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Middle Fingers Length – An Aid for Stature Estimation in South Indian Population

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ABSTRACT

Stature estimation from different parts of body holds a special place in the field of forensic anthropology. It is one of the important parameter of personal identification of an individual. The present study was designed to evaluate the ability of estimating stature from middle finger length. The study was carried out by taking the measurement of middle fingers and body height of 100 medical students (50 males and 50 females) aged between 18 to 25 years of age. The study was carried out in department of forensic medicine and toxicology at JNMC, Belgaum, Karnataka state, India. Obtained data was analyzed statistically to establish the relationship between a person's middle finger and stature. From given data mean, SEE, correlation coefficient(r). Regression equation and 'P' values were obtained. A positive correlation was observed between middle finger length and stature of a person which is statistically significant. In cases of dismembered/ mutilated bodies the present study will be helpful for forensic experts and anthropologists.

Keywords: *Identification, Finger Length, Stature, Forensic Anthropology*

INTRODUCTION

Stature is one of the most important anatomical parameters for personal identification. In forensic anthropology various parameters such as age, sex, ethnicity, stature etc. are used for personal identification. Among these, stature estimation is an essential parameter of medico-legal investigations[1]. The retrieval of mutilated remains is not uncommon, because many a times the bodies are mutilated with the intention of either concealing the identity of the deceased after committing a crime or to facilitate the disposal of dead[2]. If whole body is available then estimation of stature is easy but it is very difficult in case of only few parts of the body or some skeletal remains are available[3]. Stature estimation is based on a principle that every body part has some constant relationship with height of an individual[1]. Many Studies[1-11] have been conducted in the past using body parts like hand and foot etc. for estimation of stature. India is a vast country with varied geographical conditions and stature varies with race, sex, and geographical locations[4]. Our present study made an attempt to establish correlation between stature and middle finger and useful in conditions where only part of hand is brought for autopsy.

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MATERIAL AND METHOD

The study was conducted in the department of Forensic Medicine and Toxicology at JNMC, Belgaum, Karnataka state, India. In this study length of middle finger and height were measured from 100 students (50 males & 50 females) aged between 18 to 25 years belonging to South Indian population (Karnataka, Andhra Pradesh, Tamil Nadu and Kerala). Non-resident Indians and subjects from central, western and eastern India were excluded from the study. Subjects with Skeletal abnormalities and connective tissue diseases,

which may be congenital or acquired, were also excluded. Informed written consent was obtained prior to recording the measurements.

Anthropometric measurements and Techniques[2]: Measurements of middle finger length of males and females were taken by using a vernier caliper and the height was recorded using Anthropometer rod. Stature was measured as vertical distance from the vertex to the floor. Measurement was recorded by making the subject to stand erect on a horizontal resisting plane, bare footed with shoulder blocks and buttocks touching the wall. Palms of hand were turned inwards and fingers horizontally pointing downwards. Anthropometer was placed in straight vertical position in front of the subject with head oriented in eye-ear-eye plane (Frankfurt Plane). The movable rod of the Anthropometer is brought in contact with vertex in the mid sagittal plane. To measure Finger Length the subject is asked to place the hands on a flat table, and the distance between the phallangions and dactylions of the respective fingers was recoded using a vernier caliper.

Statistical analysis: The data was analysed using SPSS (Statistical Package for social science) version 18.0 to calculate descriptive statistics of stature and finger length for male and female subjects. For assessing the correlation between the stature and middle finger length, Pearson's correlation co-efficient was calculated and its significance was tested at a p-value of less than 0.05. The correlation coefficient was calculated separately for both male and female subjects. Linear regression models were derived for stature estimation from middle finger length in males and females keeping the stature as dependent variable and middle finger length as an independent variable.

RESULTS

The mean stature of males and females were 173.8 and 159.1 respectively. Mean stature was significantly more in males than females. Mean middle finger length of right and left sides for males was same where as in females was 7.29 and 7.3 respectively. Middle finger length was more in males than females in both the hands. Descriptive statistics of stature, middle finger length of both hands are depicted in table No.1.

Table No 1: Descriptive statistics of stature, middle finger length of both hands

	Age (years)	Height (cm)	Right Middle Finger (cm)	Left Middle Finger (cm)
Female	19.8+/- 0.83	159.1+/-5.77	7.298+/-0.5057	7.300+/-0.4836
Male	21.5+/-4.11	173.8+/-5.95	8.118+/-0.4689	8.118+/-0.4471
Both Males and Females	20.6+/-3.07	166.5+/-9.41	8.088+/-0.4589	8.188+/-0.4461

Statistically significant correlation was observed between stature and middle finger length of both hands. Pearson correlation (r) for stature and finger lengths was higher in left middle finger than right middle finger as shown in table No.2.

Table No 2: Pearson correlation (r) for stature and finger lengths

Variable	R	p
Right Middle Finger	0.672	0.00
Left Middle Finger	0.725	0.00

Linear regression equations for estimation of stature in males and females are shown in table No.3. The middle finger length showed a significant correlation with the stature in males and females. The left middle finger length in both sexes appears to be the better predictors of stature.

Table No 3: Linear regression equations for estimation of stature in males and females

Variable	Equation(St =a+bx)	r	r^2	SE	t for b	P
Combined Right Middle Finger	St =88.292+10.085 Rt Middle Finger	0.622	0.457	7.011	8.97	0.00
Combined Left Middle Finger	St =81.571+11.018 Lt Middle Finger	0.725	0.525	6.518	10.417	0.00
Females Right Middle Finger	St =114.613+6.103 Rt Middle Finger	0.534	0.286	4.913	4.381	0.00
Females Left Middle Finger	St =110.674+6.641 Lt Middle Finger	0.556	0.309	4.849	4.037	0.00
Males Right Middle Finger	St =154.791+2.364 Rt Middle Finger	0.186	0.186	5.907	1.313	0.195NS
Males Left Middle Finger	St =139.315+4.255 Lt Middle Finger	0.320	0.102	5.697	2.337	0.024

DISCUSSION

In our study a strong correlation was observed between left middle finger length and stature in both sexes. This is in accordance to findings of a study conducted by Vishal et al[5] in North Karnataka population where high correlation existed between left middle finger length and stature in males than females which are similar to our study.

Matheswaran G et al[6] also found high correlation between left middle finger length and stature among males than females of costal region of south Indian population. However, the correlation coefficient and regression equation they obtained in their study was different from our study. In another study by Kumar PGN et al[2] where highly significant correlation found between right middle finger length and stature among males than females of Mysore (south Karnataka) population which is contrast to our results.

In a recent study by Katwal B et al[1] also found high statistical significant correlation between right middle finger length and stature among males and females of Kathmandu region of Nepal. In a similar study by Shivakumar AH et al[7] found high statistical significant correlation between right middle finger length and stature among males of south Indian population of Karnataka region in India. Shivkumar AH et al[8] in his another study among females in the same south Indian population found significant correlation between right middle finger length and stature. Many studies[9-11] done in the past showed significant correlation between middle finger length and stature in males and females.

CONCLUSION

Estimation of stature is an important parameter in partial identification of an unknown and mutilated body. The present study helps in estimation of stature from middle finger length. In our study we derived a separate regression equation to estimate stature from middle finger length for south Indian population. The obtained regression equations can be used for estimation of stature of males and females of this population even if only an amputated hand is available. Such studies can help in narrowing down the search of possible victim in cases where unknown and mutilated bodies are found.

Ethical Clearance: Yes (Taken from Institutional Ethical committee)

Conflict of Interest: None declared.

Funding: None declared.

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Epidemiological Profile of Strangulation Deaths in Homicides at a Tertiary Care Teaching Hospital in South India

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ABSTRACT

The present prospective study aims to establish the epidemiological profile of strangulation deaths in homicides which were subjected to post-mortem examination in a tertiary care teaching hospital in South India for a period of two years (June 2010 to May 2012). The study revealed that among 211 homicides conducted in the study period, strangulation accounted for 59 cases (27.96%). It was common in age group 21-30 years and females. Deaths were common in individuals who were married. Urban dwellers and low socio-economic status were commonly involved. Illiterates and home makers were common victims. Incidence were reported mostly at house and during night time.

Keywords: *Strangulation, Homicide, Age, Gender, Socio-economic factors, Demographic factors*

INTRODUCTION

Homicide causes over 5 lakhs deaths worldwide annually.[1] Asphyxia which include hanging, strangulation, smothering, drowning traumatic asphyxia and choking have contributed considerably to suicidal, accidental and homicidal, deaths.[2,3] Strangulation is form of asphyxia in which there is compression of neck structures by a constricting force either by ligature, hand, elbow and bamboos other than the body's own weight.[4] Their pattern varies region to country, and are influenced or depends on factors like age, gender, unemployment, educational status, low socioeconomics status, religious attitudes, social influences, psycho-criminal activities, drug culture, political factors, marital disputes etc. [5,6,7] Although epidemiological surveys inquire about strangulation, evidence regarding its prevalence is scarce. The present study aims to fulfil this by conducting this epidemiological study of strangulation deaths in homicide.

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MATERIALS AND METHOD

The prospective cohort study aims to establish the distribution of age, gender, socio-economic and demographic factors of homicidal strangulation deaths which were subjected to post-mortem examination in a tertiary care teaching hospital in Hyderabad, Telangana, South India for a period of two years from June, 2010 to May, 2012. Based on the detailed information obtained regarding the circumstances of crime from the police, deceased's relatives and friends, 59 cases were selected. Data of mentioned parameters were collected and analyzed.

OBSERVATION

The study revealed 59 cases (27.96%) strangulation deaths among 211 cases of homicides. The highest number of deaths were recorded in the 21-30 years age group (n=21; 35.59%). (Table 1) Female deaths were 29 (49.15%) and male 30 (50.85%). Maximum deaths were noticed among Hindu religion (n= 47; 79.67%) followed by Muslim (n=4; 1.8%) and Christians (n=2; 3.39%). Religion was not known in 7 cases (11.86%). Maximum number of deaths were noticed among low socio-economic status (n=27; 45.76%) followed by middle class (n=21; 35.6%) and in upper class, only

4 cases were seen (6.78%). Status was not known in 7 cases (11.86%). Major portion of the study group belonged to urban area with 37 deaths (62.71%) and 22 victims (37.29%) were from rural area. The high deaths recorded in the urban area were due to the study being conducted in Hyderabad, which is obviously an urban area. Homicidal strangulation deaths were common among the persons who were married (n=40; 67.8%) when compared with unmarried (n=12; 20.34%) and status was not known in 7 cases (11.86%). According to the educational status, the high numbers of cases were seen in illiterates (n=26; 44.08%). (Table 2) Based on the occupational status, maximum number of deaths were noticed among house maker (n=18; 30.52%). (Table 3) Most incidence occurred at house (n=57.63%). Remaining cases occurred at open field (n=18; 30.52%) and work place (n=7; 11.86%). Maximum deaths occurred on Friday (n=19, 32.19%). (Table 4) Incidence was common during night time (n=37; 62.71%) and in day time, 22 cases (37.29%) were reported.

Table 1: Distribution of study population according to age

S.No	Age	Number of cases	Frequency (%)
1	Below 1 Year	0	0
2	1-10 Years	3	5.09
3	11-20 Years	9	15.25
4	21-30 Years	21	35.59
5	31-40 Years	9	15.25
6	41-50 Years	8	13.57
7	51-60 Years	2	3.39
8	Above 60 Years	7	11.86
	Total	**59**	**100**

Table 2: Distribution of total homicidal deaths according to educational status

S. No.	Educational Status	Number of cases	Frequency (%)
1	School level	11	18.64
2	Intermediate level	8	13.56
3	Graduation and above level	7	11.86
4	Illiterate	26	44.08
5	Unknown	7	11.86
	Total	**59**	**100**

Table 3: Distribution of total homicidal deaths according to occupation

S. No.	Occupation	Number of cases	Frequency (%)
1	Student and unemployed	3	5.08
2	Employee in government and private sector	14	23.73
3	Home maker	18	30.52
4	Manual laborer	11	18.64
5	Self employed	13	22.03
	Total	**59**	**100**

Table 4: Distribution of total homicidal deaths according to day of occurrence

S. No.	Day of Incident Occurred	Number of cases	Frequency (%)
1	Monday	9	15.25
2	Tuesday	10	16.95
3	Wednesday	4	6.78
4	Thursday	3	5.08
5	Friday	19	32.19
6	Saturday	4	6.78
7	Sunday	10	16.95
	Total	**59**	**100%**

DISCUSSION

In present study strangulation deaths constituted 27.96% of all homicides, which was close to observations by other authors.[8,9,10] But it was in contrast with other studies which reported low incidence.[11-13] Similar to studies of Singh OG et al.,[10] Chaurasia N et al.,[14] Tirmizi SZ et al.,[15] Suffla S et al.,[16] Srivastava AK et al.,[17] Verma SK et al.,[18] Ghadge MR et al.,[19] Behera C et al.[20] and Singh A et al.,[21] the highest number of deaths in our case were recorded in the 21-30 years age group. This can be considered as this age group being most active and most exposed to external violent factors. But Tirmizi SZ et al.[15] reported more cases in

11-20 years age group. Most common victims, though by less variation were found to be male. Similar findings were noticed by Singh OG et al.,[10] Chaurasia N et al.,[14] Suffla S et al.,[16] Verma SK et al.,[18] Bakkannavar et al.[22] and Afridi HK et al.[23] But strangulation was common in female in study by Srivastava AK et al.,[17] Ghadge MR et al.,[19] Ma J et al.,[24] Behera C et al.[20] and Singh A et al.[21] Maximum deaths were noticed among Hindu religion as seen in study of Chaurasia N et al.[14] and Tirmizi SZ et al.[15] because of Hindu dominated population in India. Maximum number of deaths were noticed among low socio-economic status as noted by Tirmizi SZ et al.[15] In our study, major portion belonged to urban area as in study of Gargi J et al.,[25] but Singh OG et al.[10] reported deaths were more in rural area. The high deaths recorded in the urban area were due to the study being conducted in Hyderabad, which is obviously an urban area. Homicidal strangulation deaths were common among the persons who were married as in study of Singh OG et al.[10] But unmarried were the common victims in study of Tirmizi SZ et al.[15] Strangulation deaths were common in illiterates, which was in accordance with Singh OG et al.[10] Based on the occupational status, as observed by OG et al.,[10] maximum number of deaths were noticed among house maker. Most incidence in our study occurred at house as reported by Bakkannavar et al.[22] Maximum deaths occurred on Friday, but study of Suffla S et al.,[16] observed more deaths on Monday and weekends. Incidence was common during night time in our study but Singh OG et al.[10] and Suffla S et al.[16] reported more deaths during day time.

CONCLUSION

Homicidal strangulation deaths (n=59) were common in age group 21-30 years and females. Majority belonged to Hindu religion. Deaths were common in individuals who were married. Urban dwellers and low socio-economic status were commonly involved. Illiterates and home makers were common victims. Incidence were reported mostly at house and during night time.

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Declaration of **Conflicting Interests**

The authors declare that there is no conflict of interest.

Ethical Clearance: None required

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Relevance of Postmortem in Admitted and Expired Medico-Legal Cases a Retrospective Analysis

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ABSTRACT

A retrospective study was conducted at Department of Forensic Medicine & Toxicology, BIMS, Belagavi from 1st January 2016 to June 30th 2016, to determine that, was any added information obtained by conducting post-mortem in medico-legal cases of deaths which were admitted and cause of death established clinically. During the above said period, a total of 474 cases were autopsied out of which 176 cases (37.13%) were admitted and expired at BIMS hospital, Belagavi. Among 176 cases majority were deaths due to poison-54 cases followed by road traffic accidents-48 cases and burns-47 cases. Upon comparing the clinical data and post mortem findings it was concluded the cause of death opined at autopsy was very much the same as concluded clinically.

Keywords: *Post mortem, Clinical data, Cause of death.*

INTRODUCTION

Medico-legal autopsy examination is a special type of examination of a dead body to find out the cause and nature of death, examining all the body parts, all the organs, opening all the body cavities to corroborate with the evidence of eyewitnesses as per laws of land towards administration of justice and prosecution of guilty.[1]

The main objective of medico-legal autopsy is to find out the cause of death, identity of deceased, time since death, manner of death (in certain cases if possible) and collection of relevant specimens as per merit of case.[2]

The present study wants to usher in a new thought process about the relevance of conducting postmortem on those medico-legal cases which are admitted, thoroughly scrutinized clinically, diagnosis established and treated for the same. When such a medico-legal case(MLC) expires and the objectives of conducting medico-legal autopsy on such cases are met during the course of admission, then subjecting such a dead body for postmortem (PM),will it enhance the information of data pool or will it be a mere formality.

Upon conducting inquest, if the investigating officer & panchas are convinced about cause of death and no foul play is suspected, they may release the dead body to relatives of deceased for disposal.[3]

Are the investigating officers franchising this power invested to them or do they allow the age old formality, that all medico-legal deaths should be autopsied to rule, in the pretext that they don't want to take any 'risk' is debatable.

Even before an autopsy, when most of the important objectives are met/known before-hand, 'it is not at all necessary for the autopsy surgeon to open all the cavities in the body of deceased, where the cause of death is otherwise ascertained.'[4]

Can the forensic experts do away with autopsies in such cases as mentioned above-again is debatable.

The present study points out what added information was obtained (if at all any) by conducting postmortem in such medico-legal cases of deaths which were admitted and cause of death was established clinically.

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MATERIALS AND METHOD

It is a retrospective study conducted on medico-legal cases which were admitted to BIMS hospital, Belagavi, expired after certain period of admission and were subjected to medico-legal autopsy performed by Department of Forensic Medicine, BIMS, Belagavi, during the period of January 1st 2016 to June 30th 2016.

Inclusion Criteria: All such cases, irrespective of sex and age were included.

Exclusion Criteria: The cases which at the time of admission were made as MLC & after death were converted into non-MLC & thus not subjected for PM were excluded.

The data regarding nature of injury and cause of death were obtained from clinical case sheets and were correlated with PM findings noted in PM reports and also parallely with cause of death mentioned by the IO in requisition forms (No 146 (2)-dead body challan).

OBSERVATION AND RESULTS

1) A total of 474 cases were autopsied from January 1st 2016 To June 30th 2016 at Department of Forensic Medicine, BIMS, Belagavi.

2) Out of 474 cases,176 cases (37.13%) were admitted and expired at BIMS hospital, Belagavi.

3) Among 176 cases, death due to poison constituted the majority with 54 cases (30.7%) followed by Road traffic accidents (RTA)-48 cases (27.3%) and burns-47 cases (26.7%).

4)23 cases (13.1%) out of 176, were brought to casualty in a state of unconsciousness and thus by default were made MLC.

5)2 cases (1.14%) of railway accident and 1 case of hanging and electrocution, totally completing the tally of 176 cases.

TABLE 1: NO OF ADMITTED CASES WHICH WERE AUTOPSIED DURING THE STUDY PERIOD

PERIOD	NO OF AUTOPSIED CASES	NO OF ADMITTED CASES AT BIMS
JAN 01 2016 TO JUNE 30 2016	474	176

TABLE 2:PROFILE OF ADMITTED AND EXPIRED CASES WHICH WERE AUTOPSIED

TYPE OF CASES	NO OF CASES
POISONING	54
RTA	48
BURNS	47
OTHERS	23
RAILWAYS	2
HANGING & ELECTROCUTION	2
TOTAL	**176**

TABLE 3: PROFILE OF POISONING CASES AUTOPSIED

TYPE OF POISONING	NO OF CASES
OP/OC/CARBAMATES	51
SNAKE BITE	3
TOTAL	**54**

TABLE 4: PROFILE OF ROAD TRAFFIC ACCIDENT CASES AUTOPSIED

CAUSE OF DEATH IN ROAD TRAFFIC ACCIDENT	NO OF CASES
HEAD INJURY	36
MULTI ORGAN INJURY	10
PULMONARY EMBOLISM	2
TOTAL	**48**

TABLE 5: PROFILE OF AUTOPSIED CASES BROUGHT TO CASUALTY IN A STATE OF UNCONSCIOUSNESS

CAUSE OF DEATH IN CASES WHICH WAS BROUGHT UNCONSCIOUS	NO OF CASES
ACUTE MYOCARDIAL INFARCT	6
HYPERTENSIVE BLEED	3
COMPLICATION OF DIABETES MELLITUS	5
STARVATION,HYPOTHERMIA,CHRONIC DEBILIATING DISEASES	9
TOTAL	**23**

DISCUSSION

1) In 54 cases of poisoning, 51 cases were of organophosphorus (OP), organochlorides (OC) & carbamate poisoning and 3 cases were of death due to snake bite. All 54 cases were clinically diagnosed, treated accordingly and cause of death was furnished by clinicians. During autopsy in these 54 cases, no external injuries were noted, except for fang-marks in 3cases of snake bite (1 of 3 with intense local reaction); and Forensic Science Laboratory (FSL) reports revealed OP/ OC/carbamates in 36 out of 51 cases. In 15 cases where FSL report was negative for any poison & in cases of deaths due to snake bite, cause of death was furnished based on clinical analysis.

Thus there was no dispute in cause of death between clinical diagnosis and at autopsy. The manner of death (suicide/homicide/accident) could not be commented at autopsy or neither was demanded by IO.

Among 51 cases of poisoning (excluding 3 cases of snake bite) 22 were females and 7 among those 22 were in the category of less than 7 years of marriage. For those 7 cases dying declaration was obtained by magistrate & inquest was done by same. 2 out of 7 were booked U/S 304(B) IPC.

However cause of death furnished at autopsy and by clinicians do correlate in all the cases of poisoning.

2) Among 48 cases of death due to RTA, 36 deaths were due to head injury,10 cases were due to multi organ injury & 2 cases due to pulmonary embolism. Head injury was clinically diagnosed and confirmed by CT scan, multi organ injury (injury to liver, spleen, brain and crush injury of limbs) was confirmed by Ultrasonogram & CT and accordingly cause of death was furnished clinically. At autopsy the findings of head injury and multi organ injury correlated with clinical findings and cause of death was not disputed from clinical analysis. Pulmonary embolism was clinically diagnosed and at postmortem was confirmed by histopathological examination.

3) Among 47 cases of burns,30 were female. Among 30 female cases, 12 were in the category of less than 7years after marriage for which dying declaration was obtained by magistrate and inquest conducted by same. 2 cases among those 12 cases were booked U/S 304(B) IPC. As for as cause of death & extent of burns is concerned, in all cases of burns the cause of death was clinically evaluated as hypovolaemic shock or septicaemia & was in correlation with cause of death furnished at autopsy. Variation of +/-5% was noted with respect to percentage of burnt area.

4) Out of 23 cases which were brought to casualty in a state of unconsciousness, 9 were unknown and remain till date as unknown and external appearance suggested of being beggars, where clinical cause of death (starvation ,hypothermia, chronic debilitating disease) did correlate with postmortem findings.

Among rest of 14 cases, 6 were Acute Myocardial Infarction, 3 hypertensive bleed in brain and 5 were complications of Diabetes Mellitus-the cause of death which did not change after autopsy.

CONCLUSION

Putting into perspective all the above discussed data, the primary intention of the study is to throw light on the fact that, in admitted medico-legal cases which are clinically evaluated and cause of death established, when they were subjected to medico-legal autopsy, the findings and cause of death concluded at autopsy was very much the same as concluded clinically.

The manner of death as to whether suicide/homicide/ accidental could never be opined in admitted cases of poisoning and burns by an autopsy surgeon.

Thus when it is a known and established fact that death was due to poison/burns/RTA by thorough clinical evaluation, what more information could be provided in these cases by subjecting them to autopsy was the contention in this study.

By analysing the above data, it was noted in the present study that postmortem in such cases does not provide anything more other than emphasizing the already known clinical facts. Even in those cases which were booked U/S 304(B) or 302IPC, the cause of death determined clinically and at postmortem are same and at autopsy, manner could not be opined and dying declaration by victim nails/hints at who's the culprit.

Thus assimilating all these, the present study questions:

a) The relevance of conducting autopsy in such cases.

b) By doing away with postmortem in such cases can the extreme agony of the attenders of deceased be reduced to an extent.

c) Can the burden of forensic experts, particularly in government medical colleges, be reduced to some extent and allow them to concentrate more on relevant cases.

With the present MCI staff requirement status, wherein for 150 Under graduate (UG) admissions, 3 staffs (1Prof, 1Asso, 1Asst) are sufficient in Forensic Medicine, taking an example of the college where the present study was done, conducting about 1000 postmortems/year, attending courts, performing exhumations and expert opinion of 3 districts and also looking into the academic activity of UG & PG by only 3 staff, surely strains the quality.

In the light of all these facts, it's the opinion of authors that such studies be conducted across the country and if it is evident that doing away with postmortem in such admitted medico-legal cases, does help the deceased attenders, decreases the unnecessary police and judiciary procedures and reduces the burden of forensic experts, than the same shall be put forth as a suggestion to the decision making authorities.

It's heartening to know that an initiative in this regard was taken up by Superintendent of Police of Wardha district of Maharashtra, wherein it was decided that postmortem was not needed for every case of death and as per legal provisions, there is no need to do a postmortem to know the cause of death in most cases. This initiative was well appreciated by the experts who said that this will not only save invaluable time of police and doctors but also prevent mental trauma of the attenders of the deceased.[5]

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Conflict of Interest : Nil

Ethical Clearance : Not applicable as it is only statistical analysis.

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Trends in the Rheological Characteristics of the Axial System of a Person - Depending on Age

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ABSTRACT

Background: The article describes the measuring technique for the passage of mechanical waves through the human axial system (AS) using the vibration analysis. Furthermore, by using the FFT (Fast Fourier Transformation) and other mathematical techniques, the human AS rheological characteristics selected are obtained in relation to aging. The aging process has to be seen in the context of the organism stress history, thus, with regard to the intensity of work, sport or/and health burdens. The lifestyle is thus reflected on the state of the body, organs and tissues themselves.

One of the ways to objectify these changes is to detect the mechanical properties of the pertinent body structures. In the case of the axial system of a person, the assessment of its basic rheological parameters (Young's modulus of elasticity E and viscosity μ) is to be dealt with.

The question is whether a trend in human population, according to which the selected mechanical descriptors, depending on the age changes, can be traced, in spite of their unspecified physical stress history.

The objective of this case study is based on the use of the methods TVS (Vibration Transfer through Spine) to trace the effects of aging on the mechanical response of the axial system (AS) man.

Keywords: *axial system, TVS method, damp characteristics, biomechanics*

INTRODUCTION

The aging process is to be seen in the broader context of a long-term process of change at all levels, from cellular to the organ systems of the body. According to Dylevsky 2009 & Dylevsky, Trojan 1990 the body aging process is not clearly defined, but only as a concept of its property changes - loss of physical and mental strengths, slowing biological and metabolic processes in the body, changes in all organ systems including the external manifestations of, e.g., rheological changes of the skin, hair graying, reduction of the function of analyzers and the immune system, or the like. There are many factors that have an impact on the biological length and quality of life (genetics, lifestyle, work and physical load or pharmacological load etc.). Generally, many people see the possibility of life extending by physical activity.

Professional studies, however, this supposition has not been confirmed. On the other hand, it must be admitted that physical exercise prolongs the active part of life. The question remains whether good physical condition allows to go in for sports or regular exercises keep the body in good shape[8].

The most exposed and stressed part of the body is the axial system that ensures its load-bearing, protective and driving function[3,4]. The body growth leads to many changes around the axial system due to developmental and nutritional changes and the influence of different nature loading. This are, e.g., degenerative

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change processes of soft tissues (ligaments, muscles, cartilages, changing the height and concavity index of the intervertebral discs - IVD, etc.). The IVD degenerate much sooner than other musculoskeletal tissues. The first definite signs of degenerative changes in the lumbar intervertebral plates are seen in the age group of 11 to 16 years[2]. About 20% of people aged fewer than 19 has intervertebral plates with small signs of degeneration. This rapidly increases with age, especially in men, and such that approximately 10% of fifty and 60% of seventy-aged persons have the IVD strongly degenerated[7]. The IVD is a complex joint which can carry the load while ensuring the flexibility of the spine[1].

The biomechanical functions of the articulations between IVD depend on the interaction between components IVD and consists in the transmission of the pressure and shear loads, respectively, from the nucleus (nucleus pulposus NP) to lamellar ring (annulus fibrosus) and the cartilaginous ends disc (Endplates)[1]. The NP core is extremely deformable and deformation of 12.5% is not uncommon under physiological conditions. It has been proven that the core NP contributes largely (18-36% in cattle) on the IVD damping capacity. Quantification of the damping properties of nuclei at high physiological deformations is then a key aspect for its mechanical characteristics and structural design of compensation IVD[11-16].

The objective of our case study is to show that there exists a method that can quantify the AS rheological properties (damping, viscosity, elasticity, etc.) by a non-invasive way. The experimentally obtained data can then be used for further mathematical operations serving for the evaluation and documentation, e.g. their dependence on age. In this study, we assumed that the AS viscosity and elasticity of men shall be inversely correlated with their biological age.

MEASUREMENT METHODOLOGY

This paper arouse as a case study tracking changes in the selected parameters of mechanical properties of men in relation to their age. The data detection was carried out using the TVS method - Vibration Transfer through Spine *see in Figure 1*., which is based on the ability of substances to transmit power pulsations that propagate through tissue by pressure pulsations. The pressure pulsations are generated in the tissue corresponding to the density variations of mechanical energy. This mechanical energy is transmitted through the tissues and, due to their viscoelastic properties, is partially absorbed (elastic deformation) and partially, due to their viscosity, damped. The wave transmission speed (its strength pulse) and change in its amplitude (its drop) are associated with the tissue parameters that are relevant to the transmission of mechanical energy, i.e., elastic modulus (E), viscosity (μ) and plasticity, respectively[5,6].

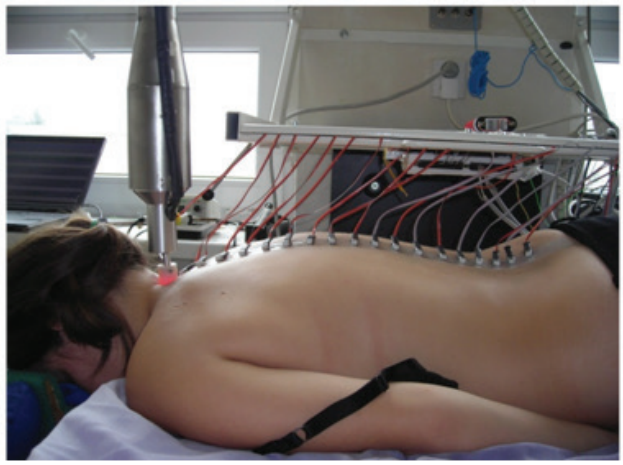


Fig. 1. The data detection by method TVS – Transfer Vibration through Spine

The group explored consisted of 8 women aged 21-71 and 7 men aged 24-71 years, unstressed by any sports activity. The females average body height was of 167.5 cm (SD 5.2) and weight of 65 kg (SD 4.6), the men average body height of 175 cm (SD 4.4) and weight of 88 kg (SD 10.7).

The said physical parameters were required for the approximate determination of the length of the AS reference segment, which is needed for calculating certain rheological parameters and, e.g., Young‘s modulus E. On the basis of the detected data, the Spearman‘s rank correlation coefficient (ρ) was used to evaluate the trend dependences on age of the rheological parameters - (E) and (μ),*(see in Table 1. and Table 2.)*

DATA ANALYSIS

The data are measured using a 16-bit converter at a sampling rate of 1024 samples per second. The measured data are: the acceleration and force on the vibrator to excite the vertebra, and then one-component of the acceleration on the vertebrae of C7, Th_1-T_{12}, L_1-L_5 (L_6), S_1. (The L_6 vertebra only, if it at the examined person exists, i.e., which is about 4% of the population) *(Figure 1.)*.

Since we are only engaged in the transfer of frequency excited, there is always selected, from the FFT (Fast Fourier Transformation) data analysis, only the frequency component corresponding to the frequency just excited. Due to the stiffness of the spine, it is necessary to take into account the signal delay between the driving point and the vertebrae analyzed. As already stated, only the just excited frequency of the given position is taken from the signal. The signal Y (t) is therefore always multiplied by a function of sin (ω_i) and cos (ω_i), and is integrated over the entire period, *see equation 1.2*.

$$S_i(t) = \int_{\tau=0}^{T} Y_i(t+\tau)\sin(\omega(t)t+\tau)\,d\tau \quad (1)$$

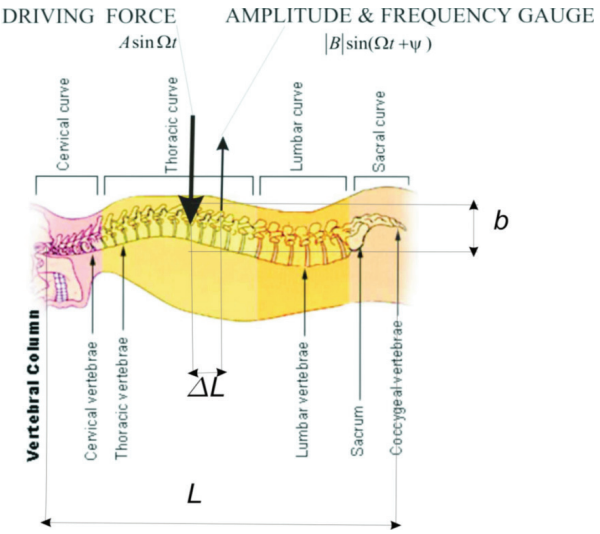
$$C_i(t) = \int_{\tau=0}^{T} Y_i(t+\tau)\cos(\omega(t)t+\tau)\,d\tau \quad (2)$$

where *i* is the order of the vertebra measured, *T* is the period just in the i-th vertebra,ω(t)is the angular frequency just being excited. From the solutions of these equations follows the $A_i(t)$ values and the $\varphi_i(t)$ phase of the excited signal, which is transferred to the currently computed vertebra, see equation (3.4).

$$A_i(t) = \frac{1}{2\pi}\sqrt{S_i^2(t)+C_i^2(t)} \quad (3)$$

$$\varphi_i(t) = arctan\left(\frac{S_i(t)}{C_i(t)}\right) \quad (4)$$

Fig. mea **axial system response**



Note: ***b[m]*** *- characteristic thickness dimension of the spinal corset (vertebral column, including muscle and ligament corset)*

L[m] *- length of the axial system considered*

Consider the transverse oscillations of the spine, *see Fig. 3*, and that the both ends of the rod, which represents a model of the spine *y = 0, y = L,* are fixed. This means that the wavelength of the basic mode (the first model) is $l_y = 2L$ and the wavelength of the second mode (the second harmonic mode) is $l_y = L$. Then the corresponding wave vector is $k_y = 2\pi/2L$ *and* $k_y = 2\pi/L$, respectively. The basic frequency is equal to (5):

$$\omega = 2\pi f = \left(\frac{n\pi}{L}\right)^2\sqrt{\frac{Eb^2}{12\rho}-\frac{\mu^2}{4\rho^2}},\quad \text{pro } n=1,2,3,\ldots,\ f\ [\text{Hz}] \quad (5)$$

where *b* [m] is the characteristic dimension of the spinal corset thickness (i.e., the spine, including its muscles and ligaments,*see Fig. 2*. The density and viscosity of segment measured range in the interval: ρ□ (1000,1500) [kg.m^{-3}] and μ□ (70,150) [Pa.s]. From this relation, we find the quantitycharacterizing the spinal corset elastic properties

$$\sqrt{\frac{Eb^2}{\rho}-\frac{3\mu^2}{\rho^2}} = 2,2f\left(\frac{L}{n}\right)^2 \quad \left[\frac{\text{m}^2}{\text{s}}\right] \quad (6)$$

This quantity can be directly determined through the vibration analysis, *see Fig. 3*. The physical size of this quantity is the kinematic viscosity, i.e., μ/ρ [m^2.s^{-1}]. If the spine viscosity is so great that it completely suppresses the proliferation of disorders (the disorder propagation speeds are proportional to $[(E/\rho)]^{-1}$), then the equation right side is also very small, *see Figure 3.*

Analogously, from the relationship

$$\exp\left(\frac{\omega_{im}k_y\Delta L}{\omega}\right) = \exp\left[-\left(\frac{\pi}{4}\right)^2\frac{\mu}{\rho f}\frac{\Delta L}{L^3}\right] \quad (7)$$

the attenuation of disorders is assessed in the ΔL distance, i.e., at the transducer distance from the excitation element, *see Figure 2*. This term describes the attenuation of the excitation disorders and characterizes the viscous properties of the spinal corset.

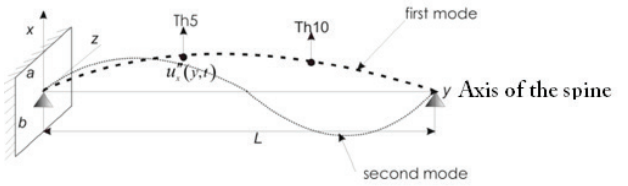


Figure 3. Interpretation on the model when transverse spinal vibrations are transmitted

The data analysis above is based on a published methodology [5, 6]. We assumed that the spine, as a whole, behaves like a damped oscillator having a natural frequency ω_p. External harmonic excitation generator, with the Ω frequency applied to the vertebra C_7, evokes a response of the entire AS, which will depend on the elasticity of intervertebral discs and surrounding connective tissues and the ability of intervertebral disc (IVD) and surrounding ligaments and muscles to damp these vibrations. This ability characterizes the damping coefficient *b*. The assessment of the damping coefficient *b* by means of size - the amplitude - at the resonant frequency at the specific vertebrae is given by

(8)

$$y = a\, e^{-bx}$$

Data analysis was based on the AS detection response to the excitation signal. At the dorsal-ventral side of the vertebrae (spinous promontories of Th_1-Th_{10}), the acceleration amplitude was detected as a one-component response to a driving signal to C_7 (*see in Figure 1.*). To prevent adaptive changes, due to the organism neuro-motoric responses to the spine mechanical conditions[10], the excitation of the periodically increasing and decreasing frequencies (from 5-180 Hz and vice versa), were applied. The entire recording cycle took 3 x 3 minutes, i.e., there were 3 pairs of increasing and decreasing excitation frequencies recorded.

When exciting one of the vertebrae, e.g. C_7, and using the variable frequency Ω, it can be assessed that at a certain frequency is the spine response stronger, at both the excited vertebrae and the vertebrae in the vicinity. We assumed, that this amplified frequency, matches the frequency of resonance (ω_r). Since the frequency of resonance depends on the material characteristics of the spine and its surroundings, it is possible to assess the Young's modulus *E* [Pa] and a viscosity μ [Pa.s], from the vertebral length, height and cross-section, respectively. For the calculation of Young modulus of elasticity *E* [Pa], we used the relationship as follow

(9)

$$E = \frac{4\rho}{R^2} \cdot \left(\frac{\omega_r^2}{2\pi} \cdot \lambda^4 + \frac{\mu^2}{4\rho^2}\right)$$

where ρ – density of 1000 [kg.m^{-3}], *R* – vertebra cross section [m^2], ω_r – frequency of resonance [s^{-1}], λ - wavelength of oscillation [m]

The viscosity (μ) calculation was performed, using mathematical operations, for the tissue density[ρ = 1000 kg.m^{-3}] and the frequency of resonanceω_r , so that

(10)

$$\mu = -\frac{2\rho\omega_r\,(l_2 + l_3)^3}{(2\pi)^3\, l_2} \cdot -b$$

where μ – the tissue viscosity between the individualvertebrae sections (it can be assumed that this viscosity expresses the IVD viscous properties between the vertebrae TH_1- Th_2, Th_2 - Th_3 etc. [Pa.s]), π – constant, ρ – density 1000 [kg.m^{-3}],*b* –damping coefficient.

To evaluate the individual vertebrae responses at the pertinentfrequencies, there was a special software developed and used, by which the waveforms were reconstructed for all the AS responses on the excitation signal, using the Fourrier transformation and the resonant frequency and damping coefficients for the selected section Th_1 –Th_{10}.

EVALUATION OF RESULTS MEASURED

The parameters, important for the evaluation of results, are *shown in Table 1*. To assess the dependence, the Spearman coefficient of rank dependence (ρ) was used, showing the trends of the monitored dependent rheological parameters axial system of age.

Table 1. The file characteristics and the identifiers of AS rheological properties

M	**Number**	**Age**	**BW**	**BH**	**Th_1-Th_{10}**	**RF**	**DRF**	**Damping**	**μ**	**E**
F		(years)	(kg)	(cm)	(m)	(Hz)	(Hz)		(Pa s)	(GPa)
M	1	24	93	177	0.036	43.84	0.50	0.21	0.77	27.411
M	2	32	110	178	0.036	42.71	0.97	0.44	1.54	26.602
M	3	36	80.1	180	0.036	44.83	0.33	0.22	0.84	30.658
M	4	53	81.9	178	0.036	54.95	0.88	0.08	0.35	44.05
M	5	59	74.4	174	0.035	56.98	0.51	0.16	0.72	43.249
M	6	64	90	166	0.033	44.76	0.65	0.24	0.77	22.108
M	7	71	86	172	0.035	46.90	0.48	0.17	0.63	27.975
average			88	175					0.80	31.722
SD			10.7	4.4					0.34	7.904
F	1	21	63	160	0.032	73.38	1.00	0.236	1.16	51.274
F	2	32	72.5	173	0.035	77.67	1.14	0.216	1.31	78.524
F	3	36	57.4	174	0.035	60.58	1.23	0.293	1.40	48.879
F	4	42	61	170	0.034	46.40	0.33	0.414	1.45	26.131
F	5	59	67.5	171	0.034	59.95	1.36	0.203	0.93	44.659
F	6	63	66.3	168	0.034	45.03	1.44	0.213	0.71	23.474
F	7	71	68	171	0.034	34.60	0.57	0.206	0.53	14.046
F	8	69	66.5	168	0.034	53.50	0.88	0.094	0.37	33.581
average			65	169.3					0.98	40.071
SD			4.6	4.1					0.39	19.01

Legend: *M – male, F – female, BW – body weight, BH – body height, Th_1 –Th_{10} – length of the spinal segmentreporting, RF – rezonant frequency,* μ *- viscosity, E - elasticity*

A statistically significant parameter is that of the decreasing trend in the AS viscosity (depending on the age) in: women (ρ= - 0.76) and mixed group of men and women (ρ= - 0.67).

The highlighted results (*see Table 2 and Figure 4*) are statistically significant at the level of α= 0.05.

Table 2. Calculation of Spearman's rank correlation coefficient

correlation (N m= 7, N f = 8))					**correlation (N m+f = 15)**				
rank age	**rank μ**	**diff. μ**	**rank E**	**diff. E**	**rank age**	**rank μ**	**diff. μ**	**rank E**	**diff. E**
1	4	-3	3	-2	2	7	-5	6	-4
2	7	-5	2	0	3	15	-12	5	-2
3	6	-3	5	-2	6	9	-3	8	-2
4	1	3	7	-3	8	1	7	11	-3
5	3	2	6	-1	9	6	3	10	-1

Cont... **Table 2. Calculation of Spearman's rank correlation coefficient**

6	5	1	1	5	12	8	4	2	10
7	2	5	4	3	14	4	10	7	7
ρ(μ)	-0.46		ρkrit(0.05)	0.79					
ρ (E)	0.07		ρkrit(0.1)	0.71					
1	5	-4	7	-6	1	11	-10	14	-13
2	6	-4	8	-6	4	12	-8	15	-11
3	7	-4	6	-3	5	13	-8	13	-8
4	8	-4	3	1	7	14	-7	4	3
5	4	1	5	0	10	10	0	12	-2
6	3	3	2	4	11	5	6	3	8
7	2	5	1	6	13	3	10	1	12
8	1	7	4	4	15	2	13	9	6
ρ(μ)	-0.76		ρkrit(0.05)	0.74	ρ(μ)	-0.67		ρkrit (0.05)	0.52
ρ (E)	-0.79		ρkrit(0.1)	0.64	ρ (E)	-0.42		ρkrit (0.1)	0.45

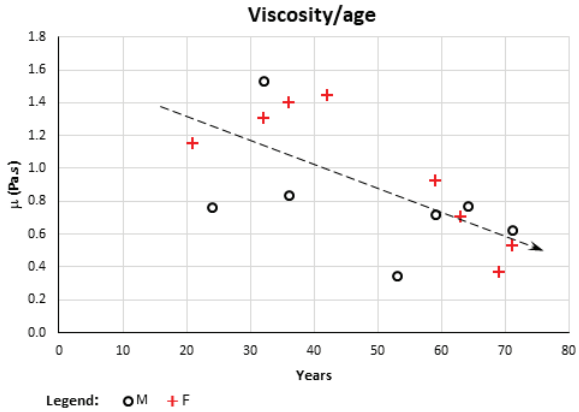


Figure 4.Trend of viscosity depending on age

In terms of the Young's modulus of elasticity, no conclusive trend in the AS dependence on the age was observed. The dashed line (*see Figure 5*) indicates the trend effect that is set for this small statistically insignificant.

