References**


Fracture Resistance of New Fiber Post System (Rebilda GT)

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Abstract

Background and Aims: Evaluate and compare the fracture resistance of endodontically treated teeth restored with bundle glass fiber post and tapered glass fiber post, at 45 degree oblique load.

Materials and Method: Thirty newly extracted single rooted mandibular first premolars were chosen, and after root canal preparation and obturation, post spaces were prepared. Then the samples were separated into three groups (n = 10) dependent on the type of restorative method used: group A restored with Rebilda fiber post [tapered glass fiber post], group B restored with Rebilda post GT post system (bundle glass fiber post), and group C restored with direct composite resin restoration without a post (control). Using a universal testing machine with speed of 0.5 mm/minute at 45 degree sloping load which was applied to the restored teeth, fracture resistance was recorded in Newton.

Results: The results showed that the fracture resistance significantly affected by different post systems (p < 0.05). The bundle glass fiber post (rebilda Gt) showed highest fracture resistance than the other groups.

Conclusion: Rebilda GT post (bundle glass fiber system) showed higher fracture resistance than the Rebilda fiber post (tapered glass fiber post) and control group respectively.

Keywords: Fracture resistance, Rebilda GT post, Rebilda fiber post.

Introduction

The restoration of root canal treated teeth is difficult to clinicians particularly when there is moderate to sever tooth loss, in such cases, the final restoration can be well retained only by means of a post and core system. The preference of suitable restoration for these teeth is affected by strength and esthetics.[1,2]

Prefabricated posts have become prevalent because of the wide assortment systems are available like: tapered, parallel sided, smooth or serrated, cemented, threaded or combination of these, the prefabricated metal posts have been used for many years to restoring endodontically treated teeth; However, the roots restored with metal posts are subjected to fracture because of the high elastic modulus of metals which is very high compared with that of dentin so any force specially lateral force will cause concentrated stress on the root and fracture. [3]

Fiber reinforced composite post was used as a substitute to metal cast post and cores and metal post, the first fiber post was introduced in the late of 1989 to restore endodontically treated teeth with an excessive loss of tooth structure, the priority of these posts can be basically attributed to that these posts has modulus of elasticity closer to that of dentin with good esthetic specially when all ceramic crowns are done, other advantages of fiber posts was decrease the hazard of root fracture because it enabling soft cementation without friction with root canal walls. [4-7]

Glass fiber posts have an elastic modulus comparable to that of dentin and can be bonded to the tooth structure which allows more homogeneous stress absorption and force distribution on the residual root consequently reinforcing the tooth structure, this property has been reported to reduce catastrophic fracture of the root and offer better distributions of the stress; Glass fiber post provides excellent esthetic and light transmission results, it require less dentin removal, and can be bonded to dentin. [8-11]
Furthermore the glass fiber posts are unaffected by corrosion; also these posts have tensile strength comparable to dentine; they are high retentive because of their matching and bonded to tooth structure also have revealed appropriate results comparative to root fracture and more convenient fracture modes.[8,9]

Other advantages of glass fiber posts are that they allow preparing the intra canal post preparation and fulfilling post cementation in a single clinical visit, because these procedures don’t required laboratory work, so that decreasing the working time, cost effective and decrease the risk of root canal contamination.[8,9]

A new glass fiber post developed by German company this post is basically a bundled post this post is radiopaque, translucent and exhibits dentine like elasticity. Each post composed of many of fine individual posts (0.3 mm in diameter) in varying numbers fixed together with color coded sleeve. In this system once remove the sleeve the bundles spread and are spread into the entire root canal, which can be adapted to any root canal anatomy. In contrast to conventional root posts, this provides uniform strengthening of the entire core buildup.

The purpose of this in vitro study was to estimate the fracture resistance of endodontically treated teeth restored with a bundle glass fiber post (rebilda GT) and tapered glass fiber post (Rebilda fiber post) at 45 degree oblique load.

The null hypothesis test was that the bundle fiber post will show superior fracture resistance than the tapered post.

**Materials and Method**

Thirty freshly extracted human single rooted lower first premolar teeth extracted for orthodontic reasons were selected for this study the teeth collected from young patient’s age between 18-25 years old.

The selected teeth with absence of cracks or caries, no posts or crowns, no external resorption, with anatomically similar roots were selected. Radiographs for all teeth were taken and examined to exclude any teeth with canal calcifications, abnormalities, and/or signs of internal resorption.

The extracted teeth stored in 0.1% thymol solution at room temperature.

During preparation of the specimen, the root surfaces were cleaned from soft tissue with a periodontal curette (LM- Ergomax, Finland). Before preparation of the root canal, the crowns of all teeth were sectioned at the level of the cement-enamel junction (CEJ) using diamond disc (Komet, Germany) adjusted to a slow-speed hand piece, with continuous water coolant, the roots were adjusted to 12 mm in length, any root that not 12mm length after section was excluded, and the working length was measured 1 mm shorter from the apex.[11]

All the root canals were instrumented by using pro-taper next rotary files driven at 250 rpm with 2N/cm torque (x smart pluse, Dentsply, Maillefer).

Each instrument was used for five canals up to size X3 (30/0.07) during preparation EDTA cream (SURE-PREP, SURE ENDO, korea) used inside canal to enhance instrumentation and 2ml of distilled water and 2ml of 5.25% sodium hypochlorite (NaOCl) irrigation were used between each file size, there after each canal received a final irrigation of 3 ml EDTA solution to remove the smear layer then 3 ml of NaOCl after washing the EDTA with 2ml of distilled water, then the canals flushed with 10 ml distilled water to remove any remnant of irrigation materials.[12]

After drying with paper points the canals were obturated with single cone using size X3 guttapercha cone which was fitted at the working length with slight resistance [tug back] effect, in conjunction with endodontic sealer (AD SEAL) (META BIOMED CO.LTD, Korea).

Then access gutta-percha was removed and condensed vertically with hand plugger after the ending of the endodontic treatment, temporary filling material MD Temp (META BIOMED, Korea) used to close the opening of the canals. Then the teeth stored inside incubator at 37°C with 100% humidity for one week.

**Fiber Post Procedure:** After one week of incubation the temporary filling removed and peeso reamer size 3 was used to remove the gutta-percha to a depth of 8 mm leaving 4mm of endodontic filling at the apex to ensure a clinically acceptable apical seal. As manufacturer instructions the Rebilda GT post system come without drills and this post well-matched with all drill systems.

Ultimately the canals flushed with 2ml NaOcl 5.25% and 2ml distilled water respectively to remove the debris then dried with paper points.
Then the roots were arbitrarily divided into three groups with regard to the post type:

**Group A:** 10 roots filled with Rebilda fiber post (1.2 mm in diameter tapered posts) (Voco Cuxhaven, Germany) (Figure 1).

**Group B:** 10 roots filled with Rebilda GT bundle fiber post (1.2 mm in diameter bundle posts) (Voco Cuxhaven, Germany) (Figure 2,3).

**Group C:** 10 roots restored with direct composite resin restoration without a post (control).

Before cementation, as manufacturer’s instructions all posts were disinfected with alcohol, then silane coupling agent was applied to the post and allowed to dry for 1 minute as manufacturer instructions, after that bonding agent (Futurabond U Voco Cuxhaven, Germany) which is self-etching and dual cure were applied inside the root canals and dried with gentle air without light cure as manufacture instructions then the core-built-up composite (Rebilda DC, VOCO Germany) inserted in the canal using special application tip for the groups: Rebilda post and Rebilda GT post. Following placement of the posts with slight finger pressure, the excess resin was removed after light curing for 3 seconds with the probe. Then the resin was light-cured with light curing device with 1600mW/mm² intensity for 40 seconds (Da-lux, Dia Dent Korea) in the occlusal direction; the intensity of light cure had been checked before using with a radiometer and rechecked after each curing. [12, 13]

The core build-ups with composite resin which were standardized using the same size of a cellulite core-forming matrices to ensure the uniformity of the specimens. Then all the specimens were maintained in 100% humidity, for 24 hours, at 37°C.

Fracture Resistance test was done by applying the load using the Instron Universal Testing Machine (TERCO, MT 3037, Sweden).

A 45-degree oblique load was applied at speed of 0.5 mm/minute until fracture occur, and the fracture loads were registered and the fracture was observed by visual inspection with the aid of transillumination and by return-back de-bonded force score to zero, as shown on a computer screen.

Statistical analysis was done using Statistical Package for the Social Science software, version 17.

Descriptive statistics were expressed as means and standard deviation (SD) for each group (Tables 1). The effect of different posts types on the fracture resistance of the tooth was assessed by comparison of groups using ANOVA test and post hoc Tukey HSD test (Tables 2 and 3). In the above tests, p ≤ 0.05 was taken to be statistically significant.

**Results**

The mean and standard deviation of fracture resistance for each experimental condition are presented in table 1.

Statistical analysis of data by using the analysis of variance ANOVA test and post hoc Tukey HSD test (Tables 2 and 3). The tables showed, that group B (Rebilda GT post) had the highest average fracture resistance, compared to group A (Rebilda fiber post) and group C (control group) respectively. Consistent with the finding, the null hypothesis was accepted as the bundle post restorations show higher fracture resistance than other groups.
Figure (2): Rebilda GT post kit.

Figure (3): Fiber post inside the specimen.
Table (1): Descriptive statistics show the fracture resistance in Newton.

<table>
<thead>
<tr>
<th>Groups</th>
<th>N</th>
<th>Mean</th>
<th>Std.deviation</th>
<th>Std. Error</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rebilda fiber post</td>
<td>10</td>
<td>222</td>
<td>12.74</td>
<td>4.03</td>
<td>200</td>
<td>240</td>
</tr>
<tr>
<td>Rebilda GT post</td>
<td>10</td>
<td>284</td>
<td>12.79</td>
<td>4.04</td>
<td>265</td>
<td>310</td>
</tr>
<tr>
<td>Control</td>
<td>10</td>
<td>80</td>
<td>7.05</td>
<td>2.23</td>
<td>70</td>
<td>90</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>195</td>
<td>87.7</td>
<td>16.02</td>
<td>70</td>
<td>310</td>
</tr>
</tbody>
</table>

Table (2): ANOVA test between the groups.

<table>
<thead>
<tr>
<th></th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between Groups</td>
<td>219901.66</td>
<td>2</td>
<td>109950.833</td>
<td>877.527</td>
<td>0.000</td>
</tr>
<tr>
<td>Within Groups</td>
<td>3383.000</td>
<td>27</td>
<td>125.296</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>223284.667</td>
<td>29</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

P value less than that of 0.05 indicates significance of difference

Table (3): Tukey HSD test to evaluate the significance of differences.

<table>
<thead>
<tr>
<th>Mean difference [I – J ]</th>
<th>Std. error</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rebilda fiber post</td>
<td>Rebilda Gt post</td>
<td>-62.000</td>
</tr>
<tr>
<td>Rebilda fiber post</td>
<td>Control</td>
<td>142.000</td>
</tr>
<tr>
<td>Rebilda Gt post</td>
<td>Rebilda fiber post</td>
<td>62.000</td>
</tr>
<tr>
<td>Rebilda Gt post</td>
<td>Control</td>
<td>204.000</td>
</tr>
<tr>
<td>Control</td>
<td>Rebilda fiber post</td>
<td>-142.000</td>
</tr>
<tr>
<td>Control</td>
<td>Rebilda Gt post</td>
<td>-204.000</td>
</tr>
</tbody>
</table>

The mean difference is significant at the p value less than or equal to 0.05 level.

**Discussion**

Restoration of endodontically treated teeth is a pivotal subject in restorative and prosthetic dentistry. Intra-radicular posts are used extensively to restore root canal treated teeth with an enormous loss of coronal structure. Glass fiber posts have elastic modulus similar, near to that of dentin which allows for the harmonized stress distribution, force absorption inside root structure. This posts are capable to bond to dentin so that it restores the function, esthetic and strengthening the remaining dental structure. Fiber-reinforced composite resin posts differ in conditions of design, shape and properties, the bonding of fiber reinforced composite resin posts to dentin is affected by many factors such as the post material, the shape of post tapered or parallel, and the luting material; the thickness of the luting materials around the post play an important role in the bonding strength. The posts absorb the applied stresses and dispense this force along the entire post channel. Rebilda GT is a new type of glass fiber dental posts, which is composed of a bundled of glass fiber-reinforced composite post, this post different from conventional posts because once open the sleeve it will occupied the canal space and adapted well to the canal walls also the thickness of cement will be less there for it show higher resistance to fracture than the single post. Rebilda GT can diffuse in the fine individual posts that are dispense in the entire root canal, this post fitted optimally to any root canal configuration; consequently, this oncoming can be used in conditions where strongly curved root canals or oval and pearl shape root cross sections and marked conicity occur. An 45 degree oblique load to the long axis of the tooth was applied to the tested specimens which appear to be the worst condition in terms of the fracture resistance this correspond to a worst occlusal loading for teeth. The results of this study revealed that the
Rebilda GT post (group B) system showed significantly higher resistance against oblique load than the Rebilda post (group A), and the control group (group C) showed the least fracture resistance, this could be attributed to a better chemical bond between the glass fiber and the resin matrix, however increase in the number of fibers in the coronal aspect leads to better adaptation and bonding to the walls of the canal and to the core respectively and thus better stress distribution than of the single post this bundle posts can be used to strengthening of the weak tooth specially the large canals because it can occupy the canal space with least amount of cement thickness which give more strength to the canal walls. This result agrees with Maceri et al. showed that a multi-post system may lead to superior adaptation to the tooth.[19]

**Conclusion**

Rebilda GT post (bundle glass fiber system) showed higher fracture resistance than the Rebilda fiber post (tapered glass fiber post) and control group respectively so that this post (rebilda GT) can be strengthen the weak tooth structure better than tapered post.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the University of Mosul and all experiments were carried out in accordance with approved guidelines.

**References**


16. Sorensen JA, Engelman MJ. Effect of post


Relation of Endothelin-1 and Malondialdehyde with Pre-eclampsia in Pregnant Women

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Abstract
A case-control study was conducted in Kirkuk city in Kirkuk general hospital from first of March 2018 and to end of September 2018 to evaluate the role of endothelin-1 and malondialdehyde in pathogenesis of preeclampsia in pregnant women. The study included 30 pregnant women with preeclampsia, patients were defined and divided according to the National High Blood Pressure Education Program Working Group on High Blood Pressure in Pregnancy. A control group of 30 healthy normotensive pregnant females was also included. All comparison groups were matched for mother’s age, parity, and gestational age at the time of enrollment and blood collection. Three ml of blood was collected by vein puncture, blood samples were placed into sterile test tubes and left for 30 minutes at 37 °C then were centrifuged at 3000 rpm for 15 minutes then the clot was removed and the obtained sera were then aspirated using automatic micropipette and transferred into clean test tubes and stored in deep freeze at -20°C for determination of endothelin-1 and malondialdehyde by usingELISA technique. The study showed that the highest mean level of endothelin-1 was found in pregnant women with pre-eclampsia(13.15±2.81 pg/ml) and the lowest mean was in the control group (0.41±0.31 pg/ml). The result was highly significant (P<0.01). The study showed that the highest mean level of MDA was found in pregnant women with pre-eclampsia (6.75±2.94 nmol/ml) and the lowest mean was recorded in the control group (3.85±1.29 nmol/ml). The result was highly significant (P<0.01). The current study showed that the mean age of patients enrolled in the study was 33.5 years, the highest mean of endothelin-1 in HD patients was recorded within the age group 20-29 year of pregnant women with pre-eclampsia. Although the results was non-significant. The study showed positive correlation between endothelin-1 and MDA levels pregnant women with pre-eclampsia. It was concluded that serum endothelin-1 and MDA levels were highly correlated with pregnant women with pre-eclampsia.

Keywords: Endothelin-1; MDA; pre-eclampsia; Pregnancy.

Introduction
One of the most common complications of pregnancy is preeclampsia. Preeclampsia occurs in ~8% of all pregnancies, and is significantly more prevalent in specific ethnic subpopulations(1). Despite an increasing awareness of the condition, and aggressive therapeutic intervention, preeclampsia remains a leading cause of both fetal and maternal perinatal morbidity and mortality, with ~15% of all preterm pregnancies attributable to preeclampsia(2). The disease is primarily seen in nulliparous women, with a significantly decreased incidence in succeeding pregnancies. Traditionally, the disorder has been defined by hypertension (systolic >140 mm Hg), proteinuria (300 mg/24 h), and edema(3). However, current guidelines omit edema as a necessary symptom for diagnosis, and there is increasing discussion as to whether the absolute values of proteinuria are the correct metrics by which to guide treatment, or whether the protein/creatine ratio would be a more diagnostic measurement (1). The molecular structure of this endothelium-derived constricting factor which produces powerful, very long-lasting constrictions of a range of mammalian blood vessels in vitro including human arteries and veins. It also causes long-lasting elevation of blood pressure when injected into rodents(4). Because of these observation, scientists at this time were of the opinion that this peptide - nowadays called endothelin-1 (ET-1) plays an important role in the pathogenesis of
arterial hypertension as well as pregnancy induced hypertension/preclampsia\(^{(5)}\). Nowadays, role of oxidative stress in PIH etiology is being researched, and acquired results show that oxidative stress could have a significant role in generation of preeclampsia since it starts damage of endothelium of placenta vascularization and immune response\(^{(6,7)}\). Normal pregnancy is considered to be a state where oxidative stress increases a bit, but there is no increase in, so called, free radicals\(^{(8)}\). Recently, a great attention is being paid to lipid peroxidation, which actually is oxidative damage of lipids and increased creation of lipid peroxides, whose final product is malondialdehyde (MDA). Nowadays, malondialdehyde (MDA) is used in many expert researches as oxidative stress marker, i.e. for assessment of lipid peroxidation\(^{(9,10)}\). The aim of this study was to evaluate the role of endothelin-1 and malondialdehyde in pathogenesis of pre-eclampsia in pregnant women.

**Materials and Method**

A case-control study was conducted in Kirkuk city in Kirkuk general hospital from first of March 2018 and to end of September 2018. The study included 30 pregnant women with preeclampsia, patients were defined and divided according to the National High Blood Pressure Education Program Working Group on High Blood Pressure in Pregnancy. A control group of 30 healthy normotensive pregnant females was also included. All comparison groups were matched for mother’s age, parity, and gestational age at the time of enrollment and blood collection.

**Exclusion Criteria:**

1. Multiple gestations.
2. Fetal structural/genetic anomalies.
5. Inflammatory disease.
6. Autoimmune disease, and other comorbidities associated with endothelial damage.

Hypertensive disorders were defined according to classification of The National High Blood pressure Education program Working group on High Blood pressure in pregnancy. Twenty-four-hour automatic blood pressure monitoring was performed. Blood pressure readings were taken at 30-minute intervals. For patients who was admitted to the hospital, and two readings of blood pressure was taken for patients who was not admitted to the hospital and diagnosed as hypertensive disorders depend on history and examination and blood pressure readings that record on antenatal card in each antenatal visit. Measurement of Bp done by sphygmomanometer in sitting position, with cuff size appropriate to patients arm circumference was used, and to eliminate a possible stressor for the patients, the visual preview of blood pressure measurement was removed. Three ml of blood was collected by vein puncture, blood samples were placed into sterile test tubes and left for 30 minutes at 37 °C then were centrifuged at 3000 rpm for 15 minutes then the clot was removed and the obtained sera were then aspirated using automatic micropipette and transferred into clean test tubes and stored in deep freeze at −20°C for determination of endothelin-1 and malondialdehyde by using ELISA technique.

**Finding:** As shown in Table 1. There was no significant difference between studied cases and the control group regarding patient age and gestational age at sampling and parity (P>0.05) while there was a significant difference between studied cases and the control group regarding systolic and diastolic blood pressure (P<0.05).

**Table 1: Clinical characteristics of studied women**

<table>
<thead>
<tr>
<th>Parameters (Mean±SD)</th>
<th>Pre-eclampsia</th>
<th>Control Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Maternal age (years)</td>
<td>32.2±5.9</td>
<td>32.2±6.2</td>
</tr>
<tr>
<td>Gestational age</td>
<td>34.1±3.2</td>
<td>35.4±6.6</td>
</tr>
<tr>
<td>Parity, median (Range)</td>
<td>1 (1–6)</td>
<td>2 (1–6)</td>
</tr>
<tr>
<td>Mean 24 h SBP, mm Hg</td>
<td>148.6±14.3*</td>
<td>110.8±7.4</td>
</tr>
<tr>
<td>Mean 24 h DBP, mm Hg</td>
<td>96.6±12.9*</td>
<td>69.4±8.3</td>
</tr>
<tr>
<td>Maximal SBP, mm Hg</td>
<td>177.9±24.1*</td>
<td>119.0±10.2</td>
</tr>
<tr>
<td>Maximal DBP, mm Hg</td>
<td>118.8±12.8*</td>
<td>74.7±13.3</td>
</tr>
</tbody>
</table>

* P<0.01.

The study showed that the highest mean level of endothelin-1 was found in pregnant women with pre-eclampsia\((13.15±2.81 \text{ pg/ml})\) and the lowest mean was in the control group \((0.41±0.31 \text{ pg/ml})\). The result was highly significant (P<0.01), Table 2.
Table 2: Level of endothelin-1 in pregnant women with pre-eclampsia and the control group.

<table>
<thead>
<tr>
<th>Endothelin 1 (pg/ml)</th>
<th>Pregnant women with pre-eclampsia</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Mean±SD.</td>
<td>1.78±1.02</td>
<td>0.41±0.31</td>
</tr>
</tbody>
</table>

(P<0.01)

The study showed that the highest mean level of MDA was found in pregnant women with pre-eclampsia (6.75±2.94 nmol/ml) and the lowest mean was recorded in the control group (3.85±1.29 nmol/ml). The result was highly significant (P<0.01), Table 3.

Table 3: Level of Malondialdehyde in pregnant women with pre-eclampsia and the control group.

<table>
<thead>
<tr>
<th>MDA (nmol/ml)</th>
<th>Pregnant women with pre-eclampsia</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Mean±SD.</td>
<td>6.75±2.94</td>
<td>3.85±1.29</td>
</tr>
</tbody>
</table>

(P<0.01)

The current study showed that the mean age of patients enrolled in the study was 33.5 years, the highest mean of endothelin-1 in HD patients was recorded within the age group 20-29 year of pregnant women with pre-eclampsia. Although the results was non-significant, Table 4.

Table 4: Distribution of patients in the study according to age and endothelin-1 level.

<table>
<thead>
<tr>
<th>Age groups (years)</th>
<th>No.</th>
<th>Pregnant women with pre-eclampsia</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-29</td>
<td>10</td>
<td>2.10±1.8</td>
</tr>
<tr>
<td>30-39</td>
<td>15</td>
<td>1.11±1.01</td>
</tr>
<tr>
<td>40-42</td>
<td>5</td>
<td>1.46±1.13</td>
</tr>
</tbody>
</table>

(P.value 0.08)

The study showed positive correlation between endothelin-1 and MDA levels pregnant women with pre-eclampsia (Figure 1).

Figure 1: Correlation between endothelin-1 and MDA levels pregnant women with pre-eclampsia

Discussion

The result of the current study was in consistence with past study, showed that, plasma ET-1 concentrations are markedly increased in pregnant women with pre-eclampsia as compared with healthy individuals(11). Xu, et al(12) also found that ET-1 was more likely to be elevated in pregnant women with pre-eclampsia. Li, et al(13) indicated that ET-1 was activated in several diseases, including renal failure and arterial hypertension. Additionally, Cin, et al(14) found that level
of ET-1 was significantly higher in pregnant women with pre-eclampsia compared to the controls (P < 0.001).

Similar results were also achieved by Hocher, et al (15) who found that MDA concentrations were significantly higher in pregnant women with pre-eclampsia than in controls. An other study demonstrated that Plasma level of MDA was significantly elevated in pregnant women with pre-eclampsia group than in healthy controls (16). Additional reports demonstrated mean serum MDA levels was significantly elevated in pregnant women with pre-eclampsia compared with normal level in healthy control group (17,18). Former report also showed that MDA was elevated in pregnant women with pre-eclampsia in comparison to the control groups. Several other studies also agreed with our findings, they found high serum MDA levels in pregnant women with pre-eclampsia compared with healthy individuals (19,20).

Former researches dealing with problem of MDA indicate that pregnancy is a state of physiological, slightly increased oxidative stress in comparison to healthy non-pregnant women. Oxidative stress could have a significant role in generation of pregnancy induced hypertension (PIH), since it starts damage of endothelium of placenta vascularization and immune response (21,22). Others also concluded in their study that pregnancy induced hypertension (PIH) is a state of extreme increase of oxidative stress and lipid peroxidation (22). In our study, we proved the increased MDA level as oxidative stress marker in pregnant women with PIH, too. Based on our acquired results, that means that pregnant women of test group had extremely increased MDA values in comparison to control group. Our results in this research show that pregnancy induced hypertension is a state of extremely increased oxidative stress which corresponds to the other studies, too (23-25).

**Conclusion**

Serum endothelin-1 and MDA levels were highly correlated with pregnant women with pre-eclampsia.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Obstetric and Gynecology Kirkuk health directorate and all experiments were carried out in accordance with approved guidelines.

**References**


Relation of Elevated Serum AFP Levels with Preterm Labor in Kirkuk City-Iraq

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Abstract

In this study conducted in Kirkuk city in the period from February 2017 to the end of December 2017, which included 100 pregnant women who had regular contractions and/or short cervical cervices between 24 to 32 weeks of pregnancy and 100 healthy controls who did not suffer from complications Pregnancy and they were delivered on time. For the purpose of comparing the two groups with respect to the level of AFP. The study included collecting blood samples from both groups prior to birth to investigate and measure the level of the protein AFP in their blood. The study demonstrated that the lowest mean of cervical length and birth Wight were found in group with preterm labor as compared with the control group. The study revealed that the mean of AFP was elevated significantly in women with preterm delivery (17.7±2.11 pg/ml) as compared with the control group (8.23 ±1.67 pg/ml) at P. value <0.05. In this study, 40 of 100 of study cases delivered preterm (< 34 weeks). The study found positive correlation of serum AFP with birth weight, birth head during 1st and 5th weeks of delivery (p< 0.01).

Keywords: AFP, Preterm labour, Term Labour.

Introduction

Virtually every publication about preterm birth (PTB) cites the profound impact PTB has on the babies, families and the healthcare system(1). In Practice Bulletin 127 (June 2012), The American College of Obstetrician and Gynecologists (ACOG) states: “Preterm birth is the leading cause of neonatal mortality and the most common reason for antenatal hospitalization(2). In the United States approximately 12% of all live births occur before term, and preterm labor (PTL) preceded approximately 50% of these preterm births preterm births account for approximately 70% of neonatal deaths and 36% of infant deaths as well as 25–50% of cases of long-term neurologic impairment in children”. These statistics magnify the importance of PTL contributing to 50% of PTB’s(3). When a patient presents to the hospital with regular uterine contractions and cervical change between 20 0/7 weeks and 36 6/7 weeks gestation with intact membranes, a diagnosis of PTL is made. Some factor or factors have caused a response of the myometrium (contractions) creating the risk of PTB(4). Maternal serum alpha-fetoprotein (MS-AFP) is a second-trimester biochemical marker for prenatal screening. High or low MS-AFP suggests high risk of fetal open neural tube defects (ONTDs) or chromosomal aneuploidy, respectively(5). Based on the decades’ experience of prenatal screening, it has been reported in numerous studies that after excluding fetal ONTDs, women with elevated second-trimester MS-AFP have higher risk of APOs(6-8). Therefore, it has been well known that second-trimester MS-AFP can be a biomarker for the predictions of APOs(9). The aim of the study was to evaluate the role of maternal AFP levels with preterm and term delivery.

Material and Method

In this study conducted in Kirkuk city in the period from February 2019 to the end of December 2019, which included 100 pregnant women who had regular contractions and/or short cervical cervices between 24 to 32 weeks of pregnancy and 100 healthy controls who did not suffer from complications Pregnancy and they were delivered on time. The gestational age were determined by crown-rump length measured by ultrasound scan. In order to promote the first-trimester one-stop screening, we performed MS-AFP test additionally combining with ultrasonic measurement of intracranial translucency (IT) and detection of fetal structural abnormalities to study
the first-trimester screening of fetal ONTDs. The study included collecting blood samples from both groups prior to birth to investigate and measure the level of the protein AFP in their blood serum using immunofluorescence (i-chroma Korea). Through the study, patients were also monitored in terms of the consequences of early birth in terms of complications as well as birth weight.

**Statistical Analysis:** Computerized statistically analysis was performed using Mintabver 18.0 statistic program for determination of the $P$ value ($P<0.05$: significant).

**Findings:** The study showed no significant difference between preterm group (Cases) and term group regarding maternal age ($P$ value $>0.05$). The study also showed that the rate of regular contractions was 40% in patients group compared while no one of the control group was with regular contractions ($P<0.01$). The study demonstrated that the lowest mean of cervical length and birth weight were found in group with preterm labor as compared with the control group (Table 1).

### Table 1: General characteristics of the studied groups

<table>
<thead>
<tr>
<th>Variables</th>
<th>Preterm Labor (n=100)</th>
<th>Control group (n=100)</th>
<th>$P$. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Mean±SD)</td>
<td>33.5±3.9</td>
<td>32.5±3.8</td>
<td>NS</td>
</tr>
<tr>
<td>Regular contractions</td>
<td>40 of 100</td>
<td>0 of 50</td>
<td>0.001</td>
</tr>
<tr>
<td>Cervical length (mm, median (min-max))</td>
<td>21 (5 - 47)</td>
<td>37 (26 - 52)</td>
<td>0.001</td>
</tr>
<tr>
<td>Birth weight (gm) (mean (range))</td>
<td>2659 (1862-3200)</td>
<td>3381 (3180-3535)</td>
<td>0.001</td>
</tr>
</tbody>
</table>

The study revealed that the mean of AFP was elevated significantly in women with preterm delivery ($17.7±2.11$ pg/ml) as compared with the control group ($8.23±1.67$ pg/ml) at $P$. value $<0.05$. Table 2.

### Table 2: Relation of mannose binding lectin with preterm delivery

<table>
<thead>
<tr>
<th>AFP level</th>
<th>Preterm delivery group</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>17.7</td>
<td>8.23</td>
</tr>
<tr>
<td>SD</td>
<td>2.11</td>
<td>1.67</td>
</tr>
<tr>
<td>No.</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

P. value: 0.041

In this study, 40 of 100 of study cases delivered preterm (< 34 weeks). In this subgroup, 12 mothers had histologically proven evidence of chorioamnionitis, and 10 of these patients additionally tested positive for funisitis. It is interesting to note that the levels of AFP in these 5 patients who tested positive for both Chorioamnionitis and funisitis were significantly reduced; (Table 3).

### Table 3: AFP serum levels and pregnancy outcomes

<table>
<thead>
<tr>
<th>AFP level</th>
<th>Benign outcomes</th>
<th>Chorioamniositis and funisitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>18.17</td>
<td>14.27</td>
</tr>
<tr>
<td>SD</td>
<td>2.22</td>
<td>2.16</td>
</tr>
</tbody>
</table>

P. value: 0.001

The study found positive correlation of serum AFP with birth weight, birth head during 1st and 5th weeks of delivery ($p< 0.01$), Table 4.

### Table 4: Correlation of AFP serum levels with gestational age

<table>
<thead>
<tr>
<th>Variable</th>
<th>by Variable</th>
<th>Spearman $\rho$</th>
<th>$P$. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum AFP levels during 1st week</td>
<td>Birth weight (g)</td>
<td>0.41</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>Weight at 4th week (g)</td>
<td>0.33</td>
<td>0.005</td>
</tr>
<tr>
<td>Serum AFP levels during 5th week</td>
<td>Serum AFP levels during 1st week</td>
<td>0.52</td>
<td>0.003</td>
</tr>
</tbody>
</table>

Discussion
The study showed no significant difference between preterm group (Cases) and term group regarding maternal age (P. value >0.05). The study also showed that the rate of regular contractions was 40% in patients group compared while no one of the control group was with regular contractions (P<0.01). The study demonstrated that the lowest mean of cervical length and birth weight were found in group with preterm labor as compared with the control group. The study showed minor differences between the two groups in relation to the ricin protein, as it was relatively low in patients with early birth. Other studies also found that the levels of the AFP are positively related to the child’s weight, height, and head circumference in the delivery period, and also found that there was a correlation with the child’s weight and head circumference after a month of birth. It was concluded in other studies that the high level of acrines was positively correlated with the weight of fetuses before birth (6-8). Moreover, the level of the iris in the blood correlates positively with the total weight of the fetus and its circular circumference as concluded by ultrasound (7). The results of our study are very similar to the results mentioned in the above-mentioned masses and his support for him, as it concerns the Moawad in the first month of their birth. Where previous studies confirmed that newborns represent low levels of serum ezine levels compared to infants during the first month of life (9), there is a significant difference between the first and second evaluation. Other studies conducted in different regions of the world indicate that the level of the iris of the eye was somewhat low compared to the control group in this research, previous studies on mature children showed that the levels of iris of the eye are generally higher compared to the results in our study (10). We assume that we have detected low levels of the iris as our blood samples are collected directly from children, unlike previous studies in which bloodstream analyzes of the iris were likely to be affected by the maternal iris. In our study of serum iris levels during the fifth week of life were positively associated with the degree of birth weight, the score increased in 5 weeks, the head circumference Z score in 5 weeks unlike some previous studies (11). Many researchers believe that AFP in serum levels in new children may be inherited (from parents) (12-14). According to earlier studies conducted earlier, the rates and concentrations of serum protein iris in new children, especially in the first month of their life, may be inherited from the mother through energy-regulating genes and in particular, the lipid protein linked to high-density cholesterol (15-18). Although this protein has not been taken as a differentiating factor in these radomas, which may be a hindrance to this research. However, we found that iris levels were positively related to the child’s weight, height, and head circumference in the delivery period, Park et al. found in recent study that newborn mother in preterm labour have elevated AFP level especially who have significant child outcomes like chorioamninitis and fusinitis(19).

**Conclusion**

Serum level of AFP decreased significantly women with preterm labour as compared with term ones

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Kirkuk Health Directorate and all experiments were carried out in accordance with approved guidelines.

**References**


Genetic and Hybrid Gray Wolf Optimization Algorithm

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Abstract

Much of the data in the classification issue contains a number of additional attributes that do not affect the accuracy of the classification. There are many evolutionary algorithms that are used to define the feature and reduce dimensional patterns such as the gray wolf algorithm (GWO) after converting it from a continuous space to a discrete space. In this research, a method of feature selection was proposed through two consecutive stages in the first stage, the mutual information (MI) method is used to determine the most important feature selection. In the second stage, the binary gray wolf optimization (BGWO) algorithm is used to lessen and determine a specific number of features affecting the process of classification, which came from the first stage. The proposed algorithm MI_BGWO is efficient and effective by obtaining higher classification accuracy and a small number of specific features compared to other competing algorithms.

Keywords: Gray wolf optimization; classification; feature selection; mutual information.

Introduction

Gray wolf optimization (GWO) is a swarm intelligent technique developed by Mirjalili et al., 2014¹. The hunting techniques and the social hierarchy of wolves are mathematically modeled in order to develop GWO and perform optimization. The GWO algorithm is tested with the standard test functions that indicate that it has superior exploration and exploitation characteristics than other swarm intelligence techniques ². Scientists have developed the basic algorithm GWO by converting the search algorithm from a continuous search space to a discrete search space. This modified algorithm is called a binary gray wolf optimization (BGWO) algorithm, which works in binary search areas and uses binary values equal to 0 or 1³. Mutual information (MI) is one of the filtering method, which is calculated between two random variables using entropy. Entropy measures an average random variable the amount of information required to describe the random variable⁷. In this study, a new MI_BGWO algorithm is suggested to determine the best-feature selection. Our proposed algorithm can efficiently achievement the powerful points of both MI and BGWO algorithms in finding the most important feature. The experimental results show the excellent performance of the proposed algorithm when the number of feature is high, and the sample size is low. The GWO is presented in Section 2. In Sections 3 and 4, a brief description of feature selection and MI respectively. In Section 5, the proposed algorithm is explained. Section 6 covers the obtained results and their discussion. Finally, the most important general conclusions are mentioned, in section 7.

Grey wolf optimization (GWO): The gray wolf (Canis lupus) is part of the Canidae family. Gray wolves are types with a very rigorous social dominant hierarchy of leadership. Males and females in the pack are leaders, and they are called alpha¹. Alpha wolf is also known as the dominant wolf because all its orders must be followed by all wolves in the pack. Only alpha wolves are allowed to mate in the pack. This means that the order of the pack and its regularity is more important than its strength. Beta is the second level in the hierarchy of gray wolves. Beta are wolves that help alpha wolves make decisions or other things about the pack. The wolf beta is the best
candidate to be alpha in the case if one of the wolves of alpha becomes too big or in the case of the death of someone in command. Omega is less gray wolves. The omega wolf always offers all the other dominant wolves on it. Omega acts as a scapegoat. The last wolves allowed to eat are omega. We may apparently notice that omega is not an important member of the group, but in fact, if omega is lost, the entire pack will face problems and internal fighting. Delta is the fourth class in the pack. Delta wolves control omega, but they must undergo alpha and beta orders. Delta shall be responsible for guards, scouts, hunters, elders, and patients and each has its own specific responsibility\textsuperscript{8}.

**Mathematical Modelling:** The first best solution in GWO is alpha (\(\alpha\)), the second-best solution is beta (\(\beta\)), and the third-best solution is Delta (\(\delta\)). While the rest of the solutions are Omega (\(\omega\)), which follows the rest of the first three solutions.

**Encircling Prey:** Gray wolves surrounded prey while hunting. The following equations will represent a mathematical model about the surrounding behavior:

\[
\begin{align*}
\bar{D} &= |\bar{c} \cdot \bar{x}_p(t) - \bar{x}(t)| \quad (1) \\
\bar{x}(t+1) &= \bar{x}_p(t) - \bar{A} \cdot \bar{D} \\
& \text{where } t \text{ is the iteration, } \bar{x}_p \text{ is the prey position, } \bar{x} \text{ is the gray wolf position, the operator indicates vector entry wise multiplication.}
\end{align*}
\]

where \(\bar{A}\) and \(\bar{C}\) are coefficient vectors calculated as follows:

\[
\begin{align*}
\bar{A} &= 2\bar{d} \cdot r_1 - \alpha \\
\bar{C} &= 2 \cdot r_2 \quad (3)
\end{align*}
\]

where components of \(\bar{d}\) are linearly decreased from 2 to 0 over the course of iterations and \(r_1, r_2\) are random vectors in [0,1].

**Hunting:** Gray wolves have the ability to encircle prey and locate them. Hunting is performed by a complete pack based on, Information from the alpha, beta and delta wolves, So the updating for the wolves positions is as in the following equations:

\[
\begin{align*}
\bar{D}_{\alpha} &= |\bar{c}_1 \cdot \bar{x}_{\alpha} - \bar{x}|, \quad \bar{D}_{\beta} = |\bar{c}_2 \cdot \bar{x}_{\beta} - \bar{x}|, \quad \bar{D}_{\delta} = |\bar{c}_3 \cdot \bar{x}_{\delta} - \bar{x}| \\
\bar{x}_1 &= |\bar{x}_{\alpha} - \bar{A}_1 \cdot \bar{D}_{\alpha}|, \quad \bar{x}_2 = |\bar{x}_{\beta} - \bar{A}_2 \cdot \bar{D}_{\beta}|, \quad \bar{x}_3 = |\bar{x}_{\delta} - \bar{A}_3 \cdot \bar{D}_{\delta}|
\end{align*}
\]

\[
\bar{x}(t+1) = \frac{\bar{x}_1 + \bar{x}_2 + \bar{x}_3}{3} \\
\text{The updating of the parameter } \bar{d} \text{ through the following equation:}
\]

\[
\bar{d} = 2 - t \cdot \frac{2}{Max_{iter}} \\
\text{where } t \text{ is the iteration number and } Max_{iter} \text{ is the total number of iteration allowed for the optimization}.\text{9 The pseudo code of the GWO algorithm is displayed in Figure 1.}
Start
Generate an initial population of the gray wolf $X_i$ (i=1.....n)
Generate an initial value $A$, $a$, and $c$
Find the fitness function of each search agent
$x_a$ = the first best search agent
$x_b$ = the second-best search agent
$x_d$ = the third best search agent
while ($t < \text{Maxiter}$ of iterations).
for each search agent
Update the position of the current search agent by equation (7)
end for
Update $A$, $a$, and $c$
Find the fitness function of each search agent
Update $x_a$, $x_b$ and $x_d$
set $t = t + 1$
end while
return $x_a$
End

Figure 1: The pseudo code of the GWO algorithm.

Binary gray wolf optimization (BGWO): The positions of gray wolves constantly change in space to any point. Solutions are limited to binary values such as 0 or 1 in some special problems such as feature selection. In our research, we suggested feature selection through a binary GWO algorithm. Updating the equations of wolves are a function of the positions of three vectors is $X_a$, $X_b$ and $X_d$, which represents the best three solutions and which attracts each wolf towards it. At any given time, all solutions are at a corner of a hypercube and the solutions are grouped in binary form. Based on the basic GWO algorithm, the given wolf positions are updated, a binary restriction must be maintained according to equation (9).

The main update equation in the GWO algorithm is written as:

$$X_i^{t+1} = \text{Crossover}(X_1, X_2, X_3)$$  \hspace{1cm} (9)

where $(X_1, X_2, X_3)$ they are binary vectors representing wolves in bGWO and $\text{crossover}(a, b, c)$ are an appropriate intersection between solutions $(a, b, c)$ and $(X_1, X_2, X_3)$, and the wolves calculate alpha, beta and delta in order using equations (10), (13) and (16).

$$X_i^d = \begin{cases} 1 & \text{if } (X_a^d + b\text{step}_a^d) \geq 1 \\ 0 & \text{otherwise} \end{cases}$$ \hspace{1cm} (10)

where $b\text{step}_a^d$ is a binary step in dimension d, $X_a^d$ is a vector representing the position of the alpha wolf in dimension d. $b\text{step}_a^d$ is calculated by the following equation:

$$b\text{step}_a^d = \begin{cases} 1 & \text{if } c\text{step}_a^d \geq \text{rand} \\ 0 & \text{otherwise} \end{cases}$$ \hspace{1cm} (11)

where $c\text{step}_a^d$ is the continuous-valued step size for dimension d, $\text{rand}$ is a random number in the closed period $[0,1]$ derived from the uniform distribution. $c\text{step}_a^d$ can be calculated using the sigmoidal function by the following equation:
where $A_d^d$ and $D_d^d$ are calculated using equations (3), and (5) in the dimension $d$.

$X_2^d$ and $X_3^d$ Can be found by the following equations:

$$X_2^d = \begin{cases} 1 & \text{if } (X_2^d + bstep_2^d) \geq 1 \\ 0 & \text{otherwise} \end{cases}$$

$$bstep_2^d = \begin{cases} 1 & \text{if } cstep_2^d \geq \text{rand} \\ 0 & \text{otherwise} \end{cases}$$

$$cstep_2^d = \frac{1}{1 + e^{-10(A_d^d D_d^d - 0.5)}}$$

$$X_3^d = \begin{cases} 1 & \text{if } (X_3^d + bstep_3^d) \geq 1 \\ 0 & \text{otherwise} \end{cases}$$

$$bstep_3^d = \begin{cases} 1 & \text{if } cstep_3^d \geq \text{rand} \\ 0 & \text{otherwise} \end{cases}$$

$$cstep_3^d = \frac{1}{1 + e^{-10(A_d^d D_d^d - 0.5)}}$$

In the following equations, we will apply the intersection to each of the solutions $a$, $b$, $c$:

$$X_d = \begin{cases} a_d & \text{if } \text{rand} < 1/3 \\ b_d & \text{if } 1/3 \leq \text{rand} < 2/3 \\ c_d & \text{otherwise} \end{cases}$$

where $\text{rand}$ is a random number derived from the uniform distribution in the closed period $[0,1]$, and $a_d$, $b_d$ and $c_d$ represents the binary values of the first, second and third parameters of the dimension $d$, $X_d$ is the result of the exchange in dimension $d$. The pseudo code of the BGWO algorithm is displayed in Figure 2:

---

**Figure 2: The pseudo code of the BGWO algorithm.**

```plaintext
Start
Generate an initial population of the grey wolf $X_i$ ($i=1,...,n$)
Generate an initial value $A$, $a$, and $c$
Find the fitness function of each search agent
$x_a$ = the first best search agent
$x_b$ = the second-best search agent
$x_c$ = the third best search agent
while ($t < \text{Max_iter}$ of iterations).
for each search agent
Calculate $X_1; X_2; X_3$ using equations (10), (13), and (16)
Apply the crossover method among $X_1; X_2; X_3$ using the equation (9)
end for
Update $A$, $a$, and $c$
Find the fitness function of each search agent
Update $x_a$, $x_b$, and $x_c$
set $t = t + 1$
end while
return $x_a$
End
```
**Feature Selection:** The feature selection method improves the performance of the algorithm by reducing the number of attributes used to describe a data set. The purpose of features selecting in an algorithm is to reduce the number of genes used to improve classification and increase classification accuracy. The feature identification algorithms consist of three parts:

1. **Search algorithm:** A subset of properties (features), which are part of the original features.
2. **Fitness function:** These input and digital assessment modes. The goal of the search algorithm is to draw attention to this function.
3. **Classifier:** It represents the required algorithm that uses the latest subset of genes (i.e., an algorithm that selects the most important features required).

---

**Figure 3: Filter control strategy**

One of the ways to select a feature on the predictive performance of a predefined algorithm is the wrapper method, which evaluates the quality and efficiency of certain features. This is based on two-steps, based on a specific algorithm: (1) Searching for a subset of properties and features (2) Evaluate these specific features and attributes. In order to obtain learning performance or to reach some stop criteria we repeat (1) and (2).

1. **Mutual information (MI):** You can get some information about the variable Y that is included in the mutual information \( I(X, Y) \) which is considered to be in the information shared by two random variables.

   \[
   I(X,Y) = \frac{H(X)}{H(Y)}
   \]  
   \[ (23) \]

   If there is a close association between the two variables X and Y, the mutual information \( I(X, Y) \) will be large. If the variables X and Y are not completely associated, then \( (X, Y) = 0 \). The mutual information was applied to filter the feature set to see the relationship between certain features and category classifications. In the theory of information, there is a classic use of many measures of feature classification. Note that these statistics work to build a relationship with the classroom and feature in \( F \). In the theory of information, one of the most important contributions to the research is the selection of the feature where it works to use the information exchanged in the evaluation of the feature and in the following formula \( F \) will be indicated by a set of features is referred to and the class naming.

   \[
   I(F,C) = \iint P(F,C) \log \frac{P(F,C)}{P(F) \times P(C)} \, df \, dc
   \]  
   \[ (24) \]

   The evaluation of mutual information (MI) is in some method between class naming and one feature. The problem is not in this measure. When evaluating entire feature sets will have difficulties arise. Possible interactions between features are the reason for evaluating entire feature sets in a multivariate way. The combination of two features may in some cases provide important information, because in some cases two individual features may not provide sufficient information about the chapter. Between the variable Y and N variables X1, X2, ..., XN, the chain rule is

   \[
   I(X_1, X_2, ..., X_N; Y) = \sum_{j=1}^{N} I(X_j; Y | X_1, X_2, ..., X_{j-1})
   \]  
   \[ (25) \]

   \[
   \text{fitness}(X_i) = I(X_i; C)
   \]  
   \[ (26) \]
In the measurement of entropy, there is a way to calculate and replace mutual information in the form of mutual information. There is an appropriate criterion for selecting items through information exchange. It is possible to define the information exchanged is a measure to reduce the uncertainty of category labels, because of knowledge of characteristics of the data set, where the fitness function is maximizing the mutual information value.12

Experimental results

The proposed algorithm MI_BGWO is evaluated, and its interest is compared with the other competitor algorithms.

**Data Sets:** We have selected (3) different classification problems from the literature to verify the effectiveness of the proposed algorithm for classification problems. From a repository UCI, a data set was obtained.21

The target variable is a binary variable that includes a set of data where the binary variable represents the condition of the sick person who has good = 1 and bad = 0.

**The following table shows the overall description of the data set:**

<table>
<thead>
<tr>
<th>Dataset</th>
<th># Samples</th>
<th># Features</th>
<th>Target class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prostate</td>
<td>102</td>
<td>12601</td>
<td>2</td>
</tr>
<tr>
<td>DLBCL</td>
<td>77</td>
<td>7130</td>
<td>2</td>
</tr>
<tr>
<td>Colon</td>
<td>62</td>
<td>2001</td>
<td>2</td>
</tr>
</tbody>
</table>

**Discussion**

To correctly evaluate the proposed algorithm MI-BGWO, the results were compared with the BGWO algorithm for feature selection. The training and testing dataset for the proposed algorithm, MI-BGWO, achieved the best results for the classification. For instance, in the prostate dataset, the CA of the testing dataset is 94% by the MI-BGWO which is higher than 65% by BGWO.

**Table 2: Classification performance on average of the algorithms used over 20 partitions (where the number in parentheses is the standard error).**

<table>
<thead>
<tr>
<th>Datasets</th>
<th>Method</th>
<th>Training dataset</th>
<th>Testing dataset</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>CA</td>
<td>SE</td>
</tr>
<tr>
<td>Prostate</td>
<td>MI-BGWO</td>
<td>0.9426</td>
<td>0.9663</td>
</tr>
<tr>
<td></td>
<td>BGWO</td>
<td>0.6529</td>
<td>0.7901</td>
</tr>
<tr>
<td>DLBCL</td>
<td>MI-BGWO</td>
<td>0.9192</td>
<td>0.9914</td>
</tr>
<tr>
<td></td>
<td>BGWO</td>
<td>0.9000</td>
<td>0.9009</td>
</tr>
<tr>
<td>Colon</td>
<td>MI-BGWO</td>
<td>0.8619</td>
<td>0.7692</td>
</tr>
<tr>
<td></td>
<td>BGWO</td>
<td>0.7429</td>
<td>0.5833</td>
</tr>
</tbody>
</table>

When comparing the BGWO algorithm with the proposed algorithm MI-BGWO we note that the proposed algorithm MI-BGWO has a clear advantage in terms of accuracy and classification capacity and BGWO worse than MI-BGWO through the three datasets.

**Conclusion**

In this study, the MI_BGWO method was proposed between the MI technique and the BGWO to improve the classification performance (when the datasets are big), relying on subsets of important features of the dataset. After the feature selection process, datasets were submitted to the Naïve Bayes classifier, and the results of the MI_BGWO method were compared with the BGWO method by the criteria shown in Table 2. Experimental results from the feature selection dataset indicate that the MI_BGWO method has a better classification performance than the BGWO method and has few features compared to the default method.

**Financial Disclosure:** There is no financial disclosure.
Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Mosul and all experiments were carried out in accordance with approved guidelines.

References

Prevalence Comparative Study of Infection with *Trichomonas* *spp* in The Three Types of Birds at The Holy City of Kerbala

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**Abstract**

The avian Trichomonosis is a parasitic disease caused by *Trichomonas gallinae*. This parasite lived in the bird’s mouth and digestive tract, and can caused a granulomatous lesions in the lumen which lead to death of bird because of severe starvation. The results of the current study for the purpose of conducting a field survey and the extent of the spread of infection in the three types of birds (Bird toilet decorations, Bird pigeon, Broiler bath decorations). The field of study was in the holy city of Karbala, which is located in south-west Baghdad, and is 100 km long and has a moderate temperament. During the course of the study (345 birds were tested). This is the study of 170 decorative samples, 150 samples of the pigeon bath and 25 samples of after the samples were taken. 15-day-old bathroom bath with 25 samples of Broiler bath decorations. Use eye and laboratory examination to examine the symptoms. The results showed that 7, 10.3 & 12 respectively.

**Keywords:** Trichomonas, Birds, Holy Kerbala.

**Introduction**

The avian Trichomonosis is a parasitic disease caused by the protozoan called *Trichomonas gallinae*. This parasite lived mainly in the bird’s anterior digestive tract, so it can caused a granulomatous lesions include the lumen of esophagus and lead to death of bird because of severe starvation. However, it’s well known that virulence of this parasite is vary among strains, so it can reached to the parenchymatous organs causing a generate necrotic foci. Columbidae is known as a parasite’s main host, particularly the domestic pigeon (Columba livia), which has been considered the responsible to the worldwide spread of *T. gallinae*. Despite of the parasite preference for pigeons and doves, *T. gallinae* can affect a wide range of bird families, and infections in bustards, psittacine birds, fowl and passerine birds also have been reported. The preyed of birds (diurnal and nocturnal) are also recorded frequently to infected by these flagellated protozoans, especially those species that usually feed on doves or bird carcasses. Data on prevalence found in Columbidae with different authors throughout the world vary greatly, ranging from 5.6% cited by 12 in mourning doves to 95% detect. This parasite has been reported throughout the year, but most outbreaks occurring which seen in spring, summer and autumn. This study is aimed to detect rates of inflection with *Trichomonas spp* in three types of birds (Bird toilet decorations, pigeon and Broiler bath decorations) at Holy Kerbala City and compared between them according to the rates of inflection.

**Material and Method**

The samples of parasite cultures (oral swabs) were taken from the oral cavity of infected pigeon and putting in tryptone/yeast extract/maltose medium, then supplemented with 10% foetal calf serum (Sigma Chemical Co., St Louis, Missouri, USA) and incubated at 378 °C (16).

These cultures were observed over three consecutive days for checking the growth of these parasites. The positive samples were frozen in tryptoneyeast extract/maltose medium which containing about 5% dimethyl sulphoxide. Necropsies were executed on euthanized or dead birds to determine the macroscopic lesions.
grams were suspended in 1000 ml distill water, then heat to boiling to melt the medium completely. Sterilize by autoclaving at 15 lbs pressure (121°C) for 15 minutes finally mix well and pouring in sterile petri dish.

Fungi were the first microorganisms recognized because some of the fruiting structures such as the mushrooms are large enough to be seen without a microscope. Fungi can be grouped simply on the basic of morphology with yeasts or molds and it’s used for isolation and differentiation from yeast and molds.

Fetal Calf Serum (FCS or FBS) consider as a common supplement for animal cell media culture, it is has free database part (3Rs programme database) the assembly function for record allows researchers to discuss them\textsuperscript{13,16}.

![Image](image1.png)

**Figure 1:** Method for taking swap from oral cavity from infected bird.

**Results**

The results showed infected at about 20 birds from all types of birds (345) which used in this study. Table 1 show the results with a percentage of total rates 14.7%.

**Table 1:** The rates and severity of infection with Trichomonas spp in the three different types of birds

<table>
<thead>
<tr>
<th>Sequence</th>
<th>Type of bird</th>
<th>Number of animals</th>
<th>Injury</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bird toilet decorations</td>
<td>170</td>
<td>7</td>
<td>4,11</td>
</tr>
<tr>
<td>2</td>
<td>Bird pigeon</td>
<td>150</td>
<td>10</td>
<td>6,6</td>
</tr>
<tr>
<td>3</td>
<td>Broiler bath decorations</td>
<td>25</td>
<td>3</td>
<td>12</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>345</strong></td>
<td><strong>20</strong></td>
<td></td>
<td><strong>14,7</strong></td>
</tr>
</tbody>
</table>
The highest rate of infection with *Trichomonas* spp. was recorded in the Bird pigeon which reached to 2.8%, while the lower rate was in the Broiler bath decorations which reached to 0.02% (Table 2).

**Table 2: The rates of infection with Trichomonas spp. in the three different types of birds**

<table>
<thead>
<tr>
<th>Numbers of Tested birds</th>
<th>Type of tested birds</th>
<th>The symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Number</td>
</tr>
<tr>
<td>345</td>
<td>Bird toilet decorations</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Bird pigeon</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Broiler bath decorations</td>
<td>3</td>
</tr>
</tbody>
</table>

**Discussion**

A number of researchers studied the distribution of this disease in Iraq and show that the prevalence of this disease has increased in the areas of birds breeding in recent time due to the lack of frequent test for the pages and poor health care for the bite birds so this disease is endemic. In Iraq the disease found in the all field and agree with5-8

The results of the current study showed that the incidence rate of the *Trichomoniasis* about 0.17% from the total number of examined birds; this result that record in germane (2,3) where others pointed to that the percentages of infection ranged from 61.04%, 72.36% and 70.40%; as well as this result was differed with some other previous studies that recorded a higher rates of infection with this parasite 4.

A ratio of 2.08% of infection in different birds approaching from the previous results (2,3). As well as this result were differed from some previous studies that recoded a higher rates of infection with this parasite 1-4.

The differences in the infection rates return to several reasons, including the number of samples where the studied number give real representative results, as well as the period of study whenever the longest study period will reflect a comprehensive picture of the disease in the conducted region of study, moreover the geographical location of the area and the surrounding environmental conditions where temperature and humidity are considered important factors affecting the life cycle of the this parasites 13.

Also pollution disparity affect the growth and activity of parasite and the ways of spared of these parasite in the different areas 11. Besides lack of health control and prevention the condition to growth the parasite

Also the percentage of the infection in bird toiler decorations with *Trichomoniasis* recorded 4.11% and this approximated from that record by researcher 2.

The differs from the percentages referred to by others4.

Also the percentage of infection of bird pigeon with *Trichomoniasis* recorded 6.6 and this approximated from the other researcher 8. In Iraq the ratio differ from the percentages referred by Amin et al., (4) the differences in the infection rate was caused by environmental conditions and geographic location where the environmental condition of kerbala city characterized by high temperatures for most of the year, the occurrence of drought in the summer and the end of spring and the beginning of autumn, and this parasite cannot live outside the body of the body for a long period of time, because of conditions of heat, moisture and nutrients are not available and is consistent with the study 11,13.

The percentage of infection of broiler bath decorations total 12% it is agree with 9 and this percentage in fact use this result depend on the condition and out or free condition and this disease depend on the environmental and the geographic location and size.

The results of this field study were based on the pigeonhole of the pigeon decorations and the results were recorded at 12%. This corresponds with Amin et al., 4. This result differs from one location to other depending on environmental conditions,

In this way the spread of this disease is reduced to small by mothers or through fodder, where the studies prove that this parasitic disease was spread in UK and then spread to the rest of Europe and we can control this disease by depriving one of the factors of growth and spread, Fresh feed and non-exposure to contaminants this adjusts 9,11.
Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Kerbala and all experiments were carried out in accordance with approved guidelines.

References


Molecular and Phylogenetic Study of The H PA I (High Pathogenic Avian Influenza) Virus Sub-type H5N8 in Iraq

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Abstract

The Avian influenza (AI) is a widespread infection of the birds and humans affected by type A of influenza virus. Highly pathogenic avian influenza (HPAI) caused by the viruses subtype (H5N1) and (H5N8) is consider as a definite risk to the poultry industry and human health and it is started as the occasional revolutionize a satisfactory because of migratory bird which consider as a carrier of the disease. Twenty oropharyngeal swabs were collected from infected flock have suffer from sudden death with high mortality, all these samples were collected from (1-5) days after clinical signs appears and the results summarized by three farms infected with HPAI subtype (H5N8), three viral isolates strain out of 20 samples were identified by RT-PCR assay, two of them have layer origin while one have broiler origin, the three sequencing results in this study have been presented to the gene bank database under accession number MN689674.1 and MN658854.1, phylogenetic analysis of our sequences were used to relatedness of strain obtaining with other avian influenza viruses around the world, the a current sequences of avian H5N8 strains were found to be related as a common ancestor with Iranian registered strain.

Keywords: Avian influenza H5N8, RT-PCR, degenerate primer, phylogenetic tree.

Introduction

The Avian influenza disease is a word that used to define influenza viruses type A and it is separate from a wide-ranging of birds species all over the world and mammals(1). Recombination between AIV strains with mammalian derived influenza strains may be take place and that producing a new recombiant influenza viruses have the ability to initiating disease in humane and other species in the same time wild birds, waterfowl and shorebirds consider important source of infection by influenza A viruses and producing important risk for this disease(2–4). AIV can be divided according to inducing pathological lesion in the natural host in to two groups: high pathogenic avian influenza (HPAI) and low pathogenic avian influenza (LPAI), the infection with HPAI strains (H5N1, H5N8) categorized from slight to heavy sickness with high death rate may arrived to 100% in infected flocks (8).

AIV was multiplication in the respirational and gastric tract system of sick birds, so the suggesting of isolation of the infections (H5N8) from oropharyngeal swabs, tracheal swabs, cloacal swabs and feces(5).

In Egypt HPAI subtype H5N8 was diagnosed since 2016 in both commercial and backyard bird with high mortality and there are six genotypes have been detected in both wild and domestic birds(5–7).

During the 2015-2017 HPAI subtype H5N8 widely spread throughout Europe, Asia and Africa and seasonal migration of wild aquatic birds and water birds consider the important source for vector of disease, so that the infected birds were shed the viruses through the rivers, marshes and lakes, eventually reached the poultry flocks(9–11). Interestingly, the H5N8 remained as localized sporadic active infection during the spring, summer and autumn of 2017 in Iran and Italy While, HPAI infection become epidemics in winter and early spring (9).

The World Organization for the Animal Health (OIE) in 2018(22) was established the HPAI (H5N8) in Iraq infected poultry with high sickness and death rate, In the last years poultry industry in Iraq suffering from high morbidity and mortality with sudden death and that lead to high economic losses in addition, the risk
of this disease on human health, so there are doubts around this farm infected with HPAI subtype (H5N8), so that this study was designed to diagnosed HPAI subtype (H5N8) by using molecular technic test and phylogenetic analysis with other avian influenza virus sequences from different geographic area due to limited research has been conducted to determine HPAI subtype (H5N8) virus in Iraq.

**Materials and Method**

**Sample Collection:** The study was conducted by collection samples from chicken broilers and layers in different unorganized cities of Karbala province, the study was carry on just birds which have suspected clinical respiratory sings and have covered with mucosa congestion in un feathered regions and highly mortality. Within 24 to 48 hours after onset symptoms oropharyngeal swabs were collected from these chickens by sterile ice boxand recently sent to the lab as soon as possible. The course of this study was beginning from February 2018 to January 2019.

**RNA extraction procedure:** RNA pellet was extracted from oropharyngeal by using (QIAamp Viral RNA Mini Kit/QIAGEN) Germany. The RNA extraction of avian influenza was done by Qia tube connected automated purification system according to manufacture company. Interestingly, the extracted RNA was eluted in 50 µl of DEPEC water and calculated by Nano drop-spectrophotometer device, and immediately store in -30C at freezing for RT-PCR analysis (23-32).

**Reverse Transcriptase Polymerase chain reaction assays and Primer designing:** RT-PCR assays were done for diagnosis avian influenza virus, depended on Hemagglutinin glycoprotein gene by using specific degenerate primers. These primers were designed using influenza genomic sequences database available in gene bank, and retrieved by multiple alignment, these set of primers are made by (Bioneer/Korea) as following table (1).

<table>
<thead>
<tr>
<th>Primer Sequence</th>
<th>Amplicon size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemagglutinin glycoprotein gene</td>
<td>1132bp</td>
</tr>
</tbody>
</table>

A total of 5 µl of cDNAs were added to new twenty micro liter of Master mix contain Taq PCR Master Mix Qiagen/germany contains Taq DNA Polymerase, the exclusive QIAGEN PCR Buffer that reduces the necessity for optimizing process, and dNTPs, and 0.5 µm of degenerate primers, The reaction was done in a Thermal cycler system (Mygene Bioneer) using the following protocol: 95°C for 5 minutes followed by 35 cycles consisted of 94°C for 35 second, 57°C for 45 second and 72°C for 35°C second as well as final extension 72°C for 5 minutes, The products were examined by agarosegel electrophoresis on a 1.5% gel under UV illumination (23-32).

**DNA sequencing method and Data analysis:** Genetic sequencing of Haemagglutinin glycoprotein gene by using analysis of phylogenetic relationship and study level of alignment by mega multiple sequence software alignment programs a product was purified from the gel by using (QIA quick Gel Extraction/Qiagen). The purified PCR product was sent to Korea for high quality DNA Sequencing service by Macrogen providing techniques (https://dna.macrogen.com/eng/support/ces/guide/ces_sample_submission.jsp). The nucleotides’ Sequences were truncated and aligned at both ends using ApE software (A plasmid editor Version 2.0.51); therefore the sequences majority were started and ended at the homologous nucleotide positions. The sequences target was submitted to BLAST (http://www.blast.ncbi.nlm.nih.gov) (Zhang et al., 2000), the nucleotides with diversity index as well as the Euclidean distances calculated were uploaded to the UPGMA (clustering) tree and the Maximum Parsimony phylogenetic tree by using the software MEGA 6 (Molecular Evolutionary Genetics Analysis Version 6.0),
Results and Discussion

Avian influenza is a very contagious viral disease among poultry flocks; the results showed that chicken were infected with highly pathogenic avian influenza by note systemic disease with multiple organ failure, we found lesion of cyanosis and edema of the head, comb wattles (figure 1) and red discoloration of feet and shanks due to subcutaneous ecchymotic hemorrhagic (figure 2). In chicken, medical marks reveal the virus duplication and harm to numerous visceral structures and circulatory, nervous systems and integument. Precisemedical appearances hang on the level of injury and which structures or organ systems are affected. In the severe stage, the results found clear clinical signs other than listlessness, closer observation of 3 obtaining chicken has discovered a reduced activity, decrease sensitivity to stimuli, reduction in “in-house” noise, dehydration, and decreased feed and water intake that rapidly progressed to severe listlessness and death\(^{(12)}\) figure 1.

Figure 1: head of infected bird suffer from conjunctivitis with congested comb and wattles (cyanosis)

Figure 2: subcutaneous ecchymotic hemorrhagic of legs
The medical signs of disease are particularly flexible and depend on other aspects including host species, age, sex, concurrent infections, acquired immunity and environmental factors\(^8\). The prevalence of H5N8 virus were revealed as 15% (3 out of 20) suspected viral samples in oropharyngeal swabs in different unorganized chicken farm field by using RT-PCR assays through amplification and visualization on agarose gel electrophoresis 1132 bp in length of HA glycoprotein gene figure 3.

![Agarose gel under UV light showing RT-PCR product analysis of hemagglutinin gene in avian influenza virus H5N8 isolates.](image)

Figure (3): Agarose gel under UV light that shows the RT-PCR product analysis of hemagglutinin gene in avian influenza virus H5N8 isolates. M: marker (range between 100 to 2000bp), lane (1, 3 and 5) wells showed positive results of avian influenza virus strain.

The Iraqi viral isolates shared features characteristic for recent HPAI virus H5N8 isolates, the genomic sequences of 3 isolates avian influenza strains were verified by dual sets of degenerate primers, two of them have shared 100% no identity with linear genomic product 1130 bp in length figure 1, except one of strain have different in some nucleotides from two previous strain, the three sequencing results in this study have been transduced to the gene bank database under the accession number MN689674.1 and MN658854.1, a neighbor-joining phylogenetic tree based on alignment of the deduced amino acid sequences of the H5 Haemagglutinating showed that 3 isolates iniraq country has the same multiple basic amino acids at the connecting peptides of cleavage site between HA1 and HA2 (PLREKRRKR\(\uparrow\)GLF) with other some recent strain isolates of different geographical distribution cities in Asian, European and American group, on this basis, it was considered that those strain high pathogenic avian influenza virus\(^13\) figure 4. Interestingly, Phylogenetic analyses of HA gene fragments from three strain indicated that most of the sequences obtaining from distinct geographic regions of world were closely related and cluster in to distinct branches based on geographic origins, the current study noted that two sequence obtaining are separated by a distinct strain originated from Iran have accession number KY701529.1 figure (5)\(^14\), the current study was limited to used reverse transcriptase Real time PCR and sequences analysis of Avian Influenza virus, otherwise, there are many method should be consider to confirm this strain by epidemiologic, Immunological results by hemagglutination-inhibition (HI) test, where the amount of antibody titers can be detected by using inhibition activity over the agar gel immunodiffusion (AGID) and enzyme-linked immunosorbent assays (antibody detection ELISA tests)\(^15,16\). Otherwise, the
incidence of AI virus can also be definite by the use of reverse transcription polymerase chain reaction (RT – PCR) or by the examination of a commercially offered immunoassay kit particular for type A influenza, e.g. Directigen TM Flu A(17) or Flu Detect®18, 23.

The phylogenic of H5N8 has been making Homology sequence identity by userRNA gene according to NCBI-BLAST site show table (2) highly sensitivity to accuracy of molecular detection. Analysis of Phylogenetic tree has done depend on the clone Hemagglutinylglycoprotein, a that used for final detection of H5N8 draw a tree by Phylogenetic analysis of Hemagglutinin in glycoprotein gene sequences has become the principal method for knowing avian influenzaphylogeny. Ourresultshowthe phylogenetic tree has done according to these strains isolates figure (4), the evolution histories of H5 N8 were contingent using the Neighbor-Joining method (20).