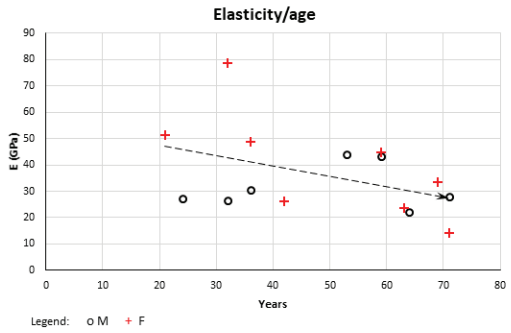


Figure 5. Trend of elasticity depending on age

Based on the results obtained, the following hypotheses can be expressed. The first, the viscosity of the axial system in humans correlates with a biological age and this in reverse proportion. The second, a Young's modulus of elasticity, at a specific person, is influenced rather by his/her physical stress history and genetic factors than by his/her age, and therefore, it does not correlate on a statistically significant level.

This case study supports the idea that the changes in the biomechanical properties of the musculoskeletal system are significantly reflected in the viscous component than in the elastic one. The results indicate that with increasing age the value of the viscous component of the axial system decreases. This supports the idea that the axial system loses with age its ability to damp vibrations. Nevertheless, the assessment of changes in the axial system must be in this moment of knowledge strictly intra-individual.

DISCUSSION AND CONCLUSION

This case study suggest that the assessment of elasticity and viscosity will be burdened with a high variability. The age is only one of many factors that influence (physicalstress history, pathology, musculoskeletal etc.). At the viscosity, it can be assumed its dependence on age and that in the negative trend. At the elasticity, it is not possible to make a definite conclusion. Elasticity of the spine does not depend on age.

The study results support the idea that changes in the biomechanical properties of the musculoskeletal system is more significantly reflected in the viscous component than in the elastic one. Although from the case study follows that the generalized views on the problem cannot be made, the case study results indicate that the value of the AS viscous components decreases with increasing age. Therefore, we can assume that the axial system loses with age its ability to damp vibrations, which can be, to a certain similarity, compared to the worn out wheel shock absorbers at cars.

Based on this study, we will build further study on this accented biomedical problem – the aging axial system of humans. The TVS method will be used and further developed to study the human AS rheological properties and responses on both the frequency and impact stresses in various motion modes and various environmental conditions. Further studies are expected to be carried out on file of probands large enough to allow the results assessed to be statistically confirmed or refuted.

Conflict of Interest - We have no conflict of interest. There is no problem with ethics committee in this manuscript.

Ethical Clearance - Taken from International Committee of Medical Journal Editors.

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Comparison of Behavioral Abnormalities of Male and Female Students

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ABSTRACT

Behavioral abnormalities are defined as the amount of person's behavioral incompatibility with social values. Since students are considered as the future capital of all societies, their behavioral health should be considered. This study sought to compare the behavioral abnormalities of students in Markazi and Hamedan provinces. The present study was applied in terms of purpose and was a combination of survey and causal-comparative methods in terms of implementation. The statistical population consisted of all students of elementary and secondary schools of urban state schools in Markazi and Hamedan in the academic year of 2015-16. Out of each province, 410 students were selected by random sampling. Data were collected using a standard questionnaire form Aachen Bach TRF and YSR. T-test with independent groups was used to analyze the field data. The results showed the syndromes that were more dominant in girls compared to the boys: anxiety and depression, physical complaints, attention problems and internalization. In other cases, behavioral abnormalities such as depression and withdrawal, social problems, thinking problems, behavioral abusive behavior, exaggerated behavior and extraversion, were more dominant in the boys compared to the girls. Therefore, behavioral abnormalities are different in terms of sex.

Keywords: *Behavioral Abnormalities, Sex, Students*

INTRODUCTION

Behavioral abnormalities in social psychology have always been considered as one of the key concepts. Many researchers have used this concept and its subset as variables that can be studied in time periods[1]. According to the American Psychiatric Association, behavioral abnormalities are a behavioral pattern in which one has disrupted social norms or other basic laws of society [2].

On the other hand, students are part of a community who are studying under the supervision of an educational system. The mechanisms in the educational system always seek to provide material and spiritual conditions for their physical, emotional and intellectual development. Therefore, the educational system as well as the families as the beneficiaries of the education system's outputs expect the competent, disciplined, adaptable graduates who respect the ethical issues. Therefore, they seek to compensate for the deficiencies in order to meet their expectations [3]. Ortuno-Sierra[4] reported emotional behavioral disorders in boys more than girls. Abdulrahman[5] studied the behavioral abnormalities of elementary school students in Saudi Arabia and showed that behavioral abnormalities have been observed in boys more than girls. Wendy[6] acknowledged that an analysis of the emotional-behavioral problems of children examined in family, school and classroom showed that emotional-behavioral problems of boys are more than girls. Stoutjedijk[7] indicated that if educational factors correctly control students' behavioral disorders,

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they will reduce and control these disorders. Special care, emotional attachment, sympathetic behavior, appropriate activities for students with behavioral disorders have a positive effect on the improvement of these disorders. Lotata[8] concluded that environmental factors such as educational and regional (urban) factors can affect students' behavior. In addition to the physical environment, the social environment also has different effects on the citizens' behavior in different climates. Kahzadi[9] and Kordzanganeh[10], demonstrated that abnormal behaviors in male students were more than girls. Students with inferior friends have been more exposed to abnormal behaviors. The lack of familial control, paternal weakness and academic failure are other causes of students' abnormal behavior.

In the Markazi province, the prevalence of behavioral disorders among high school female students is reported to be between 5% and 15% in a variety of behavioral disorders[9]. However, the current prevalence of behavioral disorders among students in the Markazi province in the last five years is unclear due to the lack of regular and scholarly studies. The same vacuum exists in Hamedan province and is the motivation for doing the present research. The development of the behavioral abnormalities atlas can be used to perform clinical intervention measures. So, the basic question is: what are the differences between behavioral abnormalities of male and female students? The results of this study will help planners in education, law enforcement force, welfare and other relevant organizations.

MATERIALS AND METHOD

The present study was applied in terms of purpose and was a combination of survey and causal-comparative methods in terms of implementation. The statistical population consisted of all 366369 students of elementary and secondary schools of urban state schools in Markazi and Hamedan in the academic year of 2015-16 of whom 820 students (each province: 410) were selected by random sampling using Cochran formula. Data were collected using the Aachen Bach questionnaire that has been approved as a normalized standard in Iran. Validity and reliability of the questionnaire have been reported based on Cronbach's alpha in the student's form 0.97 and in the teacher's form 0.49. The questionnaire for elementary students was completed by teachers in the form of altmetrics and the questionnaire of high school students was completed in a self-assessment. The data were analyzed using the indices of descriptive statistics and Z and T standard scores, which are predicted according to the Aachen Bach questionnaire. T-test with two independent groups was used to determine the significance of these differences. It is worth noting that all data processing steps were analyzed using SPSS software.

FINDINGS

The results showed that out of a total of 820 subjects, 400 were girls and 420 were boys. In terms of age, 470 students were 7 to 13 years old and 350 were 13 to 19 years old.

Research hypothesis: Behavioral abnormalities of male students are more than female students.

Table 1: Independent t test to compare behavioral disorders among male and female students

Anxiety/ Depression						
	Mean	**Number**	**SD**	**t**	**df**	**Sig**
Female	59.55	400	15.14	9.966	818	0.000
Male	50.70	420	9.86			
Withdrawal/ Depression						
Female	53.93	400	11.16	-0.251	818	0.802
Male	54.13	420	12.07			
Physical complaints						
Female	54.33	400	13.21	3.884	818	0.000
Male	51.12	420	10.30			
Social problems						
Female	50.30	400	10.57	-10.053	818	0.000
Male	59.09	420	14.13			

Cont... **Table 1: Independent t test to compare behavioral disorders among male and female students**

Thinking problems						
Female	49.75	400	10.24	-4.632	818	0.000
Male	53.36	420	11.96			
Attention problems						
Female	58.64	400	14.17	9.915	818	0.000
Male	50.16	420	10.06			
Lawlessness problems						
Female	50.23	400	10.37	-6.003	818	0.000
Male	55.45	420	13.41			
Aggressive problems						
Female	50.30	400	10.37	-6.138	818	0.000
Male	55.45	420	13.40			
Other problems						
Female	49.37	400	10.08	-1.265	818	0.206
Male	50.27	420	10.36			
Internalization						
Female	55.94	400	11.35	5.567	818	0.000
Male	51.99	420	8.87			
Externalization						
Female	50.26	400	9.81	-6.321	818	0.000
Male	55.38	420	13.04			
Total/ general problems						
Female	52.38	400	9.48	-1.50	818	0.134
Male	53.37	420	0.58			

As shown in Table 1, the mean of anxiety and depression among female students is 59.55 and among male students is 50.70. Therefore, it seems that anxiety and depression are more common among female students. On the other hand, the value of the test is t = 9.966 and sig = 0.000 < 0.01. Therefore, the anxiety and depression as the behavioral abnormalities among female students is more than that of the male students. According to Table 1, the mean of withdrawal and depression among female students is 53.93 and among male students is 54.13. On the other hand, the value of the test was t= -0.251 and sig = 0.802 > <0.01. Thus, there was no significant difference in terms of withdrawal and depression among male and female students.

As shown in Table 1, the mean of physical complaints among female students is 54.33 and among male students is 51.12. Therefore, it seems that physical complaints are more common among female students. On the other hand, the value of the test is t = 3.884 and sig = 0.000 < 0.01. Therefore, the physical complaints as the behavioral abnormalities among female students is more than that of the male students. According to Table 1, the mean of physical complaints among female students is 50.30 and among male students is 59.09. On the other hand, the value of the test was t= -10.053 and sig = 0.000 <0.01. Thus, there was physical complaints is more common among the girls than boys.

As shown in Table 1, the mean of thinking problems among female students is 49.75 and among male students is 53.36. Therefore, it seems that thinking problems are more common among male students. On the other hand, the value of the test is t = -4.632 and sig = 0.000 < 0.01. Therefore, the thinking problems as the behavioral abnormalities among male students is more than that of the female students. According to Table 1, the mean of thinking problems among female students is 58.64 and among male students is 50.16; thus, thinking problems are more common in girls than boys. On the other hand, the value of the test was t= 9.915 and sig = 0.000 < <0.01. Thus, attention problems are more common among female students than male students.

As shown in Table 1, the mean of lawlessness among female students is 50.23 and among male students is 55.45. Therefore, it seems that lawlessness are more common among male students. On the other hand, the value of the test is t = -6.003 and sig = 0.000 < 0.01. Therefore, the lawlessness as a behavioral abnormality among male students is more than that of the female students.

According to Table 1, the mean of aggression among female students is 50.30 and among male students is 55.45; thus, aggressive behavior are more common in boys than girls. On the other hand, the value of the test was t= -6.138 and sig = 0.000 < <0.01. Thus, aggressive behavior are more common among male students than female students.

As shown in Table 1, the mean of other problems among female students is 49.37 and among male students is 50.27. On the other hand, the value of the test is t = -1.265 and sig = 0.206 > 0.01. Therefore, there is no significant difference in terms of other problems among male and female students. According to Table 1, the mean of internalization among female students is 55.94 and among male students is 51.99; thus, internalization are more common in girls than boys. On the other hand, the value of the test was t= 5.567 and sig = 0.000 < <0.01. Thus, internalization are more common among female students than male students. According to Table 1, the mean of externalization among female students is 50.26 and among male students is 55.38; thus, externalization are more common in girls than boys. On the other hand, the value of the test was t= -6.321 and sig = 0.000 < <0.01. Thus, externalization are more common among male students than female students.

As shown in Table 1, the mean of total/general problems among female students is 52.38 and among male students is 53.37. On the other hand, the value of the test is t = -1.50 and sig = 0.134 > 0.01. Therefore, there is no significant difference in terms of total/general problems among male and female students.

DISCUSSION AND CONCLUSION

In order to test the research hypothesis, mean scores of behavioral abnormalities in boys and girls were compared by independent t-test. These comparisons were evaluated in terms of anxiety and depression, withdrawal, physical complaints, social problems, thinking problems, attention problems, aggressive behavior, internalization, and extraversion and total/general problems. There was a significant difference between male and female behavioral abnormalities. In all of these tests, p <0.05 showed a significant difference in the mean.

Ortuno-Sierra[4], reported emotional behavioral disorders in boys more than girls. Abdulrahman[5], studied the behavioral abnormalities of elementary school students in Saudi Arabia and showed that behavioral abnormalities have been observed in boys more than girls. Wendy[6], acknowledged that analysis of the emotional-behavioral problems of children examined in family, school and classroom showed that emotional-behavioral problems of boys are more than girls. Shaterian[11], reported in his research that there was no significant difference between behavioral abnormalities among girls and boys. Rezaei [12], found that that boys' behavioral abnormalities were higher in the first grade of the secondary school than the girls in the same grade. Nawabakhsh and Vahedi[13], studied students in Tehran and reported that girls' support in the family was more than that of boys, which had an impact on the internal and external family behavior of both sexes. Kahzadi[9], cam to conclusion that abnormal behaviors of male students in the first grade secondary school were higher than girls. Kordzanganeh[10], also confirmed this finding.

The children and adolescents' behaviors are a function of their sex. Girls are more emotionally sensitive to environmental stimuli and react more. The girls also need more attention than boys, and if this need is not addressed in the family and school environment, they react to it[14]. In boys, there is a need for independence, belonging to the group, peer tendency, and confirmation by the group, they are more affected by the peer group, and their individual and group behaviors are also influenced by these interactions[15]. Despite the psychological differences in girls and boys, it was observed that behavioral abnormalities of boys were more than girls, although the syndromes seen in girls were more than boys.

Ethical approval: Related departments should be assured about the confidentiality of the results of questionnaires.

Conflict of Interest: The authors report no conflict of interest.

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Deaths due to Fatal Road Traffic Accidents in Kalabuargi District a Retrospective Study

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ABSTRACT

A retrospective study of road traffic deaths was conducted from 01-01-2015 to 30-06- 2016 at Gulbarga institute of medical sciences, kalaburagi. Out of 570 autopsies conducted during the study period, RTAs related deaths accounted for 119 cases. Road traffic accidents are increasing in an alarming rate throughout the world. Thereby it poses itself as a major epidemiological and medico-legal problem. victims in RTA'S sustain varieties of injuries, which are fatal or dangerous to life. Hence the present study was conducted to know the injuries in victims of fatal RTA'S in relation to victims age and sex, type of victim and type of offending vehicle and suggests suitable preventive measures to reduce burden of mortality due to road accidents. In addition, an attempt also made to know the percentage of cause of death.

Keywords: *RTA, injuries, accidents, death, motor-vehicles.*

INTRODUCTION

Road traffic accident is any vehicular accident occurring on the roadway i.e originating on, terminating on, or involving a vehicle partially on the roadway. A new epidemic has emerged on road "Road Rage" leading to increased incidence of fatal injuries throughout the world thus posing a major epidemiological and medico legal problem[1.] Every day, there are 3600 deaths and 6800 serious injuries on the road in the world. Approximately 900,000 deaths occur in those who are under 45 years of age in developing countries and are the sole bread-winners for their families. Every tenth bed in the hospital is occupied by an accident victim[2.]

Although India has only 1% of the world's motor vehicles, but it accounts for 6% of the total global RTA deaths. A majority of major accident survivors are either confined to the bed or wheel chair bound for the rest of their lives due to brain injury or spinal cord injury. Alcohol intoxication causing RTA is present in 20-25% of all traffic accidents. The best chance of survival from a serious RTA victim is, if they are brought into the casualty department within the first hour of trauma or the so called Golden hour[3]. Currently motor vehicle accidents rank ninth in order of disease burden and are projected to be ranked third in the year 2020[4]. Victims in RTA'S sustain varieties of injuries external as well as internal injuries, may be abrasion, laceration, contusions etc.

Internal injuries may be fractures, rupture of viscera, destruction of major arteries etc. Fatality in RTA can be due to immediate causes like haemorrhage, injury to vital organs, vagal inhibition, neurogenic shock, embolism etc and late causes like infection, complications of injuries etc.[5] Early detection of the injury and prompt treatment are necessary in saving the lives of many of these victims.[6]

A careful and detailed study of injuries helps in the reconstruction of RTA'S especially in hit and run cases, which in turn helps the investigating officer in identification and prosecution of those responsible for the accident. In addition the study helps in implementation of measures to prevent fatalities due to RTA's.

MATERIAL AND METHOD

The study material comprised of victims of RTA'S

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who succumbed to death and subsequently autopsied at GIMS, KALABURAGI, which include the deceased which are died on spot dead on arrival and died after hospitalization, during the period 1st January 2015 to 30th June 2016. Routine information like age, sex, brief facts/history about in cases etc. is collected from the inquest report and accompanying relatives of the deceased in case of spot dead cases and brought dead cases. And from the hospital records and death summaries in admitted cases.

RESULTS

Out of 570 autopsies conducted during the study period RTAs related deaths accounted for 119 cases. there is preponderance of deaths in males as compared to females. Out of 119 cases, 98 (82.35%) males are affected by RTAs while female affected are 21 (17.65%). Male, female sex ratio is 4.7:1.

It is also clear from the table No (1) that victims from age group 21-30 years are maximum- 30 (25.21%) cases, followed by age group 31-40 years 24(20.16%) cases. The victims of age group 0-10 years are least affected by RTAs as seen to be 04 (03.36%) cases with close similarity to the victims of more than 71 year age as seen to be 05 (04.20%) cases and 61-70 year age group- as 08 (06.72%) cases. The age group 11-20 shows 07 (05.88%) cases, 41-50 shows 21 (17.64%) cases and 51-60 shows 20 (16.80%) cases.

The table No.(2) shows that among the type of victims pedestrians were the most frequently injured in 60 (50.42%) cases followed by motor cycle drivers in 35(29.41%) cases, motor vehicle drivers in 4(3.36%) cases, motor vehicle front seat passengers in 5(4.20%) cases, rear seat passengers in 3(2.52%) cases, pedal cyclist in 3(2.52%) cases while 7 (5.88%) victims were of unknown category which cannot be defined.

The table No. 3 clearly shows that in maximum number of road traffic accidents, four wheelers were involved most frequently as offending vehicles in 104(88.40%) cases which includes four wheeler light vehicles in 26(21.85%) cases, four wheeler medium vehicles in 34(28.57%) cases, four wheeler heavy vehicles in 37(31.09%) cases followed by two wheelers involved in 11(9.24%) cases, while 7(5.88%) cases of unknown category which cannot be defined. It is also revealed in above table that four wheeler heavy vehicles are offending vehicles in majority of accidents i.e. in 37(31.09%) among all i.e. 104(88.40%) cases of the four wheelers as offending vehicles.

The table No. 4 shows intracranial haemorrhage is predominant cause of death in 95(79.83%) victims, haemorrhagic shock in 17(14.28%) victims while septicemia in 06 (5.04%) and pulmonary embolism is cause of death in 1(0.84%) victim.

Table No. l: Age wise and gender wise distribution of cases

Age Group(yrs)	Male	Female	Total
0-10	03	01	04(03.36%)
11-20	05	02	07(05.88%)
21-30	28	02	30(25.21%)
31-40	19	05	24(20.16%)
41-50	17	04	21(17.64%)
51-60	17	03	20(16.80%)
61-70	6	2	08(06.72%)
>71	03	02	05(04.20%)
Total	**98**	**21**	**119(100%)**

Table No. 2: Distribution of cases of road traffic accident as per type of victim

Type of Victim	Number of cases	Percentage
Pedestrians	60	50.42
Pedal Cyclist	3	2.52
Motor cycle Drivers	35	29.41
Motor cycle rare sit passenger	2	1.68
Motor vehicle Drivers	4	3.36
Motor vehicle front sit passenger	5	4.20
Motor vehicle rear sit passenger	3	2.52
Unknown	7	5.88
Total	**119**	**100%**

Table No.3: Distribution of cases of road traffic accident as per type of offending vehicle

Type of Vehicle	No. of cases	Percentage
Two Wheeler	11	9.24
Three Wheeler	04	3.36
Four Wheeler Light Vehicle	26	21.85
Four Wheeler Medium Vehicle	34	28.57
Four Wheeler Heavy Vehicle	37	31.09
Unknown	07	5.88
Total	**119**	**100.00**

Table No.4: Profile of cause of death.

Cause of Death	No. of cases	Percentage
Intracranial Haemorrhage	95	79.83
Haemorrhagic shock	17	14.28
septicemia	06	5.04
Pulmonary embolism	01	0.84
Total	**119**	**100.00**

DISCUSSION

The present study reveals that maximum numbers of victims i.e. 25.21% were in age group 21-30 years followed by 20.16% in 31-40 years. More than half number of victims i.e.63.01% were in the age range of 21-50 year. Minimum victims were 03.36% in the age group of 0-10.

Similar findings are observed in following studies. Kumar et al (1999) observed maximum number of victims i.e. 29.45% in the age group of 21-30 years followed by 27.89% of victims in the age group of 31-40 years[1]. Singh &Dhattarwal (2004) reported commonest age group involved was 21-30 years accounting for 27.3% of victims followed by 20.6% victims in the age group of 31-40 years[06]. Meera&Nebhachandra (2005) reported maximum numbers of cases i.e. 20.8% were in age group 21-30 years followed by 18.40% cases in the age group of 31-40 years[5].

The present study shows that males involved in 85.55% cases out numbering the females in 14.45% in fatalities, male: female ratio was 5.92:1.

Different authors from different parts of the country observed similar findings. Banerjee et al (1997) reported that male preponderance was in 81.8% as compared females in 18.2%.[8] Ghangle. et al (2002) observed 90.3% of victims were males and only 9.6% were females[11]

Among the type of victims of road traffic accident the present study shows that pedestrians were the worst sufferers accounting for 50.42%.followed by motor cycle drivers in 29.41% cases while the remaining are the passengers in 8.40% cases and pedal cyclist in 2.52% and unknown cases were 5.88% which cannot be defined about their victimization.

Similar findings were also reported by various authors. Tirpude et al (1999) reported 46.35% cases were pedestrians,33% were occupants, 18.75% were drivers in road traffic accidents[07] .Chaudhary & Singh (2005) also reported pedestrians were the commonest group of victims comprising 44% cases followed by two wheeler drivers in 32.80% of cases and the occupants were 23.20%[12]

CONCLUSION

Road traffic accidents are increasing at an alarming rate, it has been observed that not only human errors but other factors were also responsible for the fatal traffic accidents, though it is very difficult task to control the human errors involved, efforts made in this direction can definitely reduce the morbidity and mortality.

The following preventive aspects, if followed may help to control human errors involved in fatal road traffic accidents.

- Proper education of road users especially pedestrians regarding road crossing and footpaths.
- Strict enforcement of traffic rules and regulations, awarding severe punishment for offenders, joy walkers and for speedy driving.
- Strict enforcement of rules during issuing of licenses to drivers and making medical examination and fitness certificate compulsory during the renewal of driving licenses.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Taken

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Retrospective Analysis of Female Unnatural Deaths due to Thermal Injuries

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ABSTRACT

Thermal injuries produced by the application of heat such as flame, radiant heat, contact with heated solid or liquid substances to the body surface. Thermal injury death is one of the leading causes of unnatural deaths in females in India. Retrospective analysis study at Department of Forensic Medicine and Toxicology, Shri Bhausaheb Hire Govt. Medical College, Dhule revealed 98 females out of all the 136 thermal injury deaths in the entire one year duration of 2016. The data of 98 female thermal injury deaths studied is obtained from the autopsy reports, hospital treatment records and from police inquest and panchnama of the deceased studied. We found 60 (61.22%) female victims in the age group of 21 to 40 years. 70 (80.62%) females were married. Accidents and suicides constituted 66 (67.35%) and 20 (20.41%) female thermal injury deaths respectively. Out of the 82 (83.67%) flame burn type of cases, in 52 (53.06%), kerosene was noted as the most common inflammable substance involved, almost invariably while cooking with kerosene stoves. 46 (46.94%) cases out of the 98 studied, survived between three to seven days. Septicemia due to thermal injuries comprised 61 (62.24%) female victims. Dying declarations were recorded in 47 (47.95%) thermal female victims before their deaths. Lack of immediate crime scene visit with immediate preparation of spot panchnama by police investigation officers in spot thermal deaths and the cases where dying declarations could not be recorded, makes the situation difficult to reach to the exact and factual opinion about manner of death, in almost similarly narrated accidental incidences of the young married burnt females.

Keywords: *Thermal, Injury, Female, Unnatural, Deaths, Married.*

INTRODUCTION

Burns constitute a major role in mortality and morbidity in the entire world and these are the fourth most common type of trauma worldwide, following traffic accidents, falls and interpersonal violence.[1] An estimated 1, 80,000 deaths every year are caused by thermals, the vast majority occurs in low and middle income countries.[2] In India, about 60,000 people suffer from burns annually, more than 50,000 come to hospitals and about 10,000 succumb to burn injuries.[3] Thermal (heat) burns occur when some or all of the cells in the skin or other tissues are destroyed by hot liquids (scalds), hot solids (contact burns), or flames (flame burns).[2] Burns are injuries produced by the application of dry heat such as flame, radiant heat or some heated solid substance like metal or glass, to surface of the body. Injuries caused by friction, lightning, electricity, ultra-violet or infra-red light rays, X-rays and corrosive chemical substances are all classified as thermals for medico-legal purposes.[4] This retrospective study of thermal injury deaths of female victims is aimed at analyzing their causes of deaths, circumstances of having thermal injuries, survival duration and about recording of their dying declarations.

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MATERIAL AND METHOD

During 1st January 2016 till 31st December 2016,

total 1181 medico legal autopsies were carried out by the Department of Forensic Medicine and Toxicology of Shri Bhausaheb Hire Govt. Medical College, Dhule of Maharashtra. Among the 1181 autopsies conducted during this one year period, total 136 unnatural deaths were due to infliction of various types of thermal injuries. 98 female thermal death victims out of the 136 deaths made them very major portion of all the thermal injury deaths. Retrospective analysis of all these unnatural female deaths of one year duration due to thermal injuries is made in this study.

Cause of death is obtained from the autopsy reports. Data related to age, marital status, manner of death, type of thermal injuries and inflammable substances involved in the thermal injury incidences is obtained from the respective cases' police inquest and panchnama. Information of whether brought dead or hospital admitted; duration of survival after having thermal injuries and whether dying declaration or deposition taken from the victims during their survival is obtained from the clinical records of the victims as well as from the police inquest and panchnama.

OBSERVATIONS AND RESULTS

Deaths following thermal injuries comprised 136 victims of all sexes out of the entire 1181 autopsies in the entire one year period of 2016. Barring 37 (37.75%) male victims and 1 (0.007%) transgender, 98 (72.05%) victims were of female sex. All the data is presented in tabular forms and important observations are noted here.

Table 1: Age group wise distribution of female victims of thermal injury deaths

Age group	Number of victims	Percentage
1 – 10 Years	04	04.08%
11–20 Years	11	11.22%
21–31 Years	30	30.61%
31–40 Years	30	30.61%
41–50 Years	11	11.22%
51–60 Years	05	05.10%
61–70 Years	07	07.14%
Total	**98**	**100%**

Only 4 female victims were from less than 10 years age. Maximum 30 female thermal death victims each were from two age groups; 21 to 30 years and 31 to 40 years. Most of the recently married females lie in these two age groups only. Older age groups of 51 to 60 years and 61 to 70 years also had less female thermal injury deaths. No deaths were recorded above age of 71 years in females in 2016.

Table 2: Marital status of the victims

Marital Status	Number of victims	Percentage
Married	79	(80.62%)
Unmarried	14	(14.28%)
Widowed	05	(5.10%)
Total	98	100%

It is observed that 79 out of the 98 (80.62%) female thermal injury death victims were married. Unmarried and widowed females comprised 14 (14.28%) and 5 (5.10%) respectively.

Table 3: Manner of death of the thermal injury death victims

Manner of death	Number of victims	Percentage
Accident	66	(67.35%)
Suicide	20	(20.41%)
Homicide	04	(4.08%)
Pending	08	(8.16%)
Total	**98**	**100%**

Maximum 66 (67.35%) thermal death female victims were reported due to some kind of accidents like burning of sari or loosely wearied cloths while cooking, kerosene or gas stove blasts, fall of lamp on body, burns due to fire crackers, flash burns due to electric current sparking and fall of hot water over body. 20 cases (20.41%) committed suicidal deaths by pouring kerosene on their own bodies. 4 cases were of homicides. In 8 cases, exact manner of death cannot be ascertained and the police are investigating them.

Table 4: Types of thermal injury and incidences reported

Types of thermal injury and their incidences reported		Number of victims	Percentage
Flame burns	While cooking with kerosene stove, pouring of kerosene by self and assailants	52	53.06%
	While cooking with gas stove	11	11.22%
	While cooking with chullah	16	16.32%
	Shekoti (Campfire)	01	01.02%
	Firecracker thermals	01	01.02%
	Fall of lamp containing edible oil	01	01.02%
Scald burns due to fall of boiling water		02	02.04%
Electric current sparking burns		01	01.02%
Exact incidence not known		13	13.26%
Total -		**98**	**100%**

We observed that most of the flame burn incidences involved accidents, while cooking with kerosene stoves. Though uncommonly reported, suicidal self-ignition and homicidal ignition of victims by pouring kerosene also involved in the flame burn type. Incidences involving kerosene as the inflammable substance claimed 52 (53.06%) female lives. Next most common incidences involved working with *chullahs* which are still used in rural areas of North Maharashtra for cooking taken toll of 16 (16.32%) female lives. Reported mostly as accidents, cooking with gas stove had 11 (11.22%) female victims. Scald burns involving fall of boiling water over the victim's body constituted 2 (2.04%) cases. Miscellaneous incidences of electric current sparking burns and flame burns due to Shekoti (Campfire), firecrackers and fall of lamp containing edible oil, all reported as accidents, each claimed one female life. Exact incidences causing thermal injuries to 13 victims could not be evaluated.

Table 5: Duration of survival of female victims of thermal injuries

Duration of survival	Number of victims	Percentage
Spot dead	08	(8.16%)
Within 24 hours	16	(16.32%)
1-2 days	06	(6.12%)
3-7 days	46	(46.94%)
8-10 days	11	(11.22%)
11-20 days	08	(8.16%)
21-30 days	01	(1.02%)
31-40 days	01	(1.02%)
41-100 days	01	(1.02%)
Total	**98**	**Total**

Female victims died at the place of incidence and declared as brought dead at the hospital were 8 (8.16%) in number. 16 (16.32%) female thermal injury cases died within 24 hours of admission to the hospital. Maximum 46 (46.94%) cases died between third to seventh days of the hospital stay. The longest survival duration after sustaining thermal injuries was 91 days.

Table 6: Cause of death as per the autopsy reports

Cause of death	Females	Percentage
Hypovolemic Shock	37	(37.76%)
Septicemia shock	61	(62.24%)
Total	**98**	**100%**

About two third, 61 (62.24%) number of the female victims died as a complication of septicemia due to the thermal injuries sustained. Hypovolemic shock following thermal injuries observed in 37 (37.76%) cases.

Table 7: Dying declaration recorded status

Dying declaration	Number of victims	Percentage
Recorded	47	(47.95%)
Not recorded	44	(44.90%)
Not known	07	(7.15%)
Total	**98**	**100%**

Dying declaration statements regarding material facts of cause of death is recorded in 47 (47.95%) cases which included most of the recently married and young females. It is not recorded in 44 females which were mostly unmarried, widowed or older married females. In seven cases we cannot found conclusive evidences of whether dying declaration statement was obtained.

DISCUSSION

Females have slightly higher rates of death from burns compared to males according to the most recent data.[2] Higher risk for females is associated with open fire cooking, or inherently unsafe cook-stoves, which can ignite loose clothing. Open flames used for heating and lighting also pose risks, and self-directed or interpersonal violence are also factors.[2] Our study results reflect these 'Thermals key facts' from WHO.[2]

We observed maximum number of female thermal deaths in the 21-30 years and 31-40 years age groups. Pawar et al[5] noted similar observations. They found that young adult females between the age group of 20-39 years constituted 190 (54.59%) of total thermal cases while Tomar et al (6) found maximum incidence in females was noted in the age group of 21-30 years i.e. 39 (32.5%). Harish et al (7) also found age group of 21-30 years accounted for the maximum number of 149 (39%) female burn cases, followed by 92 (24%) cases in the age group 31-40 years. Korah et al (8) from Ranchi, Jharkhand observed the highest number of 24 (34.3%) victims in the age group of 21 to 30 years, followed by 20 (28.5%) cases in 11 to 20 years age group.

Married females constituted 79 (80.62%) cases in our study. Similar observations were noted by other studies [(3,5-8)]. Accident was the most common of manner of death we found in 66 (67.35%) cases, distantly followed by suicidal 20 (20.41%) cases. Pawar et al[5] study revealed accidental burns most commonly in female 180 (60.81%) cases. Other studies[(7,9)] also showed most thermal death cases as accidents. Working or cooking with kerosene stoves claimed 52 (53.06%) female lives; similarly working/cooking with chullah and gas stoves lead to 16 (16.32%) and 11 (11.22%) deaths respectively, as we observed. WHO Burns Fact sheet[2] of August 2017 revealed very similar observations regarding the 'settings' in which most burn deaths occur. Gupta et al[3] pointed out that kitchen was the major culprit site of the incidence of the burns, accounting for 75% of the burn incidents. They further analyzed that Indian women wore dresses like the sari and the salwar kamiz with dupatta, often of synthetic material covering almost the whole body which favored aggravation of the burn injuries in females. Pawar et al[5] study revealed similar mode of burn injuries and situations like our study, stating that maximum 296 cases (86.48%) in their study were of flame burns; out of all accidental flame burn cases, 210 (82.03%) cases were due to clothes catching fire while cooking or working with kerosene stove, gas chullha. According to study by Tomar et al[6] 22 out of the 66 female burn injury victim's clothes caught fire while working on kerosene stove, 21 died due to fall of kerosene lamp, 8 due to stove blast and 3 died while working with gas. The other studies [(7,9)] also recorded that most of the burn deaths were due to flame burns.

We noticed maximum number of cases 46 (46.94%) who survived between three to seven days after getting burnt. The observations of the studies [(6,7,8)] were in line with ours except the study by Chaudhary BL et al[9] which found 57 out of 207 (27.53%) spot death burn cases to be the most in number, followed by 42 (20.28%) who survived between seven to fifteen days. We observed

septicemia, the leading cause of death in thermal injuries in 61 (62.24%) cases while remaining 37 (37.76%) cases died due to hypovolemic shock. Similar finding of 'septicemia' being the most common cause of death in thermal injury victims were recorded by Pawar et al[5] in 58.98% cases, by Tomar et al[6] in 77.26% cases, by Harish D et al[7] in 73% cases and by Korah MK et al[8] in 61.4% cases.

In our study, we found that dying declarations were recorded in 47 (47.95%) cases while the deceased were admitted in the hospital. It was not recorded in 44 (44.90%) cases and in 7 (7.15%) cases we don't found any record about it. We do not found any studies, including the referred here, studied this aspect.

CONCLUSION

Many other studies including this one reveal female preponderance all over India in the deaths due to thermal injuries. Dry heat in form of flames is the most common type of thermal energy source causing most of the thermal injuries to humans and to females in particular. More than fifty percent of young married female thermal deaths are narrated by police and the relatives as incidences of accidental flame burns. These involve uniform activities of working or cooking mostly with kerosene stoves; and in few circumstances, cooking with chullah or with gas stoves is involved. Lack of immediate crime scene visit with immediate preparation of spot panchnama by police investigation officers in spot thermal deaths and the cases where dying declarations could not be recorded makes the situation difficult to reach the exact and factual opinion about manner of death in almost similarly reported accidental incidences of the young married burnt females.

As most of the female thermal injury deaths constitute major portion of their total unnatural deaths and also mostly narrated as accidental in nature while cooking in kitchens; public awareness through different media shall be done regarding common and logical precautions to be followed while dealing with flame sources particularly with kerosene stoves.

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Conflict of Interest: None to declare.

Statement of Informed consent: This retrospective analysis study is based on the available records, so there is no matter of consent.

No ethical violation is done.

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Sexual Dimorphism of Complete and Incomplete Metopic Suture: A Regional South Indian Study

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ABSTRACT

The metopic suture which is the persistent suture between two halves of the frontal bone beyond early childhood can be of importance to forensic pathologists. Persistence of the suture and its relation to age, sex and race can provide information with regard to identity fixation in skeletal remains. Though a plethora of studies on metopic suture exists in medical literature, only very few studies have correlated its prevalence with gender.Therefore, in the present study, an attempt has been made to study the prevalence and morphology of complete and incomplete metopic sutures in adult skulls belonging to the southern state of Kerala, India, and to correlate the findings with the sex of the skulls.

Materials and method: 180 (90 male and 90 female) adult dry skulls were studied over a period of 10 years in the Department of Anatomy, for the presence of complete and incomplete metopic sutures. The incomplete sutures were classified according to morphology, based on the classification by Ajmani et al. Findings were documented by digital photography.

Results: Complete metopic suture was observed in 2.8% of skulls. All were female skulls. An incomplete suture was observed in 80/180 (44.4%) skulls. 58/90 (64.4%) were male skulls and 22/90 (24.4%) were female skulls. No vestige of metopic suture was observed in 95/180 (52.8%) skulls.

Conclusion: Complete metopic suture was only observed in female skulls in this study. But when the suture was incomplete, it was found to be more prevalent in male skulls to the extent of more than sixty percent. These observations can have significance in forensic investigations of skeletal remains.

Keywords: *Metopic suture, Metopism, Gender, Frontal bone*

INTRODUCTION

The persistent suture between the two halves of the frontal bone beyond infancy or early childhood is referred to as metopic suture[1]. It is considered complete when the suture extends from nasion to bregma, the condition being referred to as metopism[1]. Incomplete metopic sutures, may be present along a small length between the bregma and nasion and are usually present between the superciliary arches[2].

There is no consensus amongst various authors as to the exact time of closure of the metopic suture, the reported range varying from birth to 10 years of life[2,3]. However, the widely accepted closing period has been approximated to two years of age[2]. Racial variations in the prevalence of metopism as reported by various authors range from 1 to 10%[1], the maximum prevalence being in whites and mongoloids (about 10%), and least in negroids (2%). The prevalence varies in different ethnic groups too as is reported in anatomical literature. The largest being in Alpine skulls (63.2%) while the least described in Australian skulls (1%)[4,5]. Indian studies report a wide prevalence range of 1.2 to 29.6%[2,6].

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Metopic suture can be of importance to forensic experts. The persistence of the suture and its relation to age, sex and race can provide information with regard to identity fixation in skeletal remains. Though many studies exists in medical literature, only very few have correlated the prevalence with gender. Therefore, an attempt has been made to study the prevalence and morphology of complete and incomplete metopic sutures in adult skulls belonging to the to southern India, and to correlate the findings with the sex of the skulls.

MATERIALS AND METHOD

One hundred and eighty intact skulls available in the Department of Anatomy, as well as procured for distribution to first year medical and dental students for academic purposes, were carefully scrutinized for the presence of complete or incomplete metopic suture.

The skulls were identified as 90 male and 90 female as per the guidelines on sexual dimorphism by Krogman[7]. Skulls with visible damage were excluded from the study. The suture was considered complete when it extended from bregma to nasion. Incomplete metopic suture extended for variable distances between the above mentioned points. Accordingly the skulls were classified into 3 groups.

Those with

1) Complete metopic suture

2) Incomplete metopic suture

3) and with no apparent signs of suture.

Based on the classification by Ajmani et al [1,] the shapes of incomplete sutures were classified according to the morphology as linear, U- shaped (inverted or straight), V-shaped, H-shaped and with wide side to side excursions, etc The findings were documented with digital photography.

RESULTS

Of the 180 skulls studied, a complete metopic suture was observed in 5 cases - 5/180 (2.8%). All were female skulls (**Fig 1**). So 5/90 (5.6%) female skulls had complete metopic suture extending from bregma to nasion.

An incomplete suture was observed in 80/180 (44.4%) skulls. 58/90 (64.4%) were male skulls and 22/90 (24.4%) were female skulls.

No vestiges of metopic suture was observed in 95/180 (52.8%) skulls.

Prevalence of various shapes of incomplete metopic suture observed on the lower part of the frontal bone and their correlation to gender is depicted in **Table 1** and corresponding images in **Fig 2.**

Table 1: Incomplete metopic suture: variable morphology and correlation to gender

Sl. No.	Shapes	Male	Female	Total
1	Linear	22 (37.9 %)	12 (54.5%)	34 (42.5%)
2	H Shaped	1 (1.7%)	0 (0%)	1 (1.3%)
3	U Shaped	25 (43.1%)	6 (27.2%)	31 (38.7%)
4	V Shaped	3 (5.2 %)	1 (4.5%)	4 (5.0%)
5	Inverted U shaped	6 (10.3%)	3(13.6)	9 (11.25)
6	Side to side excursions	1 (1.7%)	0 (0%)	1 (1.3%)
Total		**58 (100%)**	**22 (100%)**	**80 (100%)**

Table 2: Comparison of incidence of metopism in different populations as reported by various workers

Workers	Populations	Percentage
Bryce [4] (1915)	European	8.7
	Mongolian	5.1
	Negro	1.2
	Australian	1
	Scottish	9.5
Romanes [23] (1972)	European	0- 8
Das et al [24] (1973)	Indian	3.31
Agarwal[25] (1979)	Indian	2.66
Ajmani et al [1] (1983)	Nigerian	3.4
Castilho et al[6] (2006)	Southern Brazil	7.04
Chandrasekaran S and Shastri D [26] (2010)	South Indian	5
Muralimanju et al[2] (2011)	Indian	1.2
Masih F et al [27] (2013)	Indian (Western Rajasthan)	6.5
Sheshgiri and Shishirkumar [28](2014)	South Indian	1.63
Wadekar et al [29] (2014)	Indian	1.25
Present study (2017)	South Indian (Kerala)	2.8

Table 3: Comparison of incidence of incomplete metopic suture

Investigators	Incomplete %								Total Incomplete %
	Linear %	H shaped %	(Double) U shaped %	V shaped %	Inverted U shaped %	Y shaped %	U shaped with extension on right side %	Side to side excursion %	
Das et al[24] (1973)	-	-	-	1.01	1.93	0.28	-	-	17.57
Agarwal et al[25] (1979)	23.12	1.57	-	3.25	2.43	1.96	-	-	35.51
Ajmani et al[1] (1983)	24.27	3.88	-	0.49	0.97	-	-	-	31.57
Castitho et al[6] (2006)	69.57	-	13.04	17.39	-	-	-	-	32.39
Chandrasekaran & Shastr[26] (2011)	17.5	-	15	7.5	-	-	-	-	40
Muralimanju et al[2] (2011)	22.2	-	19.7	21	-	-	-	-	63
Masih et al[27](2013)	20	-	8	6	-	-	-	-	34
Wadekar et al[29] (2014)	16.25	-	1.25	5	-	-	-	-	22.5
Present study (2017)	**42.5**	**1.3**	**38.7**	**5**	**11.25**	**-**	**-**	**1.3**	**44.4**

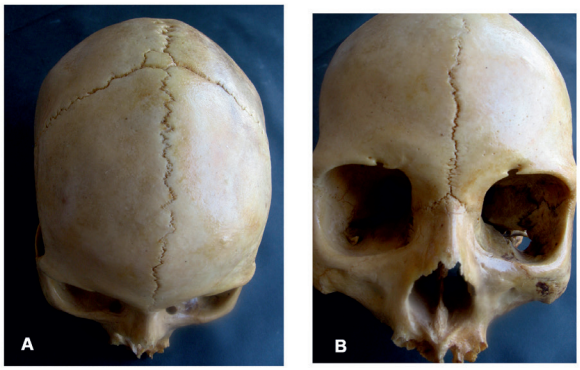

Figure : 1

Figure 1: Complete metopic suture in a female skull

A: Superior view, B: Anterior view

Figure legend

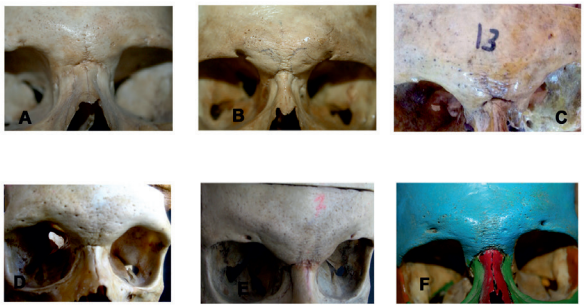

Figure 2: Incomplete metopic suture, variable morphology

A: Linear type

B: H shaped

C: Straight U

D: V shaped

E: Inverted U shaped

F: Wide side to side excursions

DISCUSSION

Metopic suture has aroused interest amongst various researchers over the decades. There is no clarity regarding neither the persistence of metopic suture nor why it demonstrates synostosis[3]. del Sol et al[5] after studying metopism attributed various causes for it, such as abnormal growth of cranial bones, hydrocephalus, growth interruption, heredity, atavism etc. Opperman et al[8] conducted a study on the closure of interfrontal suture in rats and reported that Tgf-ß3 (transforming growth factor beta-3) can regulate suture patency in vivo and can maintain the suture in an unossified state .However he cautions that it is very important to have better insight on how Tgf- ßs interact with each other and their receptors before these factors can be considered clinically usefull[8].