Our results were found that Avian influenza H5 N8 in the polygenetic tree diagram with an accession number (MN658854.1), a species identified in layer, was the next-highest match at 100% homology with our sequence21, 23.

Finally, The host species; the geographical factors and environmental conditions are main causes to formed contract values pheromones. We also found Avian influenza H5 N8 genomic sequences showed identical with other species sequences that isolates according to the geographical regions, the present study was found identical nucleotides of Avian influenza H5(21).
Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Veterinary Medicine and all experiments were carried out in accordance with approved guidelines.

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Awareness of Nurse Midwives’ toward Post-miscarriage Care at Bint Al-Huda Hospital in Al-Nasiriya City

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Abstract

Objective of Study: To assessment of nurse-midwives’ knowledge and performance concerning with post-abortion Care.

Methodology: A cross sectional descriptive analysis of (50) nurse midwives of this category of maternity nurse midwives was conducted in separate units of the Bint Al-Huda hospital between 19 January 2020 and 30 April 2020. The questionnaire’s validity and reliability was calculated through a pilot test. Due to the condition in the nation and the governorate, the emergence of the Corona epidemic and the implementation of curfews, the questionnaire was submitted electronically and the questionnaire was completed by the nurses and midwives, data was processed using the SPSS edition (20).

Results: The test showed that 22% of the test sampler replied correctly to Encourage the client to clear the toilet, 44% replied correctly to isolation of infected patients, 20% of the study sample responded correctly to the importance of hand washing, 35% responded correctly to Assess vaginal bleeding, 25% of the research sample responded correctly in, In terms of emotional assistance, 30 percent responded correctly, 19 percent of the research sample replied with right Test vital signs. 38 percent of them correctly replied with regard to the patient’s medical profile, 40 percent of the test group correctly replied with regard to Perineum care.

Keywords: Assessment, Nurse, Midwives’, Knowledge, Performance, Post-abortion, Care.

Introduction

Miscarriage is a common pregnancy failure happening in a number of women around the world. According to the American College of Obstetricians and Gynecologists¹, the most frequent cause of pregnancy loss can be encountered by around one in four women in the United States. A miscarriage or spontaneous abortion is generally described in the United States as a spontaneous loss of a fetus before the 20th week of pregnancy, about half of all fertilized eggs are believed to be spontaneously lost before a woman knows that she is pregnant, approximately 15-20% of recorded pregnancies result in miscarriage, with 80 per cent of miscarriages usually occurring before the 12th week of pregnancy². For women of reproductive age, pregnancy can be the realization of a dream or an unexpected occurrence throughout the life of a mother, however for every individual, all pregnancy and eventual miscarriage are extremely emotional. When a woman prepares to becoming pregnant and is preparing for the physiological and emotional changes that come with pregnancy, the usual course of pregnancy ends abruptly with a miscarriage. The actual loss of pregnancy can impact women in many physiological and emotional ways, and miscarriage can often influence relationships with husbands, families and friends, which also increases emotional stress related to the woman’s condition; Many variables can induce early pregnancy miscarriage and it is impossible to say for certain what induces a particular miscarriage, one or more complications of the pregnancy may be reported³. Such unregulated diabetes or uterine fibroid in significant percentage of early miscarriage in mom’s medical condition in some cases. Sporadic miscarriage is the most common early-
pregnancy complication. A less frequent phenomenon are two to three consecutive pregnancy deaths. Sporadic miscarriages are considered mainly to be a failure of faulty embryos to reach viability; repeated miscarriages are suspected of having multiple etiologies, including paternal chromosomal abnormalities, maternal thrombophilia disorders, and numerous endocrine disorders, but none of these conditions are unique to frequent miscarriages or are often associated with recurring early loss of pregnancy. Miscarriage is one of the major complications of pregnancy, causing a substantial incidence of world morbidity and mortality, estimated at 5-15 per cent of births. Slava et al. (2015), reported by the World Health Organization (WHO) at 21.6 million unwanted abortions worldwide in 2010. The rate of miscarriages is approximately 10% to 20%, while rates for all births are approximately 30% to 50%. About 5% of women have two miscarriages in a row (WHO 2010), up to 20% of pregnancies end in accidental miscarriages before 20 weeks of gestation, 80% of these arise before 12 weeks of gestation. Around 20% of abortions in the United States result in pregnancy which may result in persistent pain, grief, anxiety which signs of difficult life towards the end of pregnancy and require psychosocial assistance. WHO estimates that miscarriage happens in developed countries up to 20 per cent of surgical births, which is equal to around 14,000 miscarriages a year in Ireland. Traditionally, the majority of women who have undergone routine uterine surgery. The prevalence of miscarriage increases markedly with the parents age. Female pregnancies less than twenty-five years are 40 percent less likely than female pregnancies 25-29 years of age to result in miscarriage, 75 percent of pregnancy will end in miscarriage. Around 10% of miscarriages happen in developing countries, 35.5 percent of developed countries ‘miscarriages and 26.8 percent of Asian countries’ miscarriages, child miscarriages “(WHO 2015).

Methodology

Design of the Study: A cross sectional descriptive study of (50) nurse midwives’ such maternity nurse midwives were distributed between 19 January 2020 and 30 April 2020 in separate units of the Bint Al-Huda hospital.

Settings of the Study: The present study is conducted in Thi-Qar Governorate; Bint Al-Huda Teaching Hospital in three departments which includes: maternal words, emergency words, neonate words and labor room during morning, evening and night shift.

Sample of the Study: Which Include:

Inclusion Criteria are: A purposive” Non-probability” sample of (35) nurse-midwives’. These nurse-midwives’, who work in maternity, were distributed in different unit of Bint AlHuda hospital units.

Instrument that Used for Data Collection:
The aim of the electronic structure questionnaire was to collect the data required for this analysis, first the sociodemographic data of the nurse midwives, such as age, employment, experience, second part awareness of post-abortion treatment and third part performance of nurse midwives on post-abortion treatment. An observational check list was created to test the efficiency of the participant.

Data Collection: Collected data by using electronic instrument because of the situation in the country and the governorate, due to the outbreak of the Corona epidemic and the imposition of curfews, the form was sent electronically and the form was filled in by the nurses and midwives, was analyzed using the Statistical Package of Social Sciences (SPSS) program version22 simple. They constitute the available sample during the study period frequencies and percentage tables were used to presents the results.
Results

Figure (1): Nurse-Midwives Age

Figure (1) revealed that the higher percentage (43%) of study sample were at age group 20-25-years with mean and SD (2.14±7.969), while the lowest percentage for those who age 41-45-years were (n = 3; 6.0%).

Figure (2): Nurses -midwives Social status

Figure (2) shows that more than a half (n = 26; 52.0%) are married of study sample, while the lowest percentage is (n = 1; 2.0%) who is separated

Table (1): Distribution of the research sample based on experience of post-abortion treatment by their nurse-midwives

<table>
<thead>
<tr>
<th>Items</th>
<th>Yes</th>
<th></th>
<th>No</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>%</td>
<td>F</td>
<td>%</td>
</tr>
<tr>
<td>1. Treatment of miscarriage complications</td>
<td>20</td>
<td>20%</td>
<td>30</td>
<td>30%</td>
</tr>
<tr>
<td>2. Counseling on identifying and reacting to the emotional and physical needs of women</td>
<td>16</td>
<td>16%</td>
<td>34</td>
<td>34%</td>
</tr>
<tr>
<td>3. Contraceptive and family-planning programs</td>
<td>22</td>
<td>22%</td>
<td>28</td>
<td>28%</td>
</tr>
<tr>
<td>4. Reproductive and other health services</td>
<td>20</td>
<td>20%</td>
<td>30</td>
<td>30%</td>
</tr>
<tr>
<td>5. Partnerships with the Community and healthcare providers</td>
<td>24</td>
<td>24%</td>
<td>26</td>
<td>26%</td>
</tr>
</tbody>
</table>
Results in table (1) indicate that nurses in this study came with awareness of post-miscarriage care as follows: Treatment of miscarriage complications 20%, counselling to recognise and respond to the emotional and physical needs of women 16%, reproductive and family planning programs to help women avoid potential unintended pregnancies and abortions 22%, Reproductive and other health services preferably provided on site or through referrals to other accessible facilities, 20%, and partnerships between the Community and service providers to ensure timely care for complications of miscarriages and to ensure that health services meet the expectations of the community and 24% of the needs.

Table (2): Distribution of the research sample results for post-miscarriage treatment according to their nurses-midwives

<table>
<thead>
<tr>
<th>Items</th>
<th>Done</th>
<th>Not done</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>%</td>
</tr>
<tr>
<td>1. Carry out hand washing</td>
<td>20</td>
<td>20%</td>
</tr>
<tr>
<td>2. Test vital signs (TEMP PR BP)</td>
<td>19</td>
<td>19%</td>
</tr>
<tr>
<td>3. Psychological (emotional) support</td>
<td>30</td>
<td>30%</td>
</tr>
<tr>
<td>4. Instruct customer to drain the bladder</td>
<td>22</td>
<td>22%</td>
</tr>
<tr>
<td>5. Perineum Diagnosis</td>
<td>40</td>
<td>40%</td>
</tr>
<tr>
<td>6. An examination of vaginal bleeding</td>
<td>35</td>
<td>35%</td>
</tr>
<tr>
<td>7. Hemoglobin degree test</td>
<td>39</td>
<td>39%</td>
</tr>
<tr>
<td>8. Breastfeeding</td>
<td>25</td>
<td>25%</td>
</tr>
<tr>
<td>9. Carry out bimanual pelvic test</td>
<td>40</td>
<td>40%</td>
</tr>
<tr>
<td>10. Explanation of patient’s treatment</td>
<td>38</td>
<td>38%</td>
</tr>
<tr>
<td>11. Insulation of the patients compromised</td>
<td>44</td>
<td>44%</td>
</tr>
</tbody>
</table>

Results in table (2) reflect that in this study the nurse-midwives performance in post-miscarriage care is done well in isolation of infected patients (44 percent), perineum care (40 percent), bimanual pelvic examination (40 percent), and hemoglobin checking (39 percent), as done by more than two-thirds of nurse-midwives. In other things, the post-miscarriage performance of nurses was not well performed as it is evident in emotional assistance (30 percent) evaluating vaginal bleeding (35 percent), monitoring vital signs (19 percent), instructing clients to clean the bladders (22 percent), handling performance (25 percent), explanation of the patient’s procedure by (38%), and hand washing by (20%).

Table (3): Distribution of the survey sample according to Resource access in health facilities

<table>
<thead>
<tr>
<th>Items</th>
<th>Available</th>
<th>Not available</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>%</td>
</tr>
<tr>
<td>1. Place where to wash your hand</td>
<td>46</td>
<td>46%</td>
</tr>
<tr>
<td>2. Restauration rooms</td>
<td>35</td>
<td>35%</td>
</tr>
<tr>
<td>3. Gloves of sterites</td>
<td>30</td>
<td>30%</td>
</tr>
<tr>
<td>4. Conventional approach</td>
<td>40</td>
<td>40%</td>
</tr>
</tbody>
</table>
Table findings (4) explicitly demonstrate that, during data collection times, services are available in the health center and all selected hospitals. All services have been shown to be accessible at more than three-fourth of the health facilities surveyed. For eg, place for hand washing in health facilities (46 percent), soap in (44 percent), antiseptic solutions in (40 percent), recovery room in (35 percent), masks in (33 percent), thermometers in (48 percent), sphygmanometers in (70 percent) and disposable gloves in health facilities (69 percent).

### Discussion

Miscarriage is: one of the common complications of pregnancy is a major problem in developing world as an important public health problem in the world endangers women’s lives by exposing them to complications which may have an impact on their health in a bio-psychosocial context. By living this situation, the woman experiences beyond the physical pain, manifested by signs and symptoms presented an existential pain for the loss of pregnancy. And led to increased mortality and morbidity death. The all findings of this study revealed the higher percentage (43%) of study sample were at age group 20-25-years with mean and SD (2.14±7.969), while the lowest percentage for those who age 41-45-years were (n = 3; 6.0%), more than a half (n = 26; 52.0%) are married of study sample, while the lowest percentage is (n = 1; 2.0%) who is separated, more than a one third (n = 18; 36.0%) of study sample had 10 years or more, while the lowest percentage (n = 7; 14.0%) had one years of experiences.). Fifty per cent said they did not undergo any post-miscarriage support program. This means that most of them did not receive the training needed to care for women after miscarriage. Results of the current study revealed that reflect that in this study the nurse-midwives performance in post-miscarriage care is done well in isolation of infected patients (44 percent), perineum care (40 percent), bimanual pelvic examination (40 percent), and hemoglobin checking (39 percent), as done by more than two-thirds of nurse-midwives. In other things, the post-miscarriage performance of nurses was not well performed as it is evident in emotional assistance (30 percent) evaluating vaginal bleeding (35 percent), monitoring vital signs (19 percent), instructing clients to clean the bladders (22 percent), handling performance (25 percent), explanation of the patient’s procedure by (38%), and hand washing by (20%). It is clear that the nurses in this sample perform well just three out of ten things of the performance needed for women’s treatment after miscarriage, thus the overall experience is poor in this regard. Gavino (2013) in Canada sought to broaden the perception of nurses’ experience when caring for women undergoing emergency department (ED) miscarriage, analyzed using a concise methodological approach. Also the study revealed explicitly demonstrate that, during data collection times, services are available in the health center and all selected hospitals. All services have been shown to be accessible at more than three-fourth of the health facilities surveyed. For eg, place for hand washing in health facilities (46 percent), soap in (44 percent), antiseptic solutions in (40 percent), recovery room in (35 percent), masks in (33 percent), thermometers in (48 percent), sphygmanometers in (70 percent) and disposable gloves in health facilities (69 percent). According to Neugebauer and Ritsher (2012), miscarriage should be considered a “form of deprivation and not merely an obstetric occurrence.” Nurses identified a deficit in knowledge and training on how to support women’s emotional needs and providing bereavement care, making them inadequately equipped to deal with this challenge.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols
were approved under the Maternity and Neonatal Health Nursing Department and all experiments were carried out in accordance with approved guidelines.

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Determine the Causes Low Amniotic Fluid for Pregnant Women

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Abstract

Objective of Study: To determine the causes of low amniotic fluid for pregnant women

Methodology: A descriptive study was carried out on (100) pregnant and post pregnant women had diagnosis with low amniotic fluid in Bint Al-Huda Hospital for the period from (3 March to 11 April 2019). Validity and reliability of questionnaire are determined through pilot study. Descriptive and inferential statistical procedures were used to analyze the data, and the data were collected by using interview technique, constructed questionnaire designed and developed for the purpose of the study.

Results: Results of the study showed that the highest percentage of the study sample were within the age group (20-25 years). And (44%) of the study sample were graduated from secondary school and more than half of the study sample were housewife, and residents in urban areas. 41% of the study sample of the current pregnancy duration were (32-36), the interval between the last pregnancy and current one year to two years, (76%) of the study sample have multigravida and have no history of previous abortion. And that the cause of low amniotic fluid from a medical point is the (35%) due to pregnancy induced hypertension, (25%) of the study sample due to Premature rupture of membranes (PROM) and (20%) of the study sample due to placental problems.

Keywords: Determine, Causes, Low Amniotic Fluid, Pregnant Women.

Introduction

The fluid that collects within the amniotic cavity surrounding the embryo is called amniotic fluid. Hippocrates was the first person to attribute the development of amniotic fluid to fetal urine. Fetal urination is the major source of amniotic fluid, once the fetal kidney function begins at 10 -12 weeks¹. Fetal lung fluid is a minor contributor of amniotic fluid¹. Amniotic fluid volume rises progressively until 32 weeks of gestation. From 32 weeks to term the mean amniotic fluid volume is relatively constant about 600-800 ml. After 40 weeks, there was a gradual decrease in the amount of amniotic fluid volume by about 400 mL in 42 weeks. Amniotic fluid is removed by fetal swallowing. Normal amniotic fluid volume is critical for normal fetal growth and development.¹ Amniotic fluid (AF) is marvelously dynamic milieu constantly in a transformation as pregnancy progresses. A number of nutrients and growth factors present in AF assist growth of fetus, acts as a cushion and antimicrobial properties allow fetal protection.² Low in amniotic fluid amount has been associated with increased risk of intrauterine growth retardation, meconium aspiration syndrome, severe birth asphyxia, low APGAR scores and congenital abnormalities. Low amniotic fluid is also associated with maternal morbidity in the form of increased rates of induction and/or operative interference.³ Low Amniotic fluid is defined as AFI ≤5 cm or less than the 5th percentile. It can occur at any time during pregnancy but is more common during the last trimester. Whenever there is continuation of pregnancy beyond 2 weeks of expected date of delivery, she may be at risk for low amniotic fluid levels since fluid can decrease by half once she reaches 42 weeks gestation Low Amniotic fluid can complicate 12% of pregnancies that continue beyond 41 weeks⁴. It is defined as a single pocket of
amniotic fluid measuring < 2 cm in both vertical and horizontal planes in ultrasound and amniotic fluid index (AFI)\textsuperscript{12} Sometimes it’s difficult to rule out the cause of low Amniotic fluid giving it idiopathic nature\textsuperscript{13} Amniotic fluid forms from the fetal urine so, obstruction in fetal urinary tract can lead to oligohydramnios. Low amniotic fluid levels during the first or second trimester may associates with some fetal abnormalities\textsuperscript{20} Several factors like leaky or ruptured amniotic membranes, fetal abnormalities, genetic factors, maternal illness, nutrition status, carrying twins, NSAIDs like indomethacin and certain ACE (angiotensin converting enzyme) inhibitors may play a crucial role. Early detection of oligohydramnios and its management may help in reduction of perinatal morbidity and mortality one side and decreased caesarean deliveries on the other side.\textsuperscript{3} Low Amniotic fluid may inhibit these processes and can lead to fetal deformation, umbilical cord compression and death.\textsuperscript{10} In contrast, a study conducted at University of Milano-Bicocca, Monza, Italy among 3050 women who underwent sonographic assessments of AFI after 40.0 weeks showed low Amniotic fluid of 11.18%.

Methodology

Design of the Study: A descriptive study was carried out on (100) pregnant and post pregnant women had diagnosis with low amniotic fluid in Bint Al-Huda Hospital for the period from (3 March to 11 April 2019).

Settings of the Study: The present study is conducted in Thi-Qar Governorate; Bint Al-Huda Teaching Hospital.

Sample of the study: which include:

1. Inclusion Criteria are: A purposive” Non-probability” sample of (100) pregnant women and post pregnant women had diagnosis with low amniotic fluid, were distributed in different unit of Bint AL Huda hospital units certain criteria are included for choosing the, and they are:

Pregnant women hospitalized and hadlow amniotic fluid (27- 40) wk, for treatment and monitoring baby (prenatal care).

a. Delivered woman who receiving care both for mother and neonatal postnatal care).

2. Exclusion Criteria are: The pregnant women without diagnosis with low amniotic fluid.

Instrument that Used for Data Collection:

The study instrument from consisted three parts according to the study’s objectives which were distributed through the following:

Part I: Sociodemographic data: Which include the following variables (age, Wife Education level, and Wife Employment, Residency and Socioeconomic status from family point of view?).

Part II: Reproductive characteristics: Which are related to(Current pregnancy duration (weeks), Interval between last pregnancy and current pregnancy(months), Gravidity, Number of live birth, Number of abortion).

Part III: Questions Related low amniotic fluid Causes:

1. Medical diagnosis of current low amniotic fluid

Results

Table (1): Distribution of Study Sample According to Reproductive Characteristics.

<table>
<thead>
<tr>
<th>Variables</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current pregnancy duration (weeks)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>28---29</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>30---31</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>32---36</td>
<td>41</td>
<td>41</td>
</tr>
<tr>
<td>37-40</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>&gt;40</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Interval between last pregnancy and current pregnancy (months)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;12</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>12---</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>24---</td>
<td>36</td>
<td>36</td>
</tr>
<tr>
<td>=&gt;36</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

Gravidity

<table>
<thead>
<tr>
<th>Gravidity</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multigravida</td>
<td>76</td>
<td>76</td>
</tr>
<tr>
<td>Primigravida</td>
<td>24</td>
<td>24</td>
</tr>
</tbody>
</table>

Number of live birth

<table>
<thead>
<tr>
<th>Number of live birth</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than one</td>
<td>88</td>
<td>88</td>
</tr>
<tr>
<td>One</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

Number of Abortion

<table>
<thead>
<tr>
<th>Number of Abortion</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>69</td>
<td>69</td>
</tr>
<tr>
<td>One</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Two</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Three &amp; more</td>
<td>4</td>
<td>4</td>
</tr>
</tbody>
</table>

*F = Frequency, % percentage
Table (1) shows that highest percentage 41% of the study sample of the current pregnancy duration were (32-36) weeks while the 10% lowest percentages of them were, (28-29) weeks. Regarding the interval between last pregnancy and current pregnancy the highest percentage (40%) of the study sample have interval period between last and current pregnancy for one year to two years, while the lowest percentage (4%) of them have (>=36) month. Regarding the gravidity the highest percentages (76%) of the study sample have multigravida, while the lowest percentages (24%) of them have primigravida. Concerning the number of live birth the highest percentage (88%) of the study sample were more than one, while the lowest percentages (12%) of them were one. Regarding the number of Abortion, the highest percentage (69%) of the study sample have no history of previous abortion, while the lowest percentage (4%) of them have three and more time abortion.

**Table (2): Distribution of Study Sample According to Characteristics of the current pregnancy.**

<table>
<thead>
<tr>
<th>Variables</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical diagnosis of current Low Amniotic Fluid</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Birth defects such as a kidney or urinary tract problem</td>
<td>2</td>
<td>2%</td>
</tr>
<tr>
<td>Placental problems</td>
<td>20</td>
<td>20%</td>
</tr>
<tr>
<td>Premature rupture of membranes (PROM)</td>
<td>25</td>
<td>25%</td>
</tr>
<tr>
<td>Postdate pregnancy</td>
<td>10</td>
<td>10%</td>
</tr>
<tr>
<td>Pregnancy Induced hypertension</td>
<td>35</td>
<td>35%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>8</td>
<td>8%</td>
</tr>
</tbody>
</table>

*F = Frequency, % percentage

Table (2) shows that the highest percentage (35%) of the study sample had low amniotic fluid due to pregnancy induced hypertension, (25%) of the study sample due to Premature rupture of membranes (PROM) and (20%) of the study sample due to placental problems, while the lowest percentage (2%) of them were due to birth defects such as a kidney or urinary tract problem and (8%) of them were due to diabetes.

**Discussion**

**Age of the study sample:** Table (1) shows the highest percentage (56%) of the study sample is within age group (20-25) years, while the lowest percentages (10%) of them is less than >30 years. This result agrees with Radha (2017). Who reports that 45.9% of the respondents were in the age group of 21-25 years and 6.8% were above 30 years the maternal age over 30 years. Comparable with the finding of Nazlima et al., (2015) where 46.15% of pregnant women were between 21-25 years age group. Our findings are also in accordance with Vidyadhar et al., (2016) where 78% cases were in the age group of 20-29 years. This result agrees with Sayeda & Hajira (2015). Who reports that67% of patients were in 20-25 years age group and 23% patients were in 26-30 years age group. Thus, maximum patients were in 20-30 years age group.

**Education Level:** The wife education at level. The highest percentages (44%) of the study sample were graduated from secondary school, and the lower percentages (10%) of them were graduated from Intermediate school.

**Employment:** The study results reveal that the wife employment highest percentage (67%) of the study sample are housewives, while the lowest percentage (33%) of them are Government employee as show in table (1). These findings are is consistent with Grote, et al., (2017), who stated that women’s work during pregnancy may have an impact on their health and on the validity of the fetus, especially the risk of low birth weight (LBW) and preterm labor.

**Residency:** The highest percentages (75%) of the study sample are resident of was urban area, while (25%) of them live in rural area. as shown in table (1). These findings disagree with Kambala, et al., (2015), who reported that (60.4%) of pregnant women with low amniotic fluid live in rural areas, because the higher parity is more often encountered in the rural population.

**Current pregnancy duration (weeks):** The study result revealed that highest percentage 41% of the study sample of the current pregnancy duration were (32-36) weeks while the 10% lowest percentages of them were, (28-29) weeks.

**Interval between last pregnancy and current pregnancy:** The study result reveals that the pregnancy interval between last pregnancy and current pregnancy the highest percentage (40%) of the study sample have interval period between last and current pregnancy for one year to two years, while the lowest percentage (4%) of them have (>=36) month, as shown in table (2). This finding is in accordance with the study of Madhavi & Rao, (2015) where incidence of low amniotic fluid was 40% high among post term pregnancies (40->42 weeks). Mohamad, (2015) revealed...
that women in the low amniotic fluid group were significantly (p<0.002), less likely to have lower mean weeks of gestation compared to those in the control group (38.9±1.3 vs. 39.4 ±0.9 respectively)

**Gravidity:** The study finds that the highest percentages (76%) of the study sample have multigravida, while the lowest percentages (24%) of them have primigravida, as shown in table (2). This result disagrees with Petrozella et al., (2016), the incidence of oligohydramnios was 60% in primigravida.

**Number of live birth:** The study finds that the highest percentages (88%) of the study sample were more than one, while the lowest percentages (12%) of them were one as shown in table (2). Bahar, et al. (2017) reported that women with parity greater than four and nearly nine times have more chance of low amniotic fluid than those with of less parity.

**Number of abortion:** The highest percentage (69%) of the study sample have no history of previous abortion, while the lowest percentage (4%) of them have three and more time abortion, as shown in table (2). It is estimated that each year, worldwide 40- 70 per 1000 women of reproductive age have an abortion and that between one- fifth and one – third of all pregnancies are terminated (Royston and Armstrong, 2015).

**Medical causes of Low amniotic fluid:** The highest percentage (35%) of the study sample had low amniotic fluid due to pregnancy induced hypertension, (25%) of the study sample due to Premature rupture of membranes (PROM) and (20%) of the study sample due to placental problems, while the lowest percentage (2%) of them were due to birth defects such as a kidney or urinary tract problem and (8%) of them were due to diabetes. Jagatia, et al., (2015) reported that most common cause of low amniotic fluid is idiopathic (52%). Second commonest cause is PIH (25%). Operative morbidity is highest in PIH (60%). Sharma et al., (2016) reported 71% of oligohydramnios cases were associated with antenatal complications such as PIH 39%, IU GR 29%, PROM 15%, Abruptio placenta 15%, compared to 36% in control group. Bansa et al., (2017) reported 21% PIH, 55% anemia. Reddy et al., (2018) reported Anemia in 42.67%, PIH in 25.33%. Vidyasagar, et al., (2017) reported PIH in 17.07%, IU GR in 46.34% in study group. Bhat et al., (2015) reported PIH in 33.3%, post-datism in 50%.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Maternity and Neonatal Health Nursing Department and all experiments were carried out in accordance with approved guidelines.

**References**


Level of Some Biomarkers of Bone Remodeling in Treated Multiple Myeloma Patients and Compared with New Diagnostic Multiple Myeloma Patients

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Abstract

This study was conducted to evaluate the role of some biomarkers of bone remodeling and osteoclast activation/function in treated myeloma patients and to compare results with new diagnostic multiple myeloma (MM) patients who did not receive any treatment during the period from March (2019) to end November (2019). The study involved measuring serum level of RANKL, Osteoprotegerin (OPG), RANKL/OPG ratio, Interleukin 6 (IL-6), C-terminal cross-linking telopeptide of type I collagen (CTX type –I), tartrate-resistant acid phosphatase isoform-5b (TRACP-5b) as markers of bone resorption in 47 treated myeloma patients and the results of these parameters comparing with 13 new diagnosed patients and (30) age- and sex-matched healthy controls groups. The statistical analysis of results showed that the serum level of (RANKL, RANKL/OPG ratio, IL-6, CTX type –I and TRACP-5b) decreased in the treated myeloma patients compared to the new diagnosis patients and the level OPG increased in treated myeloma patients.

The results also showed a significant rise (p≤0.05) serum level of (RANKL, RANKL/OPG ratio, IL-6, CTX type –I and TRACP-5b) and reduce level OPG in myeloma patients (treated and new diagnosis) in general compared to healthy control individuals. In conclusion, RANKL, OPG and IL-6 play significant roles in MM pathophysiology, as regulators of bone turnover The study showed that an increase leads to an increase in bone resorption, and it appears that chemotherapy reduces resorption.

Keywords: Multiple Myeloma, Bone Remodeling, Biomarkers.

Introduction

Multiple myeloma is a type of malignant cancer of plasma cells that normally develops and found in the bone marrow and this disease is part of a group of disorders known as “plasma cell dyscrasias”. Plasma cell are playing important roles in immune system through produce humoral factors which is called antibodies.

A hallmark feature of Multiple myeloma is Myeloma bone disease (MBD); up to 80% of patients present with osteolytic bone lesions (bone disease) at diagnosis and leading to pathophysiological features referred to as skeletal-related events (SREs), which contribute to a reduced quality of life and associated with rise mortality and morbidity.

MBD occurs due to the interactions between malignant plasma cells (MPCs) and cells in the bone marrow microenvironment (BMME), leading to accelerated overall bone loss and the formation of focal osteolytic lesions.

Although the mechanisms responsible for the development of a myeloma bone disease still not clear, several studies have begun highlights on cytokines and growth factors produced by myeloma cells or by the stromal cells of bone. As a result of the interaction between them, leads to an increase in the formation and activity of the osteoclast and adherence of myeloma cells to bone marrow stromal cells hence an increase production of cytokines, Among these cytokine is (RANKL), a member of the tumor necrosis factor (TNF) gene family produce by stromal cells causes activation of the cellular receptor RANK on osteoclasts by its ligand, RANKL, differentiation, proliferation, and survival of osteoclasts is enhanced, osteoclast fusion
and activation is promoted, and osteoclastic apoptosis is suppressed, leading to a dramatic increase of the number and activity of osteoclasts. In addition, production of osteoprotegerin (OPG), a soluble decoy receptor of RANKL produced by marrow stromal cells, is suppressed through the above interactions and has been found to be reduced in patients with MM. Studies in vitro show that IL-6 trans-signaling promotes osteoclastogenesis by increasing RANKL expression in osteoblasts and T cells (Wong et al., 2006) this effect is dependent on the JAK/STAT-3 signaling pathway (Duplomb et al., 2008). IL-6 transsignaling also increases RANKL expression by synovial fibroblasts to support osteoclastogenesis in the inflamed joint., however, under some circumstances IL-6 can actually inhibit osteoclastogenesis from human CD14+ precursors in vitro.

Bio markers of bone turnover, C-terminal cross-linking telopeptide of type I collagen CTX type –I tartrate resistant acid phosphatase isoform 5b (TRACP-5b), provide information on bone dynamics that in turn may reflect myeloma disease activity in bone. Several studies have shown bone markers to be elevated in myeloma patients and reflect the extent of bone disease, while in some of them bone resorption markers correlate with survival. These markers may also be helpful in knowledge respond to bisphosphonate treatment, and monitoring the effectiveness of bisphosphonate therapy in the management of myeloma bone disease.

The purpose of this study was to evaluate serum levels of OPG, RANKL, the ratio sRANKL/OPG, CTX type –I, and (TRACP-5b) at diagnosis and to estimate the effect of treatment on their circulating levels in patients with MM.

**Subjects and Method**

**1. Patients and healthy:** The study subjects comprised of 60 patients suffering from multiple myeloma, 47 patients received drugs of multiple myeloma (28 male and 19 female) and 13 new diagnosis (7 male and 6 female), age (mean ± SD) = 63.28 ±6.68 (ranging from 45 to 80 years). All patients were suffered from MM and were referred to the Hematology Consultation Clinic in each of the teaching hospitals at Baghdad governorate (medical city), Babil governorate (Marjan city) for diagnosis and/or treatment Those MM cases then have been diagnosed by a specialized haematologist. Diagnosis was based on bone marrow aspiration, biopsies reports and other diagnostic criteria included complete blood counts (CBC), serum protein electrophoresis and renal function (urea and creatinine) treated patients received first-line bortezomib- or lenalidomide-based chemotherapy. The healthy group included 30 individual (15 male, 15 female) age (mean± S.D) = (55.96 ± 4.7) (range 45 to 62), not suffering from any disease, served as a control group and this group matched with patient group. All subjects in this study were taken consent before participation in this study.

**2. Biomarkers analysis:** Venous blood samples were drawn from patients and control subjects by using disposable syringes. Five ml of blood was obtained from each subject, pushed slowly into disposable gel containing tubes, allowed to clot at room temperature for 15 minutes and then centrifuged at 3000 rpm for approximately 10-15. minutes, after that sera was obtained and stored at -20˚C until used. Quantitative detection of RANKL, OPG,CTX type-I and IL-6 in serum was done according to the industrial company (Bioassay Technology Laboratory (China), that depended on the technique of the quantitative sandwich enzyme immunoassay (ELISA) and (TRAP – 5b) was assayed in serum according to the industrial company Express Biotech International (USA).that also depended on the technique (ELISA).

**3. Statistical Analysis:** Analysis of data was made by using Statistical Package for Social Science (SPSS) system/version 23 Results expressed as mean ± Standard division S.D . The analysis of variance (ANOVA),the independent sample T- test, and correlate bivariate were used for this purpose.

**Results**

General features and clinical characteristics of patients and healthy controls are reported in Table 1. In a figure(1) shows the results of the statistical analysis of the biomarkers that were included in this work, it was found that there was a significant increase (p≤0.05) in the level RANKL, RANKL/OPG ratio, IL-6 and enzymatic markers (TRACP-5b and CTX- type I) of myeloma patients groups when compared with healthy control individuals. Also the study showed the presence of a significant decrease (p≥0.05) in the level of (OPG) when compared with healthy people. As The results showed the presence difference with statistically indication of the level (enzymatic marker (TRACP-5b) in treated patients when compared with new diagnosed patients While the difference was not significant in, RANKL, RANKL/OPG and CTX type –I.
Table (1): Demographic data and clinical characters of MM patients (treated and new diagnostic) and controls Mean ± S.D.