An interesting study on the histological and radiographic aspects of human metopic suture, before during and after its closure by Manzanares et al[9] has revealed that chondroid tissue constitutes the edges of metopic suture during the entire period of suture development and is responsible for the growth of frontal bones towards each other. According to them[9] a nearly closed metopic suture consists of large trabeculae of chondroid tissue which is progressively substituted by lamellar bone.The sutural space is maintained by resorption and the active resorption process continues at least till the 17th month of postnatal life[9], but according to Latham and Burston[10] this happens up to 2-3 years of age. Watzek et al[11] opined that this is an essential pre-requisite for continued sutural bone growth and therefore for normal cranial growth[12] indirectly.

Most et al[13] in an attempt to study the mechanisms involved in normal suture development and fusion, harvested posterior frontal and sagittal sutures along with the underlying dura, from rats at 8,12,16 and 35 days of postnatal life and demonstrated that the expression of TGF beta-1 and bFGF (basic fibroblast growth factor) genes were remarkably increased both in the fusing suture as well as in the surrounding dura[13].

However, conflicting reports regarding the time of closure of metopic suture exists in medical literature. While the rest of the sutures of calvaria close in man between twenty six to thirty years with subsidiary periods of activity in the fifties and late seventies,[9,14] reported closure of metopic suture varies from birth to 10 years.[2,3.] In fact, Vu Hugh et al[15] reviewed 159 patients using reconstructed 3D CT scans of the craniofacial region, and the earliest evidence of metopic closure was 3 months in 33% of the cases. All the patients over 9 months of age had complete metopic closure.

Metopism is not considered pathological in adults[16]. But metopic synostosis has been found to be associated with adverse pathology like raised intracranial pressure, learning disability, behavioural abnormality, etc.[15] Cohen and Pershing reviewed literature on increased intracranial pressure in single suture craniosynostosis and acknowledged the significance of elevated intracranial pressure as well as adverse developmental

outcome in single suture craniosystosis.[17] Premature fusion can also result in trigonocephaly[18].

In the present study, metopism was observed in 5 /180 skulls (2.8%). All were female skulls. A comparision on the prevalence of metopism is depicted in **Table 2**. Similar female predominance was observed by Castilo et al[6] and Del Sol et al[5]. But in an another Indian study by Muralimanju et al[2] on 81 skulls, complete metopic suture was observed only in one male skull. Male preponderance was also observed by Baaten et al[19] in Lebanese population.

In the present study, incomplete metopic sutures were observed in 44.4% cases, predominant in males (64.4%) than females (24.4%). There are similar studies with higher percentage of incomplete metopic suture in males[19], as well as studies with contradictory results, for instance, according to another Indian study[2], the highest frequency of incomplete metopic sutures were in females (60.86 %) in comparison to males (31.13 %).

Incomplete metopic sutures present variable morphology. The prevalence of various shapes in the present study is depicted in **Table 1** and a comparison with the findings of other researchers in **Table 3**. Our study is in agreement with other studies regarding the prevalence of linear shape being the maximum and our findings were limited only to the lower part of the frontal bone. Since incomplete metopic sutures can be mistaken for vertical fractures next to the midline, especially in a head injury patient[2] in an emergency setting, surgeons should certainly be aware of this anatomical variation while performing surgical interventions in a traumatized patient, especially while performing frontal craniotomy for any reason.

3D CT scans can be used to evaluate the metopic suture patency status[3]. Multiplanar reformat of CT scans give valuable information about shape, extent and closing status[20]. From a forensic perspective, aside from the fact that incomplete metopic sutures can be mistaken for a vertical traumatic skull fracture in patients with trauma to the head, the correlation of metopism with age, sex and race can provide important information with regard to identify fixation in skeletal remains. According to most forensic text books available in India[21,22], the prevalence of metopic suture is more in females. Our study reiterates this fact.

CONCLUSION

It is well known that the presence of a metopic suture (complete or incomplete) in a skull recovered as part of skeletal remains in a forensic case can have significance in relation to estimation of age, sex, race, etc of the individual concerned when it comes to identity fixation. While many studies have been conducted on various aspects of the metopic suture, there is a relative paucity of information with regard to sex differences. The current study focused on this aspect, and it was found that complete metopic suture was only observed in female skulls included in the study. But when the suture was incomplete, it was found to be more prevalent in male skulls to the extent of more than sixty percent. These observations add to the significance of the metopic suture in identity fixation in forensic investigations of skeletal remains.

Conflict of Interest - Nil

Source of Funding - Nil

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Study of the Diagnostic Value of the Presence of Free Liquid within the Sphenoid Air Sinuses (Svechnikov's sign)

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ABSTRACT

Background: In current forensic practice, it remains difficult to demonstrate that drowning was the cause of death in certain cases. Once putrefaction is established and certainly when it is advanced, the diagnosis is a matter of inference. Svechnikov's sign[1] (presence of free liquid within the spenoidal air sinuses) has been proposed as a diagnostic test of drowning.[2]

Aim: To detect, quantitate and validate the presence of fluid in sphenoid sinuses and to compare the findings in drowning and non drowning cases.

Materials and Method: 50 drowning victims brought for autopsy examination at a teaching hospital in central Kerala formed the cases and the control group was selected from consecutive 50 autopsies with known cause of death other than drowning and those without severe head injury or head and neck malignancy. The jugum sphenoidale was removed and the fluid present in the sinuses was withdrawn by a needle bearing syringe and measured. Qualitative data was analysed using proportions and Chi-square test, while quantitative data was analysed using means, standard déviations and t-Test using SPSS-16.0.

Results: Detectable quantity of fluid were seen in 43 cases (86%) among 50 drowning victims. 6 out of 7 (85.7%) drowning victims with absent fluid in the sphenoid sinuses were children less than 6 years.

Conclusion: The study revealed that detection of fluid in the sphenoid sinuses can be used as a diagnostic sign for death by drowning.

Keywords: *Drowning, Medium, Sphenoidal air sinuses, Svechnikov's sign*

INTRODUCTION

In wet/typical/true drowning, water enters the lungs due to inhalation and the classical diagnostic autopsy findings such as Paltauf sign, emphysema aquosum and presence of fluid in the pleural cavity can develop. Other diagnostic tests such as diatom test are also dependent upon the entry of water into lungs.[1] Diagnosis death due to 'dry drowning', however, is practically impossible. 10% of drowning cases happen without inhalation of the drowning medium in to the lungs.

The diagnosis of death by drowning, in a non-decomposed body or a body in early putrefaction, may be relatively simple; but once putrefaction is established & certainly when it is advanced, the diagnosis is a matter of inference, based upon the circumstances of the death & exclusion of other possible causes. After removing the body from the water, the putrefaction is much enhanced because the body has imbibed much fluid, which accelerates the process of decomposition.

The possibility of the drowning medium entering the paranasal sinuses such as the ethmoid, maxillary and sphenoid sinuses does exist. Presence of fluid in

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sphenoid sinuses in cases of death due to drowning is known as the Svechnikov's sign.[3] No study to examine the validity of this sign in the diagnosis of drowning has been conducted in Kerala to the knowledge of the authors.

AIMS OF THE STUDY

To detect and quantitate the presence of fluid in sphenoid sinuses in cases of death due to drowning & due to other causes.

To find the validity of presence of fluid in sphenoid sinuses in cases of death due to drowning.

MATERIALS AND METHOD

The study was designed as a comparative study to be done over 12 months; on dead bodies brought for medico-legal Autopsy at Department of Forensic Medicine, Government Medical College, Thrissur. Non-probability sampling technique was used for sampling. 50 cases where the cause of death was drowning as per the inquest and autopsy examination were included as cases. Those cases where there was suspicion regarding the cause of death even though the body was recovered from water were excluded from this group. 50 consecutive autopsies with known cause of death other than drowning were included in the control group. Those cases where there was head injury were excluded from the cases as well as controls.

The *jugum sphenoidale* was removed during autopsy by chisel and hammer exposing the contents of the sphenoid sinuses. Any fluid in the sinuses were withdrawn and with a needle-bearing syringe (**Fig 1**).

Data Analysis: Data was collected and entered in MS-Excel and analysed using SPSS version 16.0. Qualitative data was analysed using proportions and Chi-square test. Quantitative data was analysed using means, standard deviations and t-Test.

OBSERVATIONS AND ANALYSIS

In this study there were 36 (72% of total cases) males and 14 (28% of total cases) females. All males and females above 6 years of age showed the presence of fluid in sphenoid sinuses except for one male. There was no statistically significant difference between the sexes.

The drowning medium in all cases was water. Sphenoid sinuses contained water in 43 cases (86%) among 50 drowning victims. 6 out of 7 (85.7%) drowning victims in whom there was no water in the sphenoid sinuses were children less than 6 years of age. Maximum amount of water in the sphenoid sinuses was 7 ml with a mean volume of 3.002 + 1.846 and 95% confidence interval between 2.427 and 3.578. Water was absent in the sphenoid sinuses of the entire control group.

Among the 7 cases, in which absence of water in sphenoid sinuses was noted, 6 were children below 6 years. In all those cases, sphenoid sinuses were not developed and the cavity was filled by a bony tissue. Age related absence of fluid in the sphenoid sinuses in children below 6 years was statistically analyzed and found to be significant with p value of 0.000.

The remaining one was a case of shallow water drowning of a 20 year old male. He was heavily drunk prior to death with strong smell of alcohol during autopsy. Chemical examination revealed 246mg/100 ml of blood. It may be due to the absence of violent inspiration or struggle due to heavy intoxication.

8 bodies in the control group as well as 8 cases showed external decomposition changes like marbling. The findings are given in Table 1.

Water present in the sinuses were blood stained except for a case in which autopsy was performed within 4.5 hours after death, where it was clear. During this study, few samples of the water aspirated from the sinuses were subjected to the diatom test, which revealed dense presence of identical diatoms in the aspirated water from the sinuses and in the sample collected from the drowning medium. Water collected from the drowned decomposed bodies was thickly blood stained, whereas non decomposed bodies only showed mild to moderate staining.

Table 1: The findings in decomposed bodies.

Finding	Drowning	Not Drowning
No. of cases	8	8
Froth	3 (37.5%)	0
Foreign body	6 (75%)	0
Water in the Sphenoid sinuses	8 (100 %)	0
Emphysema aquosum	0	0

The validity of Svechnikov's sign as a diagnostic tool to identify drowning was tested. The sensitivity was found to be 86% and the specificity was 100%. The positive predictive value of presence of fluid in sphenoid sinuses was 100% while the negative predictive value of was 87.71%.

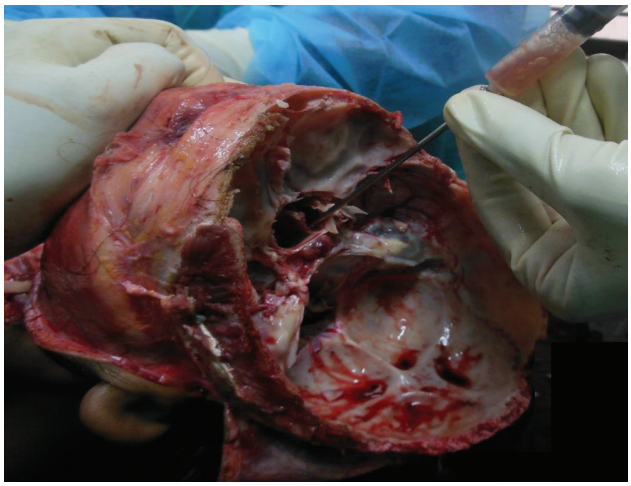

Fig 1: Aspiration of fluid from Sphenoid sinus.

DISCUSSION

Present study almost confirms the findings of Hottmar, in a study published in 1996, had found that out of a total of 387 cases of drowning in fresh water, about 75% had water in *sinus sphenoidalis.* Among 50 controls, only one case had liquid in the paranasal sinuses. He concluded that this kind of investigation can be an auxiliary method in diagnosis of drowning.[4]

A CT (Computerized Tomography) based study was conducted in Tohoku University, and published in 2012. The vast majority (38/39, 97%) of drowning cases had fluid accumulation in the maxillary or sphenoid sinuses. Fluid accumulation in the maxillary or sphenoid sinuses was also found in 73/112 (65%) non-drowning cases. Pearson's chi-square test demonstrated that fluid accumulation in the maxillary and sphenoid sinuses was significantly associated with drowning ($p = 0.0001$), but specificity (35%) and positive predictive value (34%) of the presence of fluid in sphenoid and maxillary sinuses in diagnosing drowning was poor.[5] The above study was a CT (computerized tomography) based study. In the present study, specificity and positive predictive value of the presence of fluid in the sphenoid and maxillary sinus was 100% each.

A study published in 2002 compared the liquid content in the sphenoid sinuses in 60 deaths by drowning and 157 other deaths. It found that in 92% of the deaths by drowning between 1 ml and 4 ml of aqueous fluid could be found in the sphenoid sinuses. However, a positive result was also obtained in 52% of the other cases autopsied, but in the control group the average volume of the aspirate was smaller than in the group of deaths by drowning.[3] Entire control group in the present study showed absence of fluid in sphenoid sinuses. The findings of Kawasumi *et al* and Bohnert *et al* are different from the present study with respect to the presence of water in the sphenoid sinuses in non drowning cases.

A postmortem pre-autopsy multi-sliced computerized tomography study conducted by Christe *et al* found the presence of water in 100% of drowning cases in sphenoid sinuses. Only 18% of the control group had water in the sphenoid sinuses.[6]

CONCLUSIONS

The present study strongly suggests that the presence of water in the sphenoid sinuses (Svechnikov's sign) is a reliable indicator of drowning. If it is taken as a diagnostic test, the sensitivity (86%), specificity (100%), positive predictive value (100%) and negative predictive value (87.71%) indicate that it has high reliability.

The present study indicates that the test is especially useful in those cases where the body recovered from water is in a state of decomposition. All decomposed bodies where death was due to drowning showed water in the sphenoid sinuses. This was found to be more reliable than *emphysema aquosum,* froth and the presence of foreign body in the upper respiratory passages. The fact that none of the decomposed bodies in the control group showed water in the sphenoid sinuses suggests that the finding is really significant.

There were no statistically significant gender differences. Our findings strongly indicate that the test is not reliable when the drowning victim is aged less than 6 years ($p < 0.000$), due to the under development of sinuses.

The single drowning case aged above 6 years which did not have water in the sphenoid sinuses indicates that when the respiratory effort is feeble, water is not likely to enter the sphenoid sinuses. In that case, the deceased had a high blood alcohol level (246mg/100 ml).

An important observation of this study was the presence of identical diatoms in the water collected from the sinuses and the sample collected from the drowning medium. As an incidental finding, it was seen that as the decomposition advances, the level of blood staining of the water collected from the sinus deepens as observed visually. Comparison of the quantity of fluid in the sphenoid sinus in cases of drowning and post mortem immersion can yield valuable information. The authors feel that further research can be done on these points.

Ethical Concerns: Protocol was submitted to Institute Research Committee and Ethical Committee and approval was obtained. Confidentiality of the data was maintained.

Conflict of Interest: The authors declare no conflict of interest. The research was self funded.

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Road Traffic Accidents in the Least Populated State in India: A Statistical Investigation

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ABSTRACT

Background: Road Traffic Accidents (RTA) is one of the major public health problems faced by both developed and developing countries.

Aims: 1. To describe the trends of RTA, the incidence of injured and death rates due to RTAs in Sikkim during 2001-2014.

2. To find out the significant association between the sexwise differentials in injured and deaths rates, types of the Vehicles involved in RTAs in Sikkim during 2001-2014.

Materials and method: A retrospective analysis was done using the secondary data published by Government of India.

Results : A total of 2646 Road Traffic Accidents (RTAs) were reported during 2001 to 2014. The highest RTA occurred in 2009 accounting 564 (27.9%) of total RTAs. The minimum road accidents were reported in 2006 but it's contributed the maximum 226 death rate due to road accidents per 100 cases. Of these 2646 accidents, 3964 persons were injured and 925 persons were died during 2001 to 2014. The rates of injured and deaths per 100 cases of RTA were 40 and 35 respectively during the period. The proportions of male injured and killed due to RTAs were 73% and 75% while females contributed 27% and 25% respectively though it was not significance. The ratio of male injured to females was 2.7:1 while for deaths it was 3.1:1. Jeep accident 437 (67%) was the highest among the various types of vehicles involved in RTAs which was statistically significance.

Conclusions: There was an increased trend in the incidence of RTAs in the state. However, it can b reduce to a minimum level by improving the conditions of the roads, giving proper awareness to the community and by framing suitable traffic rules and regulations by the government.

Keywords: *Road Traffic Accidents, Injury, Registered Vehicle*

INTRODUCTION

An accident has been defined as: "an unexpected, unplanned occurrence which may involve injury".[1] Road traffic accidents are defined as a collision involving at least one vehicle in motion on a public or private road that results in at least one person being injured or killed.[2] Every day around the world, more than 3000 people die from road traffic injury. Low-income and middle-income countries account for about 85% of the deaths and 90% of the annual disability adjusted life years (DALYs) lost because of road traffic injury. It was projected that these figures will increase by about 65% over the next 20 years unless there is new commitment to prevention.[2] It was also estimated that road traffic injuries will move from ninth place to take third place in the rank order of

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disease burden by the year 2020.[3] Road traffic injury is one of the leading causes of death worldwide resulting in more than 1.27 million deaths; almost equal to the number of deaths caused by HIV/ AIDS, tuberculosis and malaria combined. In addition, road traffic crashes are estimated to cause 20 to 50 million non-fatal injuries every year. The road crashes are predicted to become the fifth leading global cause of death by 2030, unless immediate action is taken.[4]

Besides creating enormous social costs for individuals, families and communities, road traffic injuries place a heavy burden on health services and economies. The economic cost of road crashes and injuries is estimated to be 1% of Gross National Product (GNP) in low-income countries, 1.5% in middle-income countries and 2% in high-income countries. The global cost is estimated to be US$ 518 billion per year. Low-income and middle-income countries account for US$ 65 billion, more than they receive in development assistance.[5] About 90 percent of the 1.3 million deaths and 50 million injuries from road traffic crashes worldwide each year occur in low- and middle-income countries, although these countries have only 48 percent of the world's registered vehicles. Increasing motorization and urbanization in these countries could double this toll by 2030.[4]

Road traffic injuries are a major but neglected public health challenge that requires concerted efforts for effective and sustainable prevention. It was in this regard that in 2004 the World Health Organization (WHO) dedicated World Health Day – for the first time – to the topic of road safety.[2] In March 2010 the UN General Assembly proclaimed the period 2011-2020 as the "Decade of Action for Road Safety". The goal of the decade is to stabilize and then reduce the forecast level of road traffic deaths around the world.[6]

As per the annual report 2010 of the National Highways Authority of India, Indian road network of 33 lakhs Km. is second largest in the world and consists of expressways, national highways, state highways, major district roads, rural and other roads. About 65% of freight and 80% passenger traffic is carried by the roads and national highways constitute only about 1.7% of the road network but carry about 40% of the total road traffic accidents. The number of vehicles has been growing at an average pace of 10.16% per annum over the last five years.[7] Road traffic injuries are the sixth leading cause of death in India with a greater share of hospitalizations, deaths, disabilities and socioeconomic losses in young and middle-age populations.[8] In India motor vehicle population is growing at a faster rate than the economic and population growth. The surge in motorization coupled with expansion of road network has brought with it the challenge of addressing adverse factors such as the increase in road accidents. Road Accidents cases in the country have marginally increased by 0.7% during 2013 compared to 2012. It is observed that the rate of deaths per thousand vehicles has decreased marginally from 1.4 in 2009 to 0.9 in 2013, as the number of vehicles in the country has increased by 78.0% and the quantum of Road Accidents has increased by 5.1% during the same period.[9] According to the report published by Government of India, 51 cases of Road Accidents took place every one hour in 2014. It was found that deaths due to Road Accidents in the country increased by 2.9% during 2014 over 2013. [10]

Sikkim, the second smallest state in term of areas with 7096 sq. km. constitutes 0.22 per cent of India's geographical area. [11] According to 2011 provisional Census report, it is the least populated state in India with a population of 607,688 in which 52.9% are males and 47.1% are females. The population of Sikkim constitutes 0.05 percent of total population of India. The administrative structure of the state constitutes 4 districts, 9-sub division, 452 villages and 9 towns. The state's urban population increased from 11.1% in 2001 to 24.97% in 2011, an increase of 13.9 percentage points while the increase in urban population for India as a whole has been just 3.4 percentage points between 2001 and 2011. Sikkim has the highest urban population growth rate of more than doubled its urban population, showing a 153.34 per cent rise and recorded a declined at 5.2 per cent in the rural population during 2001-11.[12] According to the various reports of "Accidental and Suicidal Deaths in India' published by Ministry of Home Affairs, Government of India indicates that rate of deaths per 100 cases of Road Accidents was highest in Sikkim (225.6) compared to 26.8 at the national level in 2006. The rate of accidental deaths per thousand registered motors vehicles was highest in Sikkim at 3.8 compared to 1.5 at the national level in 2001 and its became second highest in Sikkim at 2.4 as compared to 1.2 at the national level in 2010. It was highlighted that the rate of accidental deaths per thousand vehicles was highest in Arunachal Pradesh at 5.7 followed by Sikkim

(3.7), as compared to 1.2 at the national level in the year 2011. The rate of deaths per 100 cases of road accidents was highest in Nagaland (112.5), followed by Sikkim (82.2) in forth rank as compared to 31.1 at the national level in 2011.The same report also said that 52.5% accidental deaths in Sikkim were due to RTA which was higher than the national share of 37.3% in 2011. In 2013 Sikkim had the highest percentage increase of accidental deaths 93.8% in 2013 as compared to 2012 though the numerical increase was only 152. The rate of deaths per 100 cases of road accidents was highest in Daman & Diu (103.3) followed by Nagaland (89.7), Meghalaya (87.6) and Mizoram (85.1) as compared to 31.0 at the national level. It was 27.9 deaths per 100 cases in Sikkim. It was also observed that the accidental per thousand registered vehicles was highest in Bihar and Sikkim at 1.6 each followed by West Bengal (1.5).[9] Road Traffic Accidents are very high in all the seven north east states of India as per the various report Published by Ministry of Home Affairs, Government on India.

MATERIAL AND METHOD

The present study was a retrospective study. Data were extracted from the various annual report of "Accidental and Suicidal Deaths in India'' published by National Crime Records Bureau (NCRB), Ministry of Home Affairs, Government of India. Proportion and Chi-square test were used to identify the significant association between the RTAs and the variables selected in the study. Data were analyzed using SPSS for Windows Version 16.0 (SPSS Inc; Chicago, IL, USA).

OBJECTIVES OF THE STUDY

To describe the trends of RTAs, the incidence of injured and death rates due to RTAs

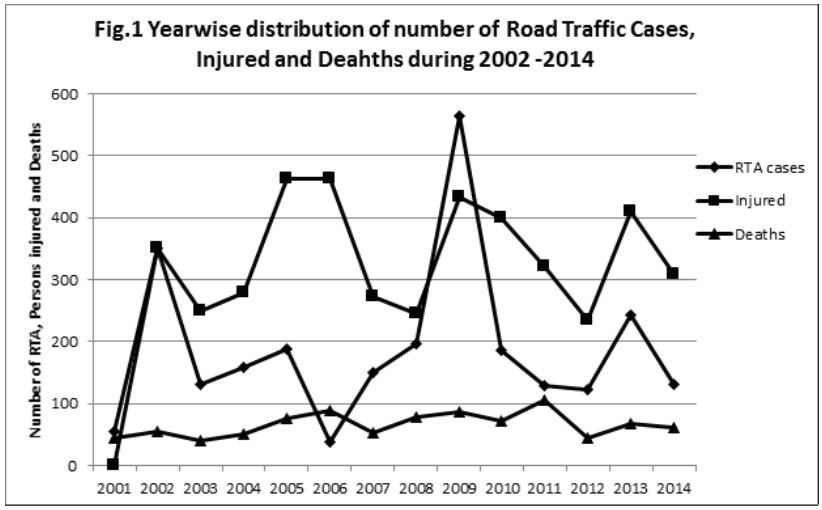
To find out the significance association between the sex differentials in injured and deaths rates, types of the Vehicles involved in RTAs

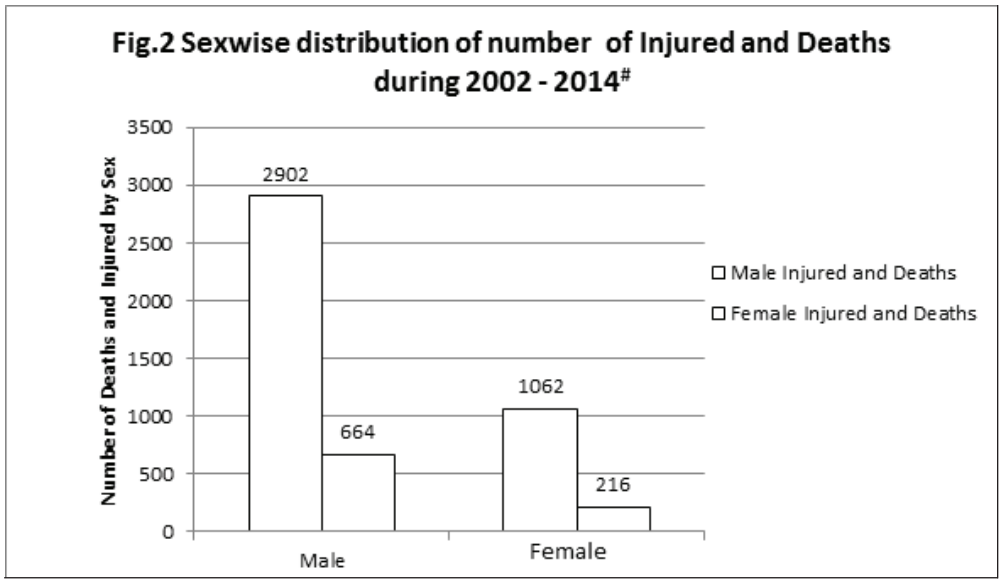
FINDING

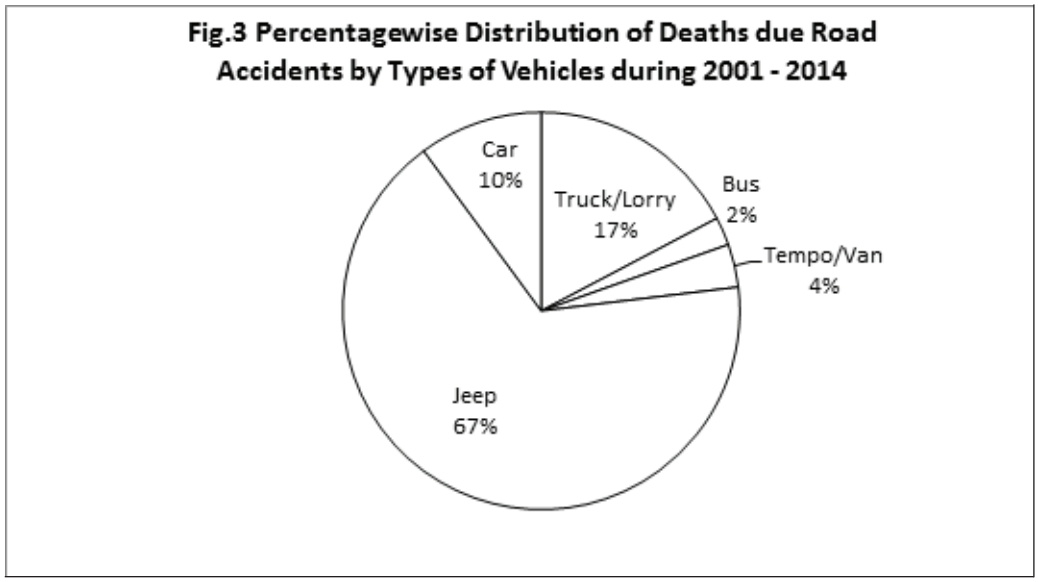
A total of 2646 RTAs were reported during the study period. The highest RTA occurred in 2009 accounting 564 (27.9%) of total RTAs.. The minimum road accidents were reported in 2006 but it's contributed the maximum 226 death rate due to road accidents per 100 cases. The overall increased in RTAs was 136% over the study period. Of these 2646 RTAs, 3964 persons were injured and 925 died giving an injured rate at 40 and 35 deaths per 100 RTA during 2001 to 2014. The proportions of male injured and killed due to RTAs were 2902 (73%) and 664 (75%) respectively while for women it was 1062 (27%) and 216 (25 %) respectively of the total such injuries and death. The ratio of male to female injured was 2.7: 1 while for deaths it was 3.1:1. No significance association existed between the sex and the frequency of injured and deaths due to RTAs ($\chi 2 = 1.87$, $P = 0.17$). Figure 1 and 2 showed the trends of injured and deaths and the sexwise differentials in injured and deaths due to RTAs during 2001 to 2014.

Sex wise figure was not available for 2001

Figure 3 indicate that Jeep accident 437 (67%) was the highest among the various types of vehicles 437 (72.6%) followed by Trucks/lorry 99 (16.4 %) and Car 41 (6.8%). It was minimum 15 (2%) by Bus. Significant association were observed between types of Vehicles involved in RTAs ($\chi^2 = 6.6$, $P < 0.001$).







DISCUSSION

A total of 2646 RTAs occurred during 2001 to 2014. The number of accidents increased from 55 cases in 2001 to 130 in 2014, an increase of 136% over the study period. The highest RTA occurred in 2009 accounting 564 (22.4%) of total RTAs. The minimum RTA was reported in 2006 (36) but it's contributed the maximum number of 88 deaths rate per 100 RTA cases during these years. In 2001, the number of RTA in India was 323.7(in'000), an increase of 5.0% as compared with the previous year 2000.[9] In a study conducted in Bhopal, revealed that a total of 1268 RTA cases were reported during 2009 to 2011. There were 405 cases of RTA in 2009, 445 in 2010 and 418 in 2011. The percentage change in RTA was found 3.2% during the study period.[13]

It was observed that a total of 3964 persons were injured and 880 deaths occurred giving an injured rate of 40 and mortality rate of 35 per 100 cases in the state during 2001 to 2014. There were 12% declined in injured rate while deaths rate increased 38% due to Road Accidents during the period. The rate of deaths per 100 cases of Road Accidents was highest in Sikkim (225.6) compared to 26.8 at the National level in 2006. The Road Accident record in India is among the worst

in the world, with an estimated 125,000 fatalities every year and India's account for 10 per cent of the world's road fatalities.[14] In a study conducted in hilly regions of northern India found that there were 512 deaths and 862 disabilities in the year 2010 and 527 deaths and 847 disabilities in 2011. The severity of the RTA calculated as the number of patients killed per 100 accidents was found to be 62. [15]

In the present study, the ratios of male to female injured and male to female deaths were 2.7:1 and 3.1:1 respectively. All national reports and independent studies conclusively point out that males were much more exposed to RTAs than females. Similar results were also reported in Delhi, Maharashtra and Haryana and Pondicherry.[16, 17,18,19] However, in Delhi, it was reported that 80% the victims involved in RTAs were males.[20] Similar observations were made by researchers from neighboring country Nepal.[21, 22] The highest numbers of Vehicles involved in RTA was Jeep 67% followed by Truck/Lorry 17% and minimum at 2% by Bus in this study. More or less similar observations were reported by others studies conducted in India and Nepal. [16, 17, 20, 21]

CONCLUSION

The number of RTAs increases more than double during the study periods. However, it was observed that there was a declination in injured rate while deaths rate increased due to Road Traffic Accidents in the state. The present study also revealed that males outnumbered the females in both injured and deaths rates though it was not statistically significance. Jeep was the most significant Vehicle involved in Road Traffic Accidents. Since the Road traffic Accidents is a preventable and partially predictable to some extent, it is therefore necessary to counteract this increasing threat to life by revising the traffic laws and regulations and to improve the condition of road of this hilly state.

Conflict of Interest: None

Source of Funding: Self

Ethical Clearance: Not required since it is a secondary data based study

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Study of Suicidal Deaths at Rajiv Gandhi Institute of Medical Sciences, Kadapa, Andhra Pradesh

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ABSTRACT

. Every suicide is a tragedy that affects families, communities and countries and has long-lasting effects on the people left behind. A study of suicidal deaths in a population gives an idea about their thinking pattern and impulsive tendencies, education, mental health, chronic annoying diseases and socio economic status. This study includes 294(31.54%) suicidal deaths occurred in the course of two years. Males (63.3%) outnumbered the females (36.7%); The most common age group involved was 21-30 years which included 31.7% males and 34.3% females. Most people were from rural area (65.65%) and were married (63.60%). Common method selected was poisoning (41.5%) followed by self immolation (32%), railway suicidal deaths (14.3%), hanging (11.2%) and fall from height (1.02%). Suicidal deaths can be curtailed by the collective approach of family members; improving strategies which are region specific and conducting social welfare programmes by the Government and other social groups like Non Governmental Organizations, Self Help Groups. Most important thing is to bring the change in thinking process of the people so that they are able to face stressful situations of life.

Keywords: *Suicide, poisoning, drug abuse, hanging.*

INTRODUCTION

Suicide is a serious public health problem; To decrease the severity of this problem comprehensive multisectoral suicide prevention strategy is needed. In the WHO Mental Health Action Plan 2013-2020, WHO Member States committed themselves to work towards global target of reducing suicide rate in countries by 10% by 2020.[1]

Most of the global suicides occur in low- and middle-income countries. Suicidal deaths emerging as major health problem and needs attention from the medical profession and the public health agencies. A prior suicide attempt is the single most important risk factor for suicide in general population. Irregular menstrual cycle was significantly associated with increased risk of suicidal ideation in female gender. In this globalized world, change in the life style, increase in stress, problems at work place and home, dowry problems and domestic violence have only added to the numbers. The nature of Suicide may be poisoning, self immolation, hanging, drowning, fall from height and many others. In addition, experiencing conflict, violence disaster, drug abuse, a sense of isolation is strongly associated with suicidal behavior. Suicide rates high amongst vulnerable groups who will experience discrimination, such as refugees and migrants; prisoners. Suicides are preventable. Every 40 seconds a person dies due to this act somewhere in the world and many more attempt suicide. These Suicides occur in all regions of the world and throughout the lifespan and is the second leading cause of death globally among young people 15-29 years of age. [1]

OBJECTIVES

To identify common method of suicide among study subjects

To analyze the probable reasons for suicide

To suggest preventive measures

MATERIALS AND METHOD

The present study conducted among medico legal autopsies held at Rajiv Gandhi Institute of Medical Sciences, Kadapa District, Andhra Pradesh, from 1st January 2012 to 31st December 2013. Our Study included 294 cases of suicidal deaths out of total 932 autopsies (Figure-1). The data was collected regarding the age, sex, religion, marital status, educational status, region, nature of suicidal death, visible causes and predisposing conditions for suicide by interrogating relatives, friends of the victim and reviewing panchanama, hospital records and other relevant documents. The collected data compiled in the form of Figure, tables and inference was drawn.

RESULTS

The present study included 294(31.54%) cases of suicidal deaths out of a total of 932 autopsies during 1st January 2012 to 31st December 2013 (Figure-1). In the age and sex wise distribution of cases, the age group of 21-30 years included the maximum number of deaths 59 males(31.7%) and 37 females (34.3%) which was followed by the age 31- 40 years, which included 47 males (25.3%) and 30 females (27.7%) (Table-1)

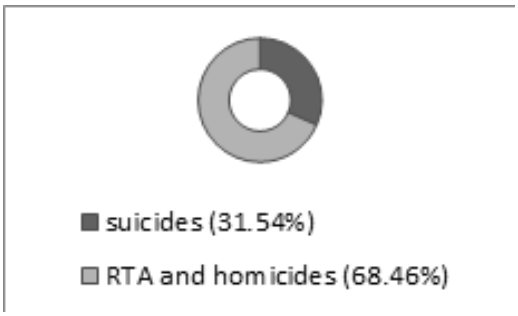

Figure 1: ratio of suicide cases to total cases

Table: 1 Age and Sex wise distribution of cases

Age	Male(%)	Female(%)
1-10		
11-20	35(18.8%)	17(15.7%)
21-30	59(31.7%)	37(34.3%)
31-40	47(25.3%)	30(27.7%)
41-50	29(15.6%)	09(8.4%)
51-60	06(3.2%)	02(1.9%)
61-70	09(4.9%)	13(12%)
>70	01(0.5%)	0
Total	**186(63.3%)**	**108(36.7%)**

Table 2: Marital status of the cases

	Male	Female	Total	percentage
Married	122	65	187	63.6%
Unmarried	64	43	107	36.4%
Total	**186**	**108**	**294**	**100**

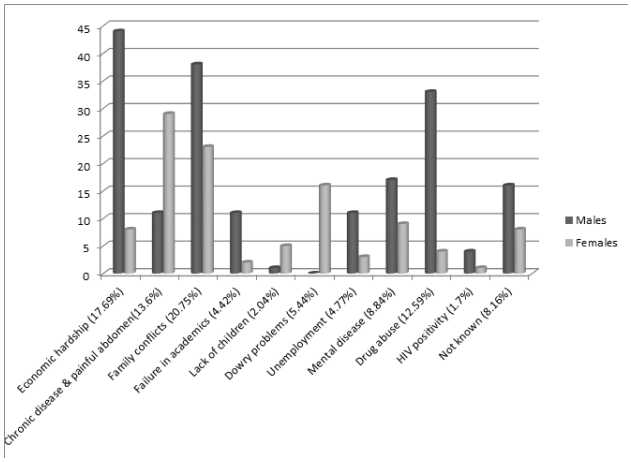

Figure 2: Predisposing factor for suicide

Table 3: Nature of suicide

	Males	Females	Total	Percentage
Poisoning	77	45	122	41.5%
Self immolation	43	51	94	32%
Railway suicidal deaths	38	04	42	14.3%
Hanging	26	07	33	11.2%
Fall from height	02	01	03	01.02%
	186	108	**294**	1oo

Table : 4 Area wise distribution

	Male	Female	Total	Percentage
Rural	119	74	193	65.65%
Urban	67	34	101	34.35%
Total	**186**	**108**	**294**	**100**

Table :5 Literacy wise distribution

	Illiterate	Primary education	Secondary education	Graduates and post graduates
Male	54	72	44	16
female	47	31	21	09
Total	101(34.4%)	103(35%)	65(22.1%)	25(8.5%)

Table:6 Religion wise distribution

Religion	Number	Percentage
Hindu	245	83.4%
Muslim	038	12.9%
Christian	011	03.7%
Total	294	100 %

The study included 186 males (63.3%) and 108 females (36.7%) (Table-1).The maximum number of deaths was among the married persons (63.6%) as compared to unmarried persons (36.4%) (Table 2).The most common method adapted in our study was Poisoning (41.5%) followed by Self immolation (32%), Railway suicidal deaths (14.3%), Hanging (11.2%) and Fall from height (1.02%) (Table 3).

In our study 101 (34.35%) cases were from urban background and 193 (65.65%) were from rural area (Table 4).Suicide cases are more in Illiterate and low education people when compared to higher education people (Table 5). Victims are more in Hindu religion (83.4%) followed by Muslims (12.9%) and Christians (3.7%) (Table 6).

DISCUSSION

Suicidal deaths are second leading cause of death next to road traffic accidents. In our study we found Increase in family disputes, monetary problems, chronic diseases, drug abuse, dowry problems and domestic violence, failure in studies and in career, depression, inability to adjust to problems and importantly living alone are leading causes for suicidal deaths. In farmers chronic debts associated with crop failure or alcoholism are triggering factors.

Suicide is highest in the age group of 21-30 and 31-40 years, which represent the productive and most active section of community. The age group of 21-30 years included the maximum number of deaths 59 males(31.7%) and 37 females (34.3%) which was followed by the age 31-40 years, which included 47 males (25.3%) and 30 females(27.7%), which is similar to study by Santosh C.S[2] and Singh P[3].In study by S.S.Kadu also same age group people outnumbered than other age group[7] .

Ours is a male dominated society and males are considered to be the bread winner for the family. Stress related to overwhelming responsibility may be the predominating factor for suicidal deaths in males than the female; Male (186) predominated female (108) in our study. These findings are similer to studies by Santosh C.S[2] , Singh P[3] , Behera A[4] , Singh D[8] .

Cases from rural area193 (65.65%) are more when compared to urban area 101(34.35%), which is similar to the study of Santosh C.S[2] and study by Sharma B.R[5].

The maximum number of deaths was among the married persons (63.6%) as compared to unmarried persons (36.4%). This is similar to study in Behera A and colleagues[4] and study by Santosh C.S[2].

Maximum numbers of victims were Hindus (83.4%), followed by Muslims (12.9%) and Christians (3.7%). It is similar to the study conducted by Santosh C.S[2] and study by SS Kadu[7].

The most common method adapted for suicide in our study was Poisoning (41.5%) followed by self immolation (32%), railway suicidal deaths (14.3%), hanging (11.2%) and fall from height (1.02%); which

is similar in studies conducted by Dhattarwal SK[6] and Sharma BR[5] where majority of the people choose poisoning followed by self immolation but in contrary with study of suicides by P Singh in Imphal[3] where most of the cases choose hanging followed by poisoning.

People up to primary education (35%) and illiterates (34.4%) are outnumbered when compared to higher educated people. This finding is contrary with study by Behara A and colleagues[4] , where victims are more from higher education.

About 25% of female were in menstrual period. Family disputes are playing major role when compared to mental illness or physical illness, with this it is clear that disharmony in family members provoke to take grave decision. Majority of the victims attempted when they are alone[4] .

People with higher education and from urban region have less suicidal rate compared to people with low education and with rural background, because the former group has more ability to tackle the stressful situation and also they have better family support.

Commonest mode of suicide is poisoning than any other methods, It may be due to easy availability of the substance, simplicity of the act, guaranteed and painless death. Most of the alcoholic's preferred poisoning than any other methods. Nature of suicide depends upon the circumstances, and ease of availability of the material for suicide; Kadapa is a district head quarter with good railway transport, that's why Railway suicidal deaths was 3rd leading cause.

CONCLUSION

Suicides are preventable. Measures to curb suicide attempts are: Early identification, medical and psychological management of people with mental and drug abuse disorders, chronic pain and acute emotional distress; Decreasing access to the means of suicide (e.g. pesticides, certain medications, firearms,); Commissioning alcohol policies to decrease harmful use of alcohol; Training of health workers in the management of suicidal behavior; Follow-up care of people with attempted suicide and provision of family and community support. Suicide prevention efforts requires coordination and collaboration between multiple sectors of society, those include health sector and other sectors such as education, agriculture, labour, business, justice, law, politics and the media. These efforts must be comprehensive and integrated.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Institutional Ethical Committee, Rajiv Gandhi Institute Of Medical Sciences, Kadapa, A.P

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Evaluation of Biomedical Waste Generation and Management: A Case Study in Odisha State, India

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ABSTRACT

Biomedical waste is the waste that is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining there to, or in the production or testing of biological components. The Biomedical waste treatment and disposal are to be done very carefully, as it is infectious in nature. The present study has been initiated to assess the Biomedical Waste generation and management in Odisha state, India, with the objective to conduct a detailed survey of different Health Care Units (HCUs) and also to record and assess the current scenario of the state Bio-Medical Waste generation & management conducted through primary data analysis via questionnaires and physical quantification methods and secondary data analysis in health care units of all 30 districts of Odisha. As per the field study carried out during the period, there were 1545 bedded and 9408 non-bedded HCUs, which together produced an approximate quantity of 4368 MT/annum of BMW. Around 828 MT/annum (19%) of the total biomedical waste so generated was treated by the existing Common Biomedical Waste Treatment Facilities (CBWTFs) functioning in the state, while the remaining 81% of this waste needs to be attended and treated. The study proposes the need for installing four new CBWTFs in different locations of the state in order to treat the larger portion of the unattended biomedical waste and also reveals the lack of proper BMW management systems and awareness regarding biomedical waste management in various HCUs.

Keywords*: waste inventory, Common Biomedical Waste Treatment Facility (CBWTF), Health Care Units (HCUs), Odisha state.*

INTRODUCTION

The term 'health-care waste' as preferred by the World Health Organization[1] or the more commonly known term, 'biomedical waste' (BMW) includes all the waste generated within health-care facilities, research centers and laboratories related to medical procedures[2]. With the increase in population, there has been a tremendous increase in the medical care facilities that have come up in the past few decades. Subsequently, the biomedical waste so generated has recently emerged as an issue of concern not only in the health care units but also a major concern for environment. A majority of around 75-80% of the waste generated from health care units is 'non-hazardous' while, the rest 20-25% of it may be regarded as 'hazardous' which is likely to pose a variety of environmental and health related risks[1]. This hazardous portion of BMW has been primarily grouped in to various broad categorized like sharps, infectious, pathological, pharmaceutical, cytotoxic, chemical & radioactive wastes which have been further categorized based on the specific characters[3] . The non-hazardous waste is the waste that does not contain any infectious agents, hazardous chemicals or radioactive substances and any sharp material. It is more similar to municipal waste from hospital like paper, cardboard, plastic,

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discarded food, metal, glass, plastic and wood, majority of which can be recycled[4]. In general, the composition and proportion of hazardous and non-hazardous waste is often characterized by the type and size of the health care facility and the health care activities of the units[5].

Though, comparatively a lesser portion of the total BMW, the hazardous BMW poses potential threat to the environment and also to the people handling or exposed to it. This waste may contain potentially harmful microorganisms which can infect hospital patients, health care workers and the general public[6,7]. Chemical, pharmaceutical and radioactive BMW on the other hand, though may seem less hazardous than the infectious pathological waste may become a magnified threat on a prolonged period if not attended and treated properly[8].

Generation of BMW in terms of quality and quantity differs with each HCU and depends on various factors like the type of health care facility, specialization, proportion of patients treated on a day-care basis, number of inpatients, proportion of reusable items employed in the hospital etc. It also depends to a great extent on the level of national income and the type of facility concerned[9]. Management of healthcare waste is very important for keeping living environment healthy. Improper management of health care waste can have both direct and indirect health consequences for health personnel, community members and to the environment[3]. The indiscriminate and uncontrolled dumping of such hospital wastes in water streams, tanks, barren lands, along river beds etc., or open cast burning can lead to serious problems related to air, soil and water pollution[10].

Many countries lack documental rules related to BMWM. India is one among the first few nations to implement BMWM rules[11]. In the year 1998, the "Biomedical Waste Management and Handling Rules" were laid down by the Ministry of Environment and Forests under the Environmental Protection Act, 1986. These rules were later amended in the years 2003, 2011[12] and finally latest revision was in 2016. The main objective of this study was to conduct a detailed survey in different HCUs and also to record and assess the current scenario of the state BMW generation & management in Odisha. The work reported in this paper is a detailed study conducted first of its kind on various health care units, types and quantity of biomedical waste generated from each unit, type of treatment method suggested, available and required treatment facilities in future keeping in view of the population associated BMW projections conducted for all districts of a state in India.

MATERIALS AND METHOD

The methodology of work progress and process chosen to complete the study included: (a) Initial Assessment, (b) Baseline survey on "generation & Physical Composition of waste" and "Questionnaire Survey" (c) processing of collected data using statistical software.

Method for quantification and projection of waste : Since physical quantification of the waste generated in all HCUs in the state of Odisha is not possible, around 53 HCUs of different categories were selected based on bed strength and number of people being treated. The results that were obtained were recorded and analysis was carried in the Statistical software (MS-Excel). The quantity of waste generated was calculated using the following formulae. The waste projection up to the year 2030 was calculated according to the formula suggested by Tripathi and Shukla (2016)

Bedded HCUs:

$$\text{Amount of waste generated per bed per day (Kg)} = \frac{\text{Quantity of waste generated (kg)}}{\text{Bed occupancy}}$$

Non-Bedded HCUs (pathological laboratories):

$$\text{Amount of waste generated per bed per day (Kg)} = \frac{\text{Quantity of waste generated (kg)}}{\text{No. of specimens tested in a day}}$$

Non-Bedded HCUs (clinics/dispensaries):

$$\text{Amount of waste generated per bed per day (Kg)} = \frac{\text{Quantity of waste generated (kg)}}{\text{No. of patients treated in a day}}$$

FINDINGS

Odisha state Profile: Odisha is the 9th largest state by area and 11th largest by population in India, located on the east coast, flanked by West Bengal and Jharkhand in North, Jharkhand and Chhattisgarh in the West and Andhra Pradesh in the south. It has more than 480 km long coastal line. Odisha has been divided into 30 districts. As per Census 2011, the total population of Odisha as of is 4,19,74,218. Of this, the rural population is 3,49,70,562 and the urban population is 70,03,656. The growth rate of population in Odisha in the last decade (2001-2011) is around 14.0%. The population of Orissa forms 3.47 percent of India in 2011.

Categorization of Health Care units: Odisha state has a vast network and wide spread distribution of health care units. For study purpose, the health care units in Odisha state have been categorized as 'bedded' and 'non-bedded' health care facilities. It is a known fact that bedded health care facilities have more waste generation than non-bedded facilities. Bedded units are further classified into public, private, specialty and voluntary hospitals, which further hold the hospitals from various levels of district and departments like railway, military, ESIC, CSR, Jail, Police hospitals. The non-bedded are classified into public and private hospitals.

Bedded HCUs of Odisha State: The survey revealed the presence of around 1545 bedded HCUs of which 916 belong to private while 629 to public sector. Total number of beds in bedded HCUs was 37385 of which private were 20393, Public were 16992. There were no private bedded HCUs in Deogarh and Malkangiri. Number of HCUs was highest in Cuttack and lowest in Boudh. Number of beds in bedded HCUs was highest in Khurda and lowest in Boudh.

Non-bedded HCUs of Odisha State: There were 9408 non-bedded HCUs in different districts of Odisha State. These non-bedded health care units consisted of around 6688 sub centers, 540 veterinary dispensaries, 435 pathological laboratories, 251 diagnostic centers, 250 clinics, 1127 primary health centers, 27 dental clinics, 79 blood banks and 11 research centers, which generate biomedical waste.

Quantification of Biomedical Waste Generated from Odisha State: The study revealed minimum generation of wastes belonging to categories 3 and 5 which included microbial laboratory stock cultures, live/attenuated microorganisms and discarded medicines, cytotoxic wastes respectively among various categories of BMW which was around 0.001 to 0.35 Kg BMW/day. On the other hand major waste belonged to the categories 6 & 7 which included solid wastes like cotton, dressings, plasters, bedding, disposable items other than sharp like tubing, catheters etc., which was around 0.09 to 0.53 kg BMW/day. Among various types of HCUs, very large and large bedded HCUs under private sector with 300 above and 150 to 300 beds respectively were the major contributors of waste, estimated to be around 0.58 and 0.45 kg BMW/day while PHCs contributed to minimum amount of BMW, which was around 0.09 kg BMW/day. Among the non-bedded HCUs, dental and veterinary hospitals were major contributors of BMW with quantities around 0.16 and 0.14 kg BMW/day.

Total BMW generation from various bedded and non-bedded HCUs of Odisha state: The data revealed that the districts Khurda, Cuttack, Sundargarh, Ganjam and Sambalpur were the highest producers of BMW which generated around 1025, 666, 407, 365 and 220 metric tons of biomedical waste per annum. Keonjhar, Puri and Angul were among the districts which produced nearly 100 MT of BMW per annum. All the other districts produced less than one metric ton of BME/annum. Annual BMW generation (Bedded & Non Bedded) by Odisha state is estimated to be around 4368 MT. Table – 1 gives the detailed information regarding various bedded and non-bedded health care units and the quantity of BMW generated by them in each district of Odisha.

Table - 1 Details of bedded and non-bedded HCUs and the biomedical waste generated (Kg/day) from different districts of Odisha state

District	Total bedded HCUs		Total non-bedded HCUs	Total BMW Generation from Bedded and Non Bedded HCUs
	No	Beds	No	Kg/annum
Angul	48	947	235	102264.13
Balasore	49	864	387	86822.8
Baragarh	44	692	295	72403.68
Bhadrak	29	580	248	57745.27
Bolangir	38	716	348	81186.28
Boudh	7	145	92	15469.9

Cont... **Table - 1 Details of bedded and non-bedded HCUs and the biomedical waste generated (Kg/day) from different districts of Odisha state**

Cuttack	294	5935	531	666533.62
Deogarh	7	150	53	14141.05
Dhenkanal	35	591	222	55030.66
Gajapati	22	670	169	57841.04
Ganjam	158	3360	629	365743.26
Jagatsinghapur	28	513	256	51717.67
Jajapur	33	669	349	67834.8
Jharsuguda	30	730	101	79988.54
Kalahandi	46	1166	415	142300.18
Kandhamal	31	805	291	65120.16
Kendrapara	23	462	425	45722.34
Keonjhar	49	1107	307	110024.6
Khordha	168	6809	527	1025872.3
Koraput	27	728	275	80922.32
Malkangiri	13	311	670	39215.07
Mayurbhanj	48	977	402	91080.03
Nabarangpur	15	364	234	44199.77
Nayagarh	38	657	146	60631.98
Nuapada	13	431	223	52256.98
Puri	64	1079	334	105178.48
Rayagada	28	658	306	81808.86
Sambalpur	61	1993	267	220585.85
Sonepur	13	226	130	20826.33
Sundargarh	86	3050	541	407308.87
Total	**1545**	**37385**	**9408**	**4367776.84**

BMW Treatment and Disposal Facilities in Odisha: There are 5 CBWTFs in the state of Odisha which have incinerators, autoclaves, microwaves and shredders. Table – 2 gives the data on the areas/ districts covered and the quantity of BMW treated by each treatment facility. The data reveals that around 2.2 MT of biomedical waste per day which accounts to around 828 MT BMW/annum is being treated by the five treatment plants collectively, which is around 19% of the total BMW generated in Odisha.

Table – 2 Existing CBWTF Providers in Odisha State

S. No	Name of CBWTF	Cities Covered	Approx. No. of HCUs in Contract	Approx. Amount of Waste Treated in (Kg/Day)				Total Waste Treated	
				Incinerable	Autoclave	Shredder	Deep Burial	Kg/day	Kg/annum
1	M/s. Sani Clean	Bhubaneswar Cuttack	289	545	290	225	-	1060	386900
2	M/s. Lifeline Pharma	Berhampur Gopalapur Ganjam	44	182	26	23	-	231	84315
3	M/s. Mediaid Marketing Services	Cuttack	14	142	151	68	19	380	138700
4	M/s. Mediaid Marketing Services	Rourkela, Sundargarh, Sambhalpur, Deogarh	47	201	38	38	24	301	109865
5	M/s.Biotech Solutions	Sambalpur Burla, Bargarh & Jharsuguda	41	211	52	34	-	297	108405
Total								**2269**	**828185**

Waste Projection: The population and waste generation projection studies indicated an increase in biomedical waste generation by 34% by the year 2030, which is expected to be around 62,25,443 kg with respect to the BMW generated in the year 2013. The graph representing the projected generation of BMW from 2013 to 2030 is given in Fig. 3.

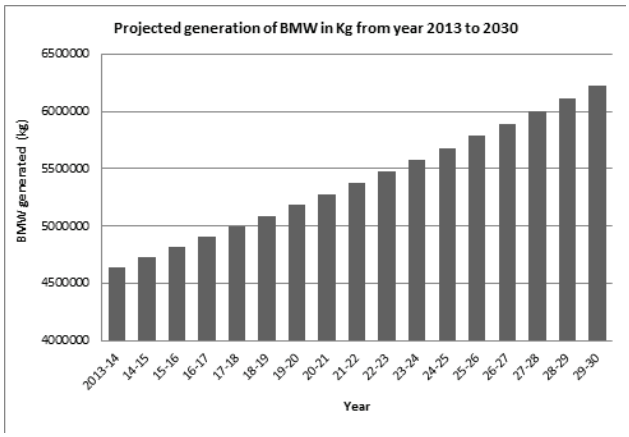

Figure1: Projection of generation of BMW up to year 2030

CONCLUSION

Based on the study, it was observed that most of the health care units (HCUs) in different districts have no proper BMW management system. Mixing of general and infectious waste, to more or less extent has been a common feature for these HCUs. Since, segregation of different categories of waste at source is most important in BMW management, the problem deserves utmost attention. Based on the observations, it was suggested that awareness seminars, workshops should be conducted for all health care workers. Educative and easily understandable posters and sign boards are suggested to be installed sufficiently in and around HCUs for the awareness of the public. It was also suggested for installation of 4 new CBWTFs, one in each Ganjam, Khurda, Cuttack and Sundargarh districts with a capacity to cater a minimum of 3500 beds. The facilities were suggested to be installed in the vicinity of approximately 150 Km from the HCUs.

On the other hand it was observed that there are many HCUs located in rural areas for which bringing BM waste to CBWTF is not feasible due to the location at remote distance, time for collection and transport would exceed 48hrs and would not be economic feasible. In the Districts where setting up of CBWTF is not feasible, it is suggested to enhance capacities of treatment facilities so that waste from the other HCUs could be efficiently diverted and treated.

From the present study, it is concluded that though the infrastructure for Bio-Medical Waste (BMW) treatment in the Odisha state is partly adequate in the highly dense waste generating areas/districts, steps need to be taken to cover other parts/districts (North and South) of the state. Stakeholders have started to resolve the issues and improve Biomedical waste management, overall status of management of BMW in the HCUs either it is government owned or private and needs improvement.

Conflict of Interest - There are no conflicts of interest associated with this publication

Source of Funding – Self

Ethical Clearance – The present report does not include any experimentation on human/animal. There are no ethical issues associated with this publication.

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Effects of the Mortuary on the Surrounding Environment

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ABSTRACT

Mortuary is a place where the dead bodies are stored and dissected for medico-legal purposes. In the present day, the mortuary is also doing other works as embalming the bodies. There are several areas in mortuaries, which are potential to produce infections and foul smells. As the bodies start decomposing, the foul smell increases. Bacteria are also abundant in these areas. Biological waste is produced a lot. There are areas to preserve the viscera, and the belongings. Maggots and other insects, all add to the worsening. Apart from the above factors, the mourning prevailing near the mortuary disturbs the environment. The hue and cry made by the relatives, attendants, public representatives and the Police, makes disturbances in the minds of the people moving in that place. Ultimately the environment in and around the mortuary is becoming hazardous to health, both in physical and mental level.

Keywords: *mortuary, environment, bacteria.*

INTRODUCTION

Death of a human being, under unnatural circumstances invites the attention of the Law. Subsequently, a Medico legal autopsy is done on that dead body to answer the questions posed by the Investigating Officer. It needs a place to conduct such autopsy. Most of the times a permanent setup will be there in hospitals where the autopsies are conducted regularly, and we call that area as Mortuary. Mortuary is a Place, where not only autopsies are conducted but also the dead bodies are preserved. Hence a mortuary must contain facilities which can meet the above needs. All mortuaries may not have the same amount of work load. Hence it may not be possible for the Government to provide all facilities to all mortuaries where the medico-legal autopsies are conducted. In some states the medico legal autopsies are conducted even in Private hospitals where there is permission for such procedures. The managements of those hospitals also may not provide all the requirements of so called ideal mortuary.

Apart from that, the techniques of conducting the medico legal autopsies are changing by time, because of the advancement in the Science and Technology and also in the quality of crime. Keeping in view of the above fact, the facilities which are present today may not be sufficient to cater tomorrow's requirement. In teaching hospitals, the mortuary is a classroom. It must also have facility to accommodate the learners, and the teaching-learning aids.

That day is not far away, when an autopsy on a dead body will be completed without dissection, with answers to all questions. It will be by so called "Virtopsy"[1]. When such virtual autopsies are encouraged, the scene of mortuary will be entirely changed. Whether the present mortuary can manage that day? For answering the above doubts, it is thought to conduct one study related to the standards of present mortuaries, and to find out the requirements for the future challenges. Hence a detailed survey is needed on the available facilities in the existing mortuaries in the state in different setups, their capacity to meet the demands, their incapacities and lacunae, their ability to adopt any advancements in that setup. However this study is made on the available information provided from different mortuaries of the present day. It may be lacking some important information in regard to the policy matters of the Government. If possible, it will be suggested to the concerned authorities in regard to the improvement of the standards of the mortuary, in the last.

MATERIALS AND METHOD

The study of public health in relation to the mortuary needs a continuous observation and monitoring of the functioning of the mortuary[2]. Health related problems will be seen in the persons working in the area of mortuary, who include:

- Doctors
- Paramedical staff
- Workers of the mortuary
- Scavengers
- Relatives of the Deceased
- Officials
- Public workers
- Public representatives etc..

Apart from the above, there are many fauna which live on the garbage of the biological waste, which include:

- Rodents
- Roaches
- Frogs
- Ants
- Flies and Beetles etc..

The health hazards are seen not only directly on men by the contaminated environment of the mortuary, but also will be carried by the other living organisms.

The details of the above data will be collected by a questionnaire served to the various people coming across the mortuaries. The structural details of the mortuary are also collected.

Inclusion criteria:

- All types of Mortuaries near to Hyderabad are selected
- Opinions expressed by the Doctors working in the hospital are taken
- Opinions of the persons who came to attend these mortuaries are also collected

FINDINGS

Present study is made on the response to the questionnaire supplied to different hospitals, where autopsies are conducted .Three Teaching hospitals, Five Area hospitals and Eight Rural hospitals are selected for the present study.The Teaching Hospitals studied are Osmania Medical College, Hyderabad, Gandhi Medical College, Secunderabad, Kakatiya Medical College, Warangal.

The Area Hospitals studied are of Pargi, Vikarabad, Sangareddy, Jadcherla and Nalgonda.The Rural Hospitals studied are Ibrahimpatnam, Sadshivpet, Zaheerabad, Kohir, Tandur, Medchal, Gajwel and Ramannapeta.

All Teaching hospitals have a permanent structure for conducting autopsies. In one Area hospital there is no permanent structure for mortuary and it is run in GI tin shed. Whereas 5 of 8 Rural Hospitals have a permanent structures for mortuary and in rest it is done under temporary arrangements.

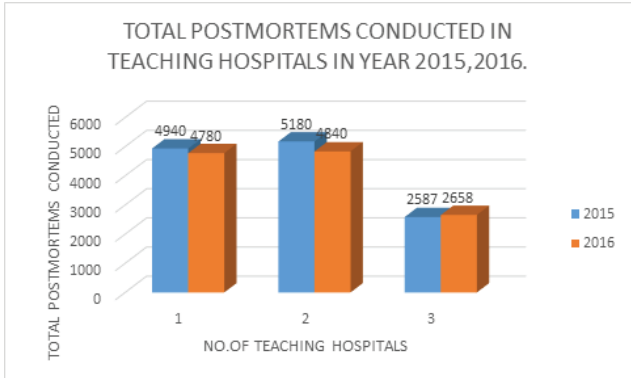

Fig. No. 1. Total number of Post-Mortem examinations conducted at Teaching Hospitals

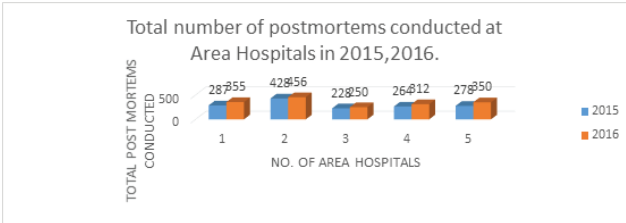

Fig. No.2. Total number of Post-Mortem examinations conducted at Area Hospitals

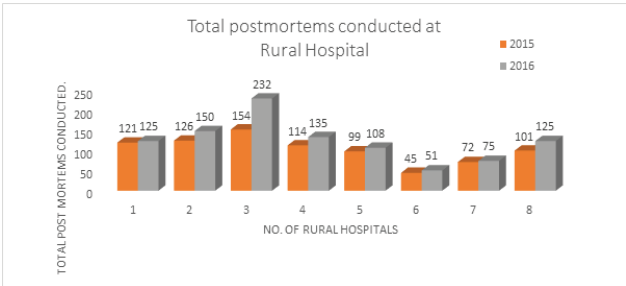

Fig. No.3. Total number of Post-Mortem examinations conducted at Rural Hospitals

Average number of Post-Mortem examinations in Teaching Hospital is varying from 7.1, 13.6 to 14.2 per day. Whereas in Area Hospital it is ranging from 0.6 to 1.2 per day. And in Rural Hospital 0.1 to 0.4 Post-Mortem examinations are conducted per day.

The total number of Doctors working in Teaching hospitals was not made available. But in Area hospitals about 17 to 25 doctors are working. In Rural hospitals the number of doctors is varying from 2 to 6. Doctors qualified in Forensic Medicine are working only in Teaching Hospitals and no other hospital in the surrounding area of Osmania Medical College are having qualified persons. Work load on the mortuaries of Teaching hospitals appears to be decreasing as some more centres in the periphery are identified by the government for conducting the autopsies .

Tab. No.1. Average number of attenders visiting Teaching Hospitals

	Teaching Hospital		
	1	2	3
Average No. of PMEs/ day	13.6	14.2	7.1
Approximate No. of Visitors coming to Mortuary / day	40.0	50.0	70.0
Average No. of attenders / PME	2.9	3.5	9.9

Tab. No.2. Average number of attenders visiting Area Hospitals

	Area Hospital				
	1	2	3	4	5
Average No. of PMEs/ day	0.8	1.2	0.6	0.7	0.8
Approximate No. of Visitors coming to Mortuary / day	6.0	8.0	4.0	5.0	5.0
Average No. of attenders /PME	7.6	6.8	6.4	6.9	6.6

Tab. No.3. Average number of attenders visiting Rural Hospitals

	Rural Hospital							
	1	2	3	4	5	6	7	8
Average No. of PMEs/ day	0.3	0.3	0.4	0.3	0.3	0.1	0.2	0.3
Approximate No. of Visitors coming to Mortuary / day	2.0	3.0	3.0	3.0	1.5	0.5	0.5	2.0
Average No. of attenders /PME	6.0	8.7	7.1	9.6	5.5	4.1	2.5	7.2

The average number of Post-Mortem examinations conducted by each Doctor in Teaching hospitals is varying as 320, 400 and 520. In Area hospitals it is 12 to 20 autopsies are conducted in an year at an average by each doctor. In Rural hospitals the total number of autopsies conducted an year are coming around 20 to 50 by each Doctor.

Tab. No.4 Availability of Sanitation Facility

Type of Hospital	**Sanitation Facility Present**	**Sanitation Facility Absent**
Teaching Hospital	3	0
Area Hospital	3	2
Rural Hospital	2	4

Sanitation facility is present in all Teaching Hospitals. In 40% of Area Hospitals sanitation is available. In Rural Hospital it is seen only in 25% (2 of 8) of them.

Permanent water supply facility is seen in all Teaching Hospitals. It is also seen in all Area Hospitals. But only in 27.5% (3 of 8) rural hospitals permanent water supply is established.

Tab. No.5 Availability of Waste Disposal Facility

Type of Hospital	Waste Disposal Facility Present	Waste Disposal Facility Absent
Teaching Hospital	3	0
Area Hospital	3	2
Rural Hospital	0	8

Waste disposal is done according to the guidelines given by the Bio-medical waste management and handling rules, 2011 in all Teaching Hospitals. It is observed in 30% (2 of 5) of Area Hospitals waste is not properly disposed, In all Rural Hospitals waste disposal facility is absent.

Incineration plant is established in all Teaching Hospitals and they are properly working to reduce the pollution. In only one Area Hospital there is a functioning incineration plant present. No Rural Hospital is having incineration plant. Menace of Rodents is seen in all mortuaries present in Teaching Hospital, Area Hospital and Rural Hospital

Not much data is made available about the outbreak of infectious diseases. There are only two incidences recorded, one about the Tuberculosis and another about the HIV in teaching hospitals. There are 4 cases of HIV reported in area hospitals, in rural hospitals 2 cases of HIV, 2 cases of tuberculosis and 1 case of hepatitis B infection is reported, but they may not be related to the handling of the deceased.

Tab. No.6 Incidence of Addiction to Alcohol, Drugs, Substance abuse among the mortuary Workers

Type of Hospital	No. of Persons Addicted to alcohol	No. Persons Addicted to Drugs	No. Persons Addicted to Substance abuse
Teaching Hospital	9	0	5
Area Hospital	10	3	4
Rural Hospital	6	4	4

Addiction to Alcohol is frequently seen among the mortuary workers and even among the Doctors. So far 9 persons in Teaching Hospitals; 10 persons in Area Hospitals and 6 persons working in Rural Hospitals found to be chronic alcoholics, 3 workers in area hospital and 4 workers in rural hospital are addicted to ganja , 5 workers in teaching hospitals, 4 workers in area hospitals and 4 workers in rural hospitals are addicted to chronic smoking.

In Teaching Hospitals 3 persons committed suicide and one person attempted to commit suicide. One person committed suicide in one of the area Hospital. Two workers committed suicide in rural hospital and one worker attempted suicide.

Familial disharmony is one of the social problems quite frequently seen among the workers of the mortuary. It is also seen in Doctors who regularly visit the mortuary. On records not many cases are found but, 6 persons from Teaching Hospitals had familial problems and two went for divorce. Four doctors from Area Hospitals had familial problems and 3 went for divorce, in rural hospitals 3 doctors and 5 workers had familial problems and 4 workers went for divorce.

CONCLUSIONS

Post-Mortem examinations in Telangana are done in hospitals run by Government only. To decrease the workload in government sector, private medical colleges should be allowed to carry out medicolegal work which will also benefit medical students.

Many hospitals have a permanent structure for mortuary. The structure of the mortuary is not uniform in all hospitals, especially in rural hospitals proper

mortuaries with doctor rooms should be constructed.

Teaching hospitals and Area hospitals are good enough to conduct regular Post-Mortem examination work but number of doctors should be increased.

Spot Post-Mortem examination and exhumations are not infrequent.

No civilian is willing to enter the mortuary, unless their beloved are dead. Waiting area for the dead person's attendants should be kept separate from the place of autopsy to prevent distraction from wailing relatives and to keep calm environment.

Mortuary is disagreeable place for many but is need of the present society. It needs to be improved in providing the facilities to conduct a smooth Medico Legal work.

Many social problems are generated by the improperly maintained mortuaries, the stench generated from decomposing bodies due to improperly maintained freezers, exhaust pipes and poor sanitation of puff rooms cause menace to people of surrounding localities, to overcome this proper care should be taken by higher authorities. Health hazards are not uncommon for the people exposed to the environment of mortuary[3]. Infections carried by rodents is always a menace. All staff involved in the necropsy or coming into contact with materials derived from it should be vaccinated against tetanus, poliomyelitis, tuberculosis and hepatitis B.[4]

Pre-necropsy testing: this should be considered in cases where there is reason to suspect that the body may be infected with a previously undetected category 3 pathogen. In cases where such testing proves positive, the pathologist has a duty of care to the patient and his/her relatives and sexual partners to disclose the information; this is usually achieved via the patient's physician.[5]. The use of appropriate protective clothing and the observance of Control of Substances Hazardous to Health regulations, will protect all who handle cadavers against infectious hazards.[6]

Lack of proper disposal facilities in mortuaries are limiting their working capacity. Renovation of old mortuaries is the need of the day.

Ethical Clearance: Taken From Institutional Ethics Committee, Gandhi Medical College, Secunderabad. Osmania Medical College, Hyderabad, Kakatiya Medical College, Warangal.

Area Hospitals And Rural Hospitals Which Were Selected For Study.

Source of Funding : Self

Conflict of Interest: Nil

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Level of anger, Coping and Factors Influences Anger amongst Adolescents

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ABSTRACT

Purpose: To assess the level of anger, identify the factors influencing anger, coping and to determine the relationship between anger and coping among the adolescents. The findings would help the teachers and parents to recognize what makes them angry and to allow new direction for developing modalities to manage anger. ***Design:*** Correlational survey design. ***Settings*:** Selected English Medium Schools. ***Subjects:*** 453 high school students (210 boys and 243 girls) between the age group of 13-16 years. ***Measures:*** State-Trait anger expression inventory (STAXI-2CA), Rating scale on factors influencing anger, and Behavioral anger response questionnaire (BARQ-C) were used, to assess level of anger, factors influencing anger and coping respectively. ***Analysis:*** Descriptive statistics, exploratory factor analysis and Pearson correlation. ***Results:*** Out of 453, 93.8% had average level of anger, 5.7% had elevated level of anger and only 0.4% had very high level of anger. Factor analysis identified seven factor solution namely social impact, emotional self-regulation, and gratification of needs, perception, and influence of family environment, over-expectations and feelings of frustration. The study found a weak positive correlation between anger and coping. ***Conclusion:*** The study findings suggest that higher the level of anger more coping was used by the adolescents. Thus if anger is expressed in a healthy way and appropriately one can avoid loss of control and can reduce various negative effects.

Keywords: *Anger, adolescents, coping, factors influencing anger, STAXI-2CA.*

INTRODUCTION

Adolescents are young people aged between 10 to 19 years. It is the transitional stage of physiological and psychological development from puberty to adulthood.[1] Adolescents often struggle with their body changes, mood swings and social issues. They are highly charged emotionally in life, and anger is one such emotion which is a critical factor experienced by the adolescents.

Anger is a state of emotion that varies in intensity from mild irritation to intense fury and rage.[2] Teenagers have a violent and fierce anger at some point during their adolescence and nearly 8% have regular anger outrage.[3] Younger age group (13 to 15 years) experience more anger than the older age group (16 to 18 years).[4]

Each adolescent has a different temperament, so it is important to understand factors that can contribute to anger in adolescents.

A study reported the anger producing situation for adolescents include; someone argues with them (40%), somebody insults them (13.3%), somebody did something they don't like (43.3%), somebody insist to do something (3.3%). Furthermore, they handle their anger by staying calm (73.3%), by throwing something (16.7%), by cursing (5%), and by threatening someone (5%).[5]

Adolescents expressed their anger differently. Some express physically while others may express verbally, some may avoid it while others may suppress the anger.

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Anger can be good if it is expressed in a healthy way, but if not it can lead to maladaptive behavior. Given many challenges faced by the adolescents today it is important for them to have a strong support system to have them cope with their problems.

Study on coping reported that praying, going for a walk, talking to someone, arguing and listening to music were the strategies used by adolescent girls, while fighting physically, bike riding, exercise, drinking alcohol, and using drugs were adopted by adolescent boys to cope with the anger.[6]

Anger is not necessarily a 'bad' emotion. Some degree of anger will be with us all in our lives. Henceforth, when expressed in a healthy way one can avoid loss of control and can reduce various negative effects. Thus a greater understanding of adolescents' anger might help public to educate and seek help in a positive way towards solving anger issues.

METHOD

The present study was conducted in Udupi district, Karnataka. Correlational survey design was used for the study. The sample consisted of 453 adolescents (210 boys and 243 girls) studying in 8th, 9th and 10th standard between 13-16 years of age.

Permission for conducting the study was obtained from Dean Manipal college of Nursing, Manipal, Institutional Research Committee, Manipal College of Nursing, Institutional Ethics Committee, Kasturba hospital, Manipal (IEC No. 882/2016), Approval letter from Deputy Director of Public Instructions, Udupi district and Principals of selected English Medium schools, Udupi.

Prior to the data collection, the purpose of the study and the participant information sheet was explained to the students. Written informed consent from the parents and assent from the subjects were taken. Tools were administered to the subjects in their classroom and in the presence of investigator the participants were asked to complete the administered tools. The confidentiality of the data was maintained.

Measures:

Level of anger

State trait anger expression inventory (STAXI-2CA) developed by Spielberger (1999) was used to determine the level of anger among adolescents. STAXI-2CA consists of 35 items, it assess the experience (state anger, trait anger) and expression (anger-in, anger-out, anger-control) of anger with a 3-point likert scale. State anger is measured by 10 items that assess the intensity of angry feelings right now. Trait anger is measured by 10 items that assess the frequency of angry feelings experienced. Anger-in, anger-out, and anger-control scales contain 5 items each. Anger-in items measures the frequency of angry feelings experience but not expressed, Anger-out items measures the frequency of angry feelings expressed toward others or object, and Anger-control items measures how often the individual tries to control the expression of angry feelings. Higher scores on each subscales reflects higher levels of either trait anger, state-anger, anger-in, anger-out, or anger control. It is interpreted in percentile ranks. Greater than 90th percentile (ie Very High), Percentile ranging from 76 to 90 (ie Elevated), Percentile ranging from 25 to 75 are in the average range and percentile ranging below 25 are in low range, on all scales and subscales as significant. The content validity, criterion-related validity, construct validity was determined by Speilberger et al. (1999). Coefficient alpha reliabilities were state anger (α=.94), trait anger (α= .88), anger-in (α = .74), anger-out (α= .84) and anger control (α= .89).

Factors influencing anger rating scale

A 5-point rating scale was developed by the researcher to measure the factors influencing anger. Components included in the scale were; personal factors, social factors, family factors, and school factors. A set of questions were prepared under each area which has a total of 44 items. The responses were given as never =1, rarely = 2, sometimes = 3, often = 4, and always = 5. Content validity was established by giving the tool to seven experts. Scale validity index was 0.85. Pretesting was done among ten adolescents. Reliability was established using Cronbach's alpha and found to be reliable (α = .99).

Coping

Behavioural anger response questionnaire (BARQ-C) developed by Linden et al (2003) to measure anger coping. The scale consists of 34 items with six domains namely direct anger out, assertion, social support seeking, diffusion, avoidance and rumination.

It is a 3-point Likert scale, the scoring ranges from 1 = not true, 2 = sometimes true, and 3 = often true. The construct validity was determined by Linden et al. (2003). Internal consistency reliabilities of sub-scales ranged from .62 to .81.

RESULTS

The frequency and percentage distribution of STAXI-2CA scale is given in Table 1. Majority of the adolescents were in the average range. The mean and standard deviation for the STAXI-2CA and BARQ-C scales are given in Table 2. To find the relationship between anger and coping, Pearson coefficient correlation were performed. The r value obtained was 0.15 which indicates a weak positive correlation between anger and coping which can be inferred as higher the anger more coping was used by the adolescents. In regard to factors influencing anger, factor analysis was performed. The number of factors to be extracted is determined by using Kaiser's criterion, which chooses only factors explaining more than the average variance of factors. Only factors that have eigen values (variances of the factors) larger than one are extracted. Bartlett's test of sphericity gave a p value of < 0.001 and the Kaiser Meyer Olkin (KMO) test gave a value of 0.95. Factor analysis was conducted with 43 items. The seven-factor solution was decided based on the scree plot which is shown in Figure1.

Table 1: Frequency and percentage distribution of STAXI-2CA

Level of anger	State-anger		Trait-anger		Anger expression -out		Anger expression-in		Anger-control	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)	Frequ-ency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Very high (>90)	23	5.1	32	7.1	30	6.6	47	10.4	34	7.5
Elevated (76-90)	57	12.6	46	10.2	54	11.9	88	19.4	80	17.7
Average (25-75)	373	82.3	211	46.6	216	47.7	230	50.8	219	48.3
Low (<25)	-	-	164	36.2	153	33.8	88	19.4	120	26.5

N= 453

Table 2: Mean and standard deviation of domain of STAXI-2CA and BARQ-C by gender N=453

Scale	Mean		Standard deviation	
	Boys (n = 210)	Girls (n = 243)	Boys (n = 210)	Girls (n = 243)
STAXI-2CA State anger	13.85	13.75	3.91	3.98
STAXI-2CA Trait anger	17.14	17.59	4.36	4.42
STAXI-2CA Anger expression out	8.38	8.84	2.18	2.35
STAXI-2CA Anger expression in	8.63	8.46	2.32	2.16
STAXI-2CA Anger control	10.08	10.39	2.99	2.68
BARQ-C Direct anger out	9.9	9.52	2.58	2.51
BARQ-C Assertion	12.14	12.67	3.54	2.76
BARQ-C Social support seeking	10.78	11.59	2.79	2.56
BARQ-C Diffusion	11.41	11.40	3.33	3.11
BARQ-C Avoidance	12.22	13.20	3.43	2.81
BARQ-C Rumination	7.40	8.07	2.13	2.20

Note: STAXI-2CA (State trait anger expression inventory).

BARQ-C (Behavioral anger response questionnaire).

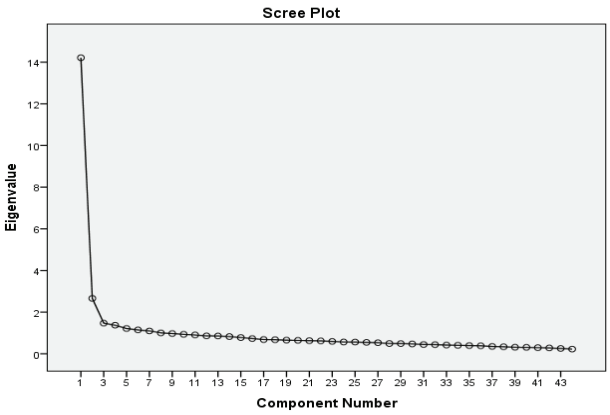

Figure 1: Scree plot showing factors influencing anger

Scree plot has number of factors on the X axis and Eigen values on the Y axis. The criterion of Eigenvalue ≥1 was used for determining the number of factors. The scree plot shows that seven of the factors explain most of the variability since the line starts to flatten after factor 7.

The accepted seven-factor solution had 15 items loading in first factor (variance explained is 32.30 %), 6 items loaded in second factor (variance explained is 6.04%), 4 items loaded in third factor (variance explained is 3.34%), 3 items loaded in fourth factor (variance explained is 3.12%) 4 items loaded in fifth factor (variance explained is 2.76%) 5 items loaded in sixth factor (variance explained is 2.60%) and 3 items loaded in seventh factor (variance explained is 2.49%). Item 43 did not load in any factor. The factor loadings are given in Table 3.

Table 3: Factor loading

Items	Components						
	1	2	3	4	5	6	7
Social impact							
Someone makes fun of my family	.715						
Someone makes fun of my (physical) stature and size	.699						
I am put down by my friends	.676						
Someone spoils my favorite item	.637						
I am unable to achieve my objectives	.610						
People say bad about me	.605						
My work is messed up	.584						
A trusted friend betrays me	.576						
I am excluded from activity in the school	.565						
My teachers give me critical feedback	.549						
I am being wrongly accused	.535						
I am overwhelmed with my homework	.517						
Someone irritates me	.488						
I planned to go out with friends and they calls back at the last moment	.453						
I am waiting longer for someone	.425						
Emotional self-regulation							
I am lonely		.654					
I feel embarrassed		.565					
My daily routine is changed		.503					
My action is control by others		.489					
I lost control of my emotions		.457					
My family face financial difficulties		.409					
Gratification of needs							
I am hungry			.606				
I feel disappointed			.576				
I don't get the respect I deserve			.509				

Cont... **Table 3: Factor loading**

Someone points out my mistake			.422				
Perception							
I am in line and someone cuts in front of me				.670			
I am not being listened to				.592			
I hear excessive noise				.412			
Influence of family environment							
My parents give me less pocket money					.720		
I am being less cared by my parents					.644		
My parents does not give me enough appreciation					.578		
My parents tell me NO to something i want to do					.446		
Over expectations							
I have to do something new						.680	
My parents ask about my homework						.655	
My parents work for long hours at office						.604	
My parents ask me where i am going						.555	
My parents put too much pressure on me to do well at studies						.442	
Feelings of frustration							
Someone use my things without asking me							.661
I loose a game							.660
Someone fails to return my book which I lend							.488

The first factor includes items associated with social feelings. Hence, it was named as 'Social impact'. The second factor had items associated with feelings of self; hence the factor was named as 'Emotional self-regulation'. The third factor had items related to awareness of self and hence it was termed as the 'Gratification of needs'. The fourth factor had items related to social ignorance and discomfort; hence the factor was named as 'Perception'. The fifth factor had items associated with parenting hence this factor was named as 'Influence of family environment'. The sixth factor was associated more with work and personal life interference hence it was named as 'Over-expectations'. The seventh factor was associated with unhealthy advantage hence it was named as 'Feelings of frustration'.

DISCUSSION

In the present study, the average score across genders was highest in the category of Trait-anger with a mean score of boys (17.14 ± 4.36) and girls (17.59 ± 4.42) and the lowest score was in the category of Anger expression out, with a score of, boys (8.38 ± 2.18) and girls (8.84 ± 2.35). In a study conducted among early adolescents of 12-14 years they found a mean score highest in the category of Trait-anger in both boys and girls (boys mean score 22.20 and girls mean score 22.62) and lowest in the category of Anger-in with a mean score of 16.55 in boys and 17.27 in girls.[7] Another study conducted among high school children (652 girls and 568 boys) in the age group of 12 to16 years, identified a higher levels of state (45%) and trait (23%) anger experience and moderate levels of anger control (40%).[8]

In regard to coping the present study revealed, that adolescents mostly used Avoidance as a coping style in both boys and girls (12.75 ± 3.15) while Rumination was minimally used (7.76 ± 2.19). A study conducted among university students had identified that those students who have lower GPA (Grade Point Average) tend to express anger in forms of assertiveness, seeking social support and rumination, and those with higher GPA express their anger in forms of diffusion and avoidance.[9]

On the basis of factor analysis, the present study identified Social impact, Emotional self-regulation, Gratification of needs, Perception, Influence of family environment, Over-expectations, Feelings of frustration. These factors influence the adolescents anger. Studies have shown the most anger aggravating factors for the high school students includes when "being treated injustice, 98.3%" "perceiving a personal threat, 94.8%"

"being criticized unfairly, 92.2%" "preventing their desires, 90.3%" "in trouble because of other's mistake, 87.4%" "when people behave self-centered, 83.8%" "when jobs don't go as they wish, 81.2%" and "hearing that someone gossips on them, 80.2%". The least anger aggravating factors were "being criticized in anyway, 22.4%" and "when they are hungry, 25.3%".[10] A study identified depression, grade, academic stress, self-esteem, and decision-making competency as predictive factors for anger.[11] Another study identified unstable self-esteem, self-efficacy, belief, attitudes, values, long term and abstract goals, provocations, frustration, and pain and discomfort as key casual factors of aggresssion.[12]

CONCLUSION

As anger is seeing to have negative effects on emotion of the adolescents it is important to deal with anger before it causes problem. The study has a practical implication for the Nurses and teachers where they can play a vital role in carrying out intervention program with anger and the associated psychosocial factors which can decrease the prevalence of adolescents maladaptive behaviors, youth violence and suicide.

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A Research Study on Deaths due to Fall from Height Brought to Ananthapuram Govt. Medical College Mortuary, Andhra Pradesh from January 2011 to December 2016

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ABSTRACT

Fall from height can cause serious and fatal injuries leading to death. It can occur in age group but more commonly seen in working age group. It can occur either at home, or at work places where work is carried out at heights, especially at construction work sites. Falls can occur by person falling into pits, trenches, holes etc. People fall from height either intentionally to commit suicide or most often accidentally ofcourse fall from height due to homicidal pushing can also occur. Fall from height cases are now a days rising because of increasing apartment living culture especially in cities. The injuries caused in fall from height cases depend not only on height from which fall has occurred but depends on part of the body having first direct impact on the ground, impact surface, clothing, any safety measures taken especially in people working at heights at construction sites.