<table>
<thead>
<tr>
<th>Subjects Variables</th>
<th>MM patients treated</th>
<th>MM patients New diagnosis</th>
<th>Healthy controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>62.34 ± 5.68</td>
<td>64.23 ± 6.23</td>
<td>55.96 ± 4.7</td>
</tr>
<tr>
<td>Gender (male/female)</td>
<td>(28/19)</td>
<td>(7/6)</td>
<td>(15/15)</td>
</tr>
<tr>
<td>RBC counts (10⁶/ml)</td>
<td>2.614 ± 0.429</td>
<td>2.250 ± 0.496</td>
<td>5.68 ± 8.34</td>
</tr>
<tr>
<td>WBC counts (10⁶/ml)</td>
<td>3.79 ± 0.439</td>
<td>3.216 ± 0.381</td>
<td>9.806 ± 0.814</td>
</tr>
<tr>
<td>Platelets count (10⁹/ml)</td>
<td>210 ± 18.104</td>
<td>187.142 ± 17.43</td>
<td>248 ± 35.09</td>
</tr>
<tr>
<td>Hb levels (g/dl)</td>
<td>9.214 ± 0.508</td>
<td>6.90 ± 0.701</td>
<td>12.82 ± 0.944</td>
</tr>
<tr>
<td>ESR (mm/hour)</td>
<td>45.32 ± 9.67</td>
<td>87.23 ± 9.67</td>
<td>18.25 ± 3.34</td>
</tr>
<tr>
<td>Urea (mg/dl)</td>
<td>41.971 ± 5.455</td>
<td>87.357 ± 40.148</td>
<td>38.43 ± 24.24</td>
</tr>
<tr>
<td>Creatinine (mg/dl)</td>
<td>1.703 ± 0.532</td>
<td>3.442 ± 1.180</td>
<td>0.98 ± 1.205</td>
</tr>
<tr>
<td>Calcium (mg/dl)</td>
<td>10.571 ± 663</td>
<td>12.412 ± 2.027</td>
<td>36.106 ± 1.656</td>
</tr>
<tr>
<td>Albumin (g/L)</td>
<td>30.282 ± 1.458</td>
<td>27.671 ± 3.055</td>
<td>36.106 ± 1.656</td>
</tr>
<tr>
<td>Total protein (g/L)</td>
<td>79.428 ± 10.361</td>
<td>110.571 ± 9.253</td>
<td>69.33 ± 2.768</td>
</tr>
<tr>
<td>Bence Jones protein in urine</td>
<td>30 (positive)</td>
<td>(13) Positive</td>
<td>(0) positive</td>
</tr>
<tr>
<td></td>
<td>17 (negative)</td>
<td>(0) negative</td>
<td>(30) Negative</td>
</tr>
<tr>
<td>Beta 2 microglobulin (g/L)</td>
<td>12.56 ± 9.3</td>
<td>14.563 ± 11.793</td>
<td>0.615 ± 0.351</td>
</tr>
</tbody>
</table>

![Graphs showing RANKL, OPG, RANKL/OPG ratio, and TRACP-5b levels](image-url)
Discussion

The microenvironment of the bone is the primary facilitator of the myeloma where MM plasma cells (PCs) typically reside in and spread through the hematopoietic bone marrow. As result accumulation of myeloma cells in the bone marrow is increased osteoclast activity resulting in lytic bone disease in 80% of patients (Yaccoby et al., 2016). In normal physiological conditions, osteoblasts perform essential role in recruitment of osteoclast precursors and induction of osteoclast formation via production of osteoclastogenic cytokines and chemokines (Kohli and Kohli, 2016). Myeloma bone disease patients is characterized by reduced number of osteoblasts on bone surfaces adjacent to myeloma cells (Terpos et al., 2019), this explain that myeloma cells may play a direct role in increasing osteoclast activity through production of key osteoclastogenic factors. While recent studies shown that myeloma plasma cell stimulate indirectly the formation of osteoclast through disruption of the balance of osteoprotegerin and the receptor activator of nuclear factor-B ligand (RANKL) in the bone marrow (Raji et al., 2019), other studies suggested that myeloma cells express RANKL or macrophage inflammatory protein-1 and can directly induce differentiation of OC osteoclast progenitors into osteoclast 7. This may explain how myeloma cells induce osteoclastogenesis in bone areas highly infiltrated by myeloma cells with reduced number of osteogenic cells. However, in our work we test level of RANKL, OPG, TRACP-5b and CTX type –I as markers of bone resorption To study the relationship between myeloma cells and osteoclast in myeloma patients and knowledge effect the treatment on these biomarkers, we established that levels of RANKL rise significantly in myeloma patient when compared with healthy control groups as result of binding RANKL its signaling receptor RANK - a tumor necrosis factor receptor (TNFR) family member - on the surface of osteoclast precursor cells, leading to the fusion of these cells into multinucleated cells which then differentiate into mature osteoclasts So it plays an important role in skeletal-related events in patients multiple myeloma 8. Many Previous studies have demonstrated that the (IL-6)/signal transducer and activator of transcription 3 (STAT3) plays a central role in osseous metabolism and remodeling by signaling pathway in osteoclasts and osteoblasts 9, our results shown elevated in IL-6 concentration in MM patients this perhaps this cytokine implicated in bone metabolism and is principally secreted by myeloid precursor cells and myeloma cell as inflammatory factors in addition IL-6 enhances osteoclast differentiation, whereas it sustains MM cell survival.

On the other hand, the results of the current study showed a clear decrease in the level of OPG in myeloma patients compared with the healthy group, this finding, agreeing with its mention Seidel and his colleagues 2013, that OPG binds to heparan sulfate chains of syndecan-1 expressed on the surface of myeloma cells. Syndecan-1 is shown to be involved in internalization of heparan sulfate-binding molecules, but whether OPG is eliminated by this route is unknown. In later stages
of the disease, bone formation and osteoblast function are impaired, (Bataille et al, 1989) which gives an explanation to the reduced OPG levels in patients with overt bone destruction. While there was an insignificant increase in the treated myeloma patients group compared with the new diagnosed myeloma patients This is due to the role bisphosphonates impair osteoclastogenesis and disrupt osteoclast activity.

To have a better picture of bone formation and bone destruction in MM patients, we checked the levels of serum CTX-I and TRACP-5b a marker of bone resorption that has been demonstrated useful to evaluate osteoclast activity in MM patients 5 In our work level of serum CTX –I and TRACP-5b of MM patients are significantly elevated compared with healthy control groups, despite the reduction of serum CTX levels after bortezomib treatment when compared with new diagnosis myeloma patients. This observation correspond into Giuliani et al (2007) 12 indicate that bortezomib increases osteoblast differentiation in human mesenchymal cells without affecting the number of osteoblast progenitors and the viability of mature osteoblasts. In vivo and in vitro observations support the hypothesis that both direct and indirect effects on bone formation process could occur during bortezomib treatment.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved and all experiments were carried out in accordance with approved guidelines.

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Antibacterial Efficacy of Biosynthetic Zinc Oxide Nanoparticles by Lactobacillus Plantarum Combined with Poly-β-hydroxybutyrate Against Pathogenic Bacteria

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Abstract

The good capability of zinc-tolerant probiotic of Lactobacillus plantarum tolerating high concentrations of Zinc +2 and producing Zinc Oxide Nanoparticles highlights the unique characteristics of these bacteria as a natural microbial cell nano-factory for a more efficient and environmentally friendly process of biosynthesis of these nanoparticles. The morphological and structural properties of Zinc Oxide Nanoparticles were determined by X-ray diffraction, Atomic Force Microscope and Field Emission Scanning Electron Microscope showed that the synthesized nanoparticles were crystalline, moderately stable, roughly spherical, hexonal in shape and pure.

We examined the antibacterial activity of the Zinc Oxide Nanoparticles and Zinc Oxide Nanoparticles/Poly-β-hydroxybutyrate bionanocomposite on some pathogenic bacteria. It is clear in this study that Zinc Oxide Nanoparticles/Poly-β-hydroxybutyrate bionanocomposite has stronger inhibitory effect on pathogenic bacteria compared with Zinc Oxide Nanoparticles only because the bionanocomposites exhibited reduced water uptake and superior gas as well as vapour barrier properties and causes increasing damage of the pathogenic bacteria.

Keywords: ZnONPs, Lactobacillus plantarum, PHB, antibacterial efficacy and bionanocomposite.

Introduction

Zinc oxide nanoparticles have gained worldwide interest as multifunctional nanoparticles because of their distinctive features of being versatile semi-conductors and piezoelectric properties¹. Microbial metal nanoparticles synthesis has recently been widely used due to their low cost, biocompatibility and eco-friendliness². ZnO has many important features like chemical and physical stability, high catalysis and efficient antibacterial activity³. Symbiotic microorganisms may use NPs as safe source. Microbial nanoparticles synthesis has more benefits than other chemical and physical method. Nanoparticles have many applications in medicine¹. In addition, the bacterial nanoparticles may also be used for controlling human bacterial pathogens⁴. Among the micro-organisms, lactic acid bacteria (LAB) receive substantial attention because of their safe handling and food-grade status, which are “generally recognized as safe” (GRAS) in the production and preservation of food⁵. A low-cost, unreported and easy method for the biosynthesis of ZnONPs by using reproducible bacteria, Lactobacillus plantarum as an eco-friendly reduction and capping agent is described in our current study. Lactobacillus plantarum is a non-pathogenic, gram-positive, facultative anaerobic bacteria and is the largest of all lactic acid bacteria in its genome. Lactobacillus plantarum has a negative electrokinetic potential; which attracts cations easily and this step works as a trigger for the ZnONPs biosynthesis⁶. Poly-β-hydroxybutyrate is a biodegradable thermoplastic polyester that can be used in medicine, agriculture, etc.. Because of its non-toxic, biodegradable and biocompatible nature, poly-3-hydroxybutyrate (PHB) is considered as an ideal drug carriers⁷. Using solution casting technique,
bionanocomposites based on PHB incorporating different content of ZnONPs were prepared. The nanoparticles are distributed without the need for surfactants or binding agents within the biopolymer⁸.

**Methodology**

**Bacterial Isolate:** *Lactobacillus Plantarum* was selected as a biological model for the synthesis of ZnONPs because it is more efficient for biosynthesis of ZnONPs. We have obtained this isolate from the dairy products which is stored in the advanced Microbiology Lab./University of Babylon. We did culture to the isolate for 24hr. on MRS agar at 38°C, as well as it is diagnosed by Vitek2 system.

**Zinc Oxide Nanoparticles’ Biosynthesis by *Lactobacillus plantarum***: The pure culture of *Lactobacillus plantarum* was inoculated in the flask containing MRS broth that sterilized by autoclave and incubated at 37° C for 24hr. at 100rpm. After the incubation period, we did Centrifuge 5000 rpm. for 25 min. then we took the supernatant. The pH of the supernatant was regulated by 0.4 M NaOH to delay the transformation process (the pH of the supernatant is acidic 4.7 to be neutral we added the NaOH to reach pH 7 to eliminate the influence of organic acids). 28.8 g. 0.1 M ZnSO₄·7H₂O dissolved in 1000 ml of distilled water, was added to 250 ml of the supernatant and then heated by a water bath of up to 85 ° C for 5-10 min. A white precipitate appears at the bottom of the flask indicates the process of transformation. Then the flask was Incubate at 37 ° C for 12 hr., all the particles are accumulated at the bottom of the flask. In order to separate the white precipitate, the product was Centrifuged at 6000 rpm for 20 min. and washed with D.W. then the process was repeated 3 times to get pure products followed by drying at 60 ° C in a hot air oven for 4 hr⁹.

The instruments that used in determining the properties of ZnO nanoparticles biosynthetic by *lactobacillus plantarum* :-

- X-ray diffraction analysis (XRD).
- Atomic Force Microscope (AFM).

**Preparation of Zinc Oxide Nanoparticles**

**Reinforced Poly-β-hydroxybutyrate Films:** 0.3gm. Poly-β hydroxybutyrate (manufactured by SIGMA-ALDRICH company/Germany) was put into the ZnONPs mixed solution 0.18 gram of ZnONPs after that putting them into scuttle bottle containing 30 ml. chloroform then stirring by ultrasonic bath device for 30 min. continuing the process until achieving the homogeneous solution and verified the homogeneity by physical observation. Then the films were poured into glass petri dish at room temperature 30 °C and left for 48 hrs. for evaporation of chloroform [10]. In this study we use different weights of PHB (0.1, 0.2, 0.3 and 0.03gm.) while using 0.18 and 0.3 gm. of ZnONPs in the preparation of ZnONPs reinforced P(βHB) Films.

**Antibacterial efficacy of ZnONP and PHB-ZnONPs bionanocomposite.**

**Disc Diffusion Method.**

This method was accomplish on Muller Hinton media as follows:

1. Concentrations were taken from each bacterial isolates and compared to McFarland solution to get the right concentration for each of them.
2. The appropriate concentration 0.1 ml of each bacterial isolates were added to dishes containing Muller Hinton agar is spread on the surface of the dish-by spreader and left the dishes for an hour.
3. PHB-ZnONPs bionanocomposites were made (3.2.11) in cork borers each 6 mm diameter. it was equal distance between the film and well. Table 1 shows the concentrations of ZnONPs and ZnONPs/PHB used in the present study.

<table>
<thead>
<tr>
<th>ZnONPs/PHB wt.%</th>
<th>ZnONPs + PHB Concentration (mg/ml)</th>
<th>ZnONPs Concentration (mg/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 0.18/0.1= 1.8</td>
<td>0.20</td>
<td>1 0.6</td>
</tr>
<tr>
<td>2 0.18/0.2= 0.9</td>
<td>0.10</td>
<td></td>
</tr>
<tr>
<td>3 0.18/0.3= 0.6</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>4 0.3/0.03= 10</td>
<td>1.25</td>
<td>2 1.04</td>
</tr>
</tbody>
</table>

4. The nanoparticles were dissolved in distal water to get a final concentrations, and dunk ZnO NPs with filter paper.
5. After incubation at 37°C for 24 hrs., the PHB-ZnO nanocomposite film and nanoparticles inhibition zones were measured by a ruler.

Results and Discussion

Zinc Oxide Nanoparticles biosynthesis by Lactobacillus plantarum: The biosynthesis of nanoparticles from Lactobacillus plantarum has been confirmed by observing a change in solution color during the synthesis of ZnONPs that explains the reduction of ZnO into ZnONPs during exposure to bacterial extract followed by a change in color from brown to yellow during 24hr., this result was compatible with the study done by 12.

The deposition of the white color at the bottom of the flask by combining Lactobacillus plantarum with ZnSO₄·7H₂O, is agreed with the results reported through 13-15. Lactobacillus plantarum has a major role in the production of Zn-ONPs. It is possibly because this bacteria possesses negative electro-kinetic potential which attracts the cations readily and triggers the synthesis of nanoparticles. Furthermore, Lactobacillus has the capacity to grow even in the presence of oxygen allowing more capability of metabolic growth. In addition, the presence of glucose in the MRS media used for Zn-ONPs synthesis tends to lower the potential for oxidation-reduction. Energy producing glucose (which regulates the value of rH₂), medium pH ionic status and complete oxidation reduction potential (rH2) partially controlled by sodium hydroxide, all of these factors cumulatively negotiate ZnONPs synthesis in the presence of Lactobacillus 9, the final stage of ZnONPs biosynthesis by Lactobacillus plantarum after the process of drying these nanoparticles in the oven.

Morphological & Structural properties of ZnONPs biosynthesized by Lactobacillus plantarum: Moderately stable ZnONPs have been synthesized using Lactobacillus plantarum. The effect of reaction time plays a vital role in the morphology of nanoparticles. The Field Emission Scanning Electron Microscopy image of the ZnONPs have shown spherical clusters of the nanoparticles as in figure 1 shows the diameters of ZnONPs (21.75 nm, 24.13 nm, 25.77 nm), indicating the diameters of NPs were accurate and appropriate as ZnONPs.

X-Ray diffraction analysis (hexagonal phase) shows that the synthesized nanoparticles were crystalline and pure in nature. The peaks at 2θ = 32.01, 45.28, 56.41, 66.12 and 75.03 were respectation lines of spherical Zn-ONPs respectively, figure 1. The average particle size of ZnONP was determined by applying the Scherrer equation. The maximum diameter measured for particles is 5.5 nm., this result was agreed with the results reported through 16,17.

Atomic Force Microscope analysis of synthesized ZnONPs was carried out to assess their morphology and size range. The 2-D and 3-D images of AFM, figure 3, showed that most of the nanoparticles are spherical in shape and some of the agglomerations were present in the background of the nanoparticles. AFM analyses revealed that obtained nanoparticles were in a hexagonal, polydispersed, nearly spherical in shape, these results were compatible with the study of 18.

Figure 1. X-Ray diffraction (XRD) Microscopy (FESEM)
The antimicrobial efficacy was due to cell membrane damage, leading to cell contents leakage and cell death. While the exact mechanism of action is still unclear, the generation of H$_2$O$_2$ (a potent oxidizing agent harmful to the cells of living organisms) from the surface of Zinc Oxide has been considered as the main factor of Zn-O reinforced nanocomposites ‘antibacterial efficacy’$^{19}$. Zn NPs or ZnONPs of extremely low concentrations can’t cause toxicity in human systems$^{20}$. The antibacterial efficacy of Zn-ONPs and bionanocomposites Zn-ONPs/PHB were tested using the method of disc diffusion agar, Tables 3 and 4. The existence of an inhibition zone clearly
indicated that ZnONPs had an antibacterial effect. As indicated in the study of 21 it was also observed in this study that the growth inhibition was also increased by increasing the concentration of ZnONPs or Zn-ONPs/PHB in the disc. Depending on the type of pathogenic bacteria and concentrations of ZnONPs or ZnONPs/PHB bionanocomposites the inhibition zone was different. In this study, four concentrations of ZnONPs and Zn-ONPs/PHB bionanocomposites were used as in tables 3 and 4 indicate that increasing concentrations of ZnONPs and ZnONPs/PHB bionanocomposites leads to increase growth inhibition of the pathogenic bacteria, but ZnONPs/PHB bionanocomposites has more activity in the inhibitory effect for these pathogenic bacteria, this analysis agreement with previous study 22.

### Table (3): Shows the diameter of inhibition zone of ZnONPs for some pathogenic bacteria.

<table>
<thead>
<tr>
<th>ZnONPs wt. (g.)</th>
<th>ZnONPs Con. (mg/ml)</th>
<th>ZnONPs(mm) Staph. aureus</th>
<th>ZnONPs(mm) Staph. epidermidis</th>
<th>ZnONPs(mm) K. pneumoniae</th>
<th>ZnONPs(mm) E. coli</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.18</td>
<td>0.6</td>
<td>8</td>
<td>24</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>0.3</td>
<td>1.04</td>
<td>13</td>
<td>29</td>
<td>14</td>
</tr>
</tbody>
</table>

### Table (4): Shows the diameter of inhibition zone of ZnONPs +PHB bionanocomposites for some pathogenic bacteria.

<table>
<thead>
<tr>
<th>ZnONPs/PHB wt.%</th>
<th>ZnONPs+PHB Con.(mg/ml)</th>
<th>ZnONPs+PHB(mm) Staph. aureus</th>
<th>ZnONPs+PHB(mm) Staph. epidermidis</th>
<th>ZnONPs+PHB(mm) K. pneumoniae</th>
<th>ZnONPs+PHB(mm) E.coli</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.18/0.1=1.8</td>
<td>0.20</td>
<td>12</td>
<td>31</td>
<td>13</td>
</tr>
<tr>
<td>2</td>
<td>0.18/0.2=0.9</td>
<td>0.10</td>
<td>10</td>
<td>29</td>
<td>11</td>
</tr>
<tr>
<td>3</td>
<td>0.18/0.3=0.6</td>
<td>0.07</td>
<td>9</td>
<td>28</td>
<td>10</td>
</tr>
<tr>
<td>4</td>
<td>0.3/0.03=10</td>
<td>1.25</td>
<td>15</td>
<td>34</td>
<td>19</td>
</tr>
</tbody>
</table>

Also figure 2 explains the difference in the efficiency of the types of inhibitors for pathogenic bacteria is indicating that the efficiency of ZnONPs/PHB has stronger inhibition because the bionanocomposites exhibited reduced water uptake and superior gas as well as vapour barrier properties compared to ZnONPs and causes increasing damage to Staph. aureus.

**Conclusion**

Our current study for ZnONPS biosynthetic by Lactobacillus Plantarum and ZnONPs/PHB bionanocomposite, and using these them as antibiotics give us wonderful results, low complications, very low cost and low resistance in comparison with ordinary antibiotics. This means that ZnONPS and ZnONPS/PHB have high antibacterial efficacy but PHB/ZnONPs bionano-composites were more effective than ZnONPs in inhibition the growth of pathogenic bacteria. The results represent a great potential benefit for a wide numbers of medical applications in the battle against antibiotic-resistant bacterial pathogens.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the College of Biotechnology and all experiments were carried out in accordance with approved guidelines.

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Study the Impact of the Concentration of Mercury Chloride on Micronuclei Formation and Some Organs of Juveniles of *Ctenopharyngodonidella*

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Abstract

There is no doubt that Mercury is considered one of the significant pollutants to the environment. It have been noticed that exists in three forms. The previously mentioned forms are elemental or metallic (mercury), organic and inorganic mercury. Inorganic mercury can be converted microbiologically into organic form. The present paper has been focused on the genotoxicity and histopathological effect of mercuric chloride on *Ctenopharyngodonidella* (Grass carp). Basically, *Ctenopharyngodonidella* is one of the most important fish species according to FAO reports. Moreover, *C. idella* fry have been divided into four groups. The first Group was exposed to sublethal concentrations of 5 ppb, Second Group was exposed to 10 ppb of mercuric chloride and the third one was exposed to 15 ppb, on the other hand, the fourth Group was kept as unexposed control. Furthermore, A blood smear was done for micronuclei examination and gills and liver of the tested fish were obtained for histopathological study. A significant increase of micronucleus notched erythrocytes in fish exposure with HgCl₂ than in the controls. The microscopic examination has shown different histological changes in the organs of the examined fish which has been exposed to mercuric chloride in comparison with control organs.

Keywords: Mercuric chloride, Ctenopharyngodonidella, Micronucleus, Histopathological changes.

Introduction

Generally speaking, Mercury is classified as one of the most harmful pollutants because of its high toxicity and persistence in the environment. To put it in other way, it exists in three forms: elemental (metallic) mercury, organic mercury (methylmercury) and inorganic mercury (Mercuric Chloride).¹,² No one can deny that the fact that it is a naturally occurring element, but it has been directly mobilized into ecosystems through mining. Moreover, it has been used in products on (paint, electronic devices) and industry.³,⁴

To that end, Mercury pollution in aquatic ecosystems has received a great deal of attention since the discovery of mercury as the cause of Minamata disease in Japan in the 1950s⁵. Having said that most mercury is released into the environment as an inorganic form, which is primarily bound to particulates and organic substances and might not be available for direct uptake by aquatic organisms. Then, part of the inorganic mercury can be microbiologically converted into methyl-mercury and taken up by the aquatic organisms⁶,⁷.

However, once Hg exists in aquatic systems, it can be accumulated in different organisms, leading to its biomagnification through the food chain. Studies examining Mercury accumulation in fish tissues are significant because these organisms represent the main human contamination pathway⁸,⁹,¹⁰.

Furthermore, *Ctenopharyngodonidella* (Grass carp), a species of the family Cyprinidae, is a subtropical to temperate fish species, native in eastern Asia with a native range from northern Vietnam to the Amur River on the Siberia-China border. It is considered one
of the most important species, according to FAO, the value of farmed *C. idella* is about 6.46 billion USD for a production of 5.03 billion tons in 2012\(^{11,12,13}\).

Additionally, this species is characterized by a wide, sacaleless head, terminal or subterminal mouth with simple lips and very short snout\(^{13}\). That is to say, the body is slender and fairly compressed with a rounded belly and the lateral line is complete, slightly decurved and extending along the middle of the depth of the tail\(^{14,15}\). As well as, adult *C. Idella* has a dark greycolour while the dorsal surface sides have a slightly golden shine. Colour fins are clear to gray-brown\(^{16}\).

*C. idella* is consumed as food in Iraq and many other countries in the world. It is also being widely introduced to control of submersed aquatic weed because of their strong preference for aquatic vegetation\(^{17,18}\).

Although many studies had been estimate the pollution of aquatic environments in Iraq, There is a need to investigate the effect of this pollution on aquatic biomass. So this study was performed to examine the effect of mercuric chloride on the histology of some organs of *C.idella* fish.

**Materials and Method**

**Fish and experiments:** *C.idella*fry with an average length of 15 -20 cm and weight of 100g were purchased from a commercial aquaculture facility in Al Rifaiacity (Thi-Qar, Iraq) and adapted to experimental conditions (running dechlorinated tap water at 25°C (with a 12 h-D,12 h-L photoperiod)for a minimum period of 15 days. During the adaptation period, fish were fed dry commercial pellets, and water was renewed daily. Later 15 fish were transferred to each one of four aquaria; of 200 L capacity. Different test doses were prepared making dilution of the stock concentration. Three of aquaria containing 5,10 and 15 ppb HgCl\(_2\), respectively. Control fish were added to the fourth aquarium which containing uncontaminated water. The fish were sacrificed after14days. Micronuclei Examination,Gills and liver was pulled out for histopathological study.

**Cytogenetic Examinations:**

**Micronuclei:** Determine the number of Micronuclei by\(^{19}\). A blood smear was made on a glass slide to dry, then fixed for 10 minutes with methanol and dye with gmsa stain for 30 minutes. The prepared slides were examined under the (40X), the number of Micronuclei was calculated in 1000 cells.\(^{20}\).

**Histopathological study:** Tissue specimens from used fish (Gills, liver and muscles) were taken and fixed in 10 % formalin. They were processed into the routine histological procedure to obtain five micron thick paraffin sections then they were stained with hematoxylin and eosin and were examined under light microscope\(^{21}\).

**Results and Discussion**

**Cytogenetic study:** It is noticed from Table (1) the rates of the number of micronuclei in (1000) red blood cell of the three groups and the control group fish, in the third HgCl\(_2\) groups a significant increase (P≤0.05) in micronuclei rates during the time of the experiment was (3.400 ± 0.910), (7.133 ± 1.355) And (10.333 ± 3.145), respectively, compared to the control group (0.666 ± 0.487), (Fig. Micronuclei). The results indicated a significant increase in micronuclei of mercury chloride exposure group compared with control groups. These results agreed with the previous\(^{22-24}\).

The micronucleus test, one of the most popular and promising tests of environmental genotoxicity, has served as an index of cytogenetic damage for over 30 years.\(^{25}\). The increase in micronuclei of red blood cells in the present study of (*ctenopharyngodonidella*) due to mercury chloride toxicity was identified as a good biological indicator of genetic toxins to monitor the influence of such elements. Mechanisms of erythrocyte nuclei deformity have not yet been explained and there is no consensus about the causes of these changes\(^{26}\).
Recently, it has been proposed that severe nuclear deformations can also originate from physical forces, such as the compression of the nucleus during migration through confined spaces that can lead to nuclear envelope rupture.27.

Histopathological study: There is no sign of mortality was noticed at the study period in all fish groups. However different histopathological changes were noticed through microscopic examination the studied organs. Moreover, the gill sections of C.idella have shown that the all fish groups which have been treated with the three concentration of mercuric chloride (5, 10 and 15 ppb) have a loss of epithelial tissue (Fig. 1,2). Additionally, the other microscopic histopathological changes in fish group which have been treated with 10 ppb mercuric chloride are the congestion of small blood vessels (Fig. 2), whats more, it has been noticed that there is presence of inflammatory cells in the secondary lamina in the gills of C.idella treated with 15 ppb of experimental toxic element that has been used in this investigation (Fig. 3). The normal histology of gills is presented in (Fig. 4).

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![Fig 1. Gills section of C. idella treated with 5 ppb mercury chloride 10X](image1)

![Fig 2. Sever loss of epithelial lining, Gill sections, Fish treated with 10 ppb mercuric chloride 10X](image2)

![Fig 4. Presence of inflammatory cells in the secondary lamina in the gills of C. idella treated with 15 ppb mercuric chloride 40X](image3)

![Fig 5. Normal set of gills 40X](image4)
Furthermore, figures (5) pointed to the Presence of inflammatory cells in the liver section of the fish treated with 5 ppb mercuric chloride.

Fish gills are particularly sensitive to the chemical and physical modifications of surrounding water. Not only but also, morph functional alterations of the gills have been widely documented after exposure to water pollutants. However, many authors suggest that gill damages are largely non-specific and can be induced by a wide range of toxicants\(^{(28,29)}\).

Several studies have been focused on the effects of mercury on gill tissues. Most of the available data have been focused on methyl mercury, while the effects of inorganic mercury are less investigated. However, gill damages and structural changes caused by water-borne inorganic mercury have been reported for relatively few species, from both marine and freshwater ecosystems\(^{(30-34)}\). Mercury caused a wide variety of morphological changes in *Danio rerio* gills and modifications of both Na+/K+-ATPase and metallothioneins expression\(^{35}\).

It has been noticed that the appearances of lysed areas were found in zebrafish liver after exposure to copper sulphate. As well as, considering the copper’s ability to induce membrane disruption, the authors suggested that the lysed distribution may reflect a heterogeneous distribution of Copper in the parenchyma. Interestingly, Observation of lysed area after exposure to inorganic mercury; whereas similar adverse effects have not been reported in liver after exposure to methyl mercury; These results further support the hypothesis that inorganic mercury, affect membrane whereas methyl mercury does not appear to act directly at plasma membrane\(^{36}\).

Wu et al\(^{37}\) provided strong evidence for liver toxicity following exposure of adult guppies (*Poeciliareticulata*) to methylmercury (1–10 µg/L for 1 and 3 months). Additionally, alterations have involved hepatocytes (cell swelling and nuclear pyknosis) and hyperplastic biliary epithelium of the intrahepatic bile duct.

It have been concluded that fish exposure to inorganic mercury causes different histopathological changes. However, further study is warranted to study the molecular effect of mercuric chloride of *C. idella*, or to know the toxic effect of mercury on the other important types of fish \(^{(38-40)}\).

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**Conflict of Interest:** The author has no disclosures to report.

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**References**


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Psychoactive Substance Use among Medical and Pharmacy Students, University of Kufa 2019

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Abstract

Background: Medical and pharmacy students are at greater risk of using psychoactive substances. Iraqi medical and health science students are at great danger of using these psychoactive substances and this may be attributed to different reasons, e.g. stressful life.

Objectives: Hence, this study was designed to identify the pattern and to investigate the triggering factors associated with psychoactive substance use among medical and pharmacy students, University of Kufa.

Subjects and Method: A descriptive cross-sectional institutional-based study was conducted from the period of March to June 2019 at the University of Kufa, in which students were recruited in multistage fashion. Randomly selected students were asked to fill in an online questionnaire prepared based on different standard questionnaires and previous studies. Pearson’s chi-square test (X²) and Fisher-Exact test were used to find the association between categorical variables. A p-value of ≤ 0.05 was considered significant.

Results: Overall, 129 students participated in this study. The mean age of the students was (21.89 ± 2.76). Overall, seven percent of the participants have confessed that they are tobacco smokers. In terms of waterpipe tobacco smoking, 10 out of 129 (7.8%) of the students were hookah smoker and only 2 students (1.6%) were e-cigarette smokers. Most of the students stated that multiple reasons behind their tobacco smoking. Nearly one-third of participants had quarrels or arguments. While no one had trouble with the police or made something who regretted later. In general, most of the students acknowledged that the use of psychoactive substances carries a risk. In terms of the triggering factors, all factors studied in this study were associated insignificantly with tobacco smoking among the target population (p-value > 0.05), except gender, if they have a family member who smokes or friends who drink alcohol and the age at initiation (p-value < 0.05). No pattern of alcohol consumption and prescription drug among the participants have been identified.

Keywords: Medical Students, Psychoactive substance use, e-cigarette, hookah, Pharmacy students.

Introduction

Psychoactive substances are a group of drugs, which has the capability of changing both internal perceived mental states, e.g. mood, and external observable activities, such as behaviors. Using these psychoactive substances is of major public health issue as it can affect both the health and well-being of millions of people. It has been estimated that more than 275 million people in 2016 had used psychoactive drugs at least once in the previous year, which represents 5.6 percent of the whole people aged between 15-64 years in the world1. Psychoactive substance use is associated with an increase in the risk of morbidity and mortality, psychological and interpersonal issues, school performance difficulties, difficulties in establishing a satisfactory relationship, engaging in unwanted and unprotected sex, crime, accidents, and injuries2,3.

Several consequences have been reported to be
attributed to psychoactive substance use. For instance, studies have linked poor academic performances with substance use or misuse. It has been found that substance use (current smoking, chewing khat at least weekly, drinking alcohol daily, and having an intimate friend who uses substance) was significantly and negatively associated with students’ academic performance. Furthermore, Olivier Marie and Ulf Zölitz have demonstrated that academic performance was increased among students who were restricted to buy cannabis. More significantly, psychoactive substances use is one of the modifiable and important risk factors for suicide attempts. It was reported that psychoactive substance use was responsible for one in five suicide attempts in 2012 (175000 out of 800 000). Furthermore, in one meta-analysis study, which identified a total of 12,413 references and included 43 studies with 870,967 participants, there was a significant association between substance use disorder and suicidal ideation: OR 2.04 (95% CI: 1.59, 2.50; I² = 88.8%, 16 studies); suicide attempt OR 2.49 (95% CI: 2.00, 2.98; I² = 94.3%, 24 studies) and suicide death OR 1.49 (95% CI: 0.97, 2.00; I² = 82.7%, 7 studies). Iraqi medical and pharmacy students are undoubtedly at greater risk of using psychoactive substances. This may be attributed to different reasons, for example many conflicts Iraq has faced in recent years and availability of psychoactive substances in the shops, markets, and drug dealers. Despite that, only a few studies have been conducted to address this rising issue in the general population and more specifically among students. Hence, this study was designed to identify the pattern of psychoactive substance use among medical and pharmacy students, University of Kufa and to investigate the triggering factors associated with psychoactive substance use among medical and pharmacy students.

Subjects and Method

Study design and settings: A descriptive cross-sectional institutional-based study was conducted from the period of March to June 2019 at the University of Kufa, in which students were recruited in multistage fashion. In the first steps, colleges were considered strata (stratified sampling). While in the second step, students were selected randomly and were fully surveyed. To make students trust the investigators before distributing the questionnaires, an illustration was given to the participants about the purpose of the current study, anonymity of the questionnaires, and the voluntary nature of participation in the survey. Furthermore, students were told not to disclose or fill in any personal information in the questionnaire.

Data collection tool: Randomly selected students were asked to fill in an online questionnaire, which was prepared and test before conducting this study. This questionnaire had been prepared based on a different standard questionnaire and previous studies, such as The Global Assessment Program on Drug Abuse Toolkit Module 3: Conducting School Surveys on Drug Abuse. The questionnaire was started asking the students if they are given consent to participate in the current study. The following sections were the demographic data including, age, gender, marital status, residency, mother’s educations, father’s education, relationship to parents and family, and the department of study.