Keywords: *Fall, heights, suicide, accident, autopsy, fracture, hemorrhage*

INTRODUCTION

Fall is dropping down from a height of relatively high position by the force of gravity. During fall the potential energy due to height is converted into kinetic energy under the influence of gravity. At impact, some of the energy is imported to the body resulting in injuries. Falls may occur at the ground level or from some height. The fall from height may vary from high rising building to ladder, chairs, tables or staircases.[1]

When a person becomes unconscious while standing or walking he will fall forward. When a person is pushed from the front, he may fall on his back. An alcoholic may stagger from some time and fall forwards or to one side. In epileptic convulsions, the person falls backwards due to spasm of the muscles of the back. In case of brain stroke, the person may fall on the side of hemiplegia.[2]

Falls are more common in extremes of ages. The range extends from children falling from cots to elderly slipping at home. The falls in middle aged persons are usually due to accidents related to work or suicidal. Suicidal jumping makes a considerable proportion of those who die from fall. More than 50% people have some pre-existing psychiatric illness or drug over dosage. In elderly, co-existing medical problems also contribute to increased incidence of fall.[3]

In a typical case of primary impact with feet (about 60%), following injuries may seen – comminuted fracture of calcaneum and other tarsal and metatarsal bones, tibia may be driven through the sole of the feet, fracture – dislocation of the ankles, comminuted or oblique fractures of tibiae and fibulae, fractures of the femurs (shafts, condyles or neck), pelvis fractures, fractures and dislocation of the vertebral column

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associated with lacerations or transection of spinal cord, ring or comminuted fracture of the base of the skull and injuries to the brain stem and inferior surface of the brain, there may be lacerations of the liver and spleen. The aorta may rupture at the junction of the aortic arch with the descending thoracic aorta. The full range of injuries does not occur in every case.[4]

In primary head impact, open comminuted or depressed skull fractures with brain lacerations and partial or complete extrusion of the brain may occur. This may also be seen with primary impact of feet and subsequent secondary head impact.[5] A range of intracranial injury occurs which varies from extradural, subarachnoid and subdural hemorrhage to brain laceration or contusion.[6] When the person falls on the side of the body, fractures of multiple ribs, shoulder girdle, arms, contusion and laceration of back, buttocks and severe abdominal and thoracic injuries may occur. The lungs are most sensitive to deceleration and as a result pulmonary hemorrhage and hemothorax are common. The liver is the most commonly injured followed by heart and aorta.[7]

All sorts of laceration may be seen. Usually greater the heights of the fall, the more severe are the injuries. In most cases, the posture or orientation on impact determines the regional preponderance of injuries. The body can bounce off the surface as it impacts and then fall some short distance away. The severity of injuries is not directly related to the distance of the fall of the person.[8]

Brain and skull injury offers the poorest correlation with height fallen. Cardiac contusion and laceration are frequently involved in extreme falls. Pneumothorax and hemothorax are commonly associated with thoracic trauma. Diaphragmatic injuries are infrequent in falls due to deceleration.[9] Occasionally extensive and severe internal visceral and skeletal injuries may occur in the absence of any significant external injury, if the body lands upon a relatively soft surface such as a grass patch.[10]

MATERIALS & METHOD

This research work was carried out by scrutinizing autopsy reports, crime scene photographs & reports, medical treatment records, suicide notes along with police inquest reports. Number of fall from height cases came for autopsy per year, sex incidence, age of the victim, injuries type and their distribution on the body in death due fall from height cases were studied and analysed.

FINDINGS

Table 1: Year wise number of autopsies conducted at Govt. Medical College Mortuary, Ananthapuram, A.P

Year	Fall from Height Death Cases
2011	08
2012	13
2013	04
2014	12
2015	07
2016	10
Total	**54**

Table 2: Sex distribution among deaths due to fall from height

Age in Years	Male	Female	Total
0 – 10	02	01	03
11 – 20	04	01	05
21 – 30	16	07	22
31 – 40	08	02	10
41 – 50	04	00	04
51 – 60	01	05	07
>60	00	03	03
Total	**35**	**19**	**54**

Table 3 : Incidence of bones fractures in fall from height death cases

Sl.No	Bone Fracture	Incidence
1.	Skull	35%
2.	Upper limb bones	15%
3.	Lower limb bones including pelvis	47%
4.	Spine	3%

Table 4 : Incidence of viscera damaged in deaths due to fall from height cases

Sl.No	Viscera damaged	Incidence
1.	Brain	65%
2.	Heart	5%
3.	Lungs	15%
4.	Kidney	10%
5.	Bladder	5%

DISCUSSION

The incidence of death due to fall from height in Ananthapuram is more in 21 – 30 years age group among both men and women to due actively involving in works especially in construction work at high places. High incidence is again seen in 50 – 60 years age group in females because of slipping at home along with decreased bone density issues in that age group. In total males are more affected than females. Skull and lower limb bones are more involved with fractures. Brain with intracranial hemorrhage and lungs are the soft viscera more subjected to damage in fall from heights. No alcohol was detected in the blood in all the cases. Poisoning was detected in 4 cases in the age group of 21 – 30 years, 1 in males and 3 in females.

CONCLUSION

The death that occurs due to fall from height must be carefully evaluated. Majority of the cases are either suicidal or accidental in nature but there may be allegations that the person was thrown or pushed from high rise buildings. Therefore injuries over the body in fall from height cases must be evaluated thoroughly while the intervening objects should be kept in mind. If the person has been pushed or thrown from the building, the body may be found little away then that of accidental fall. In such cases, though injuries may be more or less similar to accidental fall, defence wounds will be present on the body due to quarrel or fight while the person is pushed down.

Before deciding the nature of death in fall from height cases, one has to visit the scene of crime and examine the location and height of the building, presence of any intervening objects, presence of boundary wall and surface of impact. While interpreting injuries over the body, following factors should be considered, body orientation on impact, distribution of forces of impact and age of the victim.

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Spontaneous Subdural Hemorrhage due to Intracranial Aneurysm Rupture

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ABSTRACT

Rupture of Intracranial aneurysm is a well known cause of intracranial hemorrhage and sudden death. Usually, intracranial aneurysms rupture leads to hemorrhage into subarachnoid space. Here, we report two cases of intracranial aneurysms causing subdural hemorrhage. So, subdural hemorrhage in the absence of head trauma requires meticulous examination of brain and Circle of Willis during autopsy to pick any ruptured intracranial aneurysms which may be hidden.

Keywords: *Intracranial hemorrhages, subdural hemorrhage, intracranial aneurysm.*

INTRODUCTION

The World Health Organization (WHO) definition of sudden unexplained death according to the International classification of diseases, version 10 (ICD-10) is "death, non-violent and not otherwise explained, occurring less than 24 hours from the onset of symptoms".[1]

Intracranial hemorrhages are one of the top principle causes of sudden death in adults. Intracranial hemorrhages have been broadly classified as intra-axial and extra-axial hemorrhages[2]:

I. Intra-axial hemorrhage includes Intracerebral and Intraventricular hemorrhages.[2]

- Intracerebral hemorrhage is bleeding into the brain parenchyma, also known as Intraparenchymal hemorrhage.
- Intraventricular hemorrhage is bleeding into the ventricular system where the CSF circulates.

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II.`Extra-axial hemorrhage includes extradural, subdural and subarachnoid hemorrhages.[2]

- Extradural or epidural hemorrhage is collection of blood between skull and dura mater. Extradural hemorrhages are most commonly traumatic in nature and usually arises for middle meningeal artery and its branches.[3]
- Subdural hemorrhage is the bleeding into the space between the dura and arachnoid. Subdural hemorrhages are frequently associated with trauma and the source of bleeding is the bridging veins.[3]
- Subarachnoid hemorrhage refers to bleeding into the subarachnoid space. This hemorrhage is predominantly associated with mechanical trauma leading to rupture of superficial vessels in the leptomeninges, especially veins. Rupture of aneurysms or arterio-venous malformations is the most common cause of spontaneous subarachnoid hemorrhages.[3]

Sudden death from ruptured cerebral aneurysm is one of the most common cause of death in young to middle-aged adults, if coronary disease is excluded.[4] Here, we report two cases of intracranial aneurysms causing subdural hemorrhage.

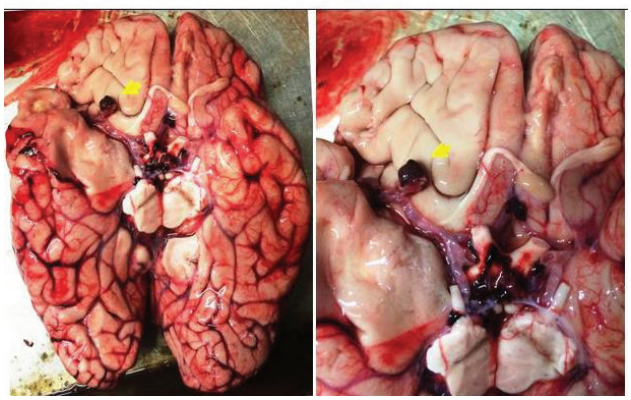
CASE REPORTS

Case 1

A 35 year old female was admitted to our hospital with history of sudden loss of consciousness, frothing from mouth and involuntary passage of urine. During the hospital stay she was diagnosed and treated for ARDS (Acute Respiratory Distress Syndrome), hypotension and suspected unknown poisoning related acute chemical pneumonitis. She succumbed to her illness within 6 hours from the onset of symptoms.

At autopsy, face was congested with reddish blood stained fine frothy fluid coming out of nose and mouth. No external injuries were present. Both lungs were heavy, congested and edematous. Pink fine frothy fluid was found oozing out from the cut surface on compression of both lungs. A blackish brown fluid filled cyst measuring 2 cm in diameter was present in the lower pole of left kidney. Both kidneys were congested on cut section. Heart, aorta, liver and spleen were grossly normal. Brain parenchyma was congested and edematous. Acute massive subdural hemorrhage was present over supero-lateral surface of right parieto-temporal lobes and minimal amount of subarachnoid hemorrhage in the basal cisterns. On careful dissection, ruptured berry aneurysm of size 10 mm in diameter, thin wall and empty sac was present in the right middle cerebral artery situated 3.5 cm from the site of its origin (Photograph 1). The arachnoid overlying the aneurysm was found to be adherent to dome of the aneurysm and was involved in the rupture. Toxicological screen was negative.

Photograph 1: Ruptured berry aneurysm (Yellow arrow) in right middle cerebral artery

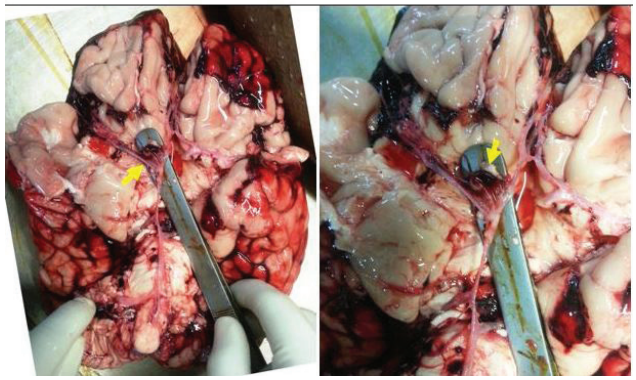


Case 2

A 30 year old male was found dead on roadside. He was a known case of chronic alcoholism and drug abuse for 8 to 10 years. There was no other significant medical or surgical history.

At autopsy no external injuries were present. Both lungs were congested and edematous. Heart, aorta, liver and spleen were grossly normal. Right kidney was irregular, shrunken; a calculus of size 2 cm X 1 cm X 1 cm present in renal pelvis and cortico-medullary junction was deranged. Left kidney was enlarged and congested on cut section. Brain parenchyma was congested and edematous. Acute massive subdural hematoma was present over supero-lateral surface of right cerebral hemisphere and diffuse thick subarachnoid hemorrhage was present in the basal cisterns. On dissection, ruptured berry aneurysm of size 15 mm in diameter, thin walled and empty sac was present at the bifurcation of right internal carotid artery (Photograph 2). Arachnoid adjacent to the aneurysm was found to be intact. Toxicological analysis gave a negative test.

Photograph 2: Ruptured berry aneurysm (Yellow arrow) at bifurcation of right internal carotid artery



DISCUSSION

Aneurysms are localized dilation or ballooning of a blood vessel. Aneurysms can be classified on the basis of their size into: small (Diameter less than 6 mm), medium (7 to 12 mm), large (13 to 24 mm) and giant (Diameter more than 25 mm).[5] Based on shape, the aneurysms can be classified into saccular and fusiform.

Etiology of Berry Aneurysm: Intracranial saccular aneurysms are also known as Berry aneurysms are out pouching of vessel wall, nearly spherical in shape and seen at the branching point of named intra-cranial arteries. Formation of berry aneurysm is attributed to the special architecture of intracranial arteries (thin media, only one elastic lamina, and minimal adventitia as compared to systemic arteries) and possible contribution of congenital defects (medial muscular defect, elastica defect, intimal pad or small rudimentary artery).[6] The

growth of the aneurysm is based on the law of Laplace.[6]

Incidence of berry aneurysm: About 2% - 5% of population have asymptomatic aneurysms which are less than 6.0 mm in size.[6,7] It is more common in females than in males and 60% rupture occurs between the ages of 40-60 years.[7]

Importance of location of the aneurysm: The aneurysms are commonly seen in the anterior portion of circle of Willis (85% - 90%).[8] The location of bleeding aneurysms in descending order is- Internal carotid artery (36%), Anterior communicating artery (35%), middle cerebral artery (21%), Posterior cerebral artery or posterior communicating artery (~5%) and basilar or vertebral artery (~5%).[6] Additionally, almost all aneurysms rupture at their apex leading to hemorrhage in the subarachnoid space (almost 60%) and sometimes in brain parenchyma (30% to 40%).[9]

Factors interfering with rupture of aneurysms are[6]:

Scarring of the sac wall (reinforcement),

Development of atheromatous plaques in the wall,

Thrombosis with organization,

Abatement of the intravascular pressures acting upon the damaged vessel,

Medical or surgical intervention.

Aneurysms of size more than 10 mm in diameter are more prone to rupture and is considered as the critical size.[10]

Forensic Impact: The aneurysm when ruptures causes stroke symptoms and death in about 30 % of cases within 24 hours.[7] These cases come for autopsy as healthy adults become a victim of sudden unexpected death. Another situation is where rupture occurs in direct proximity to some antecedent event such as scuffle, robbery, sexual activity or occupational trauma. Though majority of the aneurysm rupture occurred during sleep (36 %), association of significant number of cases with straining (lifting or bending- 12% and defecating, coughing or urinating- 8.4%) or emotional stress (4.4%) suggest that an increase in heart rate and blood pressure or raised venous pressure may play a pivotal role.[6] This area has been an uphill battle in the court hall not only for the lawyers but also for the forensic pathologists. However recent investigations show that there is no association between mechanical loading and rupture of a preexisting aneurysm.

Incidence of secondary aneurysmal acute subdural hemorrhage: About 95 % of all acute subdural hemorrhages are due to head injury. The incidence of secondary subdural hemorrhage due to aneurysmal rupture varies from 0.5 % to 7.9 %.[11] Aneurysms of internal carotid artery and middle cerebral artery are more commonly associated with the presentation of subdural hemorrhage.

Pathophysiology of aneurysmal acute subdural hemorrhage: Few mechanisms postulated to the cause of acute subdural hemorrhage following rupture of berry aneurysm are:

Steam of blood in the arachnoid space may rupture into the subdural space via a weak point in the arachnoid.[12]

The pressure due to blood in the arachnoid space may cause disruption of the arachnoid membrane.[13,14]

Aneurysm adherent to (due to previous minor hemorrhage) or protruding through arachnoid may bleed directly into the subdural space. This can produce a subdural hemorrhage without any subarachnoid hemorrhage.[13,15]

In our first case the adhesion of arachnoid to dome of the aneurysm, its involvement in rupture and negligible amount of subarachnoid hemorrhage, is in accordance with the postulate that the bleeding happened directly into the subdural space. While in second case the aneurysm ruptured into the subarachnoid space which then extended into the subdural space either through a weak spot in arachnoid or because of high pressure in the subarachnoid space.

Suspicion of aneurysmal acute subdural hemorrhage: Serge Marbacher studied the clinical records of 743 cases of acute subdural hemorrhage and observed that 7 (0.9%) of these cases had an attributable subarachnoid hemorrhage. Of these seven cases, one patient expired while the rest six of them had aneurysms which were clipped immediately or later. The review concluded that when there is an acute subdural hemorrhage associated with subarachnoid hemorrhage then an aneurysm should be looked for, especially in the absence of history of trauma. The author also suggested that aneurysmal acute subdural hemorrhage should

also be considered in the absence of intra-cerebral or subarachnoid hemorrhage when there is no history or sign of trauma.[16]

The location of the subarachnoid hemorrhage gives a valuable hint to the source of bleeding. While a diffuse dorso-lateral subarachnoid hemorrhage and focal (localized anywhere) subarachnoid hemorrhage is usually associated with a traumatic event; a diffuse basal subarachnoid hemorrhage is more than usually associated with spontaneous rupture of berry aneurysm. Traumatic rupture of basal arteries without preexisting vessel damage is described only in few cases in literature. The rare traumatic rupture of healthy basal artery, in large majority of the cases is located in the basilar artery and vertebral arteries.[3]

To identify the underlying pathology, knowledge along with a degree of suspicion is needed as the management of the case varies and so does the autopsy technique.[14,17]

Autopsy in case of suspected aneurysmal acute subdural hemorrhage: History and external examination for evidence of trauma should be done. After reflecting the scalp, multiple cuts should be made in the scalp from the periosteal side to look for any extravasation of blood. The skull cap is then removed as per standard procedure after ruling out any fractures. As the dura is being cut and separated anteriorly & laterally, the subdural hemorrhage should be examined for its location and gross dating. The brain is then removed carefully in the routine way, but being careful to take as much as vertebral artery as possible. In cases of aneurysmal rupture the subarachnoid hemorrhage is pronounced in the basal cisterna filling the cisterna interpeducularis.[18]

Fine and patient dissection is required to examine the arteries within the circle of Willis. It is to be emphasized here that fixation should not be done if one is hunting for aneurysm, as with fixation the blood clot hardens and it becomes nearly impossible to remove them without damaging the vessels. The blood clots should be removed with care using water and non-traumatic forceps. It should be kept it mind that if one aneurysm is present then there is a significant likelihood that others also exit (this likelihood in females is 20% and in males is 12%).[6] If an aneurysm is found, its size and location should be noted; the content of the aneurysm and wall has to be examined; and the surrounding arachnoid should also be examined. Despite all these measures, the aneurysm cannot always be found (8% - 27%).[7] If subarachnoid hemorrhage is identified and neither a berry aneurysm nor an arteriovenous malformation can be found, the vertebral arteries must be examined carefully.[18]

Further the brain should be examined for any intra-cerebral or intra-ventricular hemorrhages. Other organs, particularly the aorta and kidneys should be examined for berry aneurysm associated anomalies or changes of hypertension.[19]

Histologically saccular aneurysms tend to lack the muscular tunica media and internal elastic lamina. The wall of sac is made up of endothelial cells with hyalinized intima and adventitia of varying thickness.[7,20]

CONCLUSION

The suspicion of rupture of berry aneurysm should rise when there is acute subdural hemorrhage with or without subarachnoid hemorrhage in the absence of preceding traumatic event. The location of the subarachnoid hemorrhage along with meticulous autopsy will aid in accurate reconstruction of events in determining the underlying cause and manner of death.

Conflict of Interest: Nil.

Source of Funding: Not Applicable.

Ethical Clearance: Not Required

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Chronological Study to Estimate the Range of Natural Variations in Size and Proportion of Letters in Handwriting

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ABSTRACT

The exigency of computational approaches in detection of authenticity of handwriting is currently one of the imperative objective in forensic investigation. The most common pending errors made during investigation process are the utilisation of only known conventional methods of examination. The study was conducted with the objective of determining the range of natural variation in handwriting considering a period crevice of every two years. The instability of the factor, "Size and Proportion" of letters served as an indicator. Samples were collected at time intervals of two years irrespective of age from 20 individuals. "Autodesk Computer Aided Drafting" software was used to set the range of natural variations. The unique detectable range of natural variation after two years, then four years and finally after 6 years in genuine writing was found. The technique helps in solving the cases aiing in contemporary writings and could be served as a non-destructive method of examination.

Keywords: *Handwriting Examination; Size and Proportion; Penmanship; Natural Variation; Autodesk Computer Aided Drafting; Authenticity*

INTRODUCTION

The investigation process to decipher the genuineness of handwriting is done through the law of ACEs (Analysis, Comparison and Evaluation) including both the disputed as well as the specimen sample[2]. After a certain period of time of maturity, the writings get individualised and a degree of consistency expands which is the main objective to be achieved. Still, mutability occurs due to the fact that humans are not machines, thus naturally the writing varies every time the writer writes[1, 2]. As no two handwritings are alike, Natural variation in handwriting contributes a cumulative impact on the countenance of the whole matter to be written and proves to be a contributing element in handwriting identification[2]. Different class and individualistic features characterize the handwriting as authentic or forged. Size and proportion of letters in relation to natural variations is of significant interest in the field of forensic science [13, 14, 18].

Inspite of the fact that the most significant writing characteristics persist in one's handwriting depends on two criteria, the circumstances and the size of matter to be written [1, 7], Size and proportion of some commonly used combinations of letters would not be affected or influenced to a lesser extent along with natural variations.

Even after the writing gets consistent, it gradually changes in numerous particulars every time the writer writes [1, 15, 18]. The present study focusses on inculcating the range of natural variations considering Size and Proportion as a main consideration of thought in differentiating or connecting two handwritings. The idea for inculcating the range of natural variations in size and proportion addresses two specific issues related to the investigation process. First, would size and proportion being investigated in different writings pertains to divergence in cases of Forgery, Genuine and Disputed

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samples. Second, would this major characteristic could be considered as an Individual Characteristic for comparison.

Size of letters in writing is somewhat divergent under varying conditions and may have little significance for comparison[16]. The attempt to forge the writing almost inevitably indicates conspicuous evidences of variation as a forger might duplicate the size but size along with proportion would be entirely overlooked thus "Size and Proportion" plays an indispensable role in revealing the authenticity of a writing.[1,3,4]

Handwriting of an individual changes due to many variables, age and time both in combination alludes to be the most imperative one. Kapoor T.S. et al. (1985) studied the form and extent of natural variations in handwriting and inferred that the range of natural variation will gradually changes with time even though the handwriting characteristics remains constant [9]. The pattern of handwriting which distinguish the script of one person from that of another have been attributed to a variety of influences including the writer's perceptual abilities physiology musculoskeletal system nervous system, intellectual development emotions ,and motivation (Bradley, 1986), as well as education and occupation [6,18]. Eldridge M.A (1984) presented a measure called Discrimination Index (DI) that summarizes variability within any one individual's handwriting to discriminate between writing samples from different authors. He selected cursively handwritten letters into consideration to describe the variation of letter forms. Higher DIs for certain letters were observed [5]. J R Yank (1991) explore the study on variation in handwriting characteristics of persons experiencing personality traits and determined that significant difference occurs in handwriting patterns that exceed the expected ranges of variation in the general population can exist in MPD clients [10]. Following his research, Srihari (2001) in his study determines the individuality of handwriting along with the variations [12]. Szymon (2004) determines the extent of natural variations in different writing characteristics considering the female signatures [8]. Gupta et al. (2011) has additionally worked on natural variations in handwriting characteristics so that it eases the task of questioned document examiner in analysing contemporary writings[4]. Kumar S conducted a study on variation in signature of same writer [11]. Pradeep and his contemporaries (2013), conducted a study on variation in signature of same writer. The original offline signature in the image format were included in the study and recognition & verification was performed using MATLAB. Various features were classified between the signatures of the same writer and compared with the available known and a probability of similarity is obtained using a statistical test [17].

AIM OF THE STUDY

The main aim of the present study was to compare different writings and decipher the range of natural variations in size and proportion of letters considering the writings with a lapse of two years by utilizing a software technique called AutoCAD (latest version) so that the final range could confirm the genuine writing over forged one. It is hoped that this research will help and ease the task of document examiner in identification of genuine writing considering the size and proportion as a key tool in investigating writing with a long time gap and make the results demonstrable in the document examination unit.

MATERIALS AND METHOD

The Subjects

The research encompassed 20 Individuals (regardless of age and sex) from different areas of Delhi and Uttar Pradesh (India). The writing of the present sample were made on an A4 sheet of paper in the space provided under the typed matter. The subjects were asked to use their own writing instrument.

Sample Inclusion Criteria:

Subjects having their original past handwriting samples.

Healthy subjects were considered.

Sample Exclusion Criteria:

Subjects with any physical and mental illness were not considered for this study.

Handwriting Samples

Present sample: An exemplar was made with a matter including most commonly used combinations of letters needed for the analysis. Name, Date, Qualification and age were chosen as the criteria to be written on the sample Fig. 1(a) and 1(b).

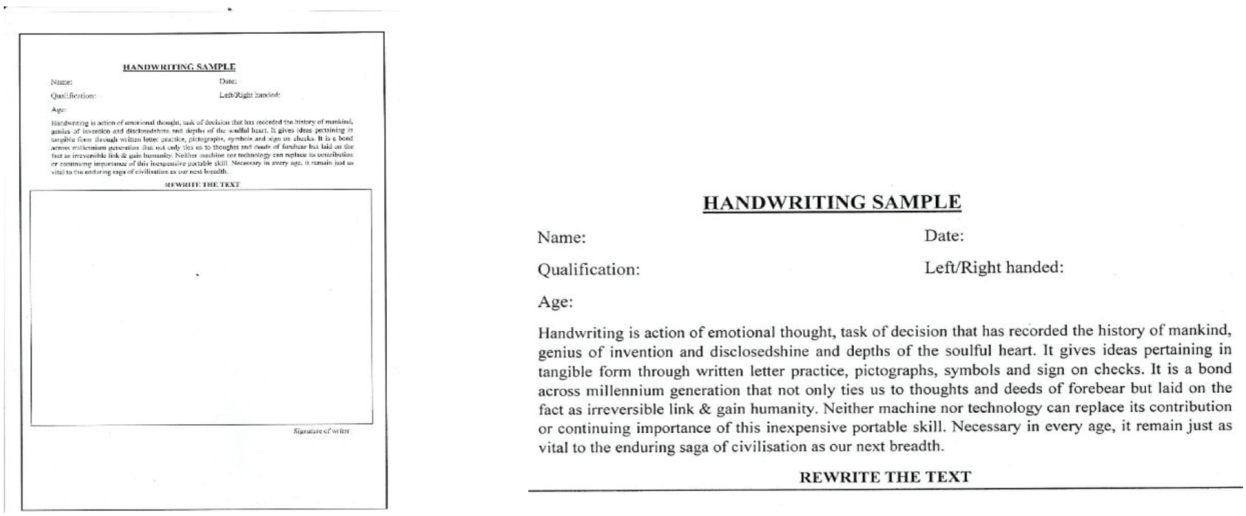


Figure 1(a) and (b): Showing the present sample exemplar with all the possible combination of letters

Past sample: The three of the subsequent samples were marked with the year of their writing and preserved separately. Samples did not contain the same matter as that of the present sample and was chosen randomly so as to maintain the integrity of the results Fig. 2(a) and 2(b).

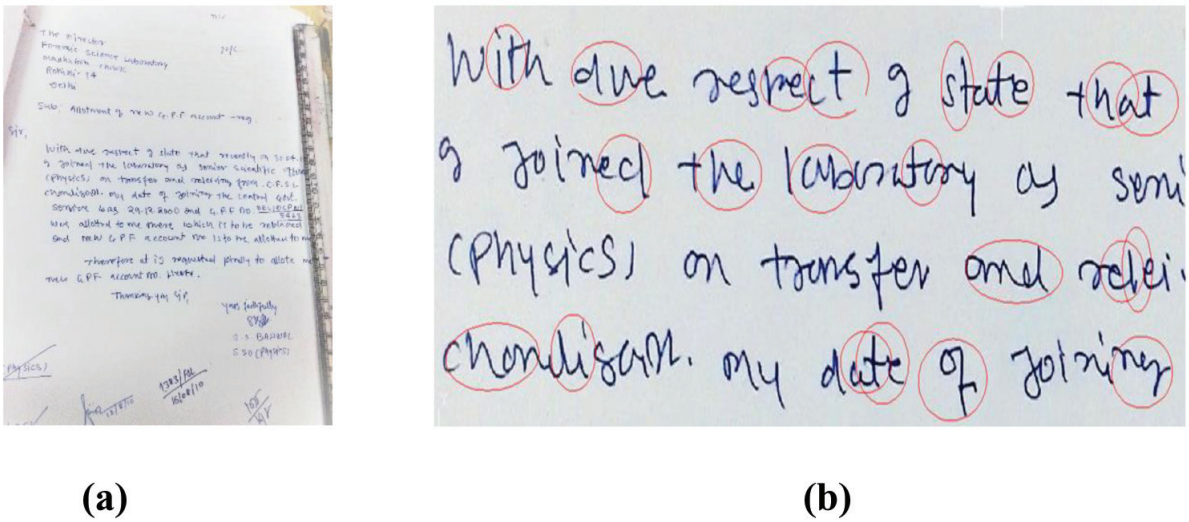


Figure 2(a) and (b): Showing the original past sample exemplar with all the possible combination of letters

Equipment

- A Digital Camera (10 megapixel)
- Latest version of AutoCAD Software (2013)
- Casio fx 991 MS calculator
- Scanner (Canon PIXMA)
- Ball point pen containing blue coloured ink

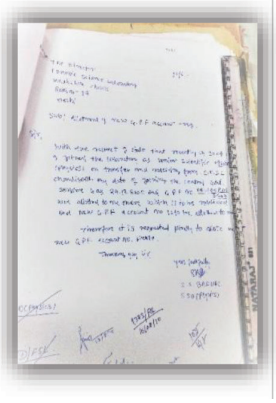
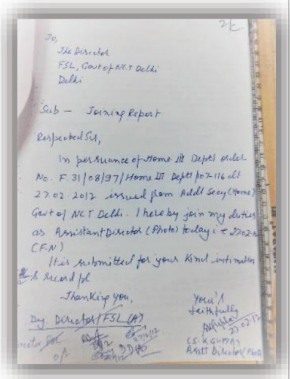
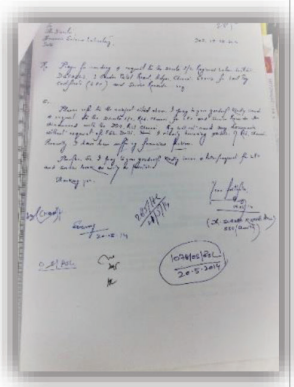
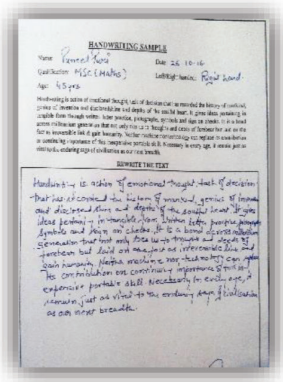
METHOD

A total of 80 handwriting samples were collected from 20 individuals written at intervals of two years producing 4 samples spanning 7-year period (2010, 2012, 2014, 2016) for determining the range of natural variation in size and proportion considering the height of some commonly used combinations of letters with respect to one another. The present sample (2016) was taken as a base year and the range is inculcated in a

series of 2010-2016 (SI-SIV); 2012-2016 (SII-SIV); 2014-2016 (SIII-SIV) and also two year and four year range is calculated in a series of 2010-2012 (SI-SII); 2012-2014 (SII-SIII); 2014-2016 (SIII-SIV) and 2010-2014 (SI-SIII); 2012-2016 (SII-SIV) Table 1.

The writings were scanned through a scanner and preserved for further analysis. The scanned copy was uploaded simultaneously in a software with full zoom out to nullify the error of measurements to be done. The samples were observed for various physical parameters but the main focus was on to measure the dimensions of the selected combinations of letters in millimetre (mm) to set the range of natural variations. Size and proportion for each combination of letters were measured and compared to determine whether the features varied significantly over time.

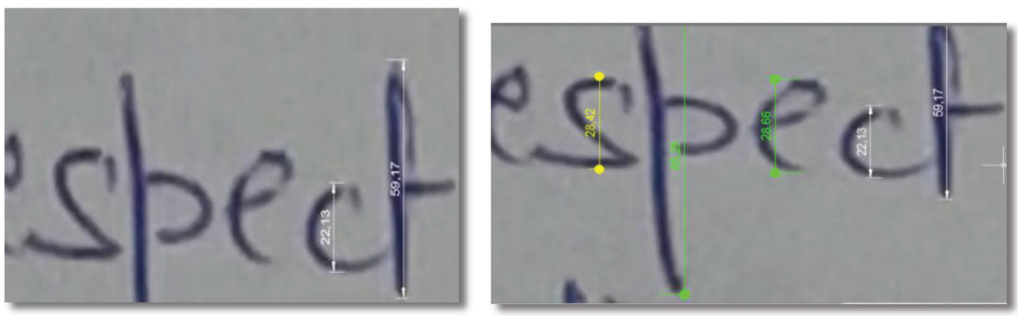
Table 1: Showing the different writing samples in a gap of 2 years and comparison with the present one

I (2010)	II (2012)	III (2014)	IV (2016)
			

FINDINGS

Analysis in AutoCAD

The scanned copy of the document was uploaded and the 3-D software applies **"Linear Dimension"** tool for measuring the heights of commonly used two letter combination of words (50 possible combinations) in millimetres (mm) further saving it at **"all zoom out"** power (Table 1) (Figure 3a and 3b). With all zoom out power, the measurements will not alter even if the document is **"zoomed in"** at whatever power. The height of the first letter to the second letter was taken and mean value for each combination was ascertain. The procedure was carefully repeated for SII, SIII and SIV with no apparent damage to the paper itself.



(a) **(b)**

Figure 3(a) and 3(b): Showing measurement of height of 'c' with respect to 't' and measurement of height of 's' with respect to 'p'; 'p' with respect to 'e' and 'c' with respect to 't' respectively

Statistical Analysis

The mean values of the letters with respect to each other varies dramatically in SI-SII; SII-SIII; SIII-SIV (2 year gap). The fluctuation in the size and proportion of letters was also observed in SI-SIII; SII-SIV (4 year gap) and SI-SIV (6 Year gap).

The difference in the mean value for all combinations were determined for computing the range of variation in writing. The significant proof for the variation in relation to size and proportion of letters was observed by determining the coefficient of range rather than only range. Since the samples with a 2 year gap resists a smaller coefficient of range than 4 year gap and 6 year gap, the more degree of variation or the greater dispersion was in the samples with 6 year gap. The writing of the individuals in a two year gap were more stable than their writing in a four year gap and the writing after six years were least stable.

Table 2: Showing the final range of natural variation (in mm) in writing alongwith the overall coefficient of range

Time Gap	Year	Range of Natural variations (in mm)	Co-efficient of range x_m-x_o/x_m+x_o	Final coefficient of range
2 Years	SI-SII SII-SIII SIII-SIV	0.01 - 0.76 = 0.75 0.01 - 0.39 = 0.3 0.02 – 1.23 = 1.21	0.76-0.01/0.76+0.01 = **0.97** 0.39-0.01/0.39+0.01 = **0.92** 1.23-0.02/1.23+0.02 = **0.96**	**0.95**
4 Years	SI-SIII SII-SIV	- 0.37 = 0.36 0.01– 1.62 = 1.61	0.37-0.01/0.37+0.01 = **0.94** 1.62-0.01/1.62+0.01 = **0.98**	**0.96**
6 Years	SI-SIV	0.01 – 1.04 = 1.03	1.04-0.01/1.04+0.01 = **0.98**	**0.98**

CONCLUSION

Application of software technique in detection and identification ranges from proving penmanship of writing, helping in solving cases with the forged writing (except traced one) as the forged one would fall below or above this range, in suicide cases where suicide letters were perceived, in conducting on the spot scientific examination of document through scanned copy and serves as a non-destructive method of examination.

This study clearly indicates that in accordance with the time gap, the variation in the writing occurs and the stability decreases after a limited period of time. If the writing indicates the coefficient of range equals to one, it means that the writing is forged by tracing. The overall measure of dispersion ranged from 0.001 to 1.62 for natural variation in size and proportion of letters.

The range of natural variation in size and proportion of letters would be a useful tool for practitioners for implementation of it in a software.

Conflict of Interest: The article submitted for publication has not been published before, and it is not under consideration for publication in any other journal. I certify that I have obtained written permission for the use of text, tables, and illustrations from any copyrighted source, and I declare no conflict of interest.

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Incidence of Homicidal Deaths with the Distribution of Age, Gender and Cause of Death at a Tertiary Care Teaching Hospital in South India

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ABSTRACT

The present prospective study aims to establish the incidence of homicidal deaths with the distribution of age, gender and cause of death among cases which were subjected to post-mortem examination in a tertiary care teaching hospital in South India for a period of two years. The study revealed that among 10137 autopsies conducted in the study period, homicidal deaths accounted for 211 (2.08%) cases. Among the study population, the majority of the victims were aged between 21-30 years (35.55%). Males comprised the majority of victims as compared to females in the ratio 2.15:1. Head injury alone was cause for 41.23% of homicidal deaths.

Keywords: *Homicidal deaths, Cause of death, Age, Gender*

INTRODUCTION

Violence is a significant social problem and homicide is its severest form, depriving an individual of his fundamental right to live. There has been a global rise in homicide and it causes over 500,000 deaths per year worldwide.[1,2] For every individual who dies as its consequence, many are injured and suffer from physical, sexual and mental illness[3,4]. The killing of a person is the highest level of aggression found in all the cultures; the very motive or reason being the same i.e. lust for money, women and land. These are further aggravated by alcohol abuse, hard drugs and stimulants.[1,5] Further the newer generation are also influenced and taken to crime by the glorification of murders in movies[5,6].

The reason or motive the behind the homicide may be as trivial a reason like petty argument leading up to the more serious issues like revenge, financial conflicts, demand for dowry, infidelity, property gain, robbery, to conceal the crime after sexual assaults (rape), etc. Their pattern varies region to country, and are influenced factors like unemployment, low socioeconomics status, cultural, religious attitudes, social influences, psychological, criminal activities, drug culture, political factors, the motive behind killing and family relationships like marital disputes [6,7,8]. The present study aims to determine the incidence of homicidal deaths with respect to the cause of death, age and gender distribution.

MATERIAL AND METHOD

The prospective study aims to establish the incidence of homicidal deaths with the distribution of age, gender and cause of death among cases which were subjected to post-mortem examination in a tertiary care teaching hospital in Hyderabad, Telangana, South India for a period of two years from June, 2010 to May, 2012. On the basis of police inquest and autopsy, the cases were selected. The detailed information regarding the circumstances of crime was sought from the police, victim's relatives and friends. These cases were examined regarding criteria such as their age, sex, cause and manner of death. Post mortem examination was carried out as per the standards. All this information

was collected on proformas, summed up, computerized master data sheet was prepared and analyzed.

OBSERVATIONS

The study revealed that among 10137 autopsies conducted for a period of two years, The most common manner of death was accident with 7629 cases (75.26%) followed by suicidal deaths (n=2297; 22.66%) and homicidal deaths being 211(2.08%). (Table 1) The total cases of the study population of homicidal deaths have been divided into 8 sub-groups i.e. below 1 year, 1-10, 11-20, 21-30, 31-40, 41-50, 51-60 and >60 years. The highest number of cases were recorded in the 21-30 years age group i.e. 75 cases (35.55%), followed by 31-40 years age group which recorded 47 cases (22.27%) and 2 cases (0.95%) were seen in the age group below 1 year. (Fig. 1) The majority of the homicidal deaths were noticed in males with 144 cases (68.25%), and female deaths were 67 (31.75%).

Among the homicidal deaths, it was observed that the leading cause of death was head injuries (n=87; 41.23%), followed by strangulation (n=42;19.91%), which are followed by stab injury (10.9%), cut throat (6.16%), smothering (5.21%), burns (2.37%), head injury with strangulation (5.21%), strangulation with burns (0.95 %), head injury with burns (0.95%) & least in remaining all other causes (0.47%). (Table 2)

Table 1: Incidence of total homicidal deaths among the total cases.

S.No	Manner of Death	Total cases	Frequency (%)
1	Suicide	2297	22.66
2	Accident	7629	75.26
3	Homicide	211	2.08
	Total	**10137**	**100**

Table 2: Distribution of total homicidal deaths according to the cause of death.

S.No	Cause of Death	Total cases	Frequency (%)
1	Head injury	87	41.23
2	Strangulation	42	19.91
3	Stab injury	23	10.90
4	Smothering	11	5.21
5	Head injury with strangulation	11	5.21
6	Cut throat	13	6.16
7	Strangulation with burns	1	0.47
8	Strangulation with smothering	2	0.95
9	Strangulation with poisoning	1	0.48
10	Burns	5	2.37
11	Decapitation with stab with burns	1	0.47
12	Fire arm injury – chest	1	0.47
13	Head injury with burns	2	0.95
14	Head injury with stab	1	0.47
15	Head injury with firearm	1	0.47
16	Head injury with cut throat	1	0.47
17	Multiple injuries with head injury	1	0.47
18	Strangulation with blunt injury abdomen	1	0.47
19	Strangulation with rupture both testis	1	0.47
20	Suffocation	1	0.47
21	Strangulation with perineal injury	1	0.47
22	Fracture femur with heart laceration	1	0.47
23	Stab injury with cut throat	1	0.47
24	Head Injury with Multiple Chop Injury	1	0.47
25	**Total**	**211**	**100**

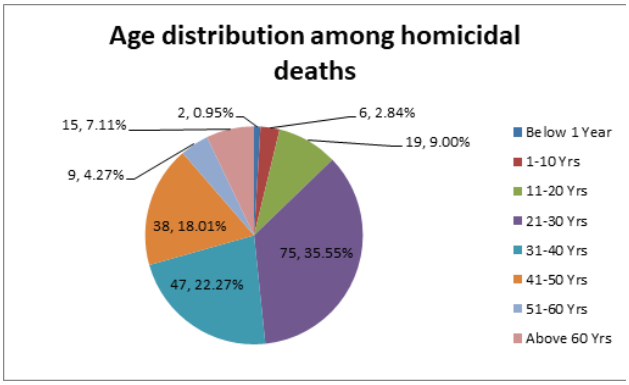

Fig. 1. Distribution of total homicidal deaths according to age.

DISCUSSIONS

As the homicidal deaths are well planned and executed, it becomes difficult for the investigating officer to explicate the truth. At this step, the postmortem examination by forensic medicine specialist is of significance to determine the medico legal injuries in the right perspective and further enabling the investigating officers and the judiciary for their legal conclusions.

Among 10137 autopsies conducted, it was observed that majority of the deaths were due to the accident (75.26%) followed by suicide (22.66%). Homicidal deaths were noticed in only 211 cases (2.08%). Similar findings were also noticed in studies conducted by Shivakumar BC[9] (4.76%), Shah Jainik P[10] (2.70%), Mohanty MK[11] (3.4%) and Mishra DP[15] (3.82%). The most common age group was 21-30 years (35.55%), followed by 31-40 years age group (22.75%). Cases are predominant in this age group, as people are more vulnerable to the variable social trends which cause an interpersonal interaction, ultimately resulting in misunderstanding and further predisposing to the causation of felonies, including homicide. Most importantly, these groups are usually married and earning member of the family. This distribution of cases among age group with 21-30 years followed by 31-40 years was also observed in studies of Shivakumar BC[9], Shah JP[10], Mohanty MK[11], Prajapati P[12], Patel DJ [13] and Gupta Avnesh[14].

The majority of the homicidal deaths were predominant in males (82.47%). Males being more aggressive and more indulged in occupation and social exposure, interpersonal interactions route to heated debate and conflict. Further unemployment, unsuccessful romantic and marital disputes, dowry disputes, gang rivalry and arguments were the reasons in males. This finding was in tune with studies of Shivakumar BC[9], Shah JP[10], Mohanty MK[11], Prajapati P[12], Patel DJ [13] and Gupta Avnesh[14].

Among total homicides, head injuries alone accounted for 41.23%, and constituted the most commonest cause of death causing homicide followed by strangulation (19.91%). As the head being a vital organ and the most vulnerable part of body to sustain injuries, it is the reason being a most effective method of the homicidal deaths. The various underlying factors, method of implication and the severity of trauma play a vital role in determining the ultimate result. Other studies by Mishra DP[15], Yogender Malik[16], Vijayakumari N[17] and Buchade D[18].

CONCLUSION

The study revealed that among 10137 autopsies conducted in the two years study period, homicidal deaths accounted for 211 (2.08%) cases. Among the study population, the majority of the victims were aged between 21-30 years (35.55%). Males comprised the majority of victims as compared to females in the ratio 2.15:1. Head injuries alone accounted for 41.23% of homicidal deaths. Violence is often predictable and preventable. Identifying and measuring certain factors strongly predictive of violence can provide timely warning to take the required action. Sustained efforts by many sectors of society along with political commitments are often necessary tackle these.

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Autopsy Evaluation of Perinatal Mortality: A Series of 84 Cases

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ABSTRACT

Perinatal autopsy provides an opportunity to determine accurate cause of death, factors that may have a role in it along with the presence of congenital malformations in newborns. Such perinatal autopsies were conducted in this study to evaluate vivid causes of death, factors associated with it and presence of common congenital anomalies. Total 84 cases were studied. Pneumonia (32.14%) followed by septicaemia (19.04%) were the major contributors of mortality among natural causes and among unnatural deaths, head injury (3.57%) and thermal burns (2.38%) were noted. Preterm deliveries, low birth weight and poor socioeconomic conditions were the leading factors associated perinatal mortality. Tracheo-oesophageal fistula (4.76%) and anorectal malformations (2.38%) were most commonly observed. Cases where congenital anomalies were suspected but could not be confirmed clinically were confirmed on autopsy examination. Thus perinatal autopsy is valuable tool in retrieving the valuable information regarding paediatric mortality which subsequently is critical for planning of health services.

Keywords- *Perinatal deaths, Perinatal autopsy, Congenital malformation*

INTRODUCTION

"To lose an offspring is hard and harder still to lose him by a disease not yet fully understood by doctors. But for the sake of other children; I think that to have seen his organs is of greatest utility." – Lester King.[1]

The term **"Autopsy"** derives from the ancient Greek word "autopsia" that means "to see for oneself" derived from (autos- "oneself") and (Opsis-"eye").[2]The loss of a viable foetus has multidimensional repercussions on society. To the mother it is a great psychological trauma and a tremendous strain on health. To the family, it is a psychological trauma, coupled with financial burden. It is now realized that stillbirths are influenced by environmental factors. Factors pertaining to the mother, placenta and foetus have been recently brought to light. But we are still in the dark regarding many factors responsible for stillbirths. Hence, well conducted autopsies on stillborn foetuses are of prime importance.

Perinatal autopsy represents the fusion of several overlapping disciplines - clinical and forensic pathology, anatomy, gynaecology, clinical neonatology, internal medicine and surgery. This mixture involves a complex synthesis to which there may be clinical pathological and legal approaches.[3] Perinatal death is unfortunate but common clinical problem. The pathologist must be able to evaluate the degree of injury and its secondary consequences in the light of `Legal Casualty`[3]. Thus Perinatal autopsy remains the gold standard in investigating the perinatal deaths.[4]

MATERIAL AND METHOD

he present study was conducted for the period of two years. Total 84 cases were studied in detail. These cases were referred for medico-legal post mortem examination to the Department of Forensic Medicine

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and Toxicology at a tertiary care Government Hospital and Medical college. Cases include those cases in which the dead body of a foetus, neonate or an infant was referred by concerned investigating officer for medico-legal post mortem examination. It also included the dead bodies of foetuses, neonates and infants which were found abandoned and were brought dead. Hospitalized medico-legal cases of foetus, neonate and infant which subsequently died during hospitalization and treatment and also the medico-legal cases of stillborn, dead born, post-partum deaths were studied. The foetuses obtained from the womb of deceased mother referred for post mortem examination were also studied in detail and were included in the study.

For selecting the cases and for statistical analysis purposes the cases are divided into three categories as foetus which is a product of conception irrespective of the period of gestation and up to 9 weeks it is designated as embryo while the neonatal period which is defined as first 28 days after birth and infancy which is defined as the 1st year after birth.[5] In order to classify in groups post neonatal age group i.e. after 28 days of birth were considered as infants.

Before performing the autopsy these cases were studied in detail from Indoor Case Papers, hospital records, and history obtained from relatives and Accidental Death Record (ADR) from police. Standard autopsy protocols were followed. External examination from head to toe with vital parameters of perinatal autopsy like weight, crown heel length, crown rump length, head circumference, chest circumference and abdominal circumference were noted and an attempt was made to rule out any unnatural cause of death. During autopsy, each system was studied thoroughly for screening of pathological findings and to correlate it with the clinical history and history obtained by relatives. Suspected congenital anomalies were confirmed on autopsy examination. Cases in which no evident pathology was observed on gross appearance and cause of death could not be proved beyond reasonable doubt, in such cases tissue samples were kept for histopathology examination and results were confirmed on retrieval of reports.

Cases in which death occurred after 1 year of survival were excluded from studies. Details of every case were studied in detail and findings of the individual examination were entered in pre designed proforma and then the data was recorded in master sheet. Data was statistically analysed in the form of percentage and proportions.

OBSERVATIONS AND RESULTS

In the present study (n=84), 7 (8.33%) are foetus, 41 (48.8%) are neonate and 36 (42.85%) are infants**.** All 7 foetuses were stillborn cases referred for post mortem examination.

Causes of death were studied in all the neonates and infants respectively. In neonates (n=41), among natural causes of deaths pneumonia with 16 cases (39.02%) was the leading cause of death followed by septicaemia with 9 cases (21.95%) while 5 cases of neonatal death were due to unnatural cause. Similarly among infants (n=36), Pneumonia with 11 cases (30.55%) was the leading cause of death followed by septicaemia with 7 cases (19.44%). Thus pneumonia and septicaemia are the major contributors of neonatal and infant mortality and morbidity in this study.

Associated factors along with disease play a crucial role in the infant, foetal and neonatal mortality. Such factors were also studied in this study to determine the causes of morbidity and mortality. In neonate group (n=41), preterm delivery 10 cases (24.39%), complication following congenital disorders and low birth weight 6 cases (14.63%) each, non institutional deliveries and poor hygiene/ poor nourishment/ poor socio-economic conditions 5 cases (12.19%) each were the major contributors of morbidity and mortality. While in infants (n= 36), poor socio-economic conditions / poor hygiene/ poor nourishment (38.88%) was the major culprit followed by congenital anomalies and post immunization complications (8.33%).

No significant congenital anomalies were noted in foetuses. Among neonates (n=41), trachea-oesophageal fistula with 4 cases (9.75%) was most commonly observed followed by 2 cases (4.8%) of ano-rectal malformation and 1 case (2.43%) each of occipital encephalocoele, duodenal atresia, intestinal obstruction, diaphragmatic hernia and metabolic disorders. In infants (n=36), 1case (2.77%) each of ano-rectal malformation, occipital encephalocoele, imperforate anus and metabolic disorders were observed.

Among neonates (n=41), 2 cases (4.87%) are of head injury, 1 case (2.43%) of haemorrhagic shock due to non ligation of umbilical cord in abandoned baby, 1

case (2.43%) of multiple injuries/ fractures sustained by fall from height and 1 case (2.43%) of asphyxia due to obstruction of foreign body in trachea and bronchi were observed. In infants (n=36), 2 cases (5.55%) were of thermal burns followed by 1 case (2.77%) each of head injury, ligature strangulation and decomposed state with multiple injuries/ fractures following unnatural death.

DISCUSSION

Out of all eighty four cases studied (n=84), manner of death was natural in 63 cases (75%), unnatural were 10 cases (11.9%). Study by Singh M.[6] shows that immaturity, birth asphyxia, bacterial infections and congenital malformations are the leading causes of neonatal mortality while studies by Kaushik S L.[7] stated that birth asphyxia, infections, immaturity, hypothermia are the leading causes of neonatal mortality. Similarly study by Modi N.[8] stated that respiratory problems of prematurity (49%), lethal congenital malformations (22%), complications of asphyxia (20%) and sepsis (5%) were the major cause of death in early neonatal deaths and Fottrel E, Osrin D, Alcocock G, et al. stated that prematurity, birth asphyxia and infections accounted for most neonatal deaths but important sub-national and regional differences were observed.[9] Similar findings were observed in the present study where pneumonia and septicaemia were the major contributors in neonatal and post neonatal age groups along with prematurity as an associated cause. Thus the parameters considered in the present study regarding cause of death and factors associated with it correlates well with the above mentioned studies.

In a study regarding pattern and manner of death in paediatric age group by Kumar et al. it was observed that 51.72% were accidental, 5.12% were suicidal, 3.73% were homicidal, 4.32% were natural and 35.11% were of unknown origin.[10] Burns were observed in 24.73% cases followed by poisoning (7.68%), drowning (4.32%), stillborn (1.54%), suffocation (1.39%) and strangulation (0.37%).[10] In the present study, 8 cases (9.52%) were homicidal out of which among neonates, head injury (4.87%) was more commonly observed followed by haemorrhagic shock (2.43%) and in infant age group homicide by means of burns (5.55%) was most frequently observed. Thus findings in the present study correlate well with the observations made by Kumar et al. regarding method of homicide used. In a study by Collins K. A. and Nicolas K.A.[11] forty five percent of the homicides were by head trauma. Similarly in the present study, among unnatural deaths (n=10), maximum cases (n=3) thirty three percent died of head injury followed by burns. Thus findings in the present study correlate well with study by Collins K. A. and Nicolas K.A.

Congenital anomalies associated with live birth or in utero poses a great amount of threat to foetal, neonatal and infant life in future. Such congenital anomalies were observed in this study. Among neonates (n=41), trachea-oesophageal fistula (9.75%) was most frequently observed followed by ano-rectal malformations (4.8%). In infants (n=36), one case (2.77%) each of anorectal malformation, occipital encephalocele, imperforate anus and metabolic disorders were observed. In a study by Kalyani R.[12] it was observed that malformation of the alimentary system (20.31%) were most common followed by genitor-urinary system (18.75%), musculoskeletal system (17.18%) and central nervous system (9.37%). Thus the findings in the present study regarding congenital anomalies co-relates well with the findings of study by Kalyani R.

CONCLUSION

Meticulous perinatal autopsy aid in understanding the factors responsible for triggering the chain of events which ultimately lead to perinatal morbidity and mortality. It also help to arrive at conclusive diagnosis of cause of death in unnatural deaths and factors associated with it. Extensive research studies needs to be conducted to attain a better understanding of the related factors and thus perinatal autopsy may prove to be very effective tool in redesigning the current protocols of medical treatment for the betterment of paediatric age group.

Table I - Age and Sex distribution

	Male	**Female**	**Total**
Foetus	4	3	7
Neonate	26	15	41
Infant	20	16	36
Total	**50**	**34**	**84**

Table II - Causes of Death (Natural)			
Cause of Death	**Foetus (n=7)**	**Neonate (n=41)**	**Infant (n=36)**
	No.	**No.**	**No.**
Still birth/ non viable	7	0	0
Pneumonia/ ARDS	0	16	11
Pulmonary edema/ haemorrhage.	0	1	1
Septicaemia	0	9	7
Meningitis	0	0	2
Aspiration Pneumonia	0	2	3
Miliary Tuberculosis	0	1	0
Cerebro-Pulmonary edema	0	1	**1**
Intracerebral Haemorrhage	**0**	**1**	**0**
Unnatural deaths	0	5	6
Opinion reserved pending	0	5	5
Total	**7**	**41**	**36**

Table III - Causes of Death (Un-natural)			
Cause of Death	**Foetus (n=7)**	**Neonate (n=41)**	**Infant (n=36)**
	No.	**No.**	**No.**
Burns	0	0	2
Head injury (SDH, SAH)	0	2	1
Ligature strangulation	0	**0**	**1**
Aspiration due to obstruction of foreign body	**0**	**1**	**0**
Haemorrhagic shock	**0**	**1**	**1**
Decomposed with physical injuries	**0**	**0**	**1**
Multiple injuries / Fractures	**0**	**1**	**0**
Natural cases	7	31	25
Opinion reserved pending	0	5	5
Total	**7**	**41**	**36**

Table IV- Data of factors associated with natural perinatal deaths.			
Natural Factors/ Age distribution	**Foetus (n=7)**	**Neonate (n=41)**	**Infant (n=36)**
	No.	**No.**	**No.**
No associated factors	7	1	0
Low birth weight	0	6	2
Preterm delivery	0	10	1
Congenital anomalies	0	6	3
Poor hygiene/nourishment/ socioeconomic condition	0	5	14
Non institutional deliveries	0	5	1
Abandoned	0	5	4
Post-immunization complications	0	1	3
Post-operative deaths	0	1	3
History Not Available	0	1	5
Total	**7**	**41**	**36**

Table V- Data of congenital anomalies in perinatal deaths			
Congenital Anomalies	Foetus (n=7)	Neonate (n=41)	Infant (n=36)
	No.	No.	No.
No Anomalies	7	30	32
Tracheo-oesophageal fistula	0	4	0
Anorectal Malformations	0	2	1
Occipital Encephalocele	0	1	1
Intestinal Obstruction	0	1	0
Duodenal atresia	0	1	0
Imperforate anus	0	0	1
Metabolic Disorders	0	1	1
Diaphragmatic hernia	0	1	0
Total	**7**	**41**	**36**

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Dental Age Estimation among Normal and Disabled (Deaf and Dumb) Children in Gandhinagar City – A Cross Sectional Study

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ABSTRACT

Introduction: Dental age estimation is of supreme importance in the field of forensic science. There are numerous techniques to estimate the age of children and adults of various ethnic origins but none of them has been tried to estimate the age of individuals with disabilities.

Materials and method: In this paper, we attempted to compare the dental ages of normal and disabled (deaf and dumb) children between 9 and 12 years. A sum of 76 children were considered for the study. The dental ages of both normal and disabled children were compared with London atlas of tooth development and eruption. The obtained results were statistically analysed by calculating their mean and standard deviation values.

Results: We observed that there were obvious differences among the dental ages of normal and disabled children. Most of the children in the disabled group had a retarded dental development.

Conclusion: Dental ages of disabled children differ from that of otherwise normal children. A bigger sample size with deeper investigations and studies on individuals with other disabilities at different regions of the world could confirm the fidelity of the study.

Keywords: *age estimation, dental, disabled children, London atlas, teeth.*

INTRODUCTION

Age estimation is one of the most crucial duties entrusted to a forensic expert. In cases of legal interests, age estimation plays a promising role, as it decides the fate of individuals by determining the punishment for a crime. An accurate method of age estimation is important for forensic investigators dealing with unknown bodies or missing cases, especially in children during mass disasters[1].

Dental age estimation is considered as the most superior method of age estimation among all methods available today. This is because other methods such as physical, skeletal and biochemical are influenced by numerous confounding factors that leads to arriving at erroneous results. Dental tissues are also least affected by malnutrition and do not decompose like soft tissues. Therefore, dental age estimation is lauded as a highly reliable means of age estimation[2].

Dental age estimation can circuitously be beneficial in identifying the individual when identification by visual means is not feasible. This holds good in some cases

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of mass disasters or when the bodies are in advanced stages of decomposition, where putative identity of an individual can be established with evidences from dental tissues such as the number of teeth present, the restorations on teeth, dental peculiarities, etc.[3]

Whether mass disasters or bodies in advanced decomposition stages, it need not be only normal and healthy individuals whose identities have to be ascertained. As there are approximately about 500 million disabled individuals globally, there are fair chances that there may be some individuals with disabilities among the lot[4]. Even in criminal cases, there may be involvements of disabled individuals, either in the form of a perpetrator or as a victim.

While some disabilities are physically manifested, certain disabilities such as deafness and dumbness are not physically manifested. This can pose greater challenges to the forensic fraternity while making attempts to identify those with such conditions when adopting to standard identification protocols. Because there are lots of differences in the physiology and social behaviour of the disabled, special attention has to be given to those with physical and mental impairments[5]. As with general body functioning, there may also be changes in the teeth eruption patterns, which could be a challenge to a forensic expert to estimate the age of living or deceased.

Unfortunately, till date, there are only a few studies in the literature done on handicapped individuals and there is no record of studies in the literature related to age estimation among disabled children based on their teeth eruptive patterns in both Indian and international contexts.

So, study was planned to investigate differences in clinical tooth eruption patterns between normal and disabled (deaf and dumb) individuals in both children and adolescent categories. In this study, we estimated the clinical dental age among normal and deaf and dumb children. The determination of the number of clinical erupted teeth might give helpful information for estimating age and individual identifications. It may also give identity of suspects associated with crime or violence if situations demand[6].

London atlas of tooth development and eruption[7], which is a comprehensive evidence-based atlas that correlates chronological age with both tooth development and alveolar eruption was used as a standard for this study, with which the teeth eruption patterns of all the individuals under study were compared and results were derived.

MATERIALS AND METHOD

This study was conducted in Gandhinagar, on 153 individuals of known chronological age from almost the same socio-economic status. Individuals that were examined belonged to the same ethnic class and were categorised into two different groups. Totally, we examined 84 apparently normal children of 8 – 19 years at Mahatma Mandhir School in Gandhinagar and 69 disabled children (Deaf and Dumb) of 7 – 21 years at Saraswati Vidya Mandhir in Gandhinagar, Gujarat were examined. A written consent was obtained from the heads of both the schools, a week before the day of clinical examination. Subjects with mental retardation, children who were apprehensive about dental examination (esp. disabled children), unwell individuals and those who were suspected to have major syndromes were excluded from the study.

A clinical assessment of teeth that were visible in the oral cavity was done by using simple mouth mirror and probe on all subjects. Both the primary and permanent teeth were included in the study as the study population comprised of individuals with mixed and permanent dentition stages. Teeth with only one cusp present were also considered as present in the mouth. Teeth present in the subjects' oral cavities were compared with the London atlas of tooth development and eruption chart[7]. Among these age groups, we considered only the children from 9 to 12 years of age, which includes 76 children, and compared their chronological ages with their dental ages. In each age, there were equal numbers of normal and disabled children. The remaining sample population was not included in the study because the subjects belonging to the other ages were not equal in number, and also that we did not want to have statistical discrepancies. Males and females were not separately categorised in this study. The ages of individuals were recorded by different examiner. Thus, the observers do not know during examination. This data of the subjects' chronological age was disclosed after dental age estimations were performed by the observer.

When comparing the ages of the children with the atlas, the age closest to the age available in the atlas, in the upper limit was taken into consideration. For example, the dentition of a child who was 10 years by chronological age was compared with the dentition of a 10.5-year-old child, in the atlas.

Type III examination was carried out throughout the study. The intra-observer and inter-observer variabilities were performed and tested. Finally, the obtained differences were subjected to the standard deviation values and results were interpreted accordingly.

RESULTS

The table shows the mean and standard deviation values of normal and disabled children in comparison to London atlas.

The table (Table 1) shows that there is a marked variability in tooth eruption sequence in normal and disabled children. The tooth eruption sequence of the normal children corresponds to the London atlas of tooth development and eruption considerably well. While comparing disabled and normal children by studying their mean of dental age and standard deviation, it is clear that a noticeable difference can be seen between both the groups.

On the other hand, the table also elucidates that the dental age is both delayed and accelerated in disabled children. An increased dental age was observed in 9 year olds, while a delayed dental age was observed in 10 to 12 year olds. This gives a notion that there is a predominant retardation of dental development in the disabled study group.

Table 1. Dental ages among 9 to 12-year-old normal and disabled children

Age	Normal Children		Disabled Children	
	Mean	Standard Deviation	Mean	Standard Deviation
9 years (n=16)	9	0.67	10.21	2.29
10 years (n=20)	10.5	0.89	9.25	1.14
11 years (n=20)	11.5	0	9.14	0.24
12 years (n=20)	12.2	0.5	10.7	0.90

DISCUSSION

Disabled children differ in their lifestyle when compared to normal individual. This in turn may affect their body functions as they are not always capable of taking good care of themselves, regardless of their social status. Jain et al., in their study demonstrated that children with hearing deficiency had a poorer oral health with many teeth affected by caries. Additionally, they discovered that the children had many dental problems that were left unattended[8].

From a forensic perspective, studies performed on handicapped children were not much found in the literature. To the best of our knowledge, there were no studies of dental age estimation performed on children with permanent sensory and motor deficiencies. This existing lacuna was the factor that drove us to investigate tooth eruption pattern of children with hearing and speaking disabilities.

Nevertheless, there have been a few studies that evaluated the dental age among children with Protein Energy Malnutrition (PEM), done in India and internationally. Some of them include the clinical examination based study done by Psoter et al., on adolescents in Haiti[9] and the one by Kumar et al., in India, on 100 children, using Demirjian's method of dental age estimation[10]. In both the studies, it was concluded that dental maturation retarded from the ideal timeline in those with Protein Energy Malnutrition.

London atlas was chosen as the standard of the study to compare the eruption sequences of the subjects under study. The reason for choosing London atlas is due to the fact that the study had Bangladeshi children in their samples[7], who share a very close genetic makeup with that of Indians. So we believed that there would not be much variations in the eruption sequence. Moreover, this atlas gives a scope to limit the study to clinical

comparisons, so that, at least, a pilot study could be done. Also, the study sample population was not split into males and females as the atlas we compared to, did not have separate versions for males and females.

Radiographic investigations were not employed in this study. This is due to practical impossibilities with the disabled children, who have limited proficiency in normal communications and difficulties in cognition. Unnecessary radiation exposure and financial constraints were the other reasons for abstaining from radiography. This could be one of the major limitations or drawbacks of the study.

Another possible drawback of this study was the smaller sample size. This was due to limited manpower and resources, besides the paucity of deaf and dumb schools in the city. An ambiguity in the findings with no statistical significance might also be due to this reason. This indicates the need of a future study on an extensive basis. A future study involving radiographic sampling (with proper precautions) and a larger sample population could give a stronger or a contrasting result, with more validity and better reliability.

Our study brings an alluring thought to the forensic researchers, all over the world, to work more on studies focused on the disabled individuals as there is a shortage of studies pertinent to disabled individuals. According to the recent census in 2011, disabled individuals account for 2.21% (2.68 crores of individuals) of the total Indian population. Among children between 0 – 6 years of age, one in every hundred children is disabled[11]. As it is the need of the hour, the authors therefore encourage the research community to further investigate and explore the forensic significance of all kinds of disabled individuals on various physical, biological and social aspects, throughout the country.

CONCLUSION

The study proved that disabled children have a different rates of teeth eruption when compared to normal children. Performing more such studies on various disabled children could help in generating a separate age estimation chart for those individuals, which could be prospectively used as a standard, whenever need arises. In addition to this, it could also pave way to explore more about their oral health status and address any hidden public health related issues, thereby ameliorating the dental health of the disabled children.

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Analytical Study of Burns and their Artefacts in Twin Cities of Hyderabad and Secunderabad in the Years of 2015 -2016

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ABSTRACT

Burning is a known cause of death since eras. In olden days, a custom called as Sathi used to exist, where the living wife of the dead male person was thrown in to fire. According to Hindu mythology, even Rama asked his wife Sita to prove her chastity by entering in to fire. In olden days, suicide by burning was taken as sign of honor. People died of burning were given equal respect like a soldier dying in a war field. Putting afire a person, gave a cruel pleasure to the people. Of course, accidental burns were there every time. Even burns by para suicide or threating to kill oneself is not uncommon. In India, dowries are a continuing series of gifts endowed before and after the marriage. When dowry expectations are not met, the young bride may be killed or compelled to commit suicide, most frequently by burning.

Homicide by burning amongst women is a major concern in India as it has become pervasive throughout all social strata and geographical areas. The present study is aimed to make a critical analysis of the deaths occurring due to burns and a focus is made on the presence of artefacts in them, in relation to their production and extension.

Keywords: *Burns, Artefacts, Homicide.*

INTRODUCTION

Death of a human being imposes a variety of problems for a Medical Practitioner, as in, Understanding the process and mechanism, which leads to the failure of organs and systems resulting in death, Declaring the death, as early as possible, in keeping view of Cadaver organ transplantation, and as late as possible, in keeping view of Consumer Protection Act and Criminal negligence charges, Conducting the Post mortem examination on the dead body, to establish the Cause of Death.

Whenever a dead body is recovered from a burnt area, it carries a number of artefacts with it. Some of them will be misleading the Medical Officer in taking a wrong decision about the cause and manner of death. In turn, it hampers the investigation of the case by police personnel and it will be seriously considered by the Judiciary.

The present study is conducted on those dead bodies in which burns are present, which are subjected to postmortem examination in the Mortuary of Gandhi Medical College, Secunderabad. during the years 2015 -16. This study is mainly conducted to know the common manner of death and different types of artefacts that co-exist in the dead bodies having burn injuries and their frequency of occurrence.

MATERIALS AND METHOD

The present study is mainly aimed at the different types of burns and the artefacts produced in them. These cases are collected from the postmortem examinations conducted by the Department of Forensic Medicine, Gandhi Medical College, Secunderabad during calendar year 2015 - 2016. They included the deaths occurring in Gandhi Medical College, and other hospitals in twin cities of Hyderabad and Secunderabad while undergoing treatment. Some of them died on the spot, i.e. at the scene of offence, and some people died on the way to hospital, while they were shifting. A total number of 100 cases are selected from both sexes, with different manners of death.

The postmortem examination reports, Inquests, Panchanama of scene of offence, Photographs, Personal enquiry reports collected from the relatives, especially about the previous diseases and treatment history, previous unsuccessful attempts in case of suicides are perused thoroughly, and the data is analyzed for this study. In some cases visit to the scene of offence is also made to collect some more information.

FINDINGS

A total of postmortem examinations were conducted in the calendar year 2015 -16. Out of them 429 were total deaths occurred due to burns. Only 100 cases out these were selected for the present study, which had some of the artefacts with them. During the study, the following things were observed.

1. Age and Sex distribution:

Females outnumbered by 58 to males who were 42 in number. Deaths were less common in the age groups less than 20 years (14%), with peak in the age groups of 20 to 40 years (59%).Suicidal burns were more common (64%) than the other manners, as to accidents (34%) and homicides (2%).

Tab No.1: Burns in relation to manner, sex and age

Age	Accidents		Suicides		Homicides		Total
	Male	Female	Male	Female	Male	Female	
<10 y	2	2	0	0	0	0	4
11to20 y	1	2	2	5	0	0	10
21to30 y	3	8	11	14	0	1	37
31to40 y	4	6	4	7	1	0	22
41to50 y	1	1	5	5	0	0	12
51to60 y	2	0	4	4	0	0	10
>60 y	1	1	1	2	0	0	5
Total	**14**	**20**	**27**	**37**	**1**	**1**	**100**

Burns take a major number of lives, and they are accounting for about 20% of total autopsies in the present study. It is similar to studies of other areas.

Females are outnumbering males because of easy availability of kerosene like inflammable material in the kitchen[1]. This also went parallel to other studies. The younger age people from 20 years to 40 years are committing suicides because of emotional stress and psychological imbalance. **Singh D** et al in their study made at PGIMER Chandigarh, opined that most burn deaths occurred in the age group 21-40 years (67%)with female preponderance (61%) in all age groups except in the extreme age groups[2]. 62% of burn cases originated in urban areas. The majority of subjects (99% females and 76% males) died because of flame burns. Kerosene was the most common factor (76%) in burn deaths.

2. Educational status:

Tab No.2: Burns in relation to educational status

Education	Accidents		Suicides		Homicides		Total
	Male	Female	Male	Female	Male	Female	
Illiterate	**11**	**11**	**22**	**27**	**1**	**1**	**73**
Primary	2	8	4	8	0	0	22
High school	0	1	1	2	0	0	4
Post High school	1	0	0	0	0	0	1
Total	14	20	27	37	1	1	100

73 people were illiterates among them, only one was having college education. Illiterate people are becoming vulnerable, because of their ignorance and emotional component. Of course, low socio-economic status also adds to that. Literacy is another factor which is indirectly proportionate in causing the victimization. Unfortunately even 2 post-graduates are also ended their lives during this period.

3. Marital status:

Tab No.3: Burns in relation to marital status

Age	Accidents		Suicides		Homicides		Total
	Male	Female	Male	Female	Male	Female	
Married	8	12	22	30	1	1	74
Unmarried	6	5	3	5	0	0	19
Widowed	0	3	2	2	0	0	7
Total	**14**	**20**	**27**	**37**	**1**	**1**	**100**

74 people were married and 19 were unmarried, and the remaining was widowed. Peak incidence of burns in females was observed between 5.01 a.m. and 11 a.m. (38%), which was the time of least incidence in males (10.3%) and the opposite trend was seen between 11.01 p.m. and 5 a.m. in them. Among males, burn deaths were more common (85%) in those who were living alone, away from their families; whereas in women the incidence of burn deaths was higher (74%) in those living with their families. The majority of deaths due to burns occurred within one week (77%) of the incident. Septicaemia was the major cause of death (55%).

Burns were more common in low-income group, and accounted for 80 deaths. No death occurred due to burns in the high-income group, in the present study.

4. Age group and sex distribution in relation to percentage of burns

Tab No.4: Burns in relation to age,sex and percentage.

Age group	<30%		30 to 50%		50 to 70%		70 to 90 %		> 90 %		Total
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
<10 y	1	1	1	1	0	0	0	0	0	0	4
11to20 y	1	1	1	2	0	2	0	1	1	1	10
21to30 y	0	1	3	6	7	5	4	7	2	2	37
31to40 y	0	0	2	4	0	5	3	5	1	2	22
41to50 y	0	0	3	1	1	0	1	1	2	3	12
51to60 y	0	0	1	0	0	0	1	0	4	4	10
>60 y	0	1	1	1	0	0	0	0	1	1	5
Total	**2**	**4**	**12**	**15**	**8**	**12**	**9**	**14**	**11**	**13**	**100**
	6		27		20		23		24		

Age and percentage of burns have direct effect over the outcome of the burns. Younger people of less than 20 years of age are unable to withstand even the simple burns of low percentage as 24% even. There are no deaths occurring in people of more than 25 years of age group due to burns of less than 30%. The total number of deaths of burns subjected to postmortem examination in people more than 50 years may be underscored, as they might have taken out from the hospitals while undergoing treatment

5. Period of survival in relation to percentage of burns

Tab No.5: Burns in relation to,sex and period of survival.

Period of survival	<30%		30 to 50%		50 to 70%		70 to 90 %		> 90 %		Total
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
Spot death	0	0	0	0	0	0	0	1	3	4	8
< 24 Hours	0	0	2	3	4	5	8	10	5	6	43
24 to 72 Hrs	0	0	3	4	4	7	1	3	3	3	28
3 to 7 Days	1	2	7	8	0	0	0	0	0	0	18
> 7 days	1	2	0	0	0	0	0	0	0	0	3
Total	**2**	**4**	**12**	**15**	**8**	**12**	**9**	**14**	**11**	**13**	**100**
	6		27		20		23		24		

Availability of treatment facilities has definitely increased the rate of survival in burn cases. This reflected in our study as spot deaths rate is decreased even in burns of more than 80%.

Less number of deaths occurring in cases of burns of less than 30% indicates the availability of better health care facilities. Death is almost assured in burns of more than 70%, and it is within 3 to 7 days of infliction of burns. Children were vulnerable for burns. Even less than 30% burns could take the life. Whereas adults could withstand the lesser percentage burns. As the percentage of burns is increasing the period of survival decreased. All spots deaths in those persons who had more than 90% of burns[3].

Young adults from 21 to 40 years died of 50 to 70% burns mostly. People who sustained less than 30% of burns survived for more than 3 days, some people survived for more than one week after sustaining burns even.

6. Artefacts found in dead bodies of burns in relation to percentage of burns:

Tab No.6: Burns in relation to,sex and artefacts.

Artefact	<30%		30 to 50%		50 to 70%		70 to 90 %		>90%		Total
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	
Heat rupture	0	0	0	0	0	0	1	1	2	3	7
Heat fracture	0	0	0	0	0	0	0	0	1	1	2
Pugilistic attitude	0	0	0	0	0	0	0	2	2	3	7
Heat haematoma	0	0	0	0	0	0	0	0	1	0	1
Singeing of hair	0	0	4	1	3	2	9	11	11	13	54
Venesection	2	2	6	10	6	11	9	14	11	13	84
Tracheostomies	0	0	0	0	0	0	0	0	2	0	2
Over-hydration	1	0	2	4	2	2	0	0	0	0	11
Faster putrefaction	0	1	2	8	2	6	2	4	1	1	27
Curling's ulcer	0	0	1	1	0	1	0	0	0	0	3
Total	**3**	**3**	**15**	**24**	**13**	**22**	**21**	**32**	**31**	**34**	**198**

Artefacts is one of the commonest finding in burns cases as about 198 artefacts are found in 100 cases which are taken for the present study a in a total number of 498 burns cases.

Venesections made over the ankles and wrists are the commonest therapeutic artefact, which is made at the time of admission, to replace the fluid. These must not be confused to incised wound of traumatic origin.

Singeing of hair is another finding which seen frequently, will be confused for mechanical cuts especially when they accompany the heat ruptures. Whenever more than 50% of body surface area is involved, it will have some effect of on the scalp or pubic hair, resulting in singeing. The same thing observed in the present study.

Faster onset of putrefactive changes is also found in the present study. This can be attributed to the tropical climate and variety of bacteria present in the environment.

Rigor mortis resulting a posture simulating pugilistic attitude is seen in 7 cases, in the present study[4]. Pugilistic attitude is an instantaneous phenomenon occurring in those bodies having more than 90% of burns and died on the spot. The rigor mortis usually sets in after a time of 3 to 6 hours of death. Due to unexplained mechanism, the body takes the same posture simulating the pugilistic attitude even in delayed deaths[5].

SUGGESTIONS

1. Dead bodies presenting with burns need a careful examination, and evaluation, in finding the percentage, depth and severity of burns.
2. Admission in to hospital and adoption of different therapeutic procedures, produce a variety of artefacts. Medical officer must be thorough with all this information; otherwise, he may mistake many of the procedural findings. It is always welcoming to attend the seminars and C.M.E.s regularly to up date the knowledge.
3. Some of the artefacts like fragmentation of the charred body leave a suspicion in the mind that there are other antemortem injuries. This can be avoided, if a visit to the scene of offence is made. Medical officers working in the mortuary, must be sent for orientation classes to the Department of Forensic Medicine in the nearest Medical Colleges, to update their knowledge and for clarification. Every effort must be made by the policy makers to provide the required equipment, at least to the higher centres, which deal with medico legal work. Especially instruments like spectrophotometer, which detects the presence of carboxy haemoglobin, will solve many problems at the mortuary table itself. Society has to play an important role in this mission. It is not only the family members, friends, neighbors, colleagues but also Medical / Paramedical personnel, teachers, and educated persons of the community have to take part in identifying the risk prone groups.
4. It is not hard to identify the future victim for a person who is closely observing. Any change in the behaviour, attitude, and decline in optimistic levels of a person will be alarming signs of depression, which are to be watched carefully, and need to be informed to the responsible persons of the victim.
5. Health education, counselling, timely crisis intervention either by medical or psycho social methods certainly reduce the number of victims.
6. Non-governmental Organizations must take part actively in this issue.
7. Whenever any death of female occurs within the seven years of married life, it must be booked under 304 - B section of I.P.C. and must be examined by a team of doctors. Many times the accused is escaping because of lack of evidence regarding the demand for dowry. Hence it is the duty of the grieved parents and teachers to help the investigating authorities in this regard.
8. In every possible case the Autopsy surgeon should visit the scene of offence to get more information. In some cases even the homicide may be concealed as burn injury deaths, hence enough care should be taken while conducting the Autopsy.
9. Students should not be stressed at studies and other aspects. They are lagging beyond appropriate help must be offered to improve their performances. Healthy family relations enables parents to offer more care towards their children.
10. People must be educated about psychological disorders like depression to identify them as treatable diseases which are aggravated during menstrual period in females.
11. Young females before marriage should be aware

of the structure, problems and consequences of marriages in order to cope up with new circumstances i.e., new life with new man parents especially mother should take their responsibility. The law regarding domestic violence must be strictly implemented without any compliance, as majority of the suicidal deaths in newly married females are due to harassments by husbands and his relations.

12. From the beginning everyone should develop financial discipline keeping the future requirements in mind. The problem of elders of must be sympathetically approached by the family members and society. Neglected parents abonded by their children should be provided with old age homes with adequate health facilities.

Ethical Clearance: Taken From Institutional Ethics Committee, Gandhi Medical College.secunderabad.

Source of Funding : Self

Conflict of Interest: Nil

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Estimation of Supine Length from Percutaneous Measurement of Forearm Length

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ABSTRACT

Identification of the deceased is important at the time of medicolegal autopsy in case of mutilated dead bodies. Stature is one of the parameter which could help in identification of the deceased especially in cases of mass disasters wherein mutilated or amputated body fragments are brought to the mortuary for the purpose of examination. The aim of the present study was to estimate supine length from percutaneous measurement of forearm length in 200 dead bodies (100 male and 100 female) brought to the mortuary of University College of Medical Sciences and Guru Teg Bahadur Hospital, Delhi. The results showed significant positive correlation between forearm length and supine length (right forearm length r = 0.939 and left forearm length r = 0.840).

Keywords: *Stature, Supine Length, Forearm length, Percutaneous measurement.*

INTRODUCTION

Identification means determination of exact individuality of a person. When the person is known by his name with complete address, it is known as complete identification. But in certain circumstances when some details like age, sex etc. can only be established it is known as partial identification. The question of identification may arise in living and dead and also in civil and criminal cases. Identification is basic responsibility of investigative agencies. The identification of dead bodies is required in cases of sudden and unexpected deaths, fire explosions, railway or aircraft accidents.

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For establishing the identity points taken into consideration include : (i) Age (ii) Sex (iii) Religion (iv) Complexion (v) General development including stature (vi) Anthropometric measurements (vii) Fingerprints and footprints (viii) Superimposition (ix) Teeth (x) DNA fingerprinting and (xi) Personal belongings .

Stature refers to body length from the crown to the bottom of the feet in standing position. Supine length refers to the body length taken in supine position from the vertex of skull to heel of feet. Body length increases after death by about 2 cm due to loss of muscle tone, relaxation of joints and tensions of inter vertebral discs.[1] Stature varies with race and is determined by genetics of a person, geographical location, environment and climatic conditions.[2] Estimation of stature is an important objective in the identification of an individual from dismembered and skeletal remains in forensic case work.[3] Establishing the identity of an individual from mutilated, decomposed and amputated body fragments has become an important necessity in recent times due to increase in mass disaster, be it natural disasters like earthquakes, tsunamis, cyclones, floods or man-

made disasters like terror attacks, bomb-blasts, mass accidents, wars, and plane crashes etc.[4]

A Number of multiplication factors and regression equations have been developed from long bones throughout the world. Multiplication factors as given by Pan (1924) for East Indians (Hindus) are as follows: Humerus (5.30), Radius (6.90), Ulna (6.30), Femur (3.70) and Tibia & Fibula (4.48).[1] Estimation of stature from bones is a tedious and time consuming process and gives erroneous results due to considerable statistical differences between the lengths of fresh and dry bones.

Some of the equations used to estimate the stature include parameters like length between the tips of one middle finger to that of the opposite when the arms are fully extended, length of arm from acromial process of scapula to tip of olecranon process, length from vertex to symphysis pubis, length from sternal notch to symphysis pubis, length of forearm from tip of olecranon process to tip of middle finger etc.[1] Many studies have been conducted on the determination of stature from percutaneous measurements of various body parts including arm[5], forearm[6], hand[7], foot etc. This is usually conducted by correlating various measurements of body with height of the person using scientifically derived formula such as multiplication factors and regression equations.

The regression equations for western population were first evolved by Trotter and Gleser, Dupurtuis and Hadden.[1] The present study is aimed to deduce the correlation between supine length of adult cosmopolitan population of Delhi with their forearm length for subsequent determination of supine length.

MATERIAL AND METHOD

Supine length and bilateral forearm lengths was recorded from 100 Male and 100 Females dead bodies within the age group of 21 to 45 years brought to mortuary of GTB hospital for medicolegal postmortem examination. Individuals without any anatomical distortion of body in relation to stature were included in the study. Cases with physical deformity, disease or defect affecting the growth in general or of bones and suffering from gigantism or dwarfism were excluded from the study.

Procedure:

After breaking rigor mortis by treating the dead body with warm water, supine length and bilateral forearm lengths were recorded. Dead body was placed in supine position on autopsy table, with knee and hip joints extended, and neck & feet in same plane.

Supine length was measured from vertex of head to the base of heel using scientifically standardized graduated anthropometer.

Forearm length was measured with hand and forearm in straight line and flexed elbow position as the distance between tip of olecranon process to mid-point joining radial and ulnar tuberosity on dorsal aspect using scientifically standardized graduated Vernier calipers.

The measurements were tabulated and appropriate statistical tests were applied.

RESULTS

Supine length

Supine length in males ranged from 155 cm to 180 cm with mean supine length of 166.23 cm & standard deviation of 4.75 cm. In females, supine length ranged from 140 cm to 167 cm with mean supine length of 154.32 cm & standard deviation of 5.30 cm.

Forearm length

The descriptive variables of forearm lengths of both sides in males and females are as shown in table 1.

Table – 1: Measurements of forearm length on both sides

Gender	Measurement side	Minimum	Maximum	Mean	Standard deviation
Male (n = 100)	R	25.2	28.6	27.384	1.0066
	L	25.2	26.8	26.260	0.3943
Female (n = 100)	R	22.4	27.6	23.636	1.4637
	L	22.2	26.6	23.622	1.5128

Regression Equation

Linear regression equation derived from both forearm lengths for estimation of supine length in **males and females** showed significantly positive correlation of right forearm length with lesser value of standard error as compared to left forearm length as illustrated in table 2.

Table – 2: Regression equation for estimation of supine length

Gender	Measurement side	Regression equation for Supine length	Std error of estimate(+/-) cms	Correlation coefficient (r)
Male	R (Figure 1)	55.790+4.033×FAL	2.482	0.853
	L (Figure 2)	109.384+2.165×FAL	4.681	0.179
Female	R (Figure 3)	81.204+3.093×FAL	2.767	0.853
	L (Figure 4)	87.480+2.830×FAL	3.136	0.807
Combined	R (Figure 5)	77.505 +3.245 × FAL	2.689	0.939
	L (Figure 6)	65.349 +3.806 × FAL	4.239	0.840

Figure 1: Regression Equation for Supine length from Right forearm length in Males

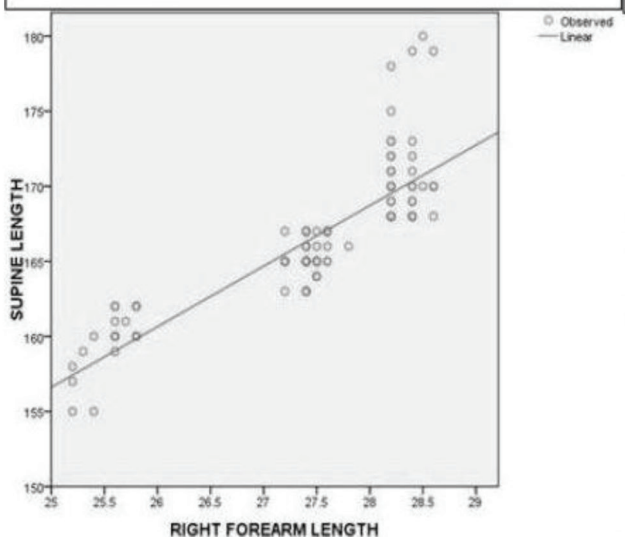


Figure 2: Regression Equation for Supine length from Left forearm length in Males

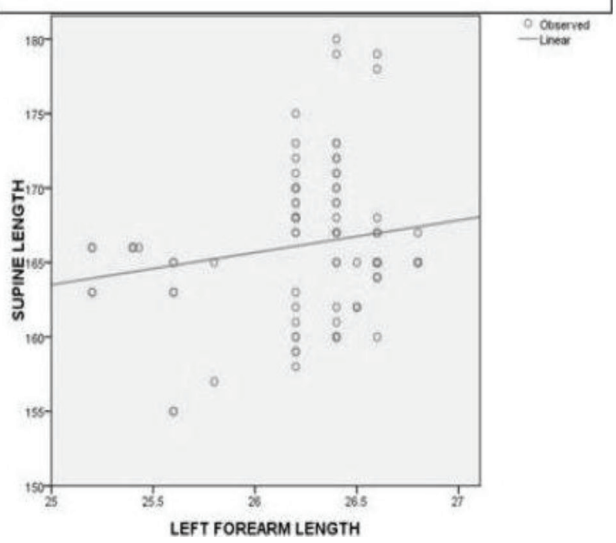


Figure 3: Regression Equation for Supine length from right forearm length in Females

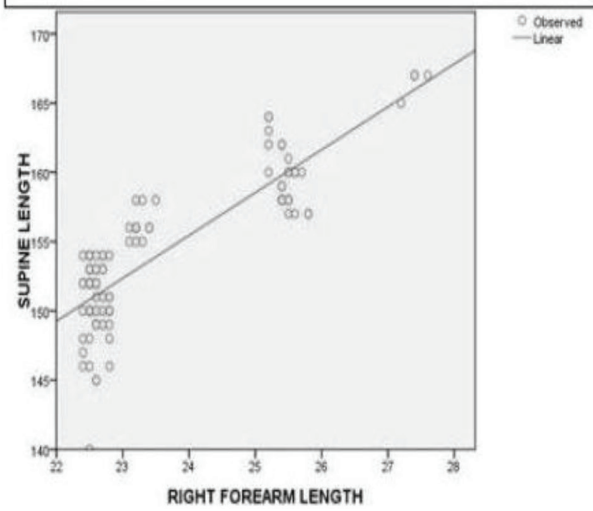


Figure 4: Regression Equation for Supine length from Left forearm length in Females

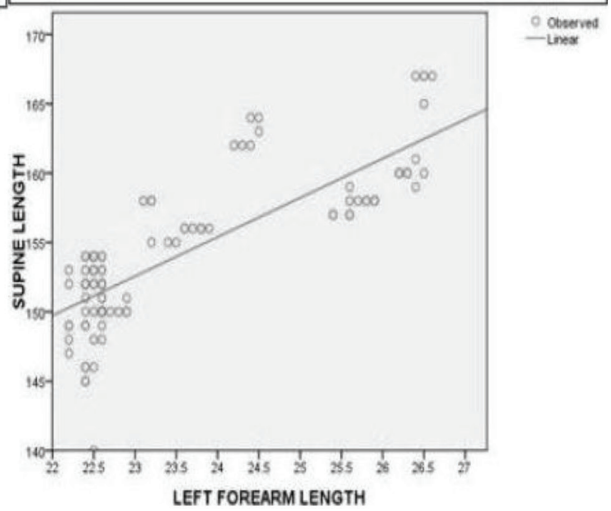


Figure 5: Regression Equation for Supine length from Right forearm length in combined cases

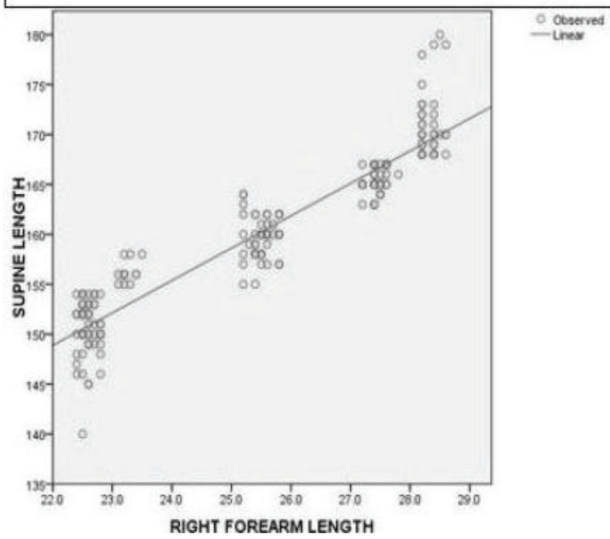
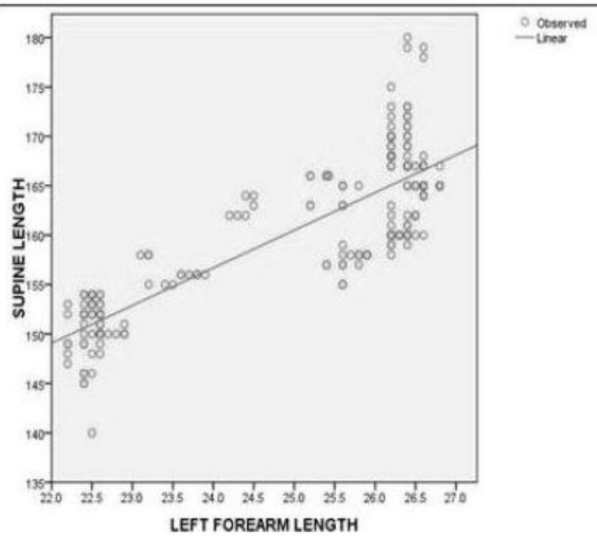


Figure 6: Regression Equation for Supine length from Left forearm length in combined cases



The forearm length on both sides showed significantly positive correlation with supine length even in total females together. Right forearm length in total cases gave better prediction of supine length with high correlation coefficient and lower standard error of prediction.