Data analysis: Statistical analysis was carried out using Statistical Package for Social Sciences version 24. Categorical variables were presented as frequencies and percentages. Continuous variables were presented as (Means ± SD). Pearson’s chi-square test (X²) and Fisher-Exact test were used to find the association between categorical variables. A p-value of ≤ 0.05 was considered significant.

Results

Table 1: Reasons for tobacco smoking (n =9)

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peer Pressure</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>5(55.6)</td>
</tr>
<tr>
<td>No</td>
<td>4(44.4)</td>
</tr>
<tr>
<td>Skipping life problems</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>5(55.6)</td>
</tr>
<tr>
<td>No</td>
<td>4(44.4)</td>
</tr>
<tr>
<td>Psychological stress</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>5(55.6)</td>
</tr>
<tr>
<td>No</td>
<td>4(44.4)</td>
</tr>
<tr>
<td>Academic performance difficulties</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>5(55.6)</td>
</tr>
<tr>
<td>No</td>
<td>4(44.4)</td>
</tr>
<tr>
<td>Entertainments</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>5(55.6)</td>
</tr>
<tr>
<td>No</td>
<td>4(44.4)</td>
</tr>
<tr>
<td>Emotional reasons</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>5(55.6)</td>
</tr>
<tr>
<td>No</td>
<td>4(44.4)</td>
</tr>
<tr>
<td>Family disputes</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>4(44.4)</td>
</tr>
<tr>
<td>No</td>
<td>5(55.6)</td>
</tr>
<tr>
<td>Multiple reasons</td>
<td></td>
</tr>
<tr>
<td>No reason</td>
<td>2 (22.2 %)</td>
</tr>
<tr>
<td>Multiple</td>
<td>7 (77.8 %)</td>
</tr>
</tbody>
</table>
Perception of participants about psychoactive substance use: In general, most of the students acknowledged that the use of psychoactive substances carries risks. For instance, students believe that smoking occasionally or regularly has an impact on their lives and they think this risk raise with regular smoking (table 3). Similarly, students consider have one or two drinks nearly every day or have four or five drinks in a row per weekend carry moderate to great risk (31.8% and 37.2% and 26.4 and 46.5 respectively), yet the majority (55.0%) of them acknowledged that have four or five drinks in a row per every day carry a great risk. Regarding misusing marijuana or hashish, most of the students consider using these substances once or twice or using it regularly carry a moderate to great risk.

<table>
<thead>
<tr>
<th>Variables</th>
<th>No risk</th>
<th>Slight Risk</th>
<th>Moderate risk</th>
<th>Great risk</th>
<th>Don’t know</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoke cigarettes occasionally</td>
<td>5(3.9)</td>
<td>16(12.4)</td>
<td>43(33.3)</td>
<td>57(44.2)</td>
<td>8(6.4)</td>
</tr>
<tr>
<td>Smoke one or more packs of cigarettes per day</td>
<td>9(7.0)</td>
<td>16(12.4)</td>
<td>41(31.8)</td>
<td>48(37.2)</td>
<td>15(11.6)</td>
</tr>
<tr>
<td>Have four or five drinks in a row nearly every day</td>
<td>7(5.4)</td>
<td>7(5.4)</td>
<td>29(22.5)</td>
<td>71(55.0)</td>
<td>15(11.6)</td>
</tr>
<tr>
<td>Have five or more drinks in a row each weekend</td>
<td>5(3.9)</td>
<td>11(8.4)</td>
<td>34(26.4)</td>
<td>60(46.5)</td>
<td>19(14.7)</td>
</tr>
<tr>
<td>Try marijuana or hashish (cannabis, pot, grass) once or twice</td>
<td>9(7.0)</td>
<td>15(11.6)</td>
<td>28(21.7)</td>
<td>50(38.8)</td>
<td>27(20.9)</td>
</tr>
<tr>
<td>Smoke marijuana or hashish regularly</td>
<td>7(5.4)</td>
<td>12(9.3)</td>
<td>27(20.9)</td>
<td>59(45.7)</td>
<td>24(18.6)</td>
</tr>
<tr>
<td>Try an amphetamine once or twice</td>
<td>11(8.5)</td>
<td>32(24.8)</td>
<td>35(27.1)</td>
<td>27(20.9)</td>
<td>24(18.6)</td>
</tr>
<tr>
<td>Take amphetamines regularly</td>
<td>9(7.0)</td>
<td>11(8.5)</td>
<td>38(29.5)</td>
<td>46(35.7)</td>
<td>25(19.4)</td>
</tr>
</tbody>
</table>

Consequences of tobacco smoking: In terms of the consequences, which may have happened because of tobacco smoking, nearly one-third of participants had quarrels or arguments. While no one had trouble with the police or made something who regretted later. The main consequences of tobacco smoking are illustrated in table 3.

Table 3: The main consequences of tobacco smoking among the participants (n = 9)

<table>
<thead>
<tr>
<th>Consequences</th>
<th>Yes, because of my smoking N(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quarrel or argument</td>
<td>3(33.3)</td>
</tr>
<tr>
<td>Scuffle or fight</td>
<td>1(11.1)</td>
</tr>
<tr>
<td>Accident or injury</td>
<td>1(11.1)</td>
</tr>
<tr>
<td>Loss of money or other valuable items</td>
<td>2(22.2)</td>
</tr>
<tr>
<td>Problems in your relationship with your parents</td>
<td>2(22.2)</td>
</tr>
<tr>
<td>Problems in your relationship with your teachers</td>
<td>1(11.1)</td>
</tr>
<tr>
<td>Performed poorly at school or work</td>
<td>0(0.0)</td>
</tr>
<tr>
<td>Trouble with police</td>
<td>1(11.1)</td>
</tr>
<tr>
<td>Done something that you regretted later</td>
<td>0(0)</td>
</tr>
</tbody>
</table>

Triggering factors associated with exposure to smoking: In terms of the triggering factors, all of these factors are associated insignificantly with tobacco smoking among the target population (p-value > 0.05), except gender, if they have a family member who smokes or a friend who drinks alcohol and the age at initiation of this tobacco smoking (p-value < 0.05). Association between triggering factors and illicit drug use are illustrated in table 4.
Table 4: Association between triggering factors and tobacco smoking (n =129)

<table>
<thead>
<tr>
<th>Triggering Factors</th>
<th>N (%)</th>
<th>Smoking</th>
<th>χ²</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Yes N (%)</td>
<td>No N (%)</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>59(100.0)</td>
<td>9(3.34)</td>
<td>50(96.66)</td>
<td>0.001*f</td>
</tr>
<tr>
<td>Male</td>
<td>70(100.0)</td>
<td>0(4.00)</td>
<td>70(96.00)</td>
<td></td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>113(100.0)</td>
<td>7(5.77)</td>
<td>106(94.23)</td>
<td>0.309f</td>
</tr>
<tr>
<td>Married</td>
<td>16(100.0)</td>
<td>2(12.3)</td>
<td>14(96.77)</td>
<td></td>
</tr>
<tr>
<td>Residency</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>114(100.0)</td>
<td>8(3.40)</td>
<td>106(94.60)</td>
<td>0.719f</td>
</tr>
<tr>
<td>Rural</td>
<td>15(100.0)</td>
<td>1(6.67)</td>
<td>14(97.13)</td>
<td></td>
</tr>
<tr>
<td>Relationship to parent and family</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Satisfactory</td>
<td>119(100.0)</td>
<td>110(94.6)</td>
<td>9(5.4)</td>
<td>0.472f</td>
</tr>
<tr>
<td>Not satisfactory</td>
<td>10(100.0)</td>
<td>0(10.0)</td>
<td>1(90.0)</td>
<td></td>
</tr>
<tr>
<td>Department</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medicine</td>
<td>44(100.0)</td>
<td>4(9.3)</td>
<td>40(90.7)</td>
<td>0.489f</td>
</tr>
<tr>
<td>Pharmacy</td>
<td>633(100.0)</td>
<td>5(0.8)</td>
<td>628(99.2)</td>
<td></td>
</tr>
<tr>
<td>Family member smokes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>57(100.0)</td>
<td>7(12.3)</td>
<td>50(87.7)</td>
<td>0.043*f</td>
</tr>
<tr>
<td>No</td>
<td>72(100.0)</td>
<td>2(2.8)</td>
<td>70(97.2)</td>
<td></td>
</tr>
<tr>
<td>Family member drinks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>2(100.0)</td>
<td>1(50.0)</td>
<td>1(50.0)</td>
<td>0.155f</td>
</tr>
<tr>
<td>No</td>
<td>127(100.0)</td>
<td>8(6.3)</td>
<td>119(93.7)</td>
<td></td>
</tr>
<tr>
<td>Family member misuses drugs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>14(100)</td>
<td>0(0.0)</td>
<td>14(100.0)</td>
<td>0.343f</td>
</tr>
<tr>
<td>No</td>
<td>115(100)</td>
<td>9(7.8)</td>
<td>106(92.2)</td>
<td></td>
</tr>
<tr>
<td>Friend smokes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>55(100.0)</td>
<td>7(13.1)</td>
<td>48(86.9)</td>
<td>0.176f</td>
</tr>
<tr>
<td>No</td>
<td>74(100.0)</td>
<td>2(2.7)</td>
<td>72(97.3)</td>
<td></td>
</tr>
<tr>
<td>Friend drinks alcohol</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>12(100.0)</td>
<td>3(25.0)</td>
<td>9(75.0)</td>
<td>0.038*f</td>
</tr>
<tr>
<td>No</td>
<td>117(100.0)</td>
<td>6(5.1)</td>
<td>111(94.9)</td>
<td></td>
</tr>
<tr>
<td>Friends misuse drugs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>19(100.0)</td>
<td>1(5.3)</td>
<td>18(94.7)</td>
<td>0.606f</td>
</tr>
<tr>
<td>No</td>
<td>110(100.0)</td>
<td>8(7.3)</td>
<td>102(92.7)</td>
<td></td>
</tr>
<tr>
<td>Age at initiation of smoking</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not smoker</td>
<td>113</td>
<td>0</td>
<td>113</td>
<td>&lt;0.001*f</td>
</tr>
<tr>
<td>15-18</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>&gt; 18</td>
<td>15</td>
<td>8</td>
<td>7</td>
<td></td>
</tr>
</tbody>
</table>

*p-value ≤ 0.05 was significant. f: Fisher-exact test.

Discussion

The objectives of this study were to identify the pattern and the triggering factors of psychoactive substance use among medicine and pharmacy students at the University of Kufa. The prevalence of current tobacco cigarette smoking was 7.0%, where all of the smokers were female. This prevalence of cigarette smoking is lower than found in Hawler University, Kurdistan region, which was 12.3% and lower among the University of Karbala students in 2005, which was
Furthermore, this current smoking prevalence among medical and pharmacy students when compared to Arabic and adjacent countries is lower than that found in Sudan (The National Ribat University, 10%), Lebanon (7 different universities, 25.8%), Egypt (Tanta University, 12%) and Saudi Arabia (King Fahad Medical City in Riyadh, 17.6%) (21–24). The difference in the prevalence may be attributed to different universities, hence different regulations and policies, and different ways of data collection (online versus handwritten questionnaire).

Moreover, the current study has investigated the ongoing rise issue among the Iraqi community, which is the water pipe (hookah) and e-cigarette tobacco smoking. The prevalence of hookah smoking was 7.8%, while e-cigarette prevalence was 1.6%. This hookah smoking is lower than found among medical students in Saudi Arabia (12.6%), Syria (23.5%), London (11%), and Turkey (28.6%) (23, 25, 26). This finding highlights the rise of hookah smoking among medical students, and this may be attributed to the wrong belief that hookah is less harming than tobacco cigarette smoking and the cheap cost of this sort of tobacco smoking. Another rising issue among Iraqi medical and medical students is the use of the e-cigarette. The prevalence of e-cigarette tobacco smoking was 1.6%, which is quite low percent and this could be attributed to the newer introduction of this type of smoking to the Iraqi markets and the high cost of these cigarettes. The use of e-cigarette is believed to be a route to cease cigarette smoking, yet studies have identified that using this form of tobacco smoking is a strong risk factor for current tobacco cigarette smoking among young adults.

Conclusion

Some pattern of tobacco smoking was identified and several factors play an essential role in this pattern. A larger study is warranted to address this highly risky issue.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Faculty of Pharmacy, Iraq and all experiments were carried out in accordance with approved guidelines.
and Illicit Substance Use and Their Correlations Among Medical Sciences Students in Iran. Int J High Risk Behav Addict. 2015;


17. Module T. Conducting School Surveys on Drug Abuse Global Assessment Programme on Drug Abuse (GAP) Conducting School Surveys on Drug Abuse


Therapeutic Exercises for Spine Aberrations, According to the Kinematic Analysis, in Improving the Motor Capabilities of Children (6-9 Years)

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Abstract

Physical deviations that are closely related to technological development helped to the emergence of diseases resulting from inactivity and lack of movement, So therapeutic exercise is one of the means to help improve the strength of pupils by using the means of assistance as a means of treating deviations of the spine such as (rubber ropes, medical balls, stick and various sponge pieces). The purpose of therapeutic exercises is to help the child return to activity and life as quickly as possible, reduce pain and increase the flexibility of joints and muscle elasticity. Therefore, the researcher used the one-group experimental curriculum (tribal-after test), and the research community was identified from the 150 students and students of the 2018-2019 school year, and 22 students were identified. Their age of (6-9) years in the deliberate way, as the therapeutic program was implemented which includes therapeutic exercises for (6) weeks by (12) therapeutic units and the time of the therapeutic unit (35) minutes, and concluded the researcher that the therapeutic units followed by the researcher to reduce deviations in the column.

Keyworld: Biomechanic of sport, Therapeutic exercises, motor capabilities of children.

Introduction

Good texture sits as the outward appearance through which we define the human pause and the beautiful shape of it. Due to the increased prevalence of physical deviations that may be closely linked to technological development, the emergence of diseases resulting from inactivity and lack of mobility, therapeutic exercise is one of the means to help improve the strength of pupils by using assistance as a means of treating spinal deviations¹. The purpose of therapeutic exercises is to help the child return to activity and life as quickly as possible and reduce pain and increase the flexibility of joints and muscle rubber². The process of describing the movement must be attributed to the axes and imaginary bodies in the human body where the point of prevention these bodies represent the point of the center of the weight of the body and there are three axes and three flats and when the representation of movement is said to be around the axis and this movement is located in the flat and this helps in the mechanical analysis of movement which is one of the method of research in the field of biomechanics which is looking for the effect of internal laws³. The human spine is the most complex part of the musculoskeletal system, the basic functions of the spine are to protect the spinal cord, support the head, neck and upper limbs, transfer loads from the head of the trunk to the pelvis and allow various movements. The use of kinematic analysis³ and x-ray to identify spinal deviations in pupils and pupils of the sample by comparing it with the correct anatomical position, Hence the importance of research in the use of therapeutic exercises and aids such as (physical ball, rubber ropes, some sponge pieces, wooden stick and other tools) that help in the treatment of spinal deviations in pupils by strengthening tendons and ligaments and increasing the flexibility of joints and muscle rubber where Taking care of strength helps to reduce these deviations, And through the researcher’s observation of the problems suffered by schoolchildren from carrying bags more than the required weight or study seats not suitable for the age of the students as well as sitting long imam TV or electronic devices make the child low movement and activity and may be due to
a genetic factor, as well as excess weight these factors lead to real problems suffered by society⁴, so the study aimed to prepare therapeutic exercises using the means of assistance, and to identify the effect of therapeutic exercises for some spinal deviations according to analysis Kinematic in improving the motor abilities of children.

**Material and Method**

The researcher used the one-group experimental curriculum (tribal-after test), the research community was identified from the 150 students and pupils of the Amirat Primary School for Boys/Girls in Najaf. The treatment program, which includes (6) weeks of therapeutic exercises with (12) therapeutic units and the time of the treatment unit (35) minutes, was determined by the method of treatment.

Community photography and presentation of video photography to a committee of doctors specializing in orthopedic surgery:

1. Preparing a special form on which the members of the committee indicate cases of deviations of the spine.
2. After that, the sample was determined by those who had deviations in the spine and in the intentional manner and numbered (22) pupils.
3. X-ray image of the spine was taken from the back and from the side to determine the degree of deviations.
4. The degree of deviations was determined by the introduction of the x-ray image in the calculator and within the program of dynamic analysis kinovea 8,26).

**Devices used in the search:** Digital electronic stopwatch (1/60) of a second to measure time and calculate for tests that need time (German industry) number 1 and hand-made Sony cameras with its cushions quickly (100 images/s) number 2 and rubber ropes number (2) Chinese industry and medical ball number (3) Chinese industry weighing (1kg), (2kg) and stick number (2) and various sponge pieces number (6) and physical balls number (3) weighing (1,5).

After looking at many scientific sources and conducting interviews to determine the most important the motor capabilities of children (6-9 years), namely (agility - flexibility - balance - compatibility).

**Kinematic Measurements:**

**First:** Horizontal deviation: a deviation of the axis of the shoulders from the horizontal axis, as this variable is measured from the method of x-ray imaging of the sample, and then the introduction of imaging in the program of kinetic analysis kinovea 8,26) inside the computer to determine the angle of the horizontal axis (the first side) and the second side draws between two points or two fixed on the top of each side of the body so that the point of the intersection of the two rectum represents the top of the rectum represents the axis of the two corners representing the axis of the two sides.

**Second:** Vertical deviation: which is the deviation of the spine from the vertical axis, where this variable is measured from the method of x-ray of the sample, and then the introduction of imaging in the program of kinematic analysis kinovea 8,26) inside the computer to determine the angle of the vertical axis (the first rib) and the second rib straight draws along the longitudinal axis of the spine, and the intersection of the rectum represents the head of the vertical angle.

**Third:** Gibbosity: How to measure the angle of thoracic kyphosis: By using the x-ray image of the bones of the spine (dorsal area), then the upper and lower arch is determined as the level at which the vertebrae begin to arch, and the degree of curvature is measured by drawing straight on x-ray rays), the first on the upper limits of the upper vertebrae of the arch, the second straight drawing spout from the lower boundary of the lower vertebrae of the arch, and the angle formed by the point of the intersection of the two rectum represents the angle of the curvature (cup). Through the side view the use of the horizontal axis that is perpendicular to the arrow level on which the curvature occurs, and the natural degree of curvature from the side up to (40 degrees), and the higher degree of (60) need surgical interference, but the degree of curvature between (41-60) can be treated using physical therapy programs⁵, as shown in figure 1.
Table 1: The arithmetic mean, standard deviation, sig value and morality show the differences between tribal and dimensional tests of the student group in the research variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Measuring unit</th>
<th>Pre-test</th>
<th>Post-test</th>
<th>Sig</th>
<th>Type Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Running as (8)</td>
<td>Sec</td>
<td>23.18</td>
<td>18.30</td>
<td>0.000</td>
<td>sig</td>
</tr>
<tr>
<td>Bend the trunk forward to stand</td>
<td>cm</td>
<td>1.41</td>
<td>6.5</td>
<td>0.004</td>
<td>sig</td>
</tr>
<tr>
<td>Stand on the instep</td>
<td>Sec</td>
<td>3.22</td>
<td>7</td>
<td>0.000</td>
<td>sig</td>
</tr>
<tr>
<td>Barrow for Agility</td>
<td>Sec</td>
<td>30.21</td>
<td>26</td>
<td>0.002</td>
<td>sig</td>
</tr>
<tr>
<td>The angle of deviation of the shoulders from the horizontal axis</td>
<td>Deg</td>
<td>13</td>
<td>4.21</td>
<td>0.002</td>
<td>sig</td>
</tr>
<tr>
<td>The angle of deflection of the spine from the vertical axis</td>
<td>Deg</td>
<td>6.63</td>
<td>3.5</td>
<td>0.001</td>
<td>sig</td>
</tr>
<tr>
<td>Hunching the dorsal area</td>
<td>Deg</td>
<td>32.40</td>
<td>27.64</td>
<td>0.003</td>
<td>sig</td>
</tr>
</tbody>
</table>

The results of the tribal tests after the following tests showed that all the tests conducted on the students have a statistical difference of moral because the moral value is below the level of significance of (0.05).

The statistical results showed a difference between tribal and dimensional tests and in favor of dimensional tests, the researcher attributes the reason for the difference to the applications of the period between the two tests and the various exercises included with the use of several means, and those exercises targeted a large group of skeletal muscles, that the continuous work of the muscles according to the improvement of the topical, some muscles require flexibility i.e. focus on them with exercises flexibility, especially the chest and abdominal muscles to reduce their stiffness and shortness. Because the shortness of those muscles works to pull the vertebrae inward, which leads to increased stupor of the dorsal area and this is the result of the continuation of the wrong habits of sitting or standing, or as a result of the lack of movement and activation of those muscles or focus on a muscle group in certain movements such as carrying heavy school bags for long distances, forcing the front muscles of the trunk to contract for a long time in order to generate a tightening force of the spine to the imam, resulting in obtaining vertical weight gain on the center of gravity resulting in the result of the weight of the weight. The result is bag weight and body weight. The overall improvement in the strength and elasticity of some muscles of the trunk area has helped a lot in reducing deviations of the spine, because deviations greatly affect the compatibility and movement of the pupil with the rapid change of direction during running, and the development of muscle function.
and increased capacity while reducing the deviations of the spine helped the sample members achieve a better time when applying the running test in form (8) 9,10. Physical and motor improvement has to do with the physical corrections that give balance in movement and stability. The use of auxiliary means such as rubber ropes, physiological balls, sponge pieces, stick and flexibility exercises that correct the wrong conditions taken by the body in the performance of its work and restore the body to its proper position 11. Lateral spine flexibility exercises help elongat the short muscles, which reduce the tilt of the torso to its side, either flexible exercises of the back spine help straighten the spine and stretch the short muscles in the pectoral and abdominal area, including the torso on the physical ball, and the braces on the sponge pieces 12. The continuation of the application of fixed and moving flexibility exercises during the period of therapeutic exercises has a clear effect on reducing deviations of the spine from the horizontal axis and vertical axis and stiffness, because most of these cases are caused by stiffness in more than one muscle due to not being exposed to stretching and elongation as a result of wrong social habits in terms of sitting and standing13. The diversification of the physical effort helped in involving the largest number of muscle groups, and as a result the activation of inactive and weak muscles with treatment cases of short muscles on one side of the trunk and weak muscles on the opposite side, and these steps were carried out by involving a group of method such as rubber ropes, and the wooden stick in the twisting and pulling exercises For the side with resistance to rubber cords, with applications of exercises to tighten the abdominal muscles and their flexibility on flat, inclined terraces and arched terraces. All these applications aim to reduce the deviations of the spine resulting from physical and behavioral imbalance, because the presence of these deviations will generate rotational attribution in the parts of the body hindering the constant and motor balance, i.e. the body is tilted to one side, which requires greater effort from the muscles of the opposite side to work to maintain its balance.

Conclusions

The program of therapeutic units followed by the researcher was able to reduce deviations in the spine of the sample, and the use of kinematic analysis helped the researcher in determining the degrees of deviations of the spine, in addition to the use of auxiliary means with the implementation of therapeutic exercises helped to achieve the goals of those exercises in terms of time and effort and improve the motor abilities of the sample, as working with deviations in the spine early gives better results and delay increases the difficulty of treatment.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the physical education of sport and science and all experiments were carried out in accordance with approved guidelines.

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Posttraumatic Stress Disorders among Adolescent Post the (Islamic State of Iraq and al-Sham) (ISIS) War in Kirkuk City

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Abstract

Background: The gathering of Islamic assembling in Iraq and the Levant was known as the Islamic State in Iraq and the Levant, known as the ISIS, a furnished affiliation that follows the way of thinking of jihadi Salafi social occasions, and whose people point - according to their conviction - to restore “the Islamic caliphate and the utilization of Sharia”, and its people exist and spread its effect is generally in Iraq and Syria with refreshes on its embodiment in the zones various countries are southern Yemen, Libya, Sinai, Azawad, Somalia, northeastern Nigeria and Pakistan. Additionally, the pioneer of this affiliation is Abu Bakr Al-Baghdadi

Objective(s): To assess post-traumatic stress disorders among adolescents after (the Islamic State of Iraq and the Levant War) (ISIS) in the city of Kirkuk.

Methodology: A non experimental approach using descriptive design was applied in the present study from 1st October 2019 to the 20th of February 2020. The study was conducted at rural area which was under ISIS at Alhawija district in Kirkuk Governorate. the study involve many village at alhawija district includes (Musaanaa village, Shamlan village Aleaoa village, Alhalawa village, Alkhan village). A Purposive sample consisted of (100) from both (male and female) the sample was collected from five village at alhiwija district, these village was occupied by ISIS groups approximately for 3 years from June, 2014 until October 2018. In order to gather the study data, a questionnaire was building depending on the criteria of WHO scale (formate and modify by researcher) and related literature according to their study Data were analyzed by Statistical Package for Social Science (SPSS) version (24) is used for data analysis at.

Results: The study revealed the sample size was consist of (57.0%) male and (43.0%) female also the result shows the participants are suffering from moderate to severe level of psychological distress which indicates having low level of psychological wellbeing and general health.

Recommendation: National and international interventions are required for them especially for the victims of sexual violence, physical, social and psychological supports are needed. Further studies and researches also required to assess their suffering and other possible psychological disorders.

Keywords: Post-traumatic stress disorder, adolescent, Islamic State of Iraq and al-Sham (ISIS).

Introduction

Life for many kids and youths in Iraq was flipped around in 2014 as the Islamic State in Iraq and Syria (ISIS) started a fast development that saw rushes of viciousness heighten across a significant part of the nation. In the assault that followed, more than 5 million individuals – half of them kids – were displaced. Psychiatric side effects and mental issue among evacuees are perceived as a pressing issue, particularly in the Yazidi populace, after the extreme assaults by the
alleged “Islamic State of Iraq and Syria” (ISIS) in July 2014\(^1\). Through the long stretches of cruel ISIS rule, Iraqi youngsters and teenagers were exposed to probably the most awful infringement of their privileges possible. For some residents the later battle to another control bring all the more torment. Homes and entire networks were decimated or proceed onward in the battling and innumerable kids and their families were harmed. A two year after inviting;ISIS was removed from Nenwa and Kirkuk, the injury of war lives on. Youngsters are ceaselessly helped to remember the past revulsions they encountered and still face unending threat from mines and unexploded arms, which keep on slaughtering, mangle and psychological warfare all the time. Many are battling to come back to class after years without instruction\(^2\).

A large extent of ladies than male experienced Post Traumatic SD and MD, and ladies with PTSD or gloom were more probable than their man partners to record having encountered or seen the demise of a mate or youngster. Ladies with PTSD announced the center indications of PTSD (flaShbacks, hypervIgilance, and exceptional mental misery because of tokens of injury) more much of the time than their male partners, and ladies would in general show undermodulation of feelings and low confidence in light of horrendous pressure. Discouraged ladies were almost certain than their male partners to report sentiments of blame or uselessness. Seriousness of posttraumatic side effects is by all accounts the most grounded indicator of disabled wellbeing related personal satisfaction in PTSD outpatients\(^3\). Iraq’s populace is contained generally of kids and youngsters, with about 60 percent under the period of 25.2 And it is this gathering who are frequently the most exceedingly awful influenced mentally by the battling. Just by supporting their strength and defending their psychological wellness and psychosocial prosperity can networks really push ahead, making sure about an increasingly positive future for their nation\(^5\).

Aims of the study :- to assess post-traumatic stress disorders among adolescents after (ISIS) in the city of Kirkuk

**Recommendations**: national and international interventions are required for them especially for the victims of sexual violence, physical, social and psychological supports are needed. Further studies and researches also required to assess their suffering and other possible psychological disorders.

**Methodology**

A non experimental approach using the type of design is a descriptive from 1\(^{st}\) october 2019 to the 20th of February 2020. The study was conducted at rual area which was under ISIS at Alhawija district in Kirkuk Gvernorate. the study involve many village at alhawija district includes(Musaanaa village, Shamlan village Aleaoa village, Alhalawa village, Alkhan village). A Purposive sample consisted of (100) from both gender, the sample was collected from five village at alhiwija district,these village was occcupied by ISIS groups approximately for 3 years from june,2014 untill october 2018, the sample chosen according to the following criteria: Males and females from five fillage at ahiwija district. Ranges of age was between (10 -19 years for children). Agreed to attendance in the study. The inform consent obtained from all victimes befor starting in take information. In order to gather information, a questionnaire was constructed depending on the criteria of WHO scale (formate and modify by researcher) and related literature according to their study. It is composed of many parts parts:

- **Part I**: Demographic characteristic of sample includes (age,marital status and types of event)
- **Part II**: Scale of post trauma stress which consist of 22 questions,two liker scale 2 for Yes and 1 for No
- **Part III**: Physical and psychological health assessment consist of from 28 question, four liker scale
- **Part IV**: Psychometric distress measure which consist of from 10 questions, three liker scale
Part V: Psychological reactions which consist of from 20 questions, five liker scale. Data collected by questionnaire via interview technique throughout as a means of such collection. The data was collected between 10 th october 2019 to the 10th of January 2020. Analyz data in several steps. First, descriptive statistics, which include frequency and percentages. The second step, which includes inferential statistics (Chi-Square test and ANOAV), the statistical done by SPSS version (24) is at (P.value ≤ 0.05).

Results

Table (1): Range, Mean, Standards of participants age

<table>
<thead>
<tr>
<th>Age range (years)</th>
<th>Mean ±SD</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-18</td>
<td>12.54±0.471</td>
<td>0.05</td>
</tr>
</tbody>
</table>

SD= Standard Deviation, SE= Standard Error

Table (1) describe that 100% of participant of the study sample at age of 10-18 years old.

Table 2: Distribution of study sample by their post-traumatic stress disorder with significant

<table>
<thead>
<tr>
<th>Questions about Post-traumatic stress disorder</th>
<th>Answer</th>
<th>OR</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes (%)</td>
<td>No (%)</td>
<td></td>
</tr>
<tr>
<td>Q1</td>
<td>28(28)</td>
<td>72(72)</td>
<td>8.55</td>
</tr>
<tr>
<td>Q2</td>
<td>33(33)</td>
<td>67(67)</td>
<td>7.04</td>
</tr>
<tr>
<td>Q3</td>
<td>43(43)</td>
<td>57(57)</td>
<td>2.96</td>
</tr>
<tr>
<td>Q4</td>
<td>39(39)</td>
<td>61(61)</td>
<td>9.42</td>
</tr>
<tr>
<td>Q5</td>
<td>43(43)</td>
<td>57(57)</td>
<td>2.96</td>
</tr>
<tr>
<td>Q6</td>
<td>38(38)</td>
<td>62(62)</td>
<td>10.82</td>
</tr>
<tr>
<td>Q7</td>
<td>40(40)</td>
<td>60(60)</td>
<td>6.37</td>
</tr>
<tr>
<td>Q8</td>
<td>24(24)</td>
<td>76(76)</td>
<td>12.73</td>
</tr>
<tr>
<td>Q9</td>
<td>45(45)</td>
<td>55(55)</td>
<td>1.94</td>
</tr>
<tr>
<td>Q10</td>
<td>51(51)</td>
<td>49(49)</td>
<td>0.332</td>
</tr>
<tr>
<td>Q11</td>
<td>29(29)</td>
<td>71(71)</td>
<td>9.33</td>
</tr>
<tr>
<td>Q12</td>
<td>33(33)</td>
<td>67(67)</td>
<td>7.04</td>
</tr>
<tr>
<td>Q13</td>
<td>43(43)</td>
<td>57(57)</td>
<td>2.96</td>
</tr>
<tr>
<td>Q14</td>
<td>39(39)</td>
<td>61(61)</td>
<td>9.42</td>
</tr>
<tr>
<td>Q15</td>
<td>42(42)</td>
<td>58(58)</td>
<td>4.722</td>
</tr>
<tr>
<td>Q16</td>
<td>63(63)</td>
<td>37(37)</td>
<td>8.66</td>
</tr>
<tr>
<td>Q17</td>
<td>77(77)</td>
<td>33(33)</td>
<td>7.04</td>
</tr>
<tr>
<td>Q18</td>
<td>46(46)</td>
<td>64(64)</td>
<td>5.311</td>
</tr>
<tr>
<td>Q19</td>
<td>39(39)</td>
<td>61(61)</td>
<td>9.42</td>
</tr>
<tr>
<td>Q20</td>
<td>40(40)</td>
<td>60(60)</td>
<td>4.884</td>
</tr>
<tr>
<td>Q21</td>
<td>42(42)</td>
<td>58(58)</td>
<td>4.722</td>
</tr>
<tr>
<td>Q22</td>
<td>59(59)</td>
<td>41(41)</td>
<td>4.892</td>
</tr>
</tbody>
</table>

*=Statically Significant (P<0.05), OR=odd ratio

Table 2 included survey about post-traumatic stress disorder. Participants answers significantly different (p<0.05)on survey options except on Q10(P<0.444). However, most participant not exposure to condition of present survey when most of them answer by no on all question except options on this survey where x² is 30.08 and p value equal to 0.001.
The figure shows that the majority of Participants with PTSD were (57%) male.
The study result indicate that there is a high significant differences between the overall sample at (p<0.05), except Q10 represent (P<0.444).

Table 3: Distribution of participant by their psychological distress

<table>
<thead>
<tr>
<th>Psychological distress measure</th>
<th>Survey options</th>
<th>OR</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Never</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q1</td>
<td>N (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q2</td>
<td>N (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q3</td>
<td>N (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q4</td>
<td>N (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q5</td>
<td>N (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q6</td>
<td>N (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q7</td>
<td>N (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q8</td>
<td>N (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q9</td>
<td>N (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Q10</td>
<td>N (%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Statically Significant (P<0.05), OR=odd ratio

Table (3) shows a significant differences between participants at (P<0.05).

The findings presented in table 3 indicate that the participants are suffering from moderate to severe level of psychological distress which indicates having low level of psychological wellbeing and general health.

Figure (4): Psychological distress measure/Chi Square ($X^2$) = 30.93, Degree of Freedom (DF)=27, P=0.0022*)
Discussion of the Results

Part I: The present results revealed that 100% of participant of the study sample at age of 10-18 years old. Explanation of this result refers to all study sample from same age and sample region also the research focus on this sample at study findings of the present study supportive evidence is available in the study that showed (the high percentage of their sample were adolescent and shows 65%) from total sample.

Table 2 included survey about post-traumatic stress disorder. Participants answers significantly different (p<0.05) on survey options except on Q10(P<0.444). However, most participant not exposure to condition of present survey when most of them answer by no on all question except options on this survey where $X^2$ is 30.08 and p value equal to 0.001. Explanation of this result refers to most of victim was under ISIS suffering from traumatic disorder.