Multiplication Factor

Multiplication factor was derived for both forearm length for estimation of supine length. In males multiplication factor was 6.070 and 6.330 for right and left forearm lengths respectively. Among females the multiplication factor was 6.529 and 6.532 for right and left forearm lengths respectively.

DISCUSSION

Stature estimation is an important factor in identification of commingled remains in forensic examinations. Of the two basic methods i.e. anatomical and mathematical method for estimating living stature from long bones and body parts, the anatomic method is generally preferred over mathematical method when the

complete skeleton or cadaver is available.

The anatomical method involves the direct reconstruction of stature by measuring and adding together the lengths or heights of a series of contiguous skeletal elements from the skull through the foot. Many authors consider that the anatomical method provides best approximation of stature when applicable to skeleton or cadaver. To calculate the living stature of an individual using the anatomical method, correction factors that compensate for soft tissue also need to be added. However, when mutilated remains and skeletal parts are referred for personal identification in forensic examinations, the forensic experts have to rely upon mathematical methods for stature estimation.

Mathematical methods utilize the measurements of one or more bones or body parts to estimate stature. Thus a distinct advantage of mathematical methods is that a single body part can be used to estimate the living stature of an individual. Standard error of estimate needs to be considered giving a possible range of stature from a given bone/body part. Moreover, different formulae are required for different population groups, different bones or body parts. Mathematical methods employed in stature estimation include multiplication factor and regression analysis. Forensic significance of these mathematical methods is based on the principle that there is a high linear correlation between an individual's stature and the body part or bone length[8].

Trotter[9] states that the most accurate estimates of stature can be obtained when the equation applied to the unknown has been derived from a representative sample of population of same sex, race, age and geographical area to which the unknown is believed to belong.

The present study was aimed at and concentrated on finding the co-relation between supine length and anthropometric measurements of both side's forearm of both male and female in cosmopolitan population of Delhi for subsequent determination of supine length.

Supine Length:

In the present study mean supine length for males was 166.23 cm and for females was 154.32 cm. Table 3, gives the comparison of mean supine length of the study group among different authors.

Table – 3: Comparison of mean supine lengths of study group among different authors.

Authors	Supine length			
	Mean		Std deviation	
	Males	Females	Males	Females
Agnihotri et al[3]	173.99	159.96	6.13	6.25
Ilayperuma et al[10]	170.14	157.55	5.22	5.75
Chikhalkar et al[4]	167.25		8.49	
Present study	166.23	154.32	4.75	5.30

Forearm length in Males and Females:

Gender difference in estimation of supine length from forearm length was studied in the present study. It was observed (table 6) that forearm length exhibited statistically significant bilateral differences in males ($p< 0.01$). However, in females the forearm length had no statistically significant bilateral difference ($p= 0.434$) as per Table 4.

Table – 4: Gender difference in estimation of Supine length from forearm length

Variable	Males				Females			
	Mean difference	Std deviation	t- value	p – value	Mean difference	Std deviation	t- value	p – value
Forearm length	1.150	1.067	10.776	< 0.01	0.060	0.763	0.786	0.434

Ilayperuma[10] studied 258 medical students (140 male and 118 female) in the age group of 20 – 23 years for estimation of supine length from length of forearm. The correlation coefficient in males and females was 0.66 and 0.76 respectively.

Agnihotri[3] estimated stature from percutaneous length of tibia and ulna in indo- Mauritian population in 180 students (90 males and 90 females) in the age group of 18 – 28 years. Significant correlation was noted between

stature and length of ulna. No significant differences were observed in the lengths of right and left sides of ulna in both males (r = 0.857) and females (*r* = 0.996).

Mondal[11] studied 300 Bengalee females in 20 – 50 years age group for height prediction from ulnar length and found the 'r' value of left and right ulnar length to be 0.823 and 0.67 respectively.

Chikhalkar[4] estimated stature from measurements of long bones, hand and foot dimensions in 300 subjects (147 males and 153 females) in 19- 23 year age group. Of all the parameters forearm length showed the highest degree of correlation (r = 0.6558).

Difference in estimation of supine length from right and left forearm length:

Correlation coefficient of right forearm length for estimation of supine length was 0.853 in case of both males and females whereas the correlation coefficient of left forearm length was 0.179 in case of males and 0.807 in case of females. For combined population the correlation coefficient for right forearm was 0.939 and for left forearm was 0.840.

Table 5: **Differences in estimation of supine length from right and left forearm length**

Variable	Supine length	Right forearm length	Left forearm length
t – value	16.710	20.200	15.956
p – value	< 0.01	< 0.01	< 0.01

Table – 5 depicts *t*- value and *p*- value of supine length and forearm lengths of both sides. Estimation of supine length from forearm length showed statistically significant ($p<0.01$) differences between right and left sides.

CONCLUSIONS

Forearm length showed statistically positive correlation with supine length. Right forearm length gives better prediction of supine length with high correlation coefficient and lower standard error of prediction. Hence forearm length can be used for estimation of supine length in cases of mutilated bodies and amputated body fragments.

Conflict of Interest: Nil.

Source of Funding: Self.

Ethical Clearance: Taken from Institutional Ethical committee, University College of Medical Sciences and Guru Teg Bahadur Hospital, Delhi.

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Atherosclerosis in Coronaries in Sudden Unexplained Deaths in Madurai Region of South Tamil Nadu

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ABSTRACT

The study involves the gross and microscopic examination of coronary arteries of 200 cases of sudden deaths in all age groups brought to mortuary of Government Rajaji Hospital, Madurai for post mortem from Madurai region of South Tamil Nadu. The study was carried out to find the prevalence, pattern, frequency and severity of atherosclerotic changes in coronary arteries in sudden death cases. The study was conducted in the Department of Forensic Medicine and Department of Pathology, Madurai Medical College, Madurai for a period of 3 years from January 2013 to December 2015.

Keywords: *Left coronary artery, atheroma, sudden unexplained deaths*

INTRODUCTION

In todays world, unemployment, physical and mental stress, physical inactivity, obesity, alcohol and drug addiction are on the rise creating a shift in paradigm of disease spectrum from communicable diseases to non – communicable diseases. CVDs (cardiovascular diseases) particularly coronary artery disease predominate among NCD accounting for about 7.4 million death annually throughout the world.

On gross examination, atheromatous areas look like a raised yellowish plaque. Initially the lesion is focal and in late stages it becomes confluent. Uniform involvement of coronary artery is uncommon thus producing eccentric thickening of walls and narrowing of the lumen. Ulceration and thrombosis may be followed. Calcification and even ossification are sometimes seen.

Microscopically, atheromatous area shows increase of ground substance, disintegration of internal lamina, accumulation of foam cells containing fat in the intima and subintimal regions. Chronic inflammatory cell reaction are seen when cells rupture causing release of fat. Areas of calcification and cholesterol clefts may be seen overlying intima which shows fibrosis.

The incidence of coronary arteries involvement is anterior descending branch of left coronary artery (45-64%) especially first part, right main coronary artery (24-46%) especially proximal part, left circumflex coronary artery (3-10%) and left main coronary artery (0-10%)[1].

In India, incidence of coronary atherosclerosis accounts for 85% in all sudden deaths. Incidence is less common among Nigerian as compared to other races.

MATERIALS AND METHOD

200 cases of sudden unexplained deaths brought to the mortuary of Government Rajaji Hospital, Madurai were studied. Both the gross and histopathological examination of coronary arteries was done.

Coronaries were cut serially at 2-3mmdistance, examined grossly in mortuary and histopatholoical examination was done in pathology department.

OBSERVATION

The present study was conducted to find out the prevalence, incidence, pattern, frequency and severity of atherosclerosis in sudden unexplained deaths. Further various factors affecting the same were also studied and detailed observation were made from 200 cases as follows.

TABLE 1: DISTRIBUTION OF CASES ACCORDING TO AGE AND SEX

AGE GROUP	NO	PERCENTAGE
0-20 years	2	1.33%
20-40 years	38	25.3%
40-60 years	80	53.33%
60 years	30	20.00%
	150	100%

SEX	NO	PERCENTAGE
Male	98	65.33%
Female	52	34.66%
Total	**150**	**100%**

TABLE 2: DISTRIBUTION OF CASES ACCORDING TO PERSONAL FACTORS

	PERSONAL FACTORS	NO	PERCENTAGE
DIET	VEGETARIAN	48	32%
	NON VEGETARIAN	102	68%
TOTAL		150	100%
ALCOHOLIC	**YES**	55	36.66%
	NO	95	63.33%
TOTAL		150	100%
SMOKER	**YES**	65	43.33%
	NO	85	56.66%
TOTAL		150	100%

TABLE 3: COMPARISON OF ATHEROSCLEROSIS IN RCA, LADA, AND LEX

S.NO	GRADE OF ATHEROSCLEROSIS	LEX		LADA		RCA	
		NO	%	NO	%	NO	%
1.	**MILD**	48	32%	72	48%	55	36.5%
2.	MODERATE	61	41%	19	13.5%	18	12.5%
3.	SEVERE	13	8.5%	1	2%	1	0.5%
4.	NONE	28	18.5%	58	39.5%	76	50.5%
5.	**TOTAL**	**150**	**100%**	**150**	**100%**	**150**	**100%**

DISCUSSION

Atherosclerosis is a multifactorial disease affected by various factors such as smoking, personality characteristics, alcohol consumption, presence of stress and strain in life etc.

In past few decades, Madurai has undergone a rapid change in the way of lifestyle, eating habit, stress, strain and environmental pollution. In the present study, a sincere effort has been made to study the effect of these various changed environmental factors on atherosclerosis.

In present study it was observed that out of 200 cases of sudden deaths, 150 caases gad atherosclerotic changes in coronaries (incidence – 75%). Out of 150cases, 98 cases were male (65.3%) and 52 cases were female (34.6%) this is in accordance with Murthy et.al [2]. Who studied 150 cases all of which 123 (82%) were males and 27 females (18%) and Padmavati and Sandhu [3] who observed 74.5%males and 25.5% females incidence respectively. The higher percentage of males can be explained by their increasing inclination towards alcoholism and other drugs, stress in workplace, smoking etc.

Maximum cases studied in present study were in the age group 40 – 60 years and20 – 40 years.

Atherosclerotic changes develop very early in life starting from age 17 years onwards. Overall the incidence of atherosclerosis was found to be 75% (150 cases). Incidence in male in third decade 45% and from fifth decade onwards it was 100%. Least incidence was found in 0-20 years in both sexes. Severity of lesion increased with increasing age. Earlier studies in India by Wig [6] found significant atheroma in 2/3 rd of cases above the age of 20 years.

While Tandon[4] found atherosclerosis in 2nd and 3rd decades (14.3%). Thereafter there was rise in both studies. In past studies by Murthy[(2)] observed 28%, Padmavathi and Sandhu[(3)] found 24.4%, Tandon et al seen 25.5% and by Bhargava and Bhargava[(5)] 20.40% maximum cases in age group of 21-30 years. In present study, it was observed that maximum no of cases 80 (53.3%)belong to age group 40-60 years and 38 cases (25.3%) in 20-40 years age group.

INCIDENCE OF ATHEROSCLEROSIS

Incidence of atherosclerosis in present study was 75% (65.33% in males and 34.33% in females), in previous studies incidence of atherosclerosis observed was 82% by Allism et al [7] 73% by Murthy et al[2], 67.3% by Padmavathi and Sandhu[3].

Incidence of atherosclerosis is more in males compared to females which is in accordance with previous studies. In the present study, the number of alcoholics was 55 (36.6%). 35 cases had mild, 15 cases had moderate and 5 cases had severe degree of atherosclerosis. Non vegetarian were 102out of which 10 cases had severe, 22 had moderate and 70 cases had mild degree of atherosclerosis. It was concluded that smokers, alcoholics and non vegetarian were more prone to atherosclerosis and sudden unexplained deaths.

CONCLUSION

The study showed that the male : female ratio of distribution of cases was 2:1, coronary atherosclerosis was seen at the minimum age of 18 years which are quite early age for the development of atherosclerosis in coronaries.

It was seen that atherosclerosis was found in 75% of cases which is a very high incidence and it seems to correlate with changing habit and life style, the commonest type of lesion in the present study was fatty streaks 45% alcohol, smoking, diet, type of job was not showing a linear correlation with atherosclerosis but seems to have associated with the severity of lesions. Incidence of coronary artery atherosclerosis is very high compared to other regions. Alarming increase in rates of atherosclerosis seen in females compared to previous studies.

Conflict of Interest : None

Source of Funding : Self

Ethical Clearance : As it is retrospective involving statistics, ethical clearance is not needed for this study.

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Study of Asphyxial Deaths in Bidar District

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ABSTRACT

A two year retrospective study was conducted from January 2014 to December 2015 it is an attempt to know the incidence of asphyxial deaths at Bidar institute of medical sciences, Bidar. During this period there were 772 deaths out of which 132 deaths were of asphyxial deaths. Asphyxial death forms one of the modes of death which may be suicidal, homicidal or accidental in nature. The most common form of asphyxial death in our study was hanging followed by drowning. The incidences of asphyxial deaths were more in males than females in the ratio of 1.7:1. These cases were studied to know age and sex distribution of the victims. In this study, we found that among asphyxial deaths hanging were more 83 (62.87%) followed by drowning 41 (31.06%), strangulation 06 (4.54%) and others respectively. Appropriate education, influencing the media in their portrayal of suicidal news, reporting method, involvement of young generations in encouraging activities may reduce the rate of suicidal deaths in future.

Keywords: *Asphyxial deaths, Autopsy, Hanging, Drowning, strangulation, traumatic asphyxia*

INTRODUCTION

The term asphyxia may be defined as a state in which the body lacks oxygen, because of some mechanical interference with the process of breathing[1]. Hanging produces painless death for the victims and there is no costs involvement other than that of the ligature material. A thin rope around the neck will cause unconsciousness in 15 seconds[2]. The hanging and drowning are commonly seen in suicidal cases, while strangulation including throttling is usually homicidal. In addition, accidental compression or trauma to chest that prevent respiratory movement, which is known as traumatic asphyxia or crush injury is also one of the cause for violent asphyxial death.[3,4]

Due to population explosion, poverty and increasing stress and strain in our daily life, we frequently come across cases of suicides, homicides and accidents. Males and females are both exposed to such stresses, but it seem that ours being a male dominated society and more exposure to external environment, such cases are commonly seen in males.

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With urbanization, rural areas are also not left aloof and this can be seen from the increasing incidence of such cases from this areas.[5]

MATERIAL AND METHOD

The autopsies conducted at mortuary of Bidar institute of medical sciences, Bidar. were considered for this retrospective study. The data were collected from police requisition form, postmortem report, and forensic science lab repo rt. The cases were studied to know the incidence of asphyxial deaths with respect to age group, sex, type of deaths.

RESULTS/FINDINGS

The total numbersof autopsies conducted during the study period were 772, of which 132 cases were of asphyxial deaths. The incidences of asphyxial death among males were 83 (62.18%) deaths and in females were 49 (37.12%) deaths. The asphyxial deaths were more in age group of 21–30 years (41.66%) followed by 11-20 years (20.45%) and 31–40 years (17.42%) respectively.(Table 1)Suicidal deaths 120 (90.90%) were more compared to homicidal 12 (9.09%). (Table 2) Hanging 83 (62.87%) and drowning 41 (31.06%) were most common form of asphyxia deaths seen in both the sexes. (Table 3 & 4)

Table 1: Sex and Age wise Distribution of Asphyxial Deaths

Age Groups	Male	Female	Total	(%)
0 –10 years	0	0	0	0%
11 –20 years	16	11	27	20.45%
21 –30 years	34	21	55	41.66%
31–40 years	15	08	23	17.42%
41 –50 years	08	05	13	9.84%
51 –60 years	06	04	10	7.57%
61–70 years	03	0	03	2.27%
>71 years	01	0	01	0.75%
Total	**83**	**49**	**132**	

Table 2: Manner of Asphyxial Deaths

S. N.	Manner of Asphyxial Deaths	Cases	Percentage %
1	Suicidal	120	90.90%
2	Homicidal	12	9.09%
3	Accidental	0	0.00%
4	**Total**	**132**	**100%**

Table 3: Type of Asphyxial Deaths

S. N.	Type of Asphyxial Deaths	Cases	Percentage %
1	Hanging	83	62.87%
2	Drowning l	41	31.06%
3	Strangulation	06	4.54%
4	Smothering	02	1.51%
5	Traumatic Asphyxia	00	00%
6	**Total**	**132**	**100%**

Table 4: Type of Asphyxial Deaths between males and females

S. N.	Type of Asphyxial Deaths	Male	Female	Total %
1	Hanging	51	32	62.87%
2	Drowning l	30	11	31.06%
3	Strangulation	02	04	4.54%
4	Smothering	00	02	1.51%
5	Traumatic Asphyxia	00	00	00%
6	**Total**	**83**	**49**	**100%**

DISCUSSION

The autopsies conducted during the study period were 772, of which 132 cases were of asphyxial deaths. Table.No.1 shows incidence of asphyxial deaths based on age and sex. The incidences among males were 83 (62.18%) deaths and in females were 49(37.12%) deaths. The asphyxial death was more in age group of 21 –30 years(41.66%) followed by 11-20 years (20.45%) and 31–40 years (17.42%) respectively. [6] The incidence of asphyxial deaths was more in males than females in ratio of 1.7:1. This is in accordance with other studies which showed about 68% in males.[6]

Among all these registered suicides cases, hanging was the commonest method used to commit suicide[7], which is found to be more prevalent among males in comparison to females 21 to 30 years of age groups, showed maximum number of cases after which age group 11-20 years. [6, 8, 11, 12] This was quite similar to the study done by Sharma et al. [9] The incidence of various asphyxial deaths was recorded and drowning was found to be commonest.The disparity between males and females in suicide rates has been most apparent in this study. Men have a higher risk of suicide than women.[10] In present study most of the victims were from the age group 20-30 years (41.66%). Study has shown that people belong to this age group were also common victims of hanging in other countries.[12] Males predominate both in hanging and drowning as these are not as commonly opted method of suicide by females as compared to poison intake and burning.[10]

CONCLUSION

The number of suicidal hanging cases is increasing day by day. A well designed and comprehensive programme is needed to identify the causative factors and prevention of suicidal behaviours. Appropriate education, influencing the media in their portrayal of suicidal news, reporting method, involvement of young generations in encouraging activities may reduce the rate of suicidal death by hanging in future. Due to repeated physical and mental torture, they go beyond threshold level of self constrain and commit suicide by easily available ligature material like dopatta or sari or rope. In case of male; poverty, lack of job, family problems, defamation and alcoholism are the main reason for suicidal hanging.

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An Autopsy Profile of Bony, Visceral and Organ Injuries in Fatal Road Traffic Accident in South India

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ABSTRACT

Road Traffic Accidents constitute the leading cause of unnatural deaths. This study was conducted with an objective to determine patterns of bony, visceral and organ injuries in fatal road traffic accidents brought for medico legal autopsy at tertiary teaching hospital in South India. The cases were commonly seen in age group 41-50 years and in males. Skull and brain was the most common skeletal and organ injured respectively.

Keywords: *Road traffic accident; Skeletal injury; Visceral injury; Organ injury*

INTRODUCTION

Road Traffic Accidents (RTA) are the leading cause of unnatural deaths in the world with about 1.25 million deaths each year[1]. In India, according to Accidental Deaths and Suicides in India report, 1,48,707 road accidents deaths were recorded in 2015 contributing to 42.9% of total unnatural deaths[2]. Injuries due to RTA depend upon a number of factors-human, vehicle and environmental factors play vital roles before, during and after a serious RTA. The important factors constitute road conditions, traffic congestion, mechanical fault in vehicle, human errors, poor traffic sense, speeding and overtaking, violation of traffic rules, etc[3,4,5,6]. The spectrum of RTA is immense resulting varied types of injuries skeletal and visceral injuries[7,8,9]. The aim of the study is to determine the patterns of bony, visceral and organ injuries in fatal road traffic accidents.

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MATERIALS AND METHOD

The present retrospective study comprised of cases of fatal road traffic accidents brought for medico legal autopsy at tertiary teaching hospital in Pondicherry, South India in 2016-2017. This work was comprised of randomly sample of 100 cases of fatal road traffic accidents of all age groups confirmed from police inquest reports, and autopsy examination conducted by the author. The data pertaining to the patterns of bony, visceral and organ injuries were collected and analyzed.

RESULTS

Among the study population (n=100) of fatal road traffic accidents, most of the victims belonged to age group 41-50 years (25%), followed by 21-30 years and 61-70 years (17%). (Table 1) Male were the most common victims (89%). Among the bony injuries, Skull fracture was noticed in 80 cases with involvement of base of skull in 70 cases and vault of the skull in 52 cases. This was followed by rib fracture which was seen in 29 cases. (Table 2) The most common viscera or organ injured was brain (93%) followed by spinal cord (15%), and lung injury was seen in 10 cases. (Table 3)

Table 1: Age distribution of fatal road traffic accidents (n=100)

Age group	Frequency (%)
1-10 years	1
11-20 years	7
21-30 years	17
31-40 years	14
41-50 years	25
51-60 years	15
61-70 years	17
71-80 years	4

Table 2: Distribution of bony injuries fatal road traffic accidents (n=100)

Part of Body	Bone fractured	Number of cases
Head (Skull)	Vault	52
	Base	70
	Cheek bone	2
	Nasal bone	14
	Maxilla	2
	Mandible	1
Neck	Cervical Vertebrae	9
Chest	Thoracic Vertebrae	5
	Clavicle	10
	Sternum	2
	Ribs	29
Abdomen	Lumbar Vertebrae	1
	Pelvic bones	4
Upper Extremities	Humerus	3
	Radius	3
	Ulna	1
Lower Extremities	Femur	8
	Tibia	7
	Fibula	8
	Tarsal and Metatarsal	4

Table 3: Distribution of visceral/organ injuries in fatal road traffic accidents (n=100)

Viscera/ organ	Number of cases
Brain	93
Lung	10
Heart	1
Liver	7
Lungs	10
Kidney	9
Mesentery	3
Spinal Cord	15
Testis	3

DISCUSSION

The present study reported that most of the victims belonged to age group 41-50 years (25%), followed by 21-30 years and 61-70 years (17%) which was in contrast with other studies where it was common in age group 21-30 years in Gupta V et al[7], Dhillon S et al[8], Kumar A et al[9], Singh R et al[10] and Patil SS et al[11] which is considered the most active and productive age groups are involved in road traffic injures Male were the most common victims (89%). Similar observation was noted in various studies[7-14]. This gender difference is probably related to high exposure and risk taking behaviour. Most of the internal injuries were found on the head followed by chest, neck and lower extremity in this study. Among the bony injuries, skull fracture was noticed commonly, followed by rib fracture. This finding was also documented by many researchers[7-9,12-14]. But this was in contrast with studies of Singh R et al[10] and Patil SS et al[11] where limb fracture was common. The most common viscera or organ injured was brain followed by spinal cord and lung injury. The majority had brain injuries, followed by injuries to the lungs and liver was also noticed in studies of Gupta V et al[7], Dhillon S et al[8], Kumar A et al[9] and Farooqui JM[12].

CONCLUSION

The present study reported that fatal road traffic accidents were commonly seen in age group 41-50 years and male. Skull fracture was the most common, and brain was the most common organ injured. To be effective,

policies on injury prevention and safety must be based on local evidences and research with implementation of stringent guidelines and laws.

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Ethical Clearance: None required

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Pattern of Fatal Road Traffic Accident Cases

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ABSTRACT

According to WHO, road traffic accidents are the sixth leading cause of death in India with greater share of hospitalization, deaths, disabilities and socio-economic losses in young and middle aged population. The present medico-legal autopsy based study was carried out in the Department of Forensic Medicine & Toxicology, Government Medical College, Latur. During study period from 1st January 2016 to 31st December 2016, total 828 autopsies were conducted by the department of which 179 (21.62%) cases of road traffic accidents were selected & studied the pattern of fatal road accident cases to determine the burden of deaths due to road traffic accidents in various age and sex groups, with special emphasis on body region involvement and cause of death.

Keywords:- *Pattern, Fatal, Road Traffic Accidents, Autopsy, Body Region Involvement, Cause of Death*

INTRODUCTION

Road traffic injuries were the 11th leading cause of death worldwide and accounted for 2.1% of all deaths globally. Furthermore, these road traffic deaths accounted for 23% of all injury deaths worldwide. 90% of road traffic deaths occurred in low income and middle-income countries, where 5098 million people or 81% of the world's population live and own about 20% of the world's vehicles[1].

Road traffic injuries constitute a major public health problem. They constitute a rapidly growing problem, with deaths from injuries projected to rise from 5.1 million in 1990 to 8.4 million in 2020. Rapid urbanization and motorization in developing countries will account for much of the rise and the rise will be steeper due to lack of appropriate road engineering and lack of injury prevention programs in the public health sector[2].

Accident is an event occurring suddenly, unexpectedly and inadvertently under unforeseen circumstances. In spite recent advancement of technology and medical sciences death and deformity following road traffic accidents is yet to be controlled successfully[3]. According to WHO, road traffic accidents are the sixth leading cause of death in India with greater share of hospitalization, deaths, disabilities and socio-economic losses in young and middle aged population[4].

In comparison to the magnitude of the problem in developing countries there has been relatively little study on road traffic collisions and their consequences. There appears to be little awareness of their contribution to the burden of disease, so they are seriously neglected in research and policy. This is true at both the national and international levels. The lack of scientifically based epidemiological, economic and risk factor data from the national level, most especially from developing countries, has inhibited the response of international agencies[2].

Hence attempt was made to study the pattern of fatal road accident cases to determine the burden of deaths due to road traffic accidents in various age and sex groups, with special emphasis on body region involvement and cause of death.

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MATERIAL AND METHOD

The present medico-legal study was carried out in the Department of Forensic Medicine & Toxicology, Government Medical College, Latur. During study period from 1st January 2016 to 31st December 2016, total 828 autopsies were conducted by the department of which 179 (21.62%) cases were turned out to be of death due to road traffic accidents were selected. Detailed history was taken before postmortem examination and studied to determine the burden of deaths due to road traffic accidents in various age and sex groups, with special emphasis on body region involvement and cause of death.

OBSERVATION AND RESULTS

During study period of 1st January 2016 to 31st December 2016 total 828 autopsies were conducted by the department of which 179 cases of road traffic accidents were selected. Burden of death due to road traffic accident cases was 21.62% (179/828) out of total medico-legal autopsies.

Table 1: Age group wise distribution of cases (n=179)

Age group (in years)	No. of Cases	Percentage (%)
00-10	03	1.68
11-20	16	8.94
21-30	48	26.82
31-40	45	25.14
41-50	22	12.29
51-60	19	10.61
61-70	20	11.17
71-80	06	3.35
Total	**179**	**100**

In the present study (Table No.1), out of total 179 cases maximum number of deaths i.e. 64.24% observed between 21-50 years of age group with the highest percentage of deaths found between the age group 21-30 years was 26.82% followed by 31-40 years of age group had 25.14%. 41-50 years of age group were 12.29% and least percentage was observed i.e. 1.68% in less than 10 years of age.

Table 2: Sex wise distribution of cases (n=179)

Sex	No. of Cases	Percentage (%)
Male	156	87.15
Female	23	12.85
Total	**179**	**100**

In the present study (Table No.2), out of total 179 cases maximum number of deaths i.e. 87.15% observed in males and females were 12.85%. Males were greatly outnumbered the females with Male: Female ratio was 6.78:1.

Table 3: Classification of cases as per fatal injuries to body region (n=179)

Fatal Injuries to Body Region	No. of Cases	Percentage (%)
Only Head Region	101	56.42
Only Thoracic Region	04	2.24
Only Abdominal & Pelvic Region	09	5.03
Other (Limbs) Body Region	06	3.35
More than One Body Region	59	32.96
Total	**179**	**100**

In the present study table 3 shows classification of cases as per the fatal injuries to various body regions with percentage. Out of total 179 cases, highest i.e. 56.42% (101) cases had fatal injuries to only head region followed by 32.96% (59) cases had fatal injuries to more than one body region. Only Abdomen and pelvic region fatal injury cases were 5.03% (9). 3.35% (6) cases had fatal injuries to other (limbs) body region and least i.e. 2.24% (4) cases had fatal injuries to only thoracic region.

Table 4: Classification of cases as per cause of death (n=179)

Cause of death	No. of Cases	Percentage (%)
Head Injury	105	58.66
Multiple Injuries	38	21.23
Injury of Vital Organs	22	12.29
Crush Injury	07	3.91
Spinal Cord Injury	02	1.12
Complications	05	2.79
Total	**179**	**100**

In the present study table 4 shows classification of cases as per the cause of death with percentage. Out of total 179 cases, maximum i.e. 58.66% (105) cases died due to head injury followed by death due to multiple injuries were 21.2% (38). Death due to injury to vital organs were 12.29% (22), crush injury deaths were 3.91% (7), Death due to complications were 2.79% (5) and least i.e. 1.12% (2) cases died due to spinal cord injury.

DISCUSSION

In the present medico-legal autopsy based study of pattern of fatal road traffic accident cases, burden of death due to road traffic accident cases was 21.62% (179/828) out of total medico-legal autopsies during study period.

The World report on road traffic injury prevention indicates that more than half of all global road traffic deaths occur among young adults between 15 and 44 years of age. 73% of all global road traffic fatalities are males. Vulnerable road users – pedestrians, cyclists and motorcyclists account for a much greater proportion of road traffic collisions in low-income and middle-income countries than in high-income countries[1].

In the present study (Table 1), out of total 179 cases maximum number of deaths i.e. 64.24% observed between 21-50 years of age group with the highest percentage of deaths found between the age group 21-30 years was 26.82% followed by 31-40 years of age group had 25.14%. 41-50 years of age group were 12.29% and least percentage was observed i.e. 1.68% in less than 10 years of age. It indicates that maximum deaths occurred in young adults. This observation is consistent with Singh YN et al[3], Singh H and Dattarwal SK[5], Farooqui JM et al[6], Shruthi P et al[7], Kual A et al[8], Katageri S et al[9] and Guntheti BK and Singh UP [10].

In the present study (Table 2), out of total 179 cases maximum number of deaths i.e. 87.15% observed in males and females were 12.85%. Males were greatly outnumbered the females with Male: Female ratio was 6.78:1. This observation is consistent with Singh YN et al[3], Singh H and Dattarwal SK[5], Farooqui JM et al[6], Shruthi P et al[7], Kual A et al[8], Katageri S et al[9] and Guntheti BK and Singh UP [10]. It clearly indicates that, fatal deaths by road traffic accidents were highest in youth. This could be due to rash and hurry driving only especially more in males.

An increase in average speed is directly related both to the likelihood of a crash occurring and to the severity of the consequences of the crash. For example, an increase of 1 km/h in mean vehicle speed results in an increase of 3% in the incidence of crashes resulting in injury and an increase of 4–5% in the incidence of fatal crashes[11].

Consumption of alcohol, drugs or medications affecting the central nervous system, night journey, distractions while driving plays important role in causation of fatal road traffic accidents. Driving under the influence of alcohol and any psychoactive substance or drug increases the risk of a crash that results in death or serious injuries. In the case of drink-driving, the risk of a road traffic crash starts at low levels of blood alcohol concentration (BAC) and increases significantly when the driver's BAC is $\geq$ 0.04 g/dl. In the case of drug-driving, the risk of incurring a road traffic crash is increased to differing degrees depending on the psychoactive drug used. For example, the risk of a fatal crash occurring among those who have used amphetamines is about 5 times the risk of someone who hasn't. There are many types of distractions that can lead to impaired driving. The distraction caused by mobile phones is a growing concern for road safety. Drivers using mobile phones are approximately 4 times more likely to be involved in a crash than drivers not using a mobile phone[11].

It was also noted that (Table 3), out of total 179 cases, highest i.e. 56.4% (101) cases had fatal injuries to only head region followed by 32.96% (59) cases had fatal injuries to more than one body region. Only Abdomen and pelvic region fatal injury cases were 5.03% (9). 3.35% (6) cases had fatal injuries to other (limbs) body region and least i.e. 2.24% (4) cases had fatal injuries to only thoracic region.

This pattern may be due to primary impact, secondary impact, secondary or run over injuries in case of pedestrians and front impact, side impact, rear impact, roll-over crash or other mishap such as ejection in case of driver and passengers of motor vehicle.

In the present study table 4 shows classification of cases as per the cause of death with percentage. Out of total 179 cases, maximum i.e. 58.66% (105) cases died due to head injury followed by death due to multiple injuries were 21.2% (38). Death due to injury to vital organs were 12.29% (22), crush injury deaths were

3.91% (7), Death due to complications were 2.79% (5) and least i.e. 1.12% (2) cases died due to spinal cord injury.

It indicates that maximum deaths occurred due to head injury alone. This finding is in agreement with Singh H and Dattarwal SK[5] and Farooqui JM et al[6]. Non use of helmet by two wheeler occupants, seat belts and child restraints increase the fatality rate. Wearing a motorcycle helmet correctly can reduce the risk of death by almost 40% and the risk of severe injury by over 70%. Wearing a seat-belt reduces the risk of a fatality among front-seat passengers by 40–50% and of rear-seat passengers by between 25–75%. If correctly installed and used, child restraints reduce deaths among infants by approximately 70% and deaths among small children by between 54% and 80%[11].

It clearly gives a thought that most of the deaths due to road traffic accidents are preventable deaths. Knowledge about pattern of body region involvement and cause of death in case of road traffic accident is very essential for the initiation of prompt treatment, deciding priorities and for planning prevention strategies. It is also very important for the medico-legal experts in deciding causation of injuries, manner and corroboration with the circumstances.

Good laws relating to key risk factors can be effective at reducing road traffic injuries and deaths. Some progress has been made: over the past 3 years, 17 countries (representing 5.7% of the world's population) have amended their laws to bring them into line with best practice on key risk factors. Nonetheless, many countries lag far behind in terms of ensuring their laws meet international standards. Lack of enforcement frequently undermines the potential of road safety laws to reduce injuries and deaths. More effort needs to be placed in optimizing enforcement efforts[12].

CONCLUSION

Road traffic accidental deaths are preventable deaths. Most of the deaths were occurred due to head injury. Consumption of alcohol, drugs or medications affecting central nervous system while driving increases the risk of road traffic accidents. Non use of helmet, seat belts and child restraints increase fatality in road traffic accidents. Apart from this, pedestrians should be cautious while crossing the roads. Unsafe and overcrowded vehicles should be avoided. During rainy seasons and night long travelling has to be discouraged. Stringent law and rigorous imprisonment has to be imposed on the other hand awareness regarding road safety and driving rules should be created. Road conditions should be improved. Moreover a neat and wide road for travelling and foot paths for pedestrians has to be constructed for comfortable and safe journey. Emergency medical service depots should be established on the highways and super-specialty service set-ups should be established in the rural areas. The present study will certainly help for planning preventive measures and deciding health priorities.

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A Quantitative Study of Factors affecting the Incidence of Behavioral Abnormalities among Students in Markazi and Hamedan Provinces

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ABSTRACT

This study aims to determine the factors affecting the incidence of behavioral abnormalities among students in Markazi and Hamedan provinces during the academic year 2015-2016. This research is applied in terms of purpose but the method is integrated in terms of its implementation, so that the survey and causal-comparative methods were used together. The statistical population consisted of high school students in Markazi and Hamedan provinces, of whom 390 people were determined according to the Cochran formula and using the random quota sampling method. The questionnaire of effective factors in behavioral abnormalities was applied for data collection. Its validity was confirmed by experts and scholars and its reliability was calculated based on Cronbach's alpha of 0.85. Questionnaires were completed by high school students. Data were analyzed using descriptive statistics and Chi-squared test. Data were also analyzed and processed using SPSS software. The results show that each individual, family, peer, social and school factors affect the incidence of behavioral abnormalities in the students.

Keywords: *Behavioral Abnormalities, Factors, Students*

INTRODUCTION

Preparing the students for future life and equipping them with descent ethics and normal behaviors is one of the main goals of all educational systems worldwide. Although, the norm is considered as a relative concept in each society and is explained in comparison to values, it is certain that norm-based behavior belongs to those who are positively educated in their life[1]. A number of factors affect the educator's behavior including cultural ecosystem factors, individual, social, family, and school factors[2].

Behavioral abnormalities refers to those behaviors associated with emotional disorders that are inconsistent with social norms, and incapacitate individuals to meet their interactive needs[3]. In psychology, a set of behaviors, emotions and emotions have been identified that can measure behavioral abnormalities. Therefore, educational practitioners can measure and identify students' behavioral abnormalities[4]. Children and adolescents are more exposed to environmental factors than others. In addition to being affected by environmental, family and school factors, they will have environmental behaviors as their future social capital[5]. What students receive as social behavior from school, family, and media will affect social development[6]. This is why environmental education has been addressed in educational systems. If educating the students is associated with a kind of balance in their attitudes, knowledge and behavior, one can expect they become normal citizens as the output of the education process[5]. Personality is shaped under the influence of family and inheritance and within the family, normal or abnormal

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behaviors are transferred[7]. Then, educational settings are effective in teaching the principles of moral and ethical behaviors[3]. Even the schools and its staff can affect the students' behaviors. The social environment and media are another factors influencing their behaviors. What is referred to as social culture is the result of the interaction of students with such environments[8].

According to the social learning theory, children and adolescents receive many of their teachings from their surrounding environment and through observation. That is why parents and educators should have a normal relationship with this group. This research aims to investigate the factors affecting the incidence of the behavioral abnormalities of students in Hamedan and Markazi provinces. However, the current status of the prevalence of behavioral disorders among students in the Markazi province in the last five years is unclear due to the lack of regular and scientific studies. The same gap is observed in Hamedan province, too and it was the motivation for doing this research. So, the research question of the study is as follows: Which factors affect the behavioral abnormalities of students in Hamedan and Markazi provinces? And what are the priorities of these factors?

METHODOLOGY

This research is considered applied in terms of the objectives, because the research findings will be applied after the implementation in the field of education. However, the research methodology is integrated in terms of implementation. This means that the survey and causal-comparative methods were used together. In other words, the data collection process has been emphasized in quantitative and qualitative dimensions. In the quantitative dimension, the data of various types of behavioral abnormalities were evaluated by distributing the questionnaire. The statistical population of this study consisted of the high school students in Markazi (n=84767) and Hamedan (n=107861) provinces in the academic year 2015-2016. The student population of these two provinces is 192628.

The sample size in the Markazi and Hamedan provinces was 390 people who were selected using the random sampling method. Firstly, Hamedan and Markazi provinces were individually divided into five geographical regions of the center, north, south east and west; then, from each geographic region, a city with education department was selected as a sample where two high schools for male and female students were randomly selected and in each school, based on the number, a sample size was selected. The field data were collected for the aim of this study. To this end, the questionnaires were distributed in Markazi and Hamedan provinces. The questionnaire of the educational factors affecting the behavioral abnormalities was used for data collection. Its validity was confirmed by experts and scholars and its reliability was calculated based on Cronbach's alpha as 0.85. Data were analyzed using descriptive statistics and Chi-squared test and were analyzed and processed using SPSS software.

RESULTS

The results showed that the factors affecting the behavioral abnormalities of students in Markazi province were respectively family, social, peer, individual, and school factors, and the values of x^2 = 182.489 and sig = 0.000 <0.05 indicate the significant difference in the priority given to each of the factors affecting the behavioral abnormalities of students in Markazi province. Other results demonstrated that the individual factors affecting the behavioral abnormalities of students in Markazi Province are as follows in terms of the priority: physical defect, weakness in individual skills, weakness of religious beliefs, lack of attention to emotional and psychological needs and the values of x^2= 81.608 and sig = 0.000 <0.05 denote a significant difference in the priority of each component of individual factors in the behavioral abnormalities of students in Markazi province.

The results showed that the priority of the family factors in the behavioral abnormalities of students in Markazi province were respectively discrimination between children, economic weakness of family, parents' disputes or conflicts, parents' divorce, and the presence of an addict in the family and values of x^2 =53.89 and sig = 0.000 <0.05 points out that there is a significant difference in the priority of each of the family factors in behavioral anomalies in the students of Markazi province.

The results signified that prioritizing the peer factors in behavioral abnormalities in the students of the Markazi province are respectively the behavioral disadvantages (deviancy) of peers, need for peer affirmation, peers' improper requests, inappropriate relationship with peers

and bad friends. In addition, the values of $x^2 = 30.294$ and sig = 0.000 <0.05 suggests a significant difference in the priority of each of the factors of peers in behavioral abnormalities in the students of Markazi province.

Other findings acknowledged that the social factors in the behavioral abnormalities of students in Markazi province were immigration, group media effects, lack of proper leisure facilities, and inappropriate place of residence, respectively. The values of $x^2 = 35.981$ and sig = 0.000 <0.05 makes clear a significant difference in the priority of each component of social factors in the behavioral abnormalities of students in Markazi province.