Our results is agreement with other study conduct by McCarthy and Semmache (2018) and report that numerous young ladies and young men keep on feeling is probably going to be fuelling their powerlessness to recuperate and is a key main impetus for their concerns. More than 80 percent of young people matured 13 to 17 said that they didn’t have a mood of security strolling alone and right around 50 percent didn’t have a sense of security away from their folks. Almost 33% of teenagers detailed failing to feel safe site at school, and just one-quarter think about school as a protected space (6).

Also the result shows the majority of Participants with PTSD were (57%) were male, the study conducted by Alison (2017) reported that in her study we are concentrated on male child soldiers that constituted the largest group of children within the ISIS fighting-related structures and have lacked institutionalized support. It is, of course, important to systematically take into account female child soldiers as well that are certainly in equal need of attention, protection, and support (7).

Also the result shows in Figure (2) included describe post-traumatic stress disorder, the result of study indicate that there is a high significant differences between the overall sample at (p<0.05). except Q10 represent (P<0.444).

Bobic and others (2015) Studies assessing mental clutters in war exiles show heterogeneity in commonness paces of sadness (run 2.3%–80%), PTSD (4.4%–86%), and undefined uneasiness issue (20.3%–88%), for the most part because of clinical and methodological variables (8).

With regard to psychological problems the findings presented in table 3 indicate that the participants are suffering from moderate to severe level of psychological distress which indicates having low level of psychological wellbeing and general health. This result is agreement with study conduct by Ceri and others (2018) (9).

Figure (4): Psychological distress measure (Chi Square ($X^2$) = 30.93, Degree Of Freedom (DF)=27, P=0.0022)

This figure shows most of respondents suffer from mild and severe psychological problems. The most generally detailed mental outcome of horrible accidents and war clashes specifically is the post-horrendous pressure issue (PTSD). Then again, examines have increase the issue of substance use issue (SUD) among evacuees and populaces presented to war clashes. Be that as it may, enslavement in dislodged populaces is as yet an understudied point (10).

Recommendations: National and international interventions are required for them especially for the victims of sexual violence, physical, social and psychological supports are needed. Further studies and researches also required to assess their suffering and other possible psychological disorders.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved and all experiments were carried out in accordance with approved guidelines.

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Effectiveness of Educational Program on Nurse-midwives’ Knowledge about Pregnancy Induced Hypertension at Bint Al-Huda Hospital in Al-Nasiriya City

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2Assistant Prof., Maternal and Neonatal Health Nursing Department of College of Nursing, University of Baghdad

Abstract

Background: Pregnancy induced hypertension, is common throughout the world but more frequent in developing countries and cause of maternal and infant mortality and morbidity.

Objectives: To the effectiveness of educational program about PIH on nurse-midwives’ knowledge

Subjects and Method: A quasi-experimental design, non-probability (purposive) sample of (50) nurse-midwives’ who are working in Bint Al-Huda hospital in Al-Nasiriya City during February 13th through April 2nd 2019.

Results: The results of the study show that more than a one third of the study sample are within age group (20-25) years, and had more than a half were married, one third were nursing school graduates and had experiences for 10 years or more. In pretest the nurse’s knowledge show poor and fair level, after intervention of the program and through two posttest in different timing the score show a progress in result to very good level. (84.9%) for knowledge during posttest I and to (100%) for posttest II to knowledge.

Conclusion: The study concludes there were significant of educational program on nurse-midwives’ knowledge.

Keywords: Effectiveness, Educational Program, Nurse-midwives’, Knowledge, Pregnancy Induced Hypertension.

Introduction

Pregnancy induced hypertension is defined as BP ≥ 140/90 mmHg, taken after a period of rest on two occasions or ≥160/110 mmHg on one occasion in a previously normotensive woman1. Or as systolic blood pressure (SBP) >140 mmHg and diastolic blood pressure (DBP) >90 mmHg. It is classified as mild (SBP 140-149 and DBP 90-99 mmHg), moderate (SBP 150-159 and DBP 100-109 mmHg) and severe (SBP ≥160 and DBP ≥110 mmHg)2 According to the Canadian Hypertension Society, PIH refers to one of four conditions: a) pre-existing hypertension, b) gestational hypertension, and preeclampsia, eclampsia and HELLP syndrome) pre-existing hypertension plus superimposed gestational hypertension with proteinuria and unclassifiable hypertension3 Worldwide, (10%) of all pregnancies are complicated by hypertension, with pre-eclampsia and eclampsia being the major causes of maternal and prenatal morbidity and mortality 28 It is also estimated that pregnancy induced hypertension (PIH), one of the hypertensive disorders of pregnancy, affects about (5 – 8%) of all pregnant women worldwide Muti, (2015). Incidence of hypertensive disease associated with pregnancy varies widely in epidemiological studies due to variations in definitions, and the differences in data collection Schoenaker, (2014)Pregnancy induced hypertension is one of the causes of maternal deaths in Iraq (30) deaths per year according to the 2014 census. According to the WHO, 2011 PIH is one of the main causes of maternal, fetal and neonatal mortality and morbidity, it is the most common cause of maternal
death in Europe. It is a major pregnancy complication associated with premature delivery, intra-uterine growth retardation (IUGR), abruptio placentae, and intra-uterine death, as well as maternal morbidity and mortality. It is estimated that (9.1%) of maternal deaths in Africa are due to hypertensive disorders of pregnancy. Other maternal short-term complications include central nervous system dysfunction, hepatocellular injury, thrombocytopenia, acute disseminated intravascular coagulation (DIC), oliguria, pulmonary edema, cerebrovascular events and placental abruption. Interventions during pregnancy, may improve maternal outcomes. In this regard, the intervention includes primary prevention, detection of increased risk and early detection of any stage of PIH by antenatal adequate care. Secondary prevention of progression is by treatment at primary level or referral for expert care. It is understood that care guided by findings generated from rigorous scientific method consists of gold standard in health care.

Methodology

Subjects and Method: Non-probability (purposive) sample of fifty (50) nurse-midwives’ who are working in Bint Al-Huda hospital during study intervention regardless of their age, social status and educational level on nurse-midwives’ who worked in obstetrics and gynecology department (emergency words, labor room, maternal ward, operation room and maternity intensive care unit).

Data collection has been performed throughout the use of the study instrument and the application of educational program on nurse-midwives’ knowledge about pregnancy induced hypertension, from February 13th through April 2nd 2019.

The questionnaire consists of three part: Part I included sociodemographic data related to the respondents characteristics such as age, level of education, social status, years of experience, Current site of work, previous site of work, did you know before about pregnancy induce hypertension, did you previously participation in any course about pregnancy induces hypertension and Have you ever nurse pregnant woman with pregnancy induce hypertension during work.

Part II this part is assessing with (65 items) related to the nurse-midwives’ performance, the items are rated according to a (2) points rating scale, scoring, which are as (2) for agree and (1) for dis-agree. The questions items include items of PIH performance during antenatal, during convulsion, during Labor and during postpartum.

Part III check list for evaluation the nurse-midwife performance, the items are rated to a (2) points rating scale, the level of the scale are scored as (2) for done and (1) for Not done. The questions items include items of PIH performance during emergency, convulsion, labor and Postpartum.

The data of present study were analyzed through the application of descriptive and inferential statistic.

Results

Nurses-Midwives Age (years)

![Figure (1): Nurses -midwives Age](image-url)
Figure (1) revealed that the higher percentage (43%) of study sample were at age group 20-25-years with mean and SD (2.14±7.969), while the lowest percentage for those who age 41-45-years were (n = 3; 6.0%).

![Nurse-midwife Social status](image)

Figure (2): Nurses -midwives Social status

Figure (2) shows that more than a half (n = 26; 52.0%) are married of study sample, while the lowest percentage is (n = 1; 2.0%) who is separated.

![Figure (3): The Actual Effectiveness of Program on Nurses-Midwives Knowledge during Three Periods (Pre, Post I And Post II-Test) Related To Pregnancy Induced Hypertension](image)

This finding shows that the results consistency with research hypothesis which mean the overall percentage at posttest-I and II is higher than the mean at pretest, at conclude that the program is effectively improve nurse-midwives knowledge.

**Discussion**

Assess nurse-midwives’ knowledge about pregnancy induced hypertension: The tables displays the distribution of the nurse-midwives’ knowledge about pregnancy induced hypertension that was assessed in pretest. It indicates improvement of nurses’ knowledge in the all items in post-test-I and post-test-II from poor to good. These improvements were statistically significant in the all items. Except magnesium sulphate drug application change from poor to fair in post-test-I and preeclampsia superimposed on chronic hypertension and HELLP syndrome definition item (7&8) were change from poor to fair. Nonetheless, the levels were still significantly higher in compare with pre-program levels. This is finding is consistent with Emam (2018) who stated that there was statistically significant difference before and after regarding all items of the knowledge with increased knowledge of nurses after program.
Mohamed, et al., (2013) supported this result based on the onset of hypertension in relation to the Chronic hypertension and PIH, with the distinction two basic types of hypertension during pregnancy. Disorder with pregnancy (HDP). Clinically, there are outlines current accepted terminology of hypertension for health care providers. The Watanabe et al., (2019) pregnancy induced hypertension is causing confusion (2016) mentioned that, it is important to provide care, the nurse should have a comprehensive knowledge of PIH, to detect deviations from normal and provide early treatment and supportive nursing care.

The mean value of the knowledge of nurses regarding definition of PIH at pretest measurement was (1.26±0.443), and at posttest-I was (1.86±0.351); and at posttest-II was (1.74±0.443) indicates high significant differences between (pre and posttest-I) (pre and post II-test) from poor level to good level in both posttest-I and posttest-II measurements regarding knowledge of the nurses about definition of PIH (P < 0.05).

The mean value of the knowledge of nurses regarding the classification of PIH at pretest measurement was, (1.18±0.388) and at posttest-I was,(1.88±0.328) and posttest-II was,(1.76±0.431)With comparison shows there are high significant between (pre and posttest-I) (pre and post II-test) from poor level to good level in both posttest-I and posttest-II measurements regarding knowledge of the nurses about classification of PIH (P < 0.05). Comparing with similar study was conducted in port Said University reached (100.%) in the immediate posttest and there was improvement in study sample knowledge in both study (Muti, et al., 2015) the nurse and nurse midwives should know the definition of pregnancy induced hypertension that increase blood pressure 140/90 mm/Hg or above after 20 gestation. Berhan (2016) mentioned that terminology used to describe the pregnancy induced hypertension is causing confusion for health care providers. The Watanabe et al., (2019) outlines current accepted terminology of hypertension disorder with pregnancy (HDP). Clinically, there are two basic types of hypertension during pregnancy. Chronic hypertension and PIH, with the distinction based on the onset of hypertension in relation to the pregnancy. Mohamed, et al., (2013) supported this result by reported a improvement of nurses’ knowledge in the all items of knowledge of PIH. These improvements were statistically significant in the all items. Regarding causes of PIH the meanvalue at pretest measurement was (1.18±0.388), and at posttest-I was (1.84±0.370); and at posttest-II was (1.76±0.431); indicates high significant differences between (pre and posttest -I) (pre and post II-test) from poor level to good level in both posttest-I and posttest-II measurements regarding knowledge of the nurses about causes of PIH (P < 0.05). The mean value of the knowledge of nurses regarding risk factors of PIH at pretest measurement was (1.12±0.328), and at posttest-I was (1.84±0.370), and at posttest-II was (1.80±0.404); indicates high significant differences between (pre and posttest -I) (pre and post II-test) from poor level to good level in both posttest-I and posttest-II measurements regarding knowledge of the nurses about risk factor of PIH (P < 0.05).

Conclusion

In conclusion the nurse could identify the risk group of pregnancy induce hypertension such as nulliparity and hypertension increased the risk of preeclampsia, High pre- pregnancy weight was related to a higher risk of mild and moderate preeclampsia, whereas previous preeclampsia strongly increased the risk of early onset preeclampsia. Regarding clinical picture of PIH the mean value at pretest measurement was (1.18±0.388), and at posttest-I was (2.00±0.000), and at posttest-II was (2.00±0.000); indicates high significant differences between (pre and posttest -I) (pre and post II-test) from poor level to good level in both posttest-I and posttest-II measurements regarding knowledge of the nurses about clinical picture of PIH (P < 0.05).The nurse’s knowledge about clinical picture of pregnancy induced hypertension assessed overtime. It indicates improvement of nurses’ Knowledge in the all items. These improvements were statistically significant in the all items. The most prominent improvements were related to clinical picture needed for the infants and complications of hypertension for the pregnant women, which reached 100.0% in the immediate posttest-I and remained at the level at the follow-up posttest-II.Nonetheless, the levels were still significantly higher than the pre-program levels. ELfakki, (2017) supported this result by reported the nursing knowledge in two study was better than pretest. The nurse should be aware about the weight gain during pregnancy and when the patient developed pathological edema and should know that when patient complain from severe symptoms of preeclampsia such as right hypochondrial pain, epigastric pain. This finding supported
by the result of (Magee et al., 2005), who reported that the maternity nurses mentioned some signs and symptoms. In respect to investigations related to pregnant women of PIH the mean at pretest measurement was (1.34±0.479), and at posttest-I was (1.94±0.240), and at posttest-II was (1.94±0.240); indicates high significant differences between (pre and posttest-I) (pre and post II-test) from fair level to good level in both posttest-I and posttest-II measurements regarding knowledge of the nurses about Investigations of PIH (P < 0.05). Williams et al., (2013) stated that diagnosis of hypertensive disorders in early pregnancy and preeclampsia in late pregnancy need through investigations. These investigations will differ slightly depending upon the diagnostic priorities. In early pregnancy identifying any underlying causes of hypertension is important, whereas after 20 weeks of gestation the investigations will be tailored to making the diagnosis and determining the severity of pre-eclampsia. There will, however, be a great deal of overlap between the two situations and their investigations will be considered in tandem. Légaré & Witteman (2013)24, reported that the nurses are responsible for explaining screening and diagnostic procedures and for clarifying options, so that women can make informed decisions about care.

Conclusion

The study concludes there were significant of educational program on nurse-midwives’ knowledge.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Nursing and all experiments were carried out in accordance with approved guidelines.

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Serum Glucose Level According to Menstrual Cycle Phases in Young Students at the College of Science for Women

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2Prof., Dr. Department of Biology, College of Science for Women, University of Babylon

Abstract

Objective: This study was carried out to present data on serum fasting glucose level in healthy young women with regular menstrual cycle who have moderate active state across their three different stages of the menstrual cycle (menstruation, proliferation and secretory) phases.

Subjects and Method: A total of 50 non-diabetes women with normal regular menstrual cycle were involved in this study, the subjects ages ranged from 20-24 years, fasting venous blood (3ml) was collected at early morning during menstruation phase (days 1-5), proliferation phase (6-14 days) and the secretory phase (15-28days) for each subject, serum glucose measurement were conducted by colorimetric technique.

Results: The present study shows non-significant (p<0.05) increase in the mean of glucose level during menstruation and proliferative phase (92.8±12.7, 92.6±10.2 mg/dl) respectively in the same subject comparison with secretory phase (90.48±8.3mg/dl) in the same subject.

Conclusion: This study revealed that serum glucose level does not change along stages of normal and regular menstrual at rest or moderate active young women.

Keywords: Menstrual cycle phases, Serum glucose, level, young students.

Introduction

Determining how the menstrual cycle phase affect varies aspects of metabolism is necessary to provide a comprehensive understanding of normal physiology in women1, many women notice blood glucose fluctuation at certain times in their monthly cycle, these occur to change in hormones (estrogen and progesterone), at the same time, these hormones affect another important hormone, insulin which may in turn cause variation in blood glucose level2, previous study showed relation between fluctuation of hormone and level of glucose during menstrual cycle, as well, that variation in insulin sensitivity during menstrual cycle was found by other researchers3,4 menstruation describe the female period5. Women begin menstruation at an average age of 13 years till age 51, this period involves highly complex hormonal interactions estrogen and progesterone the key hormones were involved6.

Material and Method

This study was conducted at college of science for women/university of Babylon. A total of 50 non-diabetes women with normal regular menstrual cycle were involved in this study, the subjects ages ranged from 20-24 years with BMI mean (23.67±4.37Kg/m2). Fasting venous blood (3ml) was collected at early morning during menstruation phase (days 1-5), proliferation phase (6-14 days) and the secretory phase (15-28days) for each subject, no subject was excessively sedentary or participate in heavy physical activity. Colorimetric technique was used for glucose measurement by use the Bio Merieux (France) Company kit.

Statistical Analysis: Repeated measures a nova– pair-wise comparisons test was used in studying the glucose level differences across the three menstrual phases using (spss) system. P value less or equal to 0.05 was taken as significant.
Results and Discussion

Our data revealed that rise in the mean serum glucose level in healthy women during their menstruation (92.68±12.68mg/dl) and proliferative stages (92.64±10.22mg/dl) were non-significant compared to secretory phase (90.08±8.49mg/dl), as well its non-significant different found in glucose level between the menstruation and proliferation stage as showed in table 1.

<table>
<thead>
<tr>
<th>Stage of menstrual cycle</th>
<th>Glucose level (mg/dl)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of samples</td>
<td>Mean</td>
</tr>
<tr>
<td>Menstruation(G1)</td>
<td>50</td>
<td>92.68</td>
</tr>
<tr>
<td>Proliferation (G2)</td>
<td>50</td>
<td>92.64</td>
</tr>
<tr>
<td>Secretory(G3)</td>
<td>50</td>
<td>90.84</td>
</tr>
</tbody>
</table>

NS: P value >0.05

Concerning with the result of glucose during menstruation phase it is agreement with studies which suggested that possible change in eating pattern in few days before and during menstrual cycle may affect glucose level, where many women experience craving for high-carbohydrate food during the days leading up to menstruation. Other study suggested that possibility of pre-menstrual hyperinsulinism to account for their findings of a lower premenstrual blood sugar compared to the midcycle values this association with premenstrual tension syndrome, while other study suggested that glycolysis peak rate just occurs prior to ovulation that may reason to that glucose level increase in proliferative stage in our population study.

Other studies performed on glucose utilization and carbohydrate metabolism have shown no significant difference in moderate active or at rest women across the menstrual cycle, moreover, change in estrogen and progesterone across the normal menstrual cycle do not appear to be of sufficient magnitude to significantly affect resting glucose flux, this may be the same responses in our study population was observed.

Additionally, the effect of menstrual cycle on fuel metabolism may be more apparent during exercise however contrary to what was originally hypothesized however, variables such as age, body weight and parity may be contributed in the result of the present study.

Conclusion

This study revealed that serum glucose level does not change along three stages of normal and regular menstrual cycle at rest or moderate active young women.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of biology and all experiments were carried out in accordance with approved guidelines.

References


Blood Pressure, Blood Sugar, Smokers and their Relationship with Physiological Variables of Some Risk Factors

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Abstract

This study deals with the physiological measurements of fasting blood sugar (FBG), clinical blood pressure (CBP) and smokers and their association with risk factors (obesity, gender and age) among university students. A total of 257 students (77 females and 180 males) were registered. Including 41 healthy and 42 students who were FBG; 33 were healthy and 69 were suffering from CBP; 39 non smokers and 33 students who were smokers; aged 19-26 years. A statistically not-significant connection was found between FBG, CBP and smoking with obesity rates; but a significant difference between smoking and CBP with age and gender, respectively. These findings highlight the prevalence of FBG and CBP also smoking in students and its relation to certain risk factors such as obesity, sex and age among selected student groups.

Keywords: Blood glucose, blood pressure, smoking, risk factors.

Introduction

It is important to prove now that many factors such as obesity, sex and age are linked to BG, BP and smoking. The obesity is a hazard factor to many diseases, as diabetes and hypertension1. In 2030, around 438 million people worldwide (7.8%) in adult population are suffering from diabetes. This global rise in the propagation of diabetes is attributed to urbanization, population growth, aging and obesity2. According to there is a significant impact of diabetes with gender, and women are more probability to develop diabetes than men. A study in Iraq found that the diabetes prevalence was 15.2% in female compared with 11.8% in males4. Despite the increasing burden of obesity and HBP in growing countries, there was limited information about BMI contribution in BP in these populations, especially among students. BMI is independently and positively connected with mortality and morbidity due to HBP, cardiovascular disease CVD and diabetes II5. For all BMI categories in study6, age was higher with HBP and HBP in men than in women. The systolic-BP and diastolic-BP increased with age, both for men and women7. Smoking is one of the leading causes of death as well as the main challenge to public health all over the world8. Smoking is connected with low weight9. Lack of smoking propagation has been proposed as one of the agents connected with a high in obesity10. There may be a causal impact of smoking on weight because nicotine is a metabolic stimulant as well as appetite suppressant11. The difference in CVD risk among smokers and non-smokers is significant in middle age, particularly for men12.

Materials and Method

Criteria of participants: A sample of 257 students was selected randomly among students. About 83 participants of FBG with mean(X)±standard deviation (SD) of age were divided to: health (<100 mg/100cm³; 21.97±1.49), pre-diabetes (100-125 mg/100cm³; 21.83±1.59), diabetes (≥126 mg/100cm³; 21.77±1.09), and hypoglycemia (≤70 mg/100cm³; 21.66±2.30). In addition, 102 participants of a CBP-level with X±SD of age were divided: normotensive (<120/<80; 21.38±1.706, 110.87±5.129, 72.16±6.126, 86.29±11.07), EPB,
elevated blood pressure (120-129/<80 mmHg; 21.96±2.007, 124.78±2.848, 75.71±4.767, 86.40±11.09), hypertension (130-139/80-89 or ≥140/90 mmHg; 22.00±1.647, 144.68±10.90, 90.41±6.873, 84.82±9.26), and hypotension (<90/60 mmHg; 20.28±1.603, 84.57±6.160, 56.57±3.101, 84.28±8.76). In addition, only 72 men were employed for smoking and the periods of cigarette smoking of 2-3 year with X±SD of age were divided into 39 non-smokers (control; 22.25±1.91), 9 light-smokers (≤10 cigarette daily; 22.11±1.96), 16 moderate-smokers (11-20 cigarette daily; 22.06±1.80), and 8 heavy-smokers (≥ 20 cigarette daily; 22.25±1.90).

Collection of data and measurement: The data were gathered utilizing a self-administered questionnaire. It is built on several axes such as: age, smoking case, duration of smoking, the number of cigarettes smoked per day, the family history of diabetes and physical activities. The criteria for selecting students were that no one should suffer any medical complication such as heart disease, stroke or any other disorder. BG was measured in the morning after fasting for at least 8-10 hours, using the active glucose Accu-chek meter. BP was measured by the electronic pressure device by taking the pressure reading after 5 minutes of inactivity. CW was measured by placing the measurement meter tightly on the waist (cm) and the WC/risk level are classified as follows: Low (Women <80 and Men <90), high (Women 80-88 and men 94-102), and very high >102. The waist circumference, (WC), is measured by placing the measurement meter on the active glucose Accu-chek meter. BP was measured in the morning after fasting for at least 8-10 hours, using the active glucose Accu-chek meter. BP was measured by the electronic pressure device by taking the pressure reading after 5 minutes of inactivity. CW was measured by placing the measurement meter tightly on the waist (cm) and the WC/risk level are classified as follows: Low (Women <80 and Men <90), high (Women 80-88 and men 94-102), and very high >102 for smokers men.

Measurement of obesity: The obesity was estimated using body mass (BMI) index, measured by weight in kilograms (kg) divided by a height in the meters squared [kg/m²]; BMI classification was based on WHO as: normal weight, 18.5-24.9; underweight, less than 18.5; and overweight 25-29.9. The waist circumference, (WC), is measured by placing the measurement meter tightly on the waist (cm) and the WC/risk level are classified as follows: Low (Women <80 and Men <90), high (Women 80-88 and men 94-102), and very high >102 for smokers men.

Statistical analysis: The descriptive analysis was also used to show the X±SD of the results. Gender, age and obesity were statistically tested by Chi-square ($\chi^2$) test at $p<0.05$.

Results And Discussion

Fasting blood glucose and obesity, sex and age: In Table 1: A statistically insignificant in BMI between FBG classes and healthy, although the highest percentage of pre-diabetes was obese compared with healthy. The statistically insignificant in WC of FBG levels compared with control, although the highest percentage was observed in diabetes from Low of WC and hypoglycemia from a high of WC risk level. The prevalence of diabetes (77.77) in males, and pre-diabetes (66.66) also hypoglycemia (66.66) in females. Statistically insignificant in age in FBG categories, although the highest rate of pre-diabetes and diabetes was found in both gender in the 21-22 age group, and a higher proportion of hypoglycemia in the 23-24 age group compared to health.

Clinical blood pressure level and obesity, gender and age: In Table 2: No-significant relationship between the level of CBP and obesity measured by BMI and WC, although the highest rate of EBP and hypertension was overweight and obese compared to normotensive, respectively. Hypertension and EBP are the highest in low and high of WC risk level compared with normotensive, respectively. The male had a high percentage of hypertension (82.76) and a high percentage of hypotension (85.71) in female compared with normotensive. EBP and hypertension appeared 21-22 and 23-24 years of age, compared to normotensive, respectively.

Smoking status with obesity (BMI and WC) and age: In Table 3: A statistically not-significant in obesity with BMI $\chi^2=5.652$ among smoking status. A statistically not-significant in CW risk level of smokers compared to non-smokers. And a significant in age in which the high percentage was appeared at age (21-22) years of light-smokers followed by low percentage appeared at age (23-24) years of moderate-smoker compared to non-smokers. In addition to high percentage that noted at age (21-22) years of light-smokers, moderate-smokers, and heavy-smokers compared to control, and heavy-smokers has been shown in age 25-26 years compared with non-smokers of a same age. Obesity is connected with poorer control of BP-levels and BG-levels making people with diabetes more susceptible to micro-vascular and cardiovascular diseases. Other studies have shown a strong epidemiological link between the development of diabetes and obesity. When the study trends were studied by BMI groups, disease increased only among those who have obese (18.0% to 20.1%), indicating that much of the rise in the prevalence of diabetes is due to the growing prevalence of obesity, and diabetes was less prevalent in males than in females in Iraq community.

In Turkey, there was a statistically non-significant relation between BP and sex. Although this study was statistically insignificant in age with FBG, the results were favorable with the prevalence of disease and hazard factors among people aged 15 Years and older in...
Ethiopia. A significant connection was also found in college students between age, overweight, and sex, as well as between BGelevation with gender. Many people own a classification of BP without knowing it. The results of the current study were consistent with, where a positive relationship was absorbed between obesity and hypertension, also which observed a positive connection between hypertension and BMI. The current study shows that male students had a high percentage of hypertension compared with a healthy and female students, and is close to. It is also appropriate with that there is a positive connection with BP and increasing age. The low prevalence of smoking has little impact, often less than 1%, on increasing the prevalence of obesity and reducing the healthy weight of the population.

The BMI of smokers appeared a diminishing trend compared with nonsmokers. No-significant variation in the physical mean parameters such as obesity are found when calculating X±SD in smokers and passive-smoker; but my results do not identical the results of, it was observed that both cigarette consumption and smoking frequency had positive effects with weight loss in adolescents. There has been a significant elevate over the past decade in the numbers of smokers of college age. Various studies have reported that the spread of smoking raises between the first to last year among college students, confirming the fact that the early years of the university are important to target anti-smoking activities. The University of Karbala, smokers (45.7%) smoked before the age of 18 years, and were positively correlated with male sex and growing age.

Table 1: Fasting blood glucose classes and obesity rates measured by BMI (kg/m²) and WC (cm), sexes and age (years).

<table>
<thead>
<tr>
<th>BMI</th>
<th>Fasting blood glucose classes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Health</td>
<td>N(%)</td>
</tr>
<tr>
<td>Normal</td>
<td>28</td>
<td>68.29</td>
</tr>
<tr>
<td>Under weight</td>
<td>1</td>
<td>2.43</td>
</tr>
<tr>
<td>Over weight</td>
<td>12</td>
<td>29.26</td>
</tr>
<tr>
<td>Obese</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WC</th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>30</td>
<td>73.17</td>
</tr>
<tr>
<td>High</td>
<td>11</td>
<td>26.82</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>100</td>
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<table>
<thead>
<tr>
<th>Sex</th>
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<tbody>
<tr>
<td>Male</td>
<td>19</td>
<td>46.34</td>
</tr>
<tr>
<td>female</td>
<td>22</td>
<td>53.65</td>
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<tr>
<td>Total</td>
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<td>100</td>
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<td>21-22</td>
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<td>23-24</td>
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<tr>
<td>25-26</td>
<td>3</td>
<td>7.14</td>
</tr>
<tr>
<td>Total</td>
<td>41</td>
<td>100</td>
</tr>
</tbody>
</table>
Table 2: Clinic blood pressure level and obesity rates measured by BMI (kg/m²) and WC (cm), sexes and age (years).

<table>
<thead>
<tr>
<th>BMI</th>
<th>Clinic blood pressure level</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Normotensive N(%)</td>
<td>EPB N(%)</td>
</tr>
<tr>
<td>Under weight</td>
<td>2</td>
<td>6.06</td>
</tr>
<tr>
<td>Normal</td>
<td>22</td>
<td>66.7</td>
</tr>
<tr>
<td>Overweight</td>
<td>7</td>
<td>21.2</td>
</tr>
<tr>
<td>Obese</td>
<td>2</td>
<td>6.06</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WC</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>25</td>
</tr>
<tr>
<td>High</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
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<table>
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<tr>
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<td>18</td>
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<tr>
<td>Female</td>
<td>15</td>
</tr>
<tr>
<td>Total</td>
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<table>
<thead>
<tr>
<th>Age</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>19-20</td>
<td>11</td>
</tr>
<tr>
<td>21-22</td>
<td>12</td>
</tr>
<tr>
<td>25-26</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
</tr>
</tbody>
</table>

Table 3: Smoking status and obesity rates measured by BMI (kg/m²) and WC (cm), and age (years).

<table>
<thead>
<tr>
<th>BMI</th>
<th>Non-smoker N(%)</th>
<th>Light smokers N(%)</th>
<th>Moderate smokers N(%)</th>
<th>Heavy smokers N(%)</th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td>Under weight</td>
<td>1</td>
<td>2.56</td>
<td>0</td>
<td>0.00</td>
<td>2</td>
</tr>
<tr>
<td>Normal</td>
<td>28</td>
<td>71.79</td>
<td>6</td>
<td>66.66</td>
<td>10</td>
</tr>
<tr>
<td>Overweight</td>
<td>10</td>
<td>25.64</td>
<td>3</td>
<td>33.33</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>100</td>
<td>9</td>
<td>100</td>
<td>16</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>WC</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>35</td>
</tr>
<tr>
<td>High</td>
<td>3</td>
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<tr>
<td>Very high</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
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</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>19-20</td>
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<td>21-22</td>
<td>13</td>
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<td>23-24</td>
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<td>25-26</td>
<td>6</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
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</tbody>
</table>
Conclusion

There was insignificant association between obesity and cases, but significant differences between age and sex with smoking rate and CBP level among students.

Conflict of Interest: Author declares no conflict of interest.

Ethical Clearance: This research was reviewed by the Research Review Board of the Department of environmental pollution at the University of Al-Qasim Green.

Funding: This current study was self-funded.

References

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Detect of Phylogenetic Relationships by RAPD_PCR among *Staphylococcus aureus* Isolated from Different Sources in Hilla City

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¹University of Babylon/Collage of Science for Women, Iraq, ²University of Babylon/Collage of Science for Women, Iraq

**Abstract**

*Staphylococcus aureus* (brilliant staphylococcus) is a Gram-positive, cocci – shape, it is an individual from the typical verdure of the body, oftentimes found in the nose, respiratory tract, and on the skin. Usually positive for catalase and nitrate decrease. We can portrayed *S. aureus* strains that are across the board in hospital in Hilla city, 60 clinical and condition tests were gathered from numerous parts of patients like injuries, skin, nails and urinary tract disease taken from general doctor’s facilities of Hilla city. Strategies for segregation and distinguishing *S. aureus* dependent on culture strategies with biochemical tests, A sum of 17 enhanced DNA sections from 250 to 1K base match) were watched utilizing the 2 groundworks, and every one of preliminary that fruitful giving intensification groups uncovered distinctive hereditary example. End: RAPD-Polymerase Chain Reaction investigation it used to discover an incentive in structuring an assortment of sub-atomic DNA unique finger impression dependent on epidemiological examinations that centers around the recognizable proof and portrayal of *S.aureus*.

**Keywords:** Phylogenetic, RAPD_PCR, Staphylococcus aureus

**Introduction**

*Staphylococcus aureus* is an opportunistic pathogen that causes a nosocomial infections ranging from self-limiting to lifethreatening in both developing and developed countries¹³,¹⁴. It is critical in the study of disease transmission and nature to have the capacity to distinguish bacterial species and strains precisely. Fast distinguishing proof and order of microscopic organisms is ordinarily completed by morphology, healthful prerequisites, anti-microbial obstruction, isoenzyme examinations, phage affectability³,⁴,²,⁵ Meanwhile, a few strains of *S. aureus* have mecA quality which presents protection from methicillin and the greater part of the regularly utilized antimicrobial operators including b-lactams and cephalosporins. These strains are called methicillin-safe Staphylococcus aureus (MRSA) and they thought to be more destructive than methicillin-powerless Staphylococcus aureus (MSSA) strains¹⁶. The expanding rates of nosocomial and network related MRSA diseases and their capacity to exchange between people, ox-like, and nourishment of creature birthplaces have turned into a worldwide hazard¹⁵. Recognition and distinguishing proof techniques utilizing the PCR to enhance DNA have been utilized for different creatures⁹, yet these require sequence information for particular preliminaries. In any case, PCR utilizing discretionary groundworks (AP-PCR) requiring no earlier arrangement data has uncovered DNA polymorphisms that might be valuable for fingerprint (Welsh and McClelland, 1990; Williams et al., 1990). Haphazardly Amplified Polymorphic DNA (RAPD), a straightforward PCR based procedure, has been broadly utilized for epidemiological examination. In addition, RAPD preliminaries can successfully examines the entire chromosomal DNA for the nearness of little reversed rehashes and intensifies the

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interceding DNA portions of variable length that can be utilized for distinguishing hereditary variety and setting up strain PARTICULAR fingerprints. Likewise the test can be performed with low convergence of DNA utilizing short engineered oligonucleotide groundworks long.

**Methodology**

**Sampling:** Sixty samples were collected from clinical and environmental cases. Samples were taken from out and inpatients who admitted to AL-Hilla General Teaching Hospital and Babylon Hospital for Maternity and Pediatric Hospital. Between October 2016 and May 2017.