The results imply that the priority of the school factors in the behavioral abnormalities of the students of the Markazi province are strict school regulations, threats and punishment in the school, academic failure, inappropriate teaching and classroom practices, and school staff's inappropriate behavior, respectively. The values of $x^2 = 38.673$ and sig = 0.000 <0.05 indicate a significant difference in the priority of each of the school factors in behavioral abnormalities in the students of Markazi province.

The results revealed that the factors affecting the behavioral abnormalities of Hamadan students were family, peer, social, individual, and school factors, respectively and the values of x^2=91.644 and sig = 0.000<0.05 showed a significant difference in the priorities of each of the factors affecting behavioral abnormalities in Hamedan province.

The results showed that the individual factors in behavioral abnormalities in Hamadan province students were weakness of religious beliefs, physical defect, weakness in individual skills, and lack of attention to emotional and psychological needs, lack of self-confidence, respectively. The values of $x^2 = 30.980$ and sig = 0.000 <0.05 represents a significant difference in the priority of each of individual factors in behaviors abnormalities in Hamadan province students.

Other results demonstrated that the family factors in behavioral abnormalities in Hamadan province were discrimination between children, the presence of addict in the family, parents' disputes or conflicts, economic weakness of family, and parents' divorce, respectively and the values of $x^2 = 13.787$ and sig = 0.008 <0.05 shows that there is a significant difference in the priority of each of family factors in behavioral abnormalities in Hamadan province students.

Other findings pointed out that the priority of the factors of peers in behavioral abnormalities in Hamedan province students, respectively, were the need for peer affirmation, inappropriate relationship with peers, the behavioral disadvantages (deviancy) of peers, bad friends and peers' improper requests. The values of of $x^2 = 17.05$ and sig = 0.030 <0.05 acknowledge that there is a significant difference in the priority of each of the factors of peers in the behavioral abnormalities of students in Hamedan province.

The results specified that the priority of the social factors in the behavioral abnormalities of students in Hamadan province were inappropriate place of residence, immigration, lack of proper leisure facilities, weakness of social norms, and the values of $x^2 = 18.574$ and sig = 0.001 <0.05 explain that there is a significant difference in the priority of each of the social factors in behavioral abnormalities in Hamadan province students. Other results indicated that the priority of the school factors in the behavioral abnormalities of students in Hamedan Province were the school staff's inappropriate behavior, strict school regulations, threats and punishment in school, inappropriate teaching and classroom practices, academic failure. And the values of $x^2 = 14.086$ and sig = 0.007 <0.05 indicate a significant difference in the priority of each of the school factors in behavioral abnormalities in Hamadan province students.

Table 1- Priority of components of effective factors in behavioral abnormalities of students in Markazi and Hamedan provinces

Province		Markazi				Hamedan			
Variable	**Factors**	**Average rating**	**Priority**	**Chi2**	**Sig**	**Average rating**	**Priority**	**Chi2**	**Sig**
factors affecting the behavioral abnormalities	individual	2.28	4	182.489	0.000	2.74	4	91.644	0.000
	family	3.96	1			3.54	1		
	peers	3.31	3			3.50	2		
	social	3.55	2			3.11	3		
	school	1.90	5			2.07	5		
individual	lack of Self-confidence	2.55	5	81.608	0.000	2.62	5	30.980	0.000
	weakness in individual skills	2.87	2			2.96	3		
	lack of attention to emotional and psychological needs	2.72	4			2.71	4		
	weakness of religious beliefs	2.85	3			3.44	1		
	physical defect	4.02	1			3.28	2		
family	parents' divorce	2.70	4	53.89	0.000	2.59	5	13.787	0.000
	the presence of an addict in the family	2.50	5			3.15	2		
	parents' disputes or conflicts	2.81	3			3.05	3		
	economic weakness of family	3.40	2			3.02	4		
	discrimination between children	3.59	1			3.19	1		
family	Bad friends	2.65	5	30.294	0.000	3	3	17.05	0.000
	peers' improper requests	2.86	3			2.75	4		
	the behavioral disadvantages (deviancy) of peers	3.49	1			3.01	2		
	inappropriate relationship with peers	2.76	4			3.01	2		
	need for peer affirmation	3.24	2			3.23	1		
social	inappropriate place of residence	2.42	5	35.981	0.000	3.29	1	18.574	0.000
	lack of proper leisure facilities	2.99	3			3.09	3		
	immigration	3.50	1			3.19	2		
	group media effects	3.11	2			2.63	5		
	weakness of social norms	2.98	4			2.80	4		
school	academic failure	3.03	3	38.673	0.000	2.65	5	14.086	0.000
	threats and punishment in school	3.04	2			3.10	3		
	strict school regulations	3.62	1			3.15	2		
	school staff's inappropriate behavior	2.55	5			3.24	1		
	inappropriate teaching and classroom practices	2.76	4			2.85	4		

DISCUSSION AND CONCLUSION

Behavioral abnormalities are based on psychological and sociological theories. Clearly, the child's personality is shaped within the family and then, it is influenced by other educational, community, media and other settings. Normal and abnormal behaviors occur as a result of child interaction with these environments. As the child grows older, other variables affect his or her behavior. Psychologists believe that if the stages of growth and puberty in the child and adolescent are normal with good mental health or sufficiency of life, one can expect that his or her behavior in the later periods is normal and then affects others. Rezaei[9] reported that male students' behavioral abnormalities were higher in the first grade of high school than the female students in the same grade. Nawabakhsh and Vahedi[10], investigated the students of Tehran and stated that girls' support in the family was more than that of boys, which had an effect on the internal and external family behavior of both sexes. Kahzadi[11], found out that abnormal behaviors of male students in the first grade of high school were higher than female students. Kordzanganeh[12], also confirmed this finding.

This study demonstrated that the factors affecting the behavioral abnormalities of students in Hamedan and Markazi provinces were different in terms of priority. This difference was due to educational, social, urban and geographical environments. This finding, in addition to being consistent with the results of the current literature, is theoretically acceptable, too.

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Radiological Study of Fusion of Epiphysis of Lower End of Humerus and Lower End of Femur and its Association with Height and Weight

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ABSTRACT

The bony age is determined from the study of growing ends of the long bones i.e. appearance and fusion of various epiphysis with diaphysis. . The actual bony age can't be determined in living, therefore the law enforcing agencies has to rely upon radiological estimation of bony age that too with many limitations and conditions. The appearance and ultimate union of epiphysis are influenced by various factors like heredity, race, caste, sex, nutrition, certain diseases, injury to epiphysis, heavy metal poisoning, metabolic and hormonal disorder etc. The present series of work was conducted at Forensic Medicine and Radiology Department of Sarojini Naidu Medical College ,Agra to find out association of fusion of epiphysis of lower end of humerus and lower end of femur with height and weight .The study was based on 200 cases of males and females (10-20 years) of different school and colleges running in the Agra city. In all epiphysis except (lateral epicondyle with capitulum) fusion of epiphysis occurs similar irrespective of the weight of the subjects. In all epiphysis fusion occurs earlier in subjects having less than normal reference height. However the differences were found to be stastically insignificant ($p > 0.05$)

Keywords: - *Bony age, Radiological examination, union.*

INTRODUCTION

While most researches determine union visually, some scholars advocate the use of radiographs to determine the degree of union.[1] Skeletal age, dental age, morphological age, secondary sex character age are other method in use for asserting age of individual. In medico legal practice a combined view is taken and opinion is expressed after considering all methods. However radiological examination is a must and the court of law did not believe any conclusion without it. [2] The bony age is considered nearest to accuracy in estimating the clinical age.

The complexity of overall ossification problem may be gleaned by the estimation that at the 11th prenatal week in humans there are some 806 centers of bone growth, at birth about 450, while the adult skeleton has only 206 bones.[3]

It is an established fact that the sequence of appearance and ultimate ossification of epiphysis varies in both sexes in different part of the world to the extent that there are wide variation even in the population of the different states of a country. Union is a process, not an event.[4]

In case of alleged rape when the sexual intercourse has taken place with the consent of the girl, to made it a cognizable criminal offence it has to be proved that the girl was < 16 years of age. Because of the lack of relevant data the medical experts are not in a position to certify the age of the girl with the result that the accused get the benefit of doubt and is set free.[5]

MATERIAL AND METHOD

The present study was carried out in the Forensic Medicine and Toxicology and Radiology Department of Sarojini Naidu Medical College, Agra. A total of 200 (100 males, 100 females) in the age group of 10-20 years were selected randomly from various schools of Agra Region. An informed consent was taken.

Criteria for selecting subjects:-

(1) They should be living in Agra for more than 5years.

(2) They should be free from any physical disability or endocrine anomaly.

(3) Only those cases were taken for the study whose date of birth is verified by their school or college authorities by birth certificate.

(4) Informed expressed verbal consent of the subject was taken before proceeding to their, physical, dental and radiological examinations.

The persons selected for study were groped as per their stated age, 10-11 years,11-12 years, 12-13 years, 13-14 years, 14-15 years, 15-16 years, 16-17 years, 17-18 years, 18-19 years, and 19-20 years. There age group 10-11 years is considered as those of who have completed 10 years of age but yet to complete 11 years of age and similarly other age groups. Age as stated by them is further confirmed by birth certificate or entry in their school record.

Physical measurement

Measurement of height-

Each subject height was measured without shoes standing with heels together. The shoulders, buttocks and the heels were touching the standing vertical standard scale.

Weight- Weight is recorded with the help of weighing machine.

After obtaining informed expressed verbal consent for their radiological and clinical examination each person is x-rayed for Right side elbow and knee joint. AP and Lat. view is taken and the skiagrames are studied in detail in reference to fusion of epiphysis at lower end of humerus and lower end of femur.

Radiological criteria for epiphyseal union-The union is taken as complete when.[6]

(a) Diaphyseo - epiphyseal space is completely obliterated and become bony in architecture and density.

(b) There is continuity of the periosteum between epiphysis and diaphysis with no notching at the periphery of epiphyseal line.

(c) Presence or absence of epiphyseal scar

For generalization fusion in more than 75% cases is relied upon as complete fusion. For the study X ray films were divided into two groups for each epiphysis:-

1. Those showing complete union.

2. Those showing non-union.

RESULTS

In present work 100 females and 100 males of various authentically known age groups were selected. These cases were distributed between 10 to 20 years of age.(Table-1) For association in each epiphysis only those age group were taken in which both fused and non fused males & females present.

It was observed that in relatively more number of subjects having less than normal weight lateral epicondyle with capitulum fused at an earlier age [11-12 years (66.67%),12-13 years (66.67%)] as compared to those having normal & above normal weight [33.33% both in11-12 years & 12-13 years]. In rest of the epiphysis fusion was found to be nearly similar irrespective of the weight of the subject. Though the difference were stastically insignificant. ($p > .05$) (Table-2)

In those subjects having less than normal reference height fusion of lateral epicondyle with capitulum was found to occur earlier (66.67%, 83.33%,64.29%, & 61.29% respectively in age group 11-12 years, 12-13 years, 13-14 years & 14-15 years) as compared to those having normal & above normal height (33.33%,16.67% 35.71% & 38.71 %) respectively in same age group.

In relatively more number of subjects having less than normal height trochlea with capitulum fused at an earlier age [13-14 years (63.64%), 14-15 years (68.97%) & 15-16 years (73.33%)] as compared to those having normal & above normal height (36.36%, 31.03% & 26.67% in 13-14 years , 14-15 years & 15-16 years respectively). In those subjects having less than normal reference height fusion of lower end of femur with shaft occurs earlier (75%, 85.71% & 63.64% respectively in age group 15-16, 16-17 & 17-18 years) as compared to those having normal and above normal height (25%, 14.29% & 36.36%) respectively in same age group.

It was observed that in all epiphysis fusion occurs earlier in subjects having less than normal reference

height. However the difference were found to be stastically insignificant (p >0.05) **(Table- 3)**

Table No. 1: Distribution of study Subjects According to Sex

Age Group	No. of Males Examined	No. of Females Examined	Total
10 – 11	5	4	9
11 – 12	5	4	9
12 – 13	6	5	11
13 – 14	8	10	18
14 – 15	18	15	33
15 – 16	12	20	32
16 – 17	12	10	22
17 – 18	12	12	24
18 – 19	10	12	22
19 – 20	12	8	20
Total	**100**	**100**	**200**

Table No. 2: Association of fusion of epiphysis with weight (Ref. weight taken according to ICMR 1990)

Age Group	Lateral Epicondyle with Capitulum				Trochlea with capitulum				Conjoint Epiphysis with Diaphysis				Medial Epicondyle with Diaphysis				Lower end of Femur with Shaft			
	<N. wt		≥ N. wt		< N. wt		≥N. wt		< N. wt		≥ N. wt		< N. wt		≥ N. wt		< N. wt		≥ N. wt	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
10-11	1	50	1	50	1	100	0	0	-	-	-	-	-	-	-	-	-	-	-	-
11-12	2	66.67	1	33.33	0	0	2	100	1	50	1	50	-	-	-	-	-	-	-	-
12-13	4	66.67	2	33.33	2	50	2	50	1	33.33	2	66.67	1	50	1	50	-	-	-	-
13-14	7	50.0	7	50.0	6	54.55	5	45.45	5	55.56	4	44.44	3	50	3	50	0	0	1	100
14-15	17	54.84	14	45.16	16	55.18	13	44.82	10	52.63	9	47.39	8	47.06	9	52.94	3	50	3	50
15-16	-	-	-	-	16	53.33	14	46.47	16	55.17	13	44.83	12	52.17	11	47.83	7	58.33	5	41.67
16-17	-	-	-	-	-	-	-	-	11	55.0	9	45.0	9	47.37	10	52.63	6	42.85	8	57.15
17-18	-	-	-	-	-	-	-	-	-	-	-	-	11	47.83	12	52.17	10	45.45	12	54.55

Table No. 3: Association of fusion of epiphysis with height (Ref. height taken according to ICMR 1990)

Age Group	Lateral Epicondyle with Capitulum				Trochlea with capitulum				Conjoint Epiphysis with Diaphysis				Medial Epicondyle with Diaphysis				Lower end of Femur with Shaft			
	<N. ht		≥ N. ht		< N. ht		≥N. ht		<N. ht		≥ N. ht		< N. ht		≥ N. ht		< N. ht		≥ N. ht	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
10-11	1	50	1	50	1	100	0	0	-	-	-	-	-	-	-	-	-	-	-	-
11-12	2	66.67	1	33.33.	1	50	1	50	1	100	0	0	-	-	-	-	-	-	-	-
12-13	5	83.33	1	16.67	2	50	2	50	2	66.67	1	33.33	2	100	0	0	-	-	-	-
13-14	9	64.29	5	35.71	7	63.64	4	36.36	7	77.78	2	22.22	4	66.67	2	33.33	0	0	1	100
14-15	19	61.29	12	38.71	20	68.97	9	31.03	13	68.42	6	31.58	11	64.71	6	35.29	3	50	3	50
15-16	-	-	-	-	22	73.33	8	26.67	21	72.41	8	27.59	16	69.57	7	30.43	9	75	3	25
16-17	-	-	-	-	-	-	-	-	12	60	8	40	12	63.16	7	36.84	12	85.71	2	14.29
17-18	-	-	-	-	-	-	-	-	-	-	-	-	14	60.87	9	39.13	14	63.64	8	36.36

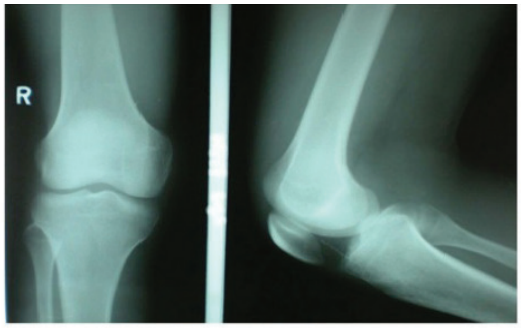

Figure 1 : Anshul 18 Years 2 months female AP and Lateral view of right knee joint showing fusion of lower end of femur

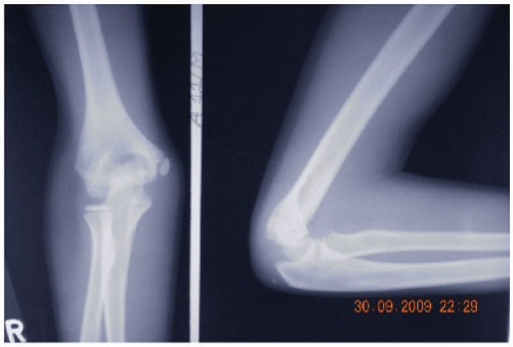

Figure 2 : Arif 11 Years 1 month male AP and Lateral view of right elbow joint showing that centre for medial epicondyle, capitulum and trochlea appeared but not fused. Centre for lateral epicondyle not appeared.

Figure 3 : Nilesh 16 Years 4 months male AP and Lateral view of right elbow joint showing partial fusion of medial epicondyle. Lateral epicondyle with capitulum and capitulum with trochlea fused.

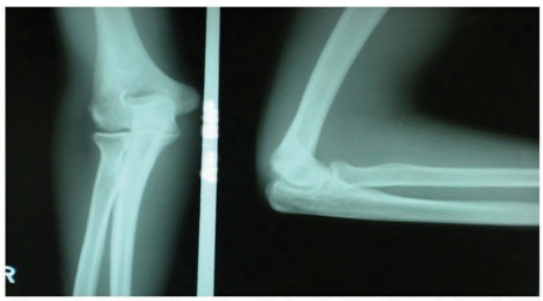

Figure 4 : Anshul 18 Years 2 months female AP and Lateral view of right elbow joint showing complete fusion of all epiphysis around lower end of humerus.

DISCUSSION

In all epiphysis except (lateral epicondyle with capitulum) fusion of epiphysis occurs similar irrespective of the weight of subjects. In lateral epicondyle with capitulum fusion occurs earlier in subjects having less than normal reference weight. However, the difference were stastically insignificant ($p > 0.05$).

It was observed in all epiphysis fusion occurs earlier in subjects having less than normal reference height. However the difference were found to be stastically insignificant ($p > 0.05$).

CONCLUSION

In assessing the age of candidates, radiological examination is of adequate help but with limitations .Precise age of candidate cannot be stated, but a range can be given by radiological assessments. India is composed of areas which differ in climatic, hereditary, dietetic and other factors; it is therefore obvious to have available data for every zone of India. We recommend further study of larger geographical area and statistic tests for near scientific opinion in age assessment cases.

Ethical Clearance -Taken From Ethical Committee

Source of Funding - Self

Conflict of Interest- Nil

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The Relationship of Micronutrients Intake and Anthropometric Indexes with High-Sensitivity C - Reactive Protein (hs-CRP) in the Elderly Living in Nursing Home, Sabzevar, Iran

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ABSTRACT

History and Objective: High-Sensitivity C-reactive protein (hs-CRP) is the most reliable means of diagnosing and controlling hidden inflammation and infection in the body. Poor nutrition in the elderly is associated with the increased CRP serum levels and accordingly systematic inflammation. This article aims to study the relationship of Micronutrients intake and Anthropometric indexes with hs-CRP serum in the elderly living in nursing home in Sabzevar, Iran.

Method and Materials: A cross-sectional-analytical study with a sample size of 105 elderlies living in nursing homes in Sabzevar, Iran was conducted using stratified sampling method. Anthropometric indexes (BMI and WHR) were calculated. Nutrient intake per person was determined using N4. Blood samples were collected to measure the hs-CRP serum. Data were analyzed using SPSS, descriptive statistics, correlation coefficient, and regression.

Findings: B_1, B_2, E, C proteins, magnesium, and selenium have a revere, significant correlation with hs-CRP. Among Anthropometric indexes, hs-CRP has a statistically direct, significant relationship with BMI.

Conclusion: According to the results, it seems that diets which are rich in antioxidant vitamins such as vitamins C and E, magnesium, and selenium are effective in reducing the systemic inflammation in the elderly.

Keywords: Micronutrients, Anthropometric Indexes, hs-CRP Serum, Elderly.

INTRODUCTION

Today, increasing life expectancy and decreasing fertility rate have caused an increase in the elderly population worldwide so that world`s aging population has become one of the public health challenges in recent years [1]. In Iran, statistical indicators and studies indicate the rapid growth of the elderly population so that Iran census in 2011 showed that almost 8.2% of Iranian population are people over 60 years old [2]. Various diseases lead to disability and mortality in the old age [3]. Since cardiovascular diseases accounts for the greatest cause of death in the elderly and general inflammation plays a central role in disease progression, researchers focus on indexes which accurately predict the risk of such diseases [4-6]. Some of these indexes are proinflammatory cytokines especially Fibrinogen, Haptoglobin, Interleukin-18, Interleukin-1, Interleukin-6, tumor necrosis factor (TNF- α), and C - reactive protein (CRP) [7]. CRP is a plasma protein which

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is sensitive to inflammation. It is a member of immune molecules called acute phase proteins [8]. Measuring CRP is the most reliable means of diagnosing and controlling hidden inflammation and infection in the body [9]. Increasing CRP in serum is important not only in diagnosis but also in the severity of disease and reaction to treatment. After appropriate treatment, CRP declines and it is not detectable in serum [9]. Diet is one of the most important environmental factors associated with concentrations of inflammatory markers. It is also effective in the development of chronic diseases by impacting the systemic inflammation that is characterized by a high concentration of CRP serum [10] Insufficient nutrients are reported in almost 24% of elderly men and 47% of elderly women. The elderly living in nursing homes are among those with poor nutrition [11] Studies show that total fat, fiber, calcium, magnesium, zinc, copper, folate, and vitamins B_1, B_6, B_{12}, C, E and D intake is low among the elderly. Poor Micronutrients diet might cause inflammation [11]. Studies indicate that the process of inflammation causes the consumption of antioxidants and generation of peroxidative products by increasing Reactive Oxygen Species (ROS) [12]. The results of studies show that high quality diet including the consumption of fruits and vegetables is associated with lower concentrations of CRP serum level and accordingly reducing risk of diseases [13].

Findings of studies conducted by Ahra in young women in Vietnam showed that hs-CRP is dramatically lower in women who intake fruits and vegetables, potassium, and folate [14]. The results of studies by Martin showed that hs-CRP, TNF- α, and IL-6 markers of inflammation are higher in the group of malnutrition so that patients in the highest quartile of CRP intake less amounts of calcium and vitamins A and B_2 [15].

Few studies have been conducted in the elderly. Poor nutrition in the elderly causes many diseases, leading to increased rates of hospital admission, increased morbidity and mortality, and ultimately increased health spending per capita. Measuring CRP serum, however, can prevent or treat elderly`s hidden and chronic inflammatory diseases. Therefore, although it is believed that some genetic and environmental factors are effective in the markers of systematic inflammation, no study has been conducted concerning the relationship between Micronutrients intake and hs-CRP serum in the elderly. Therefore, this article aims to study the relationship of Micronutrients intake and Anthropometric indexes with hs-CRP serum in the elderly.

MATERIALS AND METHOD

A cross-sectional-analytical study with a sample size of 105 elderlies living in nursing homes in Sabzevar, Iran was conducted. The inclusion criteria are written, informed consent to participate in the study, being over 60 years old, the ability to establish visual and verbal communication, the ability to speak Persian language, lack of impaired hearing and eyesight, lack of psychiatric, emotional, mood, and memory disorders, no use of statin drugs, and non-infectious and febrile diseases. The exclusion criteria are unwillingness to participate, traveling, hospitalization, using nutritional supplements, smoking, and death. Written, informed consent was taken from the participants. Stratified sampling method was employed. Data were collected using Demographic Questionnaire, 24-Hour Dietary Recall (24HR), N4, Seca digital scale, and tape measure. Interviews were conducted to fill in the demographic questionnaire. Seca digital scale was employed to evaluate the Anthropometric indexes. Minimum clothing coverage and no shoes were taken into account between 8-10 morning times with precision of 100 grams. Height was measured while in a standing position and without shoes and shoulders were in normal condition using inflexible tape measure with precision of 0.1 cm. BMI was calculated by dividing weight (kg) into squared height (m). Considering the standard guidelines, waist was measured in the narrowest region between the lowest rib and the iliac bone and at the end of exhalation with a precision of 0.1 cm. Hip circumference was measured at the widest part of the pelvic region. WHR was calculated by dividing waist into hip. In order to eliminate the individual error, measurements were performed by one person. In order to study the food intake, 24HR was used within three consequent days (2 working days and one holiday) so that all participants were asked to mention all foods and drinks within the last 24 hours. In order to help the individuals remember the amount of consumed foods, household utensils and cups were used. Then, these amounts were converted into grams [16]. All food items were coded using Nutritionist IV (N4: version 3.5.2. Average food and energy intake within 3 days was statistically analyzed. Notably, the validity and reliability of 24 HR were verified in previous

studies [17]. Content validity was used to scientifically verify the credibility of the questionnaire. Tothis end, the questionnaire was forwarded to 10 faculty members and scholars in the field of Nutrition and Diet Therapy, Master of Science in Nutrition and Nursing. Their comments were taken into account. The reliability was verified by Malek Shah et al. ranging between 0.49 and 0.82 [18]

In order to determine the level of hs-CRP serum, 3 CC venous blood samples were collected after 8 hours of fasting. Samples were transferred in cold chain in the same day of collection to the laboratory in order to separate the serum and conduct the tests. In the lab, samples were delivered to an experienced lab technician. Serum was separated using centrifuge at 3000 rpm for 5 minutes at -20 ° C in order to measure the hs-CRP in a controlled, environmental condition. Then, hs-CRP level was measured by reinforced immunoturbidimetry for two-point measurement using photometer with hs-CRP quantitative diagnostic kit in serum or plasma by Pars Immunoturbidometric method(0.1- 20 milligrams per liter interval) . Cobas-mira-plus auto analyzer was employed. SPSS V. 20, descriptive tests, Spearman correlation coefficient, and Multivariate Regression were employed at P≤ 0.05 significance level to analyze the data.

RESULTS

In this study, 64 participants (61%) were female and 41 (39%) were male. The mean age was 76.9±8.78. 44 participants (41.9%) were younger than 74, 41 (39%) were aged 74-85, and 20 (19%) were older than 85. The mean BMI was 26.01±5.95 (kg/m2). 4 participants (3.8%) were underweight, 46 participants (43.8%) were normal concerning the weight, 31 (29.5%) were overweight, and 24 (22.9) were fat. The mean WHR was 0.93±0.06 cm. Minimum and maximum WHR were 0.74 and 1.1 cm, respectively. 65 participants (61.9%) were widows. Concerning the level of education, 80% of participants were illiterate; 12.4 had elementary education, 3.8% had completed junior high school education, and 3.8% had diploma.

In terms on the level of income, 69 participants (65.7%) had an adequate level of income. The mean hs-CRP was 5.03±5.87 Mg/L. Table 1 shows the results in three categories (Low Risk, Medium Risk, and High Risk).

The results of Spearman test showed that no significant relationship is found between hs-CRP and WHR. Hs-CRP, however, has a direct, significant relationship with BMI (P=0.01 and r=0.25). hs-CRP has no significant relationship with age (P=0.8 and r=0.02).

The results of Mann-Whitney U test showed that hs-CRP has no significant relationship with gender (P=0.6 and z=-0.45). The results of Spearman test showed that E, C, B1, and vitamin B_2 have a reverse, significant relationship with hs-CRP. Vitamins A and D have a reverse relationship with hs-CRP. This relationship was not significant. Based upon the results of Spearman test, magnesium and selenium intake has a reverse, significant relationship with hs-CRP. Chromium intake has a reverse, insignificant relationship with hs-CRP. The relationship of Micronutrients intake and Anthropometric indexes with hs-CRP is shown in Tables 2 and 3. After univariate analysis for analyzing the effect of variables, all variables entered the regression model. R^2 was 0.38 and the fitting regression model was appropriate (P<0.001), meaning that this model is capable of predicting the response variable. This prediction was 0.38. Table 3 shows the results of fitting model. Based upon the regression model, all factors were effective in hs-CRP (P<0.05). One unit increase in vitamin A leads to an increase in hs-CRP by 0.003 (P=0.02). One unit increase in Beta-carotene leads to an increase in hs-CRP by 0.003 (P=0.003). One unit increase in vitamin K and B_{12} leads to a decrease by 0.1 (P=0.01) and increase by 3.43 (P=0.001) in hs-CRP. One unit increase in B_6 and C leads to reduction in hs-CRP by 3.05 (P=0.008) and 0.09 (P=0.007) in hs-CRP, respectively.

Table 1: Frequency distribution of hs-CRP in the elderly

Variable	Frequency number (%)
Low-Risk hs-CRP (<1mg/L)	39(37.1)
Medium-Risk hs-CRP (1-3mg/L)	20 (19.1)
High-Risk hs-CRP (> 3mg/L)	46 (43.8)
Total	105 (100)

Table 2: mean, SD and the results of Spearman correlation test in order to study the relationship of hs-CRP with vitamins and Anthropometric indexes

Variable	Mean±SD	Correlation Coefficient	P-Value
Vitamin A(mcg)	750±9.65	-0.16	0.09
Beta-carotene (mcg)	460.68±8.81	0.11	0.27
Vitamin B_1 (mcg)	1.06±0.31	-0.11	0.03
Vitamin B_2 (mcg)	1.22±0.41	-0.21	0.03
Vitamin B_3 (mcg)	14.26±4.44	0.15	0.13
Vitamin B_6 (mcg)	1.18±0.57	0.05	0.6
Vitamin B_9 (mcg)	1.36±4.39	0.16	0.11
Vitamin B_{12} (mcg)	2.76±1.13	0.14	0.16
Vitamin C (mcg)	35.09±1.64	-0.2	0.03
Vitamin D (mcg)	1.04±1.02	-0.04	0.69
Vitamin E (mcg)	5.78±6.20	-0.23	0.02
Vitamin K (mcg)	24.24±1.18	-0.05	0.57
BMI (kg/m^2)	26.01±5.95	0.25	0.01
WHR(cm)	0.93±0.06	0.01	0.8

Table 3: mean, SD and the results of Spearman correlation test in order to study the relationship between hs-CRP and minerals

Variable	Mean±SD	Correlation Coefficient	P-Value
Calcium (mg)	586.86±2.14	0.18	0.06
Phosphorus (mg)	697.55±213.47	0.17	0.09
Magnesium (mg)	156.4±4.37	-0.19	0.04
Sodium (mg)	1512.72±870.54	0.15	0.11
Potassium (mg)	1927.87±557.47	0.16	0.09
Iron (mg)	12.19±7.06	0.12	0.23
Zinc (mg)	6.22±2.11	0.13	0.19
Selenium (mg)	30±10	-0.23	0.03
Chromium (mg)	7±3	-0.07	0.4

Table 4: the results of multivariate regression fitting in order to study the factors affecting hs-CRP in the elderly

Variable	Non-Standardized regression coefficient (B)	Regression std. error	Standard Regression Coefficient (β)	P-value
Fixed value	10.24	3.94		0.01
Vitamin A	-0.003	0.001	-0.52	0.02
Beta-carotene	-0.003	0.002	-0.48	0.03
Vitamin B_6	-3.05	1.12	-0.29	0.008
Vitamin B_{12}	-3.43	0.65	-0.66	<0.001
Vitamin C	-0.09	0.036	-0.27	0.007
Vitamin K	-0.1	0.05	-0.23	0.01
BMI	0.2	0.08	0.21	0.01

DISCUSSION

According to the results, vitamins B_1, B_2, and C have a reverse, significant relationship with hs-CRP. Vitamins A, D, and K, however, have a reverse, insignificant relationship with hs-CRP. Magnesium and selenium intake has a reverse, significant relationship with hs-CRP serum. Among Anthropometric indexes, BMI has a direct, significant relationship with hs-CRP.

Krajcovicova et al. (2005), in his study measured the hs-CRP concentration in 273 apparently healthy individuals of whom 131 followed vegetarianism and 137 did conventional diet. Other studies found similar results to those of our study [19,20,21,22,23]

The results of the study by Martin et al. (2012) are consistent with those of ours. The results showed that vitamin B_2 intake has a reverse relationship with hs-CRP [15]. The inconsistency might lie in the fact that Subjective Global Assessment (SGA) and 240hour recall questionnaire were employed to study the nutrient intake, while 24HR was used in our study. According to the results, magnesium and selenium intake has a reverse, significant relationship with hs-CRP serum. In the study by Kafshani et al. (2010), selenium intake has a reverse relationship with CRP which is consistent with the result of our study. The results of the study by Song et al. (2006) are consistent with the results of our study so that our study showed that magnesium intake has a reverse, significant relationship with CRP serum [24].

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Conflict of Interest: Nil

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The Impact of Applying Collaborative Team Teaching Method on Students' Outcomes

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ABSTRACT

Background:- Team teaching is considered an important educational innovation at the primary, secondary, and postsecondary levels. Over the past 50 years, team teaching has typically been viewed as improving student engagement and learning and enhancing the quality and experience of teaching. Team teaching offers learners multiple perspectives by having more than one educator. Additionally, teaming allows for collaborative learning to be modeled for learners .

Objectives:- Determine the impact of applying collaborative team teaching method on students' outcomes.

Methodology:- Quasi experimental one group pre – posttest design, the study was conducted in Faculty of Nursing - University Of Al- Qadisiyah . On 200 students enrolled in Medical-Surgical department. Student Reaction Form to Measure Student Satisfaction tool was used. This appliance was ripe by the researcher based on the separate of circulars to command students' contented compensate for impediment the liquidation of the creed method; it includes two parts The total score of the students' reaction against 10 questions form is 10 scores. The respondent was given score as follows: positive reaction (1 score) and negative reaction (zero). The total evaluation of students' reaction was calculated into three levels as follow High satisfaction level, Moderate satisfaction level, Low satisfaction level

Conclusion:- Students taught by team teaching had higher scores in clinical rotation grades and exhibited a high satisfaction level. Regarding the students' opinion about team teaching 77.5% of them were stated that team teaching is interesting, applicable and effective.

Recommendations:- Consideration for less group educating support Similarly as another methodology from claiming showing alongside nursing courses for both under and post graduate courses In addition the clinical areas as well as classrooms one CNE for giving instructions and the second CNE for monitoring students' progress and giving them extra attention before falling behind or missing key concepts .the health team Providing specific pre-service training about team-teaching each year for new CNEs and A prospective study to determine the effect of years of experience of team members on the efficiency of the work of the team

Keywards: *impact of applying , collaborative team, students outcome.*

INTRODUCTION

Team teaching is considered an important educational innovation at the primary, secondary, and postsecondary levels. Over the past 50 years, team teaching has typically been viewed as improving student engagement and learning and enhancing the quality and experience of teaching. Team teaching offers learners multiple perspectives by having more than one educator. Additionally, teaming allows for collaborative learning to be modeled for learners [(1)].

The discussion of team teaching has not centered on whether or not team teaching should take place but

how to define the concept. Teaming comes in different styles. Heterogeneous or interdisciplinary teaching is more common than homogeneous teaching.

This model distinguish a ordinary confirmation credo office in which perfection educators feign bring in prankish the chat up advances and elevate d vomit the dull yell by the common oration, but equitably by change and discussing ideas and theories in front of learners. Slogan just fulfill the quota educators play get, but the nearer itself uses contrive background techniques for learners, such as small-group work, learner-led discussion and joint test-taking

Colleges and universities predominantly offer traditional courses taught by a single educator. Although traditional classes are still useful for the discovery of knowledge, delivery of foundational concepts, and the introduction of the specialized methods of content areas isolating disciplines has been found by faculty at many colleges and universities to be unsatisfactory as the only means of instruction. Discovering the limits of specialization, many teaching professionals experimented with team teaching as an alternative to traditional discipline-based courses and found the practice rewarding for students [5].

Team teaching served learners by drawing connections between disciplines, modeling collaborative discussions, allowed for higher critical thinking, and often times engaged in more active learning [6]. Exposing learners to augment perspectives and tenet styles, emphasizing aid blow the disciplines and fundamentally departments, blurring punditry wan, and accommodating pioneering set of beliefs methodologies, duo of the true to life miserly promotion in the churning of a far-out undertaking with trusted educators and the ensuing commitment to maximize the educational

OBJECTIVES

Determine the impact of applying collaborative team teaching method on students' outcomes.

Methodology

Quasi experimental one group pre – posttest design, the study was conducted in Faculty of Nursing - University Of Al- Qadisiyah . On 200 students enrolled in Medical-Surgical department. Student Reaction Form to Measure Student Satisfaction tool was used.

This appliance was ripe by the researcher based on the separate of circulars to command students' contented compensate for impediment the liquidation of the creed method; it includes two parts

Part I: related to personal data for students it included: code number, age, sex, previous clinical grade, study course, and students' academic year.

Part II: included students' reactions toward the experience aspects of collaborative team teaching strategy as applicability, effectiveness, and time allotted for the strategy to measure the satisfaction level toward application of collaborative team teaching strategy used by the educator (researcher).

Part III: included students' satisfaction level from collaborative team teaching experience as availability of critical thinking opportunities, clinical team educators' response to students' needs…etc.

Part IV: included open ended questions about the positive or negative points about collaborative team teaching from students' points of view and further suggestions for improving collaborative team teaching. The total score of the students' reaction against 10 questions form is 10 scores. The respondent was given score as follows: positive reaction (1 score) and negative reaction (zero). The total evaluation of students' reaction was calculated into three levels as follow:

High satisfaction level	More than 75%
Moderate satisfaction level	From 50% to 75%
Low satisfaction level	Less than 50%

RESULT

Table (1) shows Students' outcomes changes during the pre-intervention phase and post-intervention phases. There was a statistical significance difference in the students' clinical grades increased from pre-intervention phase (34.0±3.0) to post intervention phase (37.0±3.3) at ($p = 0.001$).

Table (1): Students' outcome changes during pre-intervention study phase and post-intervention study phase

Student academic year clinical evaluation grade	Phase				% change	P
	Before intervention		After intervention			
	Mean	SD	Mean	SD	Median	
Second year	34.0	3.0	37.0	3.3	9.3	0.001*
P+					0.028*	

P: P value for paired t-test

P+: P value for Kruskal-Wallis test

* P < 0.05 (significant)

Table (2) Students' level of satisfaction related to collaborative team teaching experience from students' point of view

Student level of satisfaction from collaborative team teaching experience n=200	Satisfactory		Unsatisfactory	
	No	%	No	%
Accessibility of basic considering chances	145	72.5	55	27.5
Clinical cooperation instructor's testament light of understudies needs Also reaction.	200	100.0	-	-
Correspondence the middle of clinical less group instructor's testament Also scholars is additional clear.	194	97.0	6	3.0
Correspondence "around scholars one another(. Connection between learners Also patients.	195	97.5	5	2.5
Clinical assessment with community oriented less group showing	193	96.5	7	3.5
Clinical observation with health care provider learning	156	78.0	44	22.0

DISCUSSION

Community oriented group educating ought to a chance to be utilized as An type of re-conceptualized nonstop professional improvement [11] It will be utilized within a lot of people schools Also Europe, hypothetical orders had more distinction than difficult work, and speculative chemistry was should cultivate learner energy What's more request What's more to Push interdisciplinary Taking in [12] Those consolation for community oriented less group teaching, constructed over chances to learners with a chance to be captivated On intercultural

As for students' **opinions related to collaborative team teaching experience**, the majority of the studied students found that collaborative team teaching was interesting because it made them focus on task, increased their communication abilities during the clinical work and provided understanding and clarified the presented assignments.

These findings were in accordance with that of Eisen (2000) and Anderson & Speck, (1998) they found that students reported how two expert educators model brainstorming, and interaction, using positive interaction, demonstrating collaboration made the teaching environment more interesting and enjoyable [14,15]. Wenger and Hornyak (1999) also concluded that collaborative team teaching demonstrates to learners how to interact, disagree, collaborate, evaluate, analyze, and resolve conflicts [16]. Moreover, the finding was also supported by Anderson and Landy (2006) as they stated that students thought having two educators created more enthusiastic communication in the clinical area [17].

Regarding the **applicability of collaborative team teaching strategy** the majority of the studied students (77.5%) reported that it was applicable and suitable for the nature of content and the profession as the information which was given by different levels of educators enhanced their understanding. On the other hand, only a minority of the students (22.5%) viewed the strategy as not applicable because it needed more time for planning and application, and they were confused when exposed to more than one educator. Vogler and Long (2003) agreed with this finding as they found that some students of their study stated that they were confused between the educators [18].

With respect to students' level from claiming fulfillment over collective cooperation showing strategy, the display ponder uncovered that more than (95%) of the concentrated on people were fulfilled by the less group educating help system. Those illustration for these comes about starting with students' focuses about see were that the system given them with distinctive chances for basic thinking, moving forward correspondence with them Also the middle of them and the CNEs, likewise those CNEs given them for prompt feedback, Also reasonable clinical assessment.

This discovering might have been underpinned via Oitzinger and Kallgren, (2004) Also Vogler, and long (2003) Likewise they found that learners for their investigations were fulfilled by community oriented less group educating support in light it furnished them with diverse perspectives on topics Also aggravated the Taking in earth more interesting, helpful, and the Taking in atmosphere urged them in the incredulous speculation abilities which generally prompted An very testing discourse. Moreover, they stated that scholar perspectives increased multi-dimensionally, and chances to additional mind boggling issue comprehending increased to both teachers Furthermore scholars [18,19].

Similarly as respects certain and negative parts from claiming community oriented cooperation showing and suggestions to change starting with students' focuses of see those present contemplate uncovered that the greater part of the mulled over scholars said that the provision about collective less group showing method needed a certain impact on the teachers educating help abilities over previously, then they were intrigued by attempting to An cooperation. But, they specified they necessary on think those clinical group educating arrangement sufficient the long run in the recent past beginning Also they acknowledged not Hosting this carried out Similarly as a negative part. Those comes about from claiming this examine try in line for Vogler Furthermore Long, (2003) they expressed that the examined people said that they acknowledged working done groups done their worth of effort field Similarly as An sure perspective. But, on the different hand, in their study the negative angle said by those people might have been they felt confounded Also they cited time permits clash that Might create the middle of teachers [18].

CONCLUSION

Students taught by team teaching had higher scores in clinical rotation grades and exhibited a high satisfaction level. Regarding the students' opinion about team teaching 77.5% of them were stated that team teaching is interesting, applicable and effective.

Recommendation:

Consideration for less group educating support Similarly as another methodology from claiming showing clinched alongside nursing courses for both under and post graduate courses.

Include two or more CNEs in clinical areas as well as classrooms one CNE for giving instructions and the second CNE for monitoring students' progress and giving them extra attention before falling behind or missing key concepts.

Providing specific pre-service training about team-teaching each year for new CNEs.

A prospective study to determine the effect of years of experience of team members on the efficiency of the

work of the team.

Consideration about less group educating Likewise another methodology of showing for nursing courses for both under What's more post graduate courses.

Inspect Innovativeness Also coordinated effort Around people taught Eventually Tom's perusing group showing

Ethical Considerations - Prior permission was taken from the Dean Nursing college ethics committee before conducting the study.

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The Association between Lead Exposure and Childhood Asthma: A Systematic Review

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ABSTRACT

Asthma in children is a complex disorder that many different types of environmental agents are considered as its risk factors. The purpose of the present study was to do a systematic review of the studies demonstrating the relation of lead exposure and childhood asthma. A review of the studies up to May 2018 was done using key words agreed by the research team. The abstracts were evaluated and suitable papers selected to review. Papers demonstrating the relation of lead exposure and childhood asthma were considered. Results: 1545 abstracts were identified, 82 papers reviewed and 5 papers included in the present review of which 4 were cross sectional studies and 1 study was cohort. There was not strong evidence that indicated the lead exposure and asthma in children. Due to methodological differences, we suggest to do the international, multicenter, multiethnic studies with larger sample size to evaluate the association between lead exposure and asthma.

Keywords*: Lead exposure, Lead poisoning, Asthma, Children, Heavy metal*

INTRODUCTION

Childhood asthma remains as an important health concern in terms of severity and prevalence worldwide.[1] Besides genetics, many environmental factors such as heavy metals have been related to the onset and development of asthma.[1] Recently, lead (Pb) exposure has become more frequent in urban areas of industrialized and developing countries.[2] Also, the prevalence of childhood asthma has increased in these rejoins.[1] Asthma and lead exposure are two serious children's environmental health concern.[3] Lead is one of the most environmental pollutant that affects various body systems.[3] Lead is used to produce toys, paints, batteries, etc.[4] The epidemiological studies indicated the direct association between living in poor quality housing and lower socioeconomic status with the increase in the blood lead levels as well as childhood asthma.[5] In addition, experimental studies found that exposure to the low levels of lead shifted the activities of immune system towards Th2-dependent responses.[3,4] This shift decreases the production of IFN