**Bacterial Isolation:** Around 250 ml S. aureus detach was enraptured into a 100 ml of supplement soup (pH seven.5) and command underneath consistent shaking at thirty seven C for twenty-four h. The microorganism cell was expelled o by action, washed with zero.1mM Tris EDTA and unbroken at - 20oC for DNA extraction.

**Genotypic identification:**

**DNA Extraction:** DNA of staphylococcus aureus isolates was extracted and purified using Extraction and purification Kit from Geneaid company (UK).

**Primers:** Two arbitrary or random primers (OPB-10,OPX-01) obtained from Bioneer, IDTDNA (USA). Bacterial isolates were tested for single primers for RAPD-PCR technique (table 1).

**RAPD-PCR amplification:** Final product of 30μl reaction volumes containing ten ul of single primer,12.5 ul of inexperienced Master combine, 5 ul of Genomic DNA and therefore the volume of reaction was completed up to thirty ul by adding a pair of 5 ul of enzyme free water Amplification was applied during a thermo-cycler (Eppendorf) programmed for 2 minutes at 94°C; for 45cycles one minute at 94°C, one minute at 35°C and 2 minutes at 72°C; and a final extension of 5 minutes at 72°C. Amplification product were electrophoresed in one.8% agarose gels so pictured by staining with ethidium bromide commonplace molecular markers were conjointly enclosed in every action run. Ultraviolet trans-illuminated gels were photographed.

**Phylogenetic Analysis::** Positions of unequivocally scorable RAPD bands were transformed into a binary characters matrix (“1” for the presence and “0” for the absence of a band at a particular position). Phylogenetic tree was created by the unweighted pair-group method arithmetic (UPGMA) average cluster analysis.

**Results and Discussion**

**RAPD analysis of staphylococcus aureus:** Polymorphism assay for staphylococcus aureus isolates was carried out using two primers. Random amplification of the DNA of S. areus isolates reveals the efficacy of these selected nucleotides sequences in determination the similarity or variations among all isolates.

**S.aureus isolates by RAPD:** A total of 9 amplified DNA fragments ranging in size from 250 to 1 Kpb were observed using two random amplified polymorphic DNA (RAPD) primers (opX-10,opB-01) where as17 polymorphic amplified fragments were commonly detected among the 9 S.aureus isolates (table 1) and each of primer give different genetic profiles. UPGMA analysis for the dendrogram made based on the RAPD data generated by primer OPX-10 were performed and shown in figure 3. Analysis showed that the 9 s. aureus strains were grouped into two and clustered into three classes. The large cluster comprised the Stap4, Stap5, Stap9,Stap7, and Stap8; a second cluster included strains of the S2, S8 and S9; and the third remaining clusters corresponded to the Stap1, Stap3,Stap2 and Stap6. While primer OPX-01 were performed and shown in figure 4. Analysis showed that the 9 S. aureus strains were grouped into two and clustered into three classes also. Genetic fingerprint and process diversity between Staphylococcus aureus isolates were determined by ever-changing RAPD data into a Jaccard similarity analysed by UPGMA to produce a organic process tree. The compound band pattern obtained is equivalent to a Universal Product Code, allowing the identification of each individual as Associate in Nursing example, isolate Sa1 presents distinctive bands once its compound amplified with most of the primers tested (Figure 1. It’s well documented that RAPD-PCR is one of the most widely used method to investigate the genetic variability of any given nosocomial pathogen, moreover in RAPD the power of designated and discriminatory primers can be been easily assessed. phenotypes consist of isolates that less related and such identification isolates using cultural and morphological techniques often lack consistency and precision. In the current examination, we have discovered that distinguishing proof of hereditary assorted variety in S. aureus relies upon wellsprings of segregates, diverse host cells and event of freaks. RAPD markers uncovered conceivable
association between host start line, amendment and hereditary selection among S. aureus separates, and this shown its process and symptomatic potential. Clearly, for these deoxyribonucleic acid teams examples to possess a helpful significance within the zones of prescription, people science and also the study of illness transmission, explicit deoxyribonucleic acid teams should be known with host beginning points, transformation and quality qualities, Rapd-pcr is important to possess fast and solid epidemiologic composing method to screen the bury or intra-spread of multidrug safe MRSA strains, this might be practiced by a organized correlation of deoxyribonucleic acid band styles among microorganisms differentiating for the varied host birthplaces, transformation and quality qualities gift. Comparative methodology has been utilised to separate forceful from non-forceful disengages of the seed assault microorganism Phoma symbol[12]. The DNA mark characterized for each race of S. aureus ought to be valuable for epidemiological reviews, medicinal analyses, and in the distinguishing proof of new destructive strains and detaches and their birthplace.

Table 1. Type and sequence of RAPD primers used for pcr analysis

<table>
<thead>
<tr>
<th>Primer</th>
<th>Sequence 5--------3</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPB-10</td>
<td>5- TCGCATCCCT-3</td>
</tr>
<tr>
<td>OPX-01</td>
<td>5- GGTGGCATCT-3</td>
</tr>
</tbody>
</table>

Figure 1. RAPD –PCR using the primer OPX-10. {M Line (ladder), the isolates numbered (1,2,3,4,5,6,7,8,9) were positive for OPX10 primer}

Figure 2. RAPD –PCR using the primer OPX-01{M Line (ladder), the isolates numbered (1,2, 4, 6, 8,9) were positive for OPX-01 primer, while3,5,7 were negative}
Fig. 3: Dendrogram analysis showing biological process diversity of 9 Staphylococcus isolates known by RAPD markers

Fig. 4: Dendrogram analysis showing phylogenetic diversity of 9 Staphylococcus isolates identified by RAPD markers
Fig. 5: Dendogram analysis showing phylogenetic diversity of 9 *Staphylococcus* isolates identified by RAPD markers using OPX-10, OPX-01

**Conclusion**

Strategies for segregation and distinguishing *S. aureus* dependent on culture strategies with biochemical tests, A sum of 17 enhanced DNA sections from 250 to 1K base match) were watched utilizing the 2 groundworks, and every one of preliminary that fruitful giving intensification groups uncovered distinctive hereditary example. End: RAPD-Polymerase Chain Reaction investigation it used to discover an incentive in structuring an assortment of sub-atomic DNA unique finger impression dependent on epidemiological examinations that centers around the recognizable proof and portrayal of *S. aureus*.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the University of Babylon/collage of science for women, Iraq and all experiments were carried out in accordance with approved guidelines.

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Lipsticks Elemental Analysis by Energy Dispersive X-Ray Used as Criminal Evidence

Wedad Al-Dahhan¹, Hassan Hashim², Emad Yousif¹, Ayad F. Alkaim³

¹Prof. Department of Chemistry, College of Science, Al-Nahrain University, Baghdad-Iraq, ²Prof. Department of Physics, College of Science, Al-Nahrain University, Baghdad-Iraq, ³Prof. Department of Chemistry, College of Sciences for Women, Babylon University, Hilla, Iraq

Abstract

Since ancient times, man has been interested in showing his appearance in the best shape and has used make-up materials including lipstick for this purpose. Four lipstick samples were selected for one brand with different colors (Lipstick-03, Lipstick-23, Lipstick-29 and Lipstick-51) as well as two different colors for the so-called magic lipstick (Luxe orang and Luxe yellow). Energy-dispersive X-ray spectroscopy (EDX) is an analytical technique was used for the elemental analysis for the selected six samples. These tests aims to explain that there are clear elemental differences for the selected samples which can be used to define the identity of each sample. Lipstick-51 has been selected to contaminate some substances that can be commonly used in homes, offices and others. The selected substances were (Plastic bottle, Plastic cup, Glass, Cigarette filter and Tissue paper). The elemental results indicate a partial match for the types of elements in lipstick contaminated with substances taken from the crime scene compared to the original Lipstick-51. Results could be more accurate when identifying the contaminated material and select the most concentrated positions for samples taken from the crime scene and for conducting tests.

Keywords: Lipstick, EDX, Crime scene, Element.

Introduction

Since the dawn of civilization cosmetics have constituted a part of routine body care not only by the upper strata of the society but also by middle and low class people(1).

A cosmetic product is any substance or preparation intended to be placed in contact with the various external parts of the human body (epidermis, hair system, nails, lips and external genital organs) or applied to the teeth and the mucous membranes of the oral cavity with a view exclusively or mainly for the purpose of cleaning, perfuming, protection, changing their appearance, correcting body odors’ and keeping the surfaces in good condition(2,3). The demand for cosmetic products has increased recently, resulting in massive production by the cosmetic industry. Different products are marketed under the name of cosmetics, such as creams, beauty soaps, talcum and facial powder, lotions, shampoos, hair products such as haircolors, baby products, bath oils, personal hygiene products, perfumes, lipsticks, skin care products, makeup products, shaving creams, body lotions, fingernail polish and polish removal(4-8).

In addition, the use of herbal medicinal preparations is common in most developing countries due to poverty and disillusionment with conventional medical care(9,10).

Heavy metals are found naturally in the environment in rocks, soil and water, and therefore exist in the manufacture of pigments and other raw materials in all industries including the cosmetics industry. Some of these metals have been used as cosmetic ingredients in the past. Examples include the preservative thimerosal (mercury), the progressive hair dye lead acetate and a
number of tattoo pigments such as red cinnabar (mercuric sulfide), Cadmium is a deep yellow to orange pigment and mostly present in lipsticks and face powders. The use of cadmium in cosmetics products are due to its color property as it has been used as a color pigment in many industries\(^{(11)}\).

For more than two thousand years humankind has been attempting to solve crimes through the application of scientific knowledge. Physical evidence often plays a pivotal role in reconstructing the series of events surrounding a crime, and may be used to prove or disprove a point in question based upon its discernible characteristics.\(^{(12)}\) In addition, trace physical evidence can be instrumental in providing evidence of association. This value stems from the exchange principle developed by Edmond Locard, who posited that physical contact between two surfaces will likely result in a cross-transfer of matter between them\(^{(13,14)}\). Zadora and Brozek-Mucha applied cluster analysis with scanning electron microscopy (SEM)-EDX to differentiate glass samples into use-type groups based on their elemental content\(^{(15)}\). An emerging area of interest in forensics is the examination of cosmetic products. Kulikov \textit{et al.} employed wavelength-dispersive X-ray fluorescence spectrometry for the elemental analysis of 39 cosmetic powders\(^{(16)}\). Cluster analysis and PCA were able to clearly discriminate between samples possessing traditional ingredient or mineral-based formulations, and also distinguish specific manufacturers of the latter.

Salahioglu \textit{et al.} later demonstrated the use of Raman spectroscopy to discriminate lipstick samples deposited on textile fibers, cigarette butts and paper tissues. The combined SEM/EDX techniques indispensable for fast, nondestructive, physicochemical analysis of trace evidence and solid objects of any size. The SEM/EDX is not ideal for quantitative analysis of elements present at traces. The ability of the SEM/EDX to detect an element below a minimum detection limit (MDL) (0.1–0.3% w/w)\(^{(17)}\).

**Experimental Part: Sampling:** Four lipstick samples were selected for one brand with different colors (Lipstick-03, Lipstick-23, Lipstick-29 and Lipstick-51) as well as two different colors for the so-called magic lipstick (Luxe orang and Luxe yellow).

**Elemental Analysis:** Energy-dispersive X-ray spectroscopy (EDS, EDX, or XEDS) Bruker model XFlash6110, is an analytical technique we used for the elemental analysis for the selected six samples (Lipstick-03, Lipstick-23, Lipstick-29, Lipstick-51, Luxe orang and Luxe yellow).

**Simulation of samples taken from the crime scene:** One type of lipstick (Lipstick-51) has been selected to contaminate some substances that can be commonly used in homes, offices and others. The selected substances were (Plastic bottle, Plastic cup, Glass, Cigarette filter and Tissue paper) as shown in figure 1 (pictures 1-5).

**Result and Discussion**

**EDX Analysis for the selected samples:** EDX analysis was carried out for the four lipstick samples (Lipstick-03, Lipstick-23, Lipstick-29 and Lipstick-51) as well as for the two different colors for the so-called magic lipstick (Luxe orang and Luxe yellow). These tests aims to explain that there are clear elemental differences for the selected samples which can be used to define the identity of each sample. Figures 2, shows EDX analysis for the selected sample Lipstick-03.
Samples withdrawn from crime scene as criminal evidence: Criminal evidence inspectors are keen to select samples that may be of benefit from the crime scene. Contaminants with personal belongings, such as lipstick, will certainly be of interest to the relationship of someone to the crime scene. The prepared samples which explained in sec. 2.3 were examined for elemental composition using EDX instrument. Results for the five samples stated in figures: 3 and 4.
In order to identify the elements in the samples taken from the crime site that belong to the contaminant (Lipstick-51), these samples must be examined using the same instrument (EDX), but without contaminants. Therefore, the elements of the contaminant will be known. Table 1 shows the elemental analysis for the contaminant and uncontaminated samples.

Table 1: The elemental analysis for the contaminant and uncontaminated samples

<table>
<thead>
<tr>
<th>Sample</th>
<th>Elements</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Lipstick-51) (contaminant)</td>
<td>C, Ba, Mg, Se, Al, Si, Hg, Ru, K, Ba, Ca</td>
</tr>
<tr>
<td>Plastic bottle with contaminant</td>
<td>C, O, Mg, Al, Si</td>
</tr>
<tr>
<td>Plastic bottle without contaminant</td>
<td>C, O</td>
</tr>
<tr>
<td>Plastic cup with contaminant</td>
<td>C, O, Al, Fe, Si</td>
</tr>
<tr>
<td>Plastic cup without contaminant</td>
<td>C, O, Al</td>
</tr>
<tr>
<td>Glass bottle with contaminant</td>
<td>C, O, Al, Si, Fe</td>
</tr>
<tr>
<td>Glass bottle without contaminant</td>
<td>C, O, Al</td>
</tr>
<tr>
<td>Cigarette filter with contaminant</td>
<td>C, O, Al, Ca, Si</td>
</tr>
<tr>
<td>Cigarette filter without contaminant</td>
<td>C, O, Al</td>
</tr>
<tr>
<td>Tissue paper with contaminant</td>
<td>C, O, Al, Si, Mg</td>
</tr>
<tr>
<td>Tissue paper without contaminant</td>
<td>C, O</td>
</tr>
</tbody>
</table>

From table 1 it was found that the elements belongs to the lipstick-51 in the plastic bottle (Mg, Al, Si), Plastic cup (Fe, Si), Glass bottle (Fe), Cigarette filter (Ca, Si) and for Tissue paper (Al, Si, Mg). These elements are part of the elements in the lipstick-51 (C, Ba, Mg, Se, Al, Si, Hg, Ru, K, Ba, Ca). On the basis of these results, it takes two things to focus on:
1. Accuracy in taking the sample from the crime scene so that it contains the most contaminated material.

2. The EDX operator must examine and select the most concentrated places of the contaminated sample, as well as a precise focus of the radiation (X-ray) on the site of the contamination, making the results more accurate.

**Conclusion**

The crime scene contains many elements and observations through which forensic inspectors can access the facts and analyze the components of the crime. The use of EDX technology could be a guide to identify the nature of existing elements as contaminants for samples taken from the crime scene. It was recommended to be more accurate in identifying the contaminated material and select the most concentrated positions when taking samples from the crime scene and conducting tests.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

**Conflict of Interest:** Non

**Funding:** Self-funding

**References**


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Isolation and Identification of Flavonoids from *Arctium lappa* Stem and Study the Hepatoprotective Effect on Acetaminophen Induced Liver Damage

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Abstract

The present study investigate the hepatoprotective and antioxidant effect of crude extract of *Arctium lappa* stem (E-ALS) and isolated total flavonoids (ITF) from the stem, With qualitative and quantitative determination of flavonoids by HPLC. Twenty four local adult male rabbits were used in this study which divided into four groups (6 animal in each group), Control-1 (C1) as control group, Control-2 (C2): treated with 300mg/kg *paracetamol* administrated for one week, Group 1 (G1): 300mg/kg *paracetamol* administrated for one week +Orally 250mg/kg of E-ALS administrated daily for 4 weeks, Group 2 (G2): Orally 300mg/kg *paracetamol* administrated for one week +Orally 50mg/kg of ITF administrated daily for 4 weeks.

The results identified five types of flavonoids for the first time in plant stem (Rutin, Myricetin, Quercetin, Apigenin, Kaempferol) with quantified determination for the concentration of each type of flavonoids in E-ALS and also in ITF which identified the same five flavonoids. The hepatoprotective effect of E-ALS and ITF were observed by monitoring the antioxidant parameters and activity of liver enzymes.

The results obtained from this study showed that the levels of glutathione-GSH, Glutathione peroxidase-GPX and Glutathione-S-Transferase-GST were significantly (P ≤ 0.05) decreased in C2 treated with *paracetamol* as comparing with C1, with significant (P ≤ 0.05) elevation of alanine aminotransferase-ALT activity and non-significant effect on Aspartate aminotransferase-AST, while the level of GSH and GPX were significantly (P ≤ 0.05) elevated in G1 and G2 treated with E-ALS and ITF respectively as compared with C2, in which the levels of GSH and GPX are less than the levels in C1 and G1. Otherwise the levels of GST, ALT and AST significantly (P ≤ 0.05) decreased in G1 and G2 as compared with C2. These findings show the hepatoprotective properties of E-ALS and IFT against liver injury induced by paracetmol and also the protective role of anti-oxidative defense system of flavonoids in the two extracts.

Keywords: *Arctium lappa*, flavonoids, acetaminophen, Glutathione, Glutathion-S-transferase, liver enzymes.

Introduction

The flavonoids are a category of natural substances belonging to the family of polyphenols, they are one of the important types of plant secondary metabolites, widely distributed in foods and Medicinal Plants (1,2). More than thirty years ago, the research studies focusing on flavonoids from medicinal plant species have increased considerably, because of their versatile benefits for human health (3). These includes: antioxidants, anti-inflammatory, anticancer, antibacterial, antiviral, anti-allergic, immune system promoting and also as detoxifying and pro-survival agents (4,5,6). So that the many researcher use different method of isolation and identification of flavonoids from different medicinal plants and evaluate the pharmacological effect of the isolated flavonoids, such as; Al-Salihi et al, study the Hypolipidemic effect of isolated flavonoids from date palm pollen (7), while AlSamarraieta (8), isolated the flavonoids from Bay leaf *Laurus nobilis* L. and also study the hypolipidemic effect.

*Arctium lappa* (also known as burdock), one of the important plant in traditional medicine worldwide medicine,
many studies have evaluated the biological activities of the different parts of plant, roots, seeds and leaves\(^{(9,10)}\), including antioxidant activities\(^{(11)}\), anti-inflammatory\(^{(12)}\), anti-cancer\(^{(13)}\) and anti-hepatotoxicity\(^{(14)}\). Many researchers identified many secondary metabolites in different parts of the plant, which include: phenolic compounds, lignans, saponins, tannin, sterols, alkaloids and Flavonoids\(^{(15-17)}\). The types of flavonoids which were identified in \textit{Arctium lappa} leaves include, luteolin, rutin, quercetin and quercetinrhamnoside. On the other hand Rajasekharan et al\(^{(18)}\) identified quercetin 3-vicianoside and quercetin 3-O-glucuronide in the root of the plants, with no flavonoids in seeds. The present study aims to isolate and identify the flavonoids from \textit{Arctium lappa} stems and study the protective effect of it against the liver damage induced by paracetamol (acetaminophen).

**Material and Method**

**Plant Materials:** The dried stems of \textit{Arctium lappa} were obtained from a local market in Samarra city, Salah Al-Din, Iraq. The stems were separated from other parts of the plant, kept in a dark container until used.

**Method**

**I. Preparation of extracts:**

- Crude extract from \textit{Arctium lappa} stems E-ALS: 45g of \textit{Arctium lappa} powder was suspend in 180ml normal saline solution.

- Isolation of total flavonoids from \textit{Arctium lappa} stems: This isolation was done according to (Chen et al, method) with some modification\(^{(19)}\), the first step before extraction was remove fatty contents, 250g plant stems powder were extracted with 750ml diethyl ether, soxhlet apparatus for 3 hours, dried the defatted plant material at 35 C° in an air oven, the second step extracted flavonoids twice with 500ml (70%) ethanol solution at 90C° for 2h. The solution was filtered and centrifugation at 3000 rpm for 15 min. The clear supernatant was subjected to charcoal treatment to remove pigments prior to evaporation under vacuum (BuchiRotavapor Re Type). Dried samples were re-suspended in 1.0 ml HPLC grade methanol by vortexing, the mixture were passed through 2,5um disposable filter and stored at 4° C for further analysis, then 20 μl of the sample injected into HPLC system according the optimum condition. Five standard solutions (25μg/ml) were used (Rutin, Myricetin, Quercetin, Apigenin and Kaempferol).

The concentration of identified flavonoids was done according to the following equation:

\[
\text{Area of sample} = \left( \frac{\text{Conc. of Flavonoids(μg/ml)/ Area of standard}}{C} \right) \times C \times D
\]

\[C = \text{Conc. of Standard solution}\]

\[D = \text{Dilution factor}\]

**III. Animals:** twenty-four local adult male rabbits (1200-1550 g weight) were used in this study. Groups of rabbits were housed at room temperature with a lighting schedule of 12 hours light and 12 h dark. Animals had free access to a standard pellet diet. All animals were divided into four groups (6 animals in each group) described as follow:

- **Control 1(C1):** Orally 1ml/kg/day administrated daily dose normal saline only.

- **Control 2(C2):** Orally 1ml/kg/day of paracetamol (300mg/kg- normal saline was used as solvent) administrated daily for 7 days.

- **Group 1(G1):** Orally 1ml/kg/day of paracetamol (300mg/kg- normal saline was used as solvent) administrated for 7 days + Orally 1ml/kg/day of \textit{Arctium lappa} stems extract (250mg/kg- normal saline was used as solvent) administrated daily for 4 weeks.

- **Group 2(G2):** Orally 1ml/kg/day of paracetamol (300mg/kg-normal saline was used as solvent) administrated daily for 7 days + Orally 1ml/kg/day of flavonoids isolated from \textit{Arctium lappa} stems (50mg/kg-normal saline was used as solvent) administrated daily for 4 weeks.
IV. Collection of blood samples: After 4 weeks, serum samples were collected by heart puncture from fasting rabbits for 12 hours. Determination of serum levels of Glutathione-GSH\(^{21,22}\), Glutathioneperoxidase-GPX\(^{23}\), Glutathione-Transferase-GST\(^{24}\), alanine aminotransferase-ALT and Aspartate aminotransferase-AST\(^{25}\) by using standard method.

V. Statistical Analysis: Results were analyzed statistically by using (analysis of variance test-ANOVA the statistical program Minitab). Averages were compared to calculations of the characteristics of the application Duncan’s Multiple Range Test by probability level \(P \leq 0.05\).

Results and Discussion

Part I: Phytochemical study: The HPLC analysis of flavonoids were done firstly by using five standard flavonoids, Table 1 showed the Retention Times and Area Under Curves for Standard Flavonoids.

<table>
<thead>
<tr>
<th>Standard Flavonoids</th>
<th>Retention time (min)</th>
<th>Area under curve µvolt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rutin</td>
<td>2.473</td>
<td>256193</td>
</tr>
<tr>
<td>Myricetin</td>
<td>3.742</td>
<td>261362</td>
</tr>
<tr>
<td>Quercetin</td>
<td>4.80</td>
<td>276233</td>
</tr>
<tr>
<td>Apigenin</td>
<td>5.877</td>
<td>240672</td>
</tr>
<tr>
<td>Kaempferol</td>
<td>6.64</td>
<td>249241</td>
</tr>
</tbody>
</table>

The HPLC analysis of the crude *Arctium lappa* stem extract showed seven peaks with different Rt (1.987, 2.51, 3.807, 4.883, 5.763, 6.038, 6.823) min [Fig. 1], while the area under curve were (186616, 406614, 387611, 58062, 404152) µvolt [Table 2].

![Fig. 1: HPLC analyses of flavonoids in Arctium lappastems](image-url)

The types of flavonoids in *Arctium lappastems* were identified by comparing the \(R_t\) obtained from chromatograms of crude stems extract with \(R_t\) in chromatogram of standard flavonoids, and then the concentration of the identified flavonoids was done by using the values of the area under curve for stem extract and for each standard. The results indicate that the crude plants contain 793.56 µg/g of rutin, 741.33 µg/g of Myricetin, 866.31 µg/g of Quercetin, 44.80 µg/g Apigenin and 810.76 µg/g Kaempferol with two unknown peaks [Table 2].
Table 2: Retention time, area under curve and concentration of identified flavonoids in *Arctium lappastems*

<table>
<thead>
<tr>
<th>Identified compounds</th>
<th>Retention time (min)</th>
<th>Area µvolt</th>
<th>Concentration g/gµ</th>
</tr>
</thead>
<tbody>
<tr>
<td>UnKnown</td>
<td>1.987</td>
<td>186616</td>
<td>.......</td>
</tr>
<tr>
<td>Rutin</td>
<td>2.51</td>
<td>406614</td>
<td>793.56</td>
</tr>
<tr>
<td>Myricetin</td>
<td>3.807</td>
<td>387510</td>
<td>741.33</td>
</tr>
<tr>
<td>Quercetin</td>
<td>4.883</td>
<td>478611</td>
<td>866.31</td>
</tr>
<tr>
<td>Apigenin</td>
<td>5.763</td>
<td>21568</td>
<td>44.80</td>
</tr>
<tr>
<td>Kaempferol</td>
<td>6.038</td>
<td>58062</td>
<td>810.76</td>
</tr>
<tr>
<td>UnKnown</td>
<td>6.823</td>
<td>404150</td>
<td>.......</td>
</tr>
</tbody>
</table>

The HPLC analysis of flavonoids in isolated flavonoids from plant stem showed six peaks with different Rt(2.843, 2.490, 3.828, 4.98, 6.088, 6.852) and area under curve were(121378, 311395, 189935, 397924, 241849, 318015) Table 3.

Table 3: Retention time, area under curve and concentration of identified flavonoids in isolated flavonoids from *Arctium lappastems*

<table>
<thead>
<tr>
<th>Identified compounds</th>
<th>Retention time (min)</th>
<th>Area µvolt</th>
<th>Concentration g/g µ</th>
</tr>
</thead>
<tbody>
<tr>
<td>UnKnown</td>
<td>2.843</td>
<td>121378</td>
<td>.......</td>
</tr>
<tr>
<td>Rutin</td>
<td>2.49</td>
<td>311395</td>
<td>607.73</td>
</tr>
<tr>
<td>Myricetin</td>
<td>3.828</td>
<td>189935</td>
<td>363.35</td>
</tr>
<tr>
<td>Quercetin</td>
<td>4.983</td>
<td>397924</td>
<td>720.26</td>
</tr>
<tr>
<td>Apigenin</td>
<td>6.888</td>
<td>241849</td>
<td>502.44</td>
</tr>
<tr>
<td>Kaempferol</td>
<td>6.852</td>
<td>318015</td>
<td>637.96</td>
</tr>
</tbody>
</table>

Part II: Biochemical study: The hepatoprotective effect of crude extract and isolated flavonoids from *Arctium lappastems* as an antioxidant on liver damage induced by acetaminophen were investigate in the present study, the results indicate that the levels of GSH, GPX and GST were significantly (P ≤ 0.05) decreased in control-2 treated with paracetamol as comparing with control-1 group with significant (P ≤ 0.05) elevation of ALT activity and non-significant effect on AST, while the level of GSH and GPX were significantly (P ≤ 0.05) elevated in G1 and G2 treated with crude stem extract and isolated flavonoids respectively compared with C2, in which the levels of GSH and GPX are less than the levels in C1 and G1. Otherwise the levels of GST, ALT and AST significantly (P ≤ 0.05) decreased in G1 and G2 as compared with C2.

The result indicate that the types of flavonoids in isolated flavonoids fraction from the plant stem indicate 607.73 µg/g of rutin, 363.35 µg/g of Myrecetin, 720.26 µg/g Quercetin, 502.44 µg/g Apigenin and 637.96 µg/g Kaempferol, with two unknown pecks [table 3].

Discussion

*Arctium lappa* one of the common medicinal plant in china. The fresh or dried roots, ripe seed and leaf were used medicinally(26), with no information related to use of plantstem in traditional medicine, in spite of the *Arctium lappa* stem may be eaten stewed or raw as a snack(27). Kim etal(28), indicate that the methanolic extract from leaves and stem of *Arctium lappa* have anti-inflammatory effect. In recent years, the drug derived from natural sources have been given much attentions more than the chemical drugs, in addition to study the chemical composition and biochemical effect. The *Arctium lappa* contain lignin especially arctin (lower concentration than other part of the plant)(29), no more information were available about the chemical composition of the *Arctium lappa* stem or about the
protective effect of it against the liver damage induced by paracetamol.

The results of the present study identified five types of flavonoids for the first time in plant stem (Rutin, Myricetin, Quercetin, Apigenin, Kaempferol) with quantified determination for the concentration of each type of flavonoids by HPLC, isolated the stem flavonoids and identified the same five flavonoids and then study the hepatoprotective and antioxidant effect of the crude stem and its isolated flavonoids.

Barros et al.\(^{(30)}\) provides invaluable insights into the therapeutic efficacy of quercetin in acetaminophen induced toxic liver damage, which suggest that the reduction in serum ALT and AST levels due to the treatment with quercetin, which is useful for prevention of liver damage caused by paracetamol, this results agree with the result of the present study, whereas the treatment with crude extract of stem and isolated flavonoids significantly (P ≤ 0.05) reduced the activity of AST and ALT in serum of rabbit in G1 and G2, on the other hand Wang et al.\(^{(31)}\) indicate that treatment with different doses of kaempferol decrease the oxidative stress, lipid peroxidation and increase the antioxidant defense activity, So this findings show the protective effect of kaempferol against liver injury.

The treatment with high dose of paracetamol in C1 cause significant high (P ≤ 0.05) elevation in serum liver enzymes (AST and ALT) and reduction of antioxidant parameters levels (GSH, GPX, GST), this depression in the level of GSH may be due to the effect of toxic metabolite N-acetyl-p-benzoquinone imine–NAPQI, which produced by hepatic cytochrome p450- CYP450 system which oxidize the excess paracetamol, and the normal detoxification of the toxic metabolite (NAPQI) by the thiol group in GSH cause consume it\(^{(32)}\), resulting in accumulation of NAPQI which then binds covalently -SH groups of proteins in hepatocytes forming NAPQI-protein adducts

**Conclusion**

1. *Arctium lappa* stem (E-ALS) and isolated total flavonoids (ITF) have hepatoprotective properties against liver injury induced by paracetamol.

2. *Arctium lappa* stem (E-ALS) and isolated total flavonoids (ITF) have the protective role of antioxidant defense system.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both MOH and MOHSER in Iraq.

**Conflict of Interest:** Non

**Funding:** Self-funding

**References**


10. Ferracane R, Graziani G, Gallo M, Fogliano V, Ritiene A. Metabolic profile of the bioactive compounds of burdock (Arctium lappa) seeds, roots...


Studying Some of Immunological Parameters of doges that Toxocara Infections in Saladin province

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Assistant Lecturer M.Sc. Educational Department of Sammara, Ministry of Education, Sammarra, Iraq

Abstract

The study examined 60 stray dogs from both sexes and aged 3 months - 3 years old, included 30 stray dogs and 30 dogs clinically normal, served as a control group. Toxocara infection has detected in the College of veterinary medicine Health Center in Tikrit city. Clinical signs were observed, the study groups divided to two groups one of these groups infected by the parasites of the study and other group was control the result appear immunological changes for protein levels in study groups, represented with significant differences was reported between toxocariasis group and healthy control in terms of Complement 3 proteins (33.21 ±14.18726, 35.57±15.56254), Complement 4 proteins (268.5±14.34, 146.06±17.83) although increased complement 3 level in toxocariasis group compared with healthy control, While the Complement 4 reported no significant differences increased between toxocariasis group and healthy control group. The immunoglobulins was reported highly significant differences in IgM (297.4±14.18726)in toxocariasis group compared with healthy control group (159 ±15.56), While revealed no significant decrease levels of IgG of toxocariasis group (760 ±14.34) compared with healthy control group (843±17.83). Toxocara Canis induces an early immunological response that detected by presence of these antibodies and immunological markers against T.canis infection.

Keywords: Complement 3, Complement 4, Immunoglobulin G, Immunoglobulin M, Toxocara Cainis.

Introduction

Dogs and cats are the most important animal hosts for toxocariasis, especially in developing countries where most cats and dogs have access to public parks and playgrounds, serving as the main source of soil contamination, and posing a huge risk of human exposure to infective eggs 17. Toxocariasis is a highly prevalent parasitic disease in the tropical regions of the world, with its impact on public health being typically underestimated[1–2]. Toxocariasis is a zoonotic disease usually caused by dog and cat roundworms, Toxocaracanis and T. cati. Detection and diagnosis is difficult in paratenic and accidental hosts. The roundworm Toxocara is a perfect example of a parasite moving from wild canids to their domestic counterparts and to humans[3,4]. Dogs or cats, especially in low-income and rural regions, play important roles in the transmission of Toxocara spp. through environmental contamination, which spreads the infection to humans[3]. Toxocara parasite has a notorious tendency to cause extraintestinal pathologies[5,6]. Indeed, toxocariasis includes four clinical forms, which can lead to serious health consequences[5,7,8]. The newly sequenced genome of T. canis along with transcriptomic analysis has allowed an in-depth characterization of this organism’s molecular characteristics[9]. Also, knowledge of the parasite’s genetic diversity has been improved and new diagnostic markers have been discovered [10, 9–11]. Indeed, evidence from recent investigations suggests that human toxocariasis is seriously neglected because limited attention has been paid to its prevention, treatment, and surveillance and because it is a non-notifiable disease[12–13]. The clinical symptoms of toxocariasis may vary from asymptomatic infection to localized symptoms (ocular and neurological) or severe systemic infection (visceral larva migrans), which is commonly complicated by blood eosinophilia[17] preposition many infections are asymptomatic and thus can be misdiagnosed[14]. Phylogenetic analyses based on the sequences of the nuclear ribosomal DNA(rDNA),
showed that Toxocara spp. form a distinct clade, in relation to their definitive hosts, which is separate from Ascaris spp.\[15\]. This syndrome relates to the migration of \textit{T. canis} larvae in CNS and subsequent induction of meningitis, encephalitis, cerebral vasculitis, or myelitis, usually associated with relatively non-specific clinical symptoms (eg, fever and headache)[16].

The aim of this study is to investigate the prevalence of toxocara parasite in study dogs insalahdin prevalence province with its immunological effects.

**Materials And Method**

**Specimen Collection and Preparation:** Serum preparation: Peripheral blood samples from cases and controls were collected by venipuncture using vacuum tubes (Vacutainer). Whole blood and plasma aliquots were obtained and stored at 4°C and -20°C, respectively until analyzed, and we use deep frozen or fresh serum samples. The specimens was obtained by Lode, The specimen after centrifugation was overstocked for up to 48 hours at 2-8°C before assay and for along storage period,. The samples thawing and repeated freezing must be impossible.

Detection of C3 and C4 concentration: The radioimmuno diffusion microplates were embosomed for 24 to 72 h at room temperature. These technique essentially of[22]. Calibrating viewer was used to gauged the distance of the ring, this technique is called Mancini method. In this reaction Ag-Ab spread on in semisolid phase, where antigen aspur will form into these phase. The reactants spread toward each other on the semi solid phase even they concurs, The distance of the ring is a calculated of antigen amount, the ring diameter microplates are read after of incubation 24-72 hrs[13].

Detection of IgG and IgM concentration: The examined protein, diffusing in agarose gel containing aspecific antibody will form an immune-complex, visible as aring around the well. The ring diameter is direct proportional to concentration of the analysed protein. The proportion corresponds to the diffusion time, in fact, at the end (72h), the square of diameter will be in linear proportion to the concentration of the sample. fill the wells with 5μl of sample and wait it has been completely adsorbing before handling the plate. close the plate and place it in amoist chamber for (72h)[13].

Statistical Analysis: The data analyzed by SPSS program (statistical package for social science) version[15]. Quantitative variables were represented as mean ±SD. P-value less than 0.05 (< 0.05) consider statistically significant. The relationship between studied variables was assessed by using Spearman correlation.

**Results**

The present study was designed to estimate some immunological biomarkers (C3, C4) in studied groups; 30 Toxocariasis patients and 10 healthy controls. The association between circulating levels of these biomarkers were investigated.

The complement protein calculated by using method encompass radially diffusing of antigen that found in well through agarose gel including monoclonal Ab. Intricate of Ag-Ab are configured under the circumstances proportioned to these reactions will constitutes ring that configured made of reactions. The Diameter of ring will proportion suited ejective between the diameter and concentration in accordance with data sheet that provided with the kit. The Diameter of ring will proportion. (Table, 2) display demographic characteristics of the patients with toxocara infection, as well as relationship between disease and different variables.

<table>
<thead>
<tr>
<th>Patient characteristics</th>
<th>Value</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years):</td>
<td>(3 mon.-3) years</td>
<td>-</td>
</tr>
<tr>
<td>Sex:</td>
<td>(Male/Female)</td>
<td>-</td>
</tr>
<tr>
<td>IgG (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N: No (%)</td>
<td>20 (84.2)</td>
<td>P&lt;0.05*</td>
</tr>
<tr>
<td>P: No (%)</td>
<td>10 (15.8)</td>
<td></td>
</tr>
</tbody>
</table>

Table (1): Demographic profile of 30 patients with Toxocariasis data include information about the, age, gender, disease duration residence, IgG, IgM.
### Table 2: C3, C4 Concentration in studied group

<table>
<thead>
<tr>
<th>Characters</th>
<th>Patients Mean ±SE No.25</th>
<th>Healthy control Mean ±SE No.15</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>C3/Mean ±SE</td>
<td>268.5±14.34</td>
<td>146.06±17.83</td>
<td>P≥0.05</td>
</tr>
<tr>
<td>C4/Mean ±SE</td>
<td>33.21±14.18726</td>
<td>35.57±15.56254</td>
<td>P≥0.05</td>
</tr>
</tbody>
</table>

HC: Healthy control; C: complement; p<0.05(t test); Highly significant; P<0.05: Significant; P≥ 0.05; No-significant.

Characteristics of patients with Toxocarasis and healthy control are detailed in (Table 2). Showed Significant decrease in C4 concentration compared with healthy control which non significant level (P>0.05), While C3 protein showed Significant increase in concentration compared with healthy control in significant level (P>0.05).

### Table 3: IgG, IgM Concentration in studied group

<table>
<thead>
<tr>
<th>Characters</th>
<th>Patients Mean ±SE No.25</th>
<th>Healthy control Mean ±SE No.15</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IgG/Mean ±SE</td>
<td>760±14.34</td>
<td>843±17.83</td>
<td>P≥0.05</td>
</tr>
<tr>
<td>IgM/Mean ±SE</td>
<td>297.4±14.18726</td>
<td>159 ±15.56</td>
<td>P≥0.05</td>
</tr>
</tbody>
</table>

HC: Healthy control; IgG: immunoglobulin gamma; IgM: immunoglobulin moderate p<0.05(t test); Highly significant; P<0.05: Significant; P≥ 0.05; No-significant.

Characteristics of patients with Toxocarasis and healthy control are detailed in (Table 3). Showed Significant increase in IgG concentration compared with healthy control which non significant level (P>0.05), While IgM showed Significant increase in concentration compared with healthy control in significant level (P>0.05).

### Discussion

The present Study was designed to correlation between some of immunological biomarkers (C3, C4, IgG, IgM). In studied groups infected stray cats showed a number of clinical signs include diarrhea, loss of appetite and wasting, and due to the diagnosis of infection with *Toxocaracanis* parasite. The infection rate appeared in this parasite high in stray dogs, which may be the reason for stray dogs spread in different regions and lack of attention with unhealthy culture conditions, which increases the chances of exposure to parasitic infection and other diseases. The presence of anti-T. canis antibodies from T. canis-infected sera were showed Significant decreased in IgG concentration compared with healthy control which non-significant level this level exhibited detectable amounts of IgG in sera at 14 days post-infection, While IgM showed Significant increase in concentration compared with healthy control in in significant level(P>0.05). The levels of circulating antigen were highest during the first week of infection, The production of specific anti-*T. canis* antibodies was increased with significance the lowest detectable levels were observed at 3 months post-infection T. canis infection exhibited detectable amounts of IgG in sera at 14 days post-infection this results aggregated with the same study[1]. No significant differences was reported between Toxocarasis group and healthy control in terms of Complement 4 proteins, Complement 3 proteins although increased complement level in Toxocarasis group compared with healthy control in in significant level(P>0.05), differences were significant and highly significant in terms of C3, and run up serum echelons of complement 3 are combination with acute phase of inflammatory interactions, Whereas C3 and C4 are completely inactivated by removal of the C-terminal arginine, C5a retains approximately 10% of its chemotactic activity, which may explain the partial inactivation of chemotaxisin this infection.
Complements and some serological markers levels were elevated in Toxocariasis group with healthy control. But some of these decline. Compared with healthy control, however, the above results revealed that in the variations observed in the time of detection and the concentration of antibodies in sera may have been due to factors such as the species of the experimental host, strain used, age of the experimental host, sex of the animal.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq.

**Conflict of Interest:** The authors declare that they have no conflict of interest.

**Funding:** Self-funding

**Reference**


19. Li MW, Lin RQ, Song HQ, Wu XY, Zhu XQ.


The Effect of Research Project Course on Nursing Students’ Attitudes toward Research Process

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Abstract

Objective: Investigate the effect of research project course on nursing students’ attitude toward research at a college of nursing in Kerbala University and identify the relationship between nursing student’ attitude and demographic variables. A pre-experimental design (One-group Pretest-Posttest design) was utilized to determine the effect of research project course on nursing students’ attitude toward research at a college of nursing in Kerbala University. All participants were exposed to assess of attitudes regarding research before and after the implementation of the research project course in order to detect the effect of the course. The current study results revealed that; the majority (74.2%) of nursing students were within age groups (20-22) years old the mean age of the all students was (22.27) years. 82.3% of total students were female the majority (82.3%) of subjects were single, most of sample (80.6%) were urban resident, the mean of score of the positive attitude of respondents in posttest of the research project course was significantly higher than the pretest of the research project course in all aspects of attitude regarding research project course, and no significant difference between the nursing students’ demographic variables and attitude responses in the posttest of research project course.

Keywords: Nursing students, Attitudes, research project course, research.

Introduction

Nursing research is characterized as the integrating, and dispersing procedure to have effect on the current nursing practice by utilizing research produced information. Additionally, nursing research application has been connected with enhance nature of nursing practice1. According to Chien, et., al. (2013) and Nieswiadomy (2011), Applying research prove amid day by day clinical practice help to upgrade the; nature of nursing care, medical attendants’ close to home and expert execution and additionally to enhance the responsibility for training, and documentation of the cost-adequacy of nursing care2,3. So, the nursing research acts to give a base to confirm base practice by approve and refine existing information (science) and growing new learning that is connected to nursing practice4,5. What’s more, when you are connected the nursing research finding in nursing practice prompt abatement expenses of medicinal services, expands individual profitability, long more advantageous lives for patients, and lessening torment and enduring of patients6. The act of nursing care needs particular information and clinical aptitudes to take care of real or potential issues that influence wellbeing of people7. Therefore, the enthusiasm for nursing research is considered as a need for medical attendants instructors and school of nursing, in light of the fact that the utilization of research is of extraordinary significance to the up and coming age of nursing staff in aptitudes, for example, leading examination, settling on free clinical choices perusing logical articles, and critical thinking approaches8. Baccalaureate programs get ready understudies for section level nursing positions.

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The center is to nurture all people through the human life expectancy. Information is procured from course books, classroom and Web-based direction, recreation, and clinical encounters. The objective of all projects is for understudies to graduate as protected, section level experts, have gotten a balanced introduction to the nursing field. Understudies are presented to prove based nursing practice all through their educational programs; nonetheless, the apportioned time for nursing research is frequently constrained. Nursing research is significance of its incorporation amid undergrad guideline can’t be overemphasized. Just with introduction and experience students would be able to start to comprehend the idea and significance of nursing research. Hence, a basic research course wound up obligatory in most baccalaureate nursing programs the world over to build understudies’ interest in research and usage of research discoveries practically speaking. Working on nursing understudies, is tested to stay up with the latest via searching for recovering and scrutinizing research articles that apply to hone issues that are encountered in their clinical setting. Also, it is essential to outfit understudies with a solid establishment in research to enable them to assess inquire about judge explore discoveries for conceivable application to clinical settings and to take an interest in investigate purports. Undergraduate research project program aims to facilitate quality undergraduate research between students and mentors and to bring students into a community of scholars within their field. They urge medical caretakers to use and be effectively engaged with investigate. Undergraduate education positively affects understudies to gain an essential perspective about research and encourage them to undertake research. The initial step into compelling use of research, which makes incredible commitments to change of nursing, is preparing for look into amid undergrad training. The exploration course ought to be joined into all undergrad training projects and educational program. With the goal that undergrad medical attendants can turn into a compelling exploration peruser and set research discoveries in motion, they ought to have the capacity to comprehend look into reports, reprimand them and comprehend phases of research. Among investigate exercises anticipated from nursing understudies are; perusing research articles fundamentally, gathering and announcing solid and legitimate information, going to nursing meetings, utilizing library assets, and plan theoretical or paper introduction. A nursing research course is viable in expanding learning about strides of research and getting the capacity to assess after effects of research and in addition having a positive attitude towards research. Students’ attitudes are connected with their inclusion in inquire about as future nurses. Positive students’ attitudes toward research encourages students to contribute in research, and increases effective application of research findings as well as improving healthcare outcomes.

Methodology

A pre-experimental design (One-group Pretest-Posttest design) was conducted on nursing students’ attitudes toward research in nursing college. During the period from October 25th 2017 to April 15th, 2018 a non-probability (purposive) sample of (62) nursing students in nursing college was participated in the research project course which are selected after taking their consent. All of the students in the fourth undergraduate academic year 2017-2018, were invited to participate in this study. The aims of the study was clarified before achievement the participants’ consents. Only 62 students were participated and returned the questionnaires. All subjects participated in the research project course at the same time, place, and environment; All participants nursing students exposed to posttest assessment of attitudes regarding research after the implementation of the research project in order to detect the effect of the research project. The tool of this study was adapted from a study by Larson (1989), Halabi and Hamdan (2010) and Halabi, (2016). Several statements of this questionnaire were modified and developed to increase the validity of this instrument and to be more appropriate for achieving the aims of the present study. After reviewing the related literatures and relevant studies, and prior to implementation of the research project, the researchers constructed the attitudes test questionnaire to assess the nursing students attitudes respondents pre and post the implementation of the research project, in order to identify the difference in attitudes of the respondents toward research. The study instrument consisted of 2 parts as the following: Demographic data (which include nursing students’ gender, age, marital status, and residence) and nursing students’ attitudes which is comprised of (22 items): section one is related to usefulness of research (4 items), section two is related personal interest in research (4 items), section three is related to research abilities (7 items), and section four is related to using research in clinical practice (7 items). Likert Scale was used to assess the level of student’s attitude towards research pre/post research project. It was adopted from Likert Scale (2006) and modified.
by the researchers according to the aims of the study. The overall number of the items included in the nursing students’ attitudes were measured in a three levels scale; Agree, uncertain and disagree, and rated as 3, 2, and 1, respectively with a cut-off point = 2. Assessment of nursing students’ attitudes was based on: Mean score for attitudes items equal to 2 or more is considered as a positive. While Mean score for attitudes items below (2) is considered as an negative. The researchers calculated the score percentages of attitudes response for each nursing student in the two related period of the course, and then calculated the difference between the posttest and pretest for each study sample to achieve the attitudes improvement effect for each nursing student.

**Data Analysis:** SPSS version 20 was used to analyze of the data. Statistical analysis was made using Chi-square and paired T-test, have been used to identify the significant change in attitudes before and after research project. The level of significance was set at $P \leq 0.05$.

**Ethical Considerations:** The study was approved by the research department of the participating college of nursing. Students were assured anonymity and confidentiality as well as the right to refuse participation and to withdraw from the study without penalty.

**Results and Discussion**

Table 1 reveals that the majority ($n=46$) 74.2% of nursing students participant in study sample were (20-22) years old with mean age of the all students was 22.27 (20-41) years. 82.3% ($n=51$) of total students were female and 17.7% ($n=11$) were male. Regarding to the nursing students marital status, the majority ($n=51$) 82.3% of the subjects were single. Also, this table shows most of sample ($n=50$) 80.6% of the residents were urban. Results related to attitude respondents regarding to research project, were presented in this table, indicate that the mean of score of the attitude respondents in posttest of the research project course was higher than the pretest of the research project course in all aspects of attitude regarding research project course (positive attitude respondents in comparison between pretest and posttest of the research project course). This table also indicates that a significant difference between pretest and posttest of the attitude of respondents at p-value (0.001). The study results reveal that there is a high significant difference between the nursing students’ attitude responses in the two tests (pretest and posttest) of research project course. Table 4 shows that there is no significant difference between the nursing students’ demographic variables and attitude responses in the posttest of research project course. Nursing research is fundamental to the practice of nursing staff, and the significance of its incorporation during undergraduate direction can’t be overemphasized. Just with presentation what’s more experience nursing students can be able to start to comprehend the concept and significance of nursing research. After the analysis of demographic characteristics as shown in table (Table 1) it was revealed that the majority of subjects (74.2%) were at age 20-22 years old with mean age of the all students was 22.27. Regarding to the nursing students gender the findings indicate that slightly more than three quarters of the students (82.3%) were females and the other (17.7%) were males. According to marital status of nursing students, the study results reveal that more than half (51%) of samples were single and 49% were married. Concerning resident place, the study findings indicate that more than three quarters (80.6%) of the sample were urban. This finding is consistent with Erkin et al. (2017) who revealed that the mean age of the nursing students was 20.72 years. 86.3% of nursing students were females and 13.7% were males (17).While, other study which was done by Hasan (2016), to assess students’ attitudes towards research at mazandaran university of medical sciences shows that approximately half (61%) of students were females and (39%) were males, this result was inconsistent with the findings of the present study. After participating the nursing students in the graduation research project course the results of analysis indicate a significant improvement in nursing students’ positive attitudes regarding research in comparison with the two periods (pretest and posttest), when the results of current study revealed that the nursing students’ attitudes about research; Usefulness of research in pretest 11.145 while in posttest 11.467 ; Personal interest in research is pretest 10.129 while in posttest 10.612; Research abilities in pretest 14.919 while in posttest 16.871; and Using research in clinical practice in pretest 13.919 while in posttest 17.112.
Table 1: Distribution of nursing students that participant in research project course with their socio-demographic characteristics (N=62).

<table>
<thead>
<tr>
<th>Socio-demographic data</th>
<th>Scale</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>20-22</td>
<td>46</td>
<td>74.2</td>
</tr>
<tr>
<td></td>
<td>23-25</td>
<td>13</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>26 and More</td>
<td>3</td>
<td>4.8</td>
</tr>
<tr>
<td>Mean ± SD (Range)</td>
<td>22.27± (20-41)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>11</td>
<td>17.7</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>51</td>
<td>82.3</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>62</td>
<td>100</td>
</tr>
<tr>
<td>Marital status</td>
<td>Single</td>
<td>51</td>
<td>82.3</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>11</td>
<td>17.7</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>62</td>
<td>100</td>
</tr>
<tr>
<td>Resident</td>
<td>Rural</td>
<td>12</td>
<td>19.4</td>
</tr>
<tr>
<td></td>
<td>Urban</td>
<td>50</td>
<td>80.6</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>68</td>
<td>100</td>
</tr>
</tbody>
</table>

Table (2): Summary statistics for the students’ Attitude Towards Research respondents in the two periods (pretest and posttest) Research Project Course with comparisons significant (N=62).

<table>
<thead>
<tr>
<th>No.</th>
<th>Domains</th>
<th>Pretest</th>
<th>Posttest</th>
<th>P(*). value</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Usefulness of Research (4 items)</td>
<td>M.S</td>
<td>S.D</td>
<td>M.S</td>
<td>S.D</td>
</tr>
<tr>
<td>2</td>
<td>Personal Interest in Research (4 items)</td>
<td>11.145</td>
<td>1.303</td>
<td>11.467</td>
<td>.881</td>
</tr>
<tr>
<td>3</td>
<td>Research Abilities (7 items)</td>
<td>10.129</td>
<td>1.722</td>
<td>10.612</td>
<td>1.395</td>
</tr>
<tr>
<td>4</td>
<td>Using Research in Clinical Practice (7 items)</td>
<td>14.919</td>
<td>2.234</td>
<td>16.871</td>
<td>2.191</td>
</tr>
<tr>
<td>5.</td>
<td>Overall Domain</td>
<td>13.919</td>
<td>2.650</td>
<td>17.112</td>
<td>2.104</td>
</tr>
</tbody>
</table>

Table (3): Paired T-test of Difference of the Nursing Students’ Attitude Responses Relative to Pretest and Posttest (N=62).

<table>
<thead>
<tr>
<th>Pairs (Paired T-test)</th>
<th>T-value</th>
<th>D.F</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest/Posttest</td>
<td>-9.200</td>
<td>61</td>
<td>0.000 HS</td>
</tr>
</tbody>
</table>

Table (4): The NOVA Test to Study the Differences Between the nursing students’ attitude responses in the posttest of research project course and Demographic Characteristics (N=62).

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>Comparative patterns</th>
<th>Df.</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age/ Years</td>
<td>Between Groups</td>
<td>14</td>
<td>1.090</td>
<td>.391</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>Between Groups</td>
<td>14</td>
<td>.867</td>
<td>.597</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>Between Groups</td>
<td>14</td>
<td>1.084</td>
<td>.396</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residents</td>
<td>Between Groups</td>
<td>14</td>
<td>.241</td>
<td>.997</td>
</tr>
<tr>
<td></td>
<td>Within Groups</td>
<td>47</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Conclusion

According to the findings of this study, the nursing students’ attitudes toward research were increasing significantly after exposing to the research project course and the demographic variables (gender, age, marital status and resident) of the nursing students had no significant effect on their attitudes toward research.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Community Health Nursing Department/College of Nursing/University of Kerbala, Iraq and all experiments were carried out in accordance with approved guidelines.

References

Association of Serum Myeloperoxidase Level with Risk of Coronary Artery Disease in Patients with Type 2 Diabetes

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Abstract

Aim: This study aimed to investigate if the change of serum myeloperoxidase (MPO) level would be associated with the incidence of coronary artery disease (CAD) in the type 2 diabetic patients. Method: Eighty-eight (88) Iraqi subjects were grouped into three categories:(29) Type 2 diabetes mellitus patients and (29) diabetic patients with CAD compared with (30) healthy person. Serum Myeloperoxidase was performed by using ELISA kit. Fasting blood sugar and lipid profile were done by Roche/Hitachi cobas c311 device. Atherogenic index (AI) and Coronary risk index (CRI) were estimated.

Results: The results of myeloperoxidase (ng/mL) indicate highly significant increase (p<0.01) in the sera of type 2 diabetic (54.18±22.62) and diabetic with CAD (70.79±35.90) patients groups in comparison to that level in control group (29.94±11.11). Meanwhile indicate highly significant differences between T2DM group and diabetic with CAD group. The results of FBS, HDL, triglyceride, VLDL, CRI and AI indicate a significant (p< 0.05) differences between all studied groups. While the results of Cholesterol and LDL indicate no significant (p≥0.05) differences between control, T2DM and diabetic with CAD groups.

Conclusion: Elevated level of MPO are association with the presence of Coronary Artery Disease in type 2 diabetic patients. These findings support a potential role of MPO as an inflammatory marker.

Keywords: Type 2 Diabetes Mellitus, Lipid profile, Myeloperoxidase, coronary artery disease.

Introduction

Diabetes is a major global health concern, it is a metabolic syndrome that manifests a grade of systemic inflammation, leads to an increase in all-cause mortality and contributes to the development of number of cardiovascular complications3,4. Cardiovascular diseases remain the leading cause of deaths in many countries globally, including coronary heart disease, stroke, high blood pressure, and arterial diseases. Notably, death rates among adults with both heart disease and diabetes mellitus are 2–4 times higher than those with heart disease alone, and the mortality rate of patients with heart disease >65 years of age is ~68% in conjunction with diabetes3,4. Clearly, diabetes very negatively impacts the progression and outcome of heart disease, thus understanding the interplay between the two is an important endeavor for advancing treatment strategies of patients with diabetic cardiac complication.

Oxidative stress and inflammation play important roles in the pathogenesis of destabilization of coronary artery disease (CAD) leading to acute coronary syndromes (ACS). Previously, there has been a renewed interest in MPO, a pro-inflammatory enzyme that is abundant in ruptured plaque5. Numerous clinical studies have assessed the utility of inflammatory biomarkers for characterization cardiovascular disease (CVD) severity and thus the risk of plaque rupture. Previous research has focused on an inflammatory markers of which myeloperoxidase (MPO), released systemically and locally by activated leukocytes, has shown great promise6. Prior study hypothesized that MPO can be used as a diagnostic aid and risk stratification tool in patients who present to the emergency department with ACS7. Myeloperoxidase (MPO) (EC 1.11.1.7) is a mammalian enzyme localized in granules of polymorphuclear granulocytes and macrophages, MPO is a homodimeric
protein with a mass of 146 kDa, consisting of two 73 kDa identical and functionally independent monomers joined by a single disulfide bond at cysteine residue 153. Each monomer has 2 polypeptide chains: a glycosylated heavy chain consisting of 467 amino acid residues and a mass of 58.5 kDa and a light chain with 106 amino acid residues and a mass of 14.5 kDa\(^{(8,5)}\). Myeloperoxidase produces reactive oxidants and other free radicals either through its peroxidase cycle or through a halogenation cycle, depending up on the substrate availability. However, any excessive or unregulated production oftheses oxidants can lead to damage of host cells and result in several diseases\(^9\).

Therefore, in this study, the relationship between MPO levels and the incidence of CAD in patients with type 2 diabetes was determined.

**Method**

The study included 88 Iraqi subjects were grouped into three categories: (29) Type 2 diabetes mellitus patients and (29) diabetic patients with CAD compared with (30) healthy person in term of non-diabetic, non-hypertensive and have no ischemic heart disease. Patients with Type 1 diabetes, gestational diabetes, chronic diabetic complication (nephropathy, retinopathy and neuropathy), type 2 diabetes taking insulin injection, malignancies were excluded. This study was designed as case–control study and done at National Diabetes Center for Research and Treatment/Mustansiriya-University.

Serum of Myeloperoxidase was performed using ELISA kit an enzyme immunoassay for quantitative in vitro diagnostic measurement, kit manufactured by Mybiosource. Fasting blood sugar and lipid profile were done by Roche/Hitachi cobas c 311 device. Atherogenic index (AI) was estimated by AI = log TG \ HDL and Coronary risk index (CRI) estimated by CRI = TG \ HDL.

**Results**

The results of myeloperoxidase (ng/mL) indicate highly significant increase (p<0.01) in the sera of type 2 diabetic (54.18±22.62) and diabetic with CAD (70.79±35.90) patients groups in comparison to that level in control group (29.94±11.11). Meanwhile indicate highly significant differences between (T2DM) and (diabetic with CAD) groups. Table (1) showed the results of FBS, lipid profile, CRI and AI that demonstrated a highly significant (P<0.01) differences of FBS, HDL, triglyceride, CRI and AI, meanwhile the VLDL result indicate a significant (p< 0.05) differences of studied groups. While the results of Cholesterol and LDL indicate no significant (p≥0.05) differences between control, T2DM and diabetic with CAD groups.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Control</th>
<th>T2DM</th>
<th>Diabetic with CAD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FBG (mg/dl)</td>
<td>90.88±6.23</td>
<td>180.7±68.86</td>
<td>182.31±78.8</td>
<td>0.00</td>
</tr>
<tr>
<td>Cholesterol (mg/dl)</td>
<td>164.79±28.52</td>
<td>169.62±47.84</td>
<td>167.29±50.19</td>
<td>0.91</td>
</tr>
<tr>
<td>Triglyceride (mg/dl)</td>
<td>101.25±36.41</td>
<td>151.86±75.40</td>
<td>149.95±86.32</td>
<td>0.009</td>
</tr>
<tr>
<td>VLDL (mg/dl)</td>
<td>21.58±8.23</td>
<td>30.32±15.13</td>
<td>29.71±17.51</td>
<td>0.037</td>
</tr>
<tr>
<td>LDL (mg/dl)</td>
<td>97.75±24.11</td>
<td>109.62±38.02</td>
<td>103.06±35.83</td>
<td>0.400</td>
</tr>
<tr>
<td>HDL (mg/dl)</td>
<td>48.94±17.44</td>
<td>31.84±8.5</td>
<td>30.33±9.27</td>
<td>0.000</td>
</tr>
<tr>
<td>CRI</td>
<td>2.26±1.09</td>
<td>5.17±3.30</td>
<td>5.52±3.26</td>
<td>0.000</td>
</tr>
<tr>
<td>AI</td>
<td>0.31±0.19</td>
<td>0.63±0.24</td>
<td>0.66±0.27</td>
<td>0.000</td>
</tr>
</tbody>
</table>
As shown in Table (2), MPO of type 2 diabetic patients showed significant negative correlation with HDL (p<0.05) as shown in Figure (1). The overall analyze of all groups samples it was observed highly significant negative correlation with HDL as shown in Figure (2), while demonstrated a significant positive correlation with Tri as shown in Figure (3). Meanwhile CRI and AI were indicated a highly significant positive correlation with MPO as shown in Figure (4) and (5) respectively.

Table 2: Pearson correlation analysis of MPO(ng/mL) in studied groups

<table>
<thead>
<tr>
<th>Parameters</th>
<th>T2DM</th>
<th>Diabetic with CAD</th>
<th>All Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>FBS (mg/dl)</td>
<td>0.179</td>
<td>0.214</td>
<td>0.418**</td>
</tr>
<tr>
<td>CHO (mg/dl)</td>
<td>-0.257</td>
<td>0.106</td>
<td>-0.010</td>
</tr>
<tr>
<td>Tri (mg/dl)</td>
<td>-0.141</td>
<td>0.253</td>
<td>0.257*</td>
</tr>
<tr>
<td>HDL (mg/dl)</td>
<td>-0.433*</td>
<td>0.114</td>
<td>-0.372**</td>
</tr>
<tr>
<td>LDL (mg/dl)</td>
<td>-0.092</td>
<td>-0.104</td>
<td>-0.025</td>
</tr>
<tr>
<td>VLDL (mg/dl)</td>
<td>-0.145</td>
<td>0.241</td>
<td>0.215</td>
</tr>
<tr>
<td>CRI</td>
<td>0.142</td>
<td>0.224</td>
<td>0.366**</td>
</tr>
<tr>
<td>AI</td>
<td>0.055</td>
<td>0.269</td>
<td>0.391**</td>
</tr>
</tbody>
</table>

*p<0.05, **p<0.01, No asterisk p≥0.05

Figure 1: The correlation between serum MPO with HDL in T2DM.
Figure 2: The correlation between serum MPO with HDL in all studied groups.

Figure 3: The correlation between serum MPO with Triglyceride in all studied groups.
Discussion

In this study, the results of myeloperoxidase indicate a highly significant increase in the sera of T2DM group and diabetic with CAD group in comparison to that level in control group. This finding was agreement with Song P, et al. study, which indicate that plasma MPO level was positively correlated with the degree of coronary artery stenosis in type 2
diabetic patients\textsuperscript{10}. Also agree with I. V. Gorudko, et al., study which reported that myeloperoxidase is increased activity in the blood can be an additional marker of oxidative stress and cardiovascular risk in patients with diabetes mellitus\textsuperscript{11}. Diabetic patients are prone to atherosclerosis, which is the major cause of cardiovascular diseases (CVD), neutrophils and monocytes play a key role in atherosclerosis, leading to chronic inflammatory problems. Different events and sequences occur during CVD, which include endothelial dysfunction besides the formation and rupture of atherosclerotic plaque. In the arterial wall sub endothelial region, all of these stages occur during inflammation, which ultimately leads to the accumulation and deposition of altered lipids \textsuperscript{12}. Atherosclerosis leads to the accumulation of cholesterol and cholesteryl esters on arterial walls, which derived from LDL. In addition to this, LDL retention on these walls triggers an immune response, resulting in a cascade of production of oxidants and inflammation\textsuperscript{13}. Plasma LDL interacts with circulating MPO, which has been reported to be higher in patients suffering from atherosclerosis. HOCl reacts with LDL, which promotes atherogenesis\textsuperscript{14}. High glucose stimulates the production of hydrogen peroxide. This hydrogen peroxide which is a physiological substrate for Myeloperoxidase is converted to hypochlorous acid. Thus, high glucose results in increase in Myeloperoxidase activity\textsuperscript{15}.

The results of cholesterol and LDL indicate no significant increase between studied groups. This finding disagreement with Rothangpui, et al., who shows LDL cholesterol level are higher among the diabetics with cardiomyopathy compared with those without cardiomyopathy\textsuperscript{16}. Also, disagree with Po-Chung Cheng, et al., who observed an inverse correlation between plasma LDL-cholesterol and heart function in individuals with T2DM. Patients with higher levels of plasma LDL cholesterol had worse left ventricular function\textsuperscript{17}. Plasma LDL-cholesterol may be a modifiable risk factor of heart failure in diabetes. P. R. Lawler, et al, study that showed cardiovascular disease events prevalent among individuals with low or normal LDL, both pretreatment and during statin therapy\textsuperscript{18} and Kenneth R Feingold & Carl Githey were reported that in Type 2 diabetes, poor glycemic control increases triglyceride levels and decreases HDL cholesterol levels with only modest effects on LDL cholesterol levels \textsuperscript{19}. The results of Triglyceride and VLDL in the sera of T2DM group and diabetic with CAD group indicate a significant increase in comparison to that level in the control group. These finding agreements with Adam Shaver, et al., who’s indicated that triglycerides are elevated in diabetic patients due to an increased dependence on fatty acid metabolism, and demonstrated that diabetic patients with CVD patients had significantly elevated triglyceride levels\textsuperscript{20}. Triglyceride are negatively associated with atheroprotective HDL-cholesterol. The most obvious lipid defect in uncontrolled diabetes is the elevated level of triglycerides \textsuperscript{21}. Increasing TG in fasting status could be marker for increased level of remnant lipoprotein particles, which could be directly atherogenic, and they could penetrate into the vessel wall and cause inflammation \textsuperscript{22}.

Results of HDL demonstrated a highly significant decrease in T2DM group and diabetic with CAD group in comparison to that level in control group. This result was in agreement with Rothangpui, et al., who indicated that serum HDL-cholesterol was lower among the diabetics with cardiomyopathy compared with those without cardiomyopathy\textsuperscript{16}. In addition, HDL decreased in many CVD patients, blood level of HDL < 40 mg\textper dl may be an effective warning sign for atherosclerotic development \textsuperscript{23}. High-density lipoprotein cholesterol is inversely associated with risk of coronary heart disease\textsuperscript{24}, associated to the anti-inflammatory, anti-thrombotic and anti-oxidant properties as well as to the ability to support endothelial physiology \textsuperscript{25}. Raising plasma HDL-cholesterol through weight loss and a healthy diet, by an increased physical activity and, if required, by proper pharmacotherapy is therefore a legitimate therapeutic target for the optimal prevention of CHD in a large proportion of high-risk patients\textsuperscript{26}.

The results of Coronary risk and atherogenic index of the studied groups indicated a highly significant increase of levels in sera of T2DM group and diabetic with CAD group in comparison to that in (control) group. The result was in agreement with Domingo O Beltran, et al., who reported that high level of CRI and AI were associated with all-cause mortality and risk of hospitalization due to coronary heart disease\textsuperscript{27}, also agree with Harini D Nimmanapalli, et al., study that demonstrated atherogenic
indices were found to be significantly different and the ratios contribute significantly to the estimation of CVD risk in type 2 diabetes mellitus. Diabetic dyslipidemia that characterized by an increased TG level and also decreased HDL-C value, a main feature of lipoproteins abnormalities in diabetic patients and in turn affects the results of CRI and AI, which lead to increase risk factors for developing CVD. There is correlation between AI and lipoprotein particle size, therefore AI could be considered as an indicator of atherogenic lipoprotein status and used as a diagnostic indicator when other atherogenic parameters appear normal.

Conclusion
Elevated level of MPO are association with the presence of Coronary Artery Disease in type 2 diabetic patients. These findings support a potential role of MPO as an inflammatory marker.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Medicine and all experiments were carried out in accordance with approved guidelines.

Reference


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3. References should be in Vancouver style.
4. As a policy matter, journal encourages articles regarding new concepts and new information.

Please submit paper in following format as far as applicable
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4. Corresponding author- name, designations, address, email id
5. Abstract with key words
6. Introduction or background
7. Material and Methods
8. Findings
9. Discussion / Conclusion
10. Conflict of Interest
11. Source of Support
12. Ethical Clearance
13. References in Vancouver style.
14. Word limit 2500-3000 words, MSWORD Format, single file
15. Please quote references in text by superscripting

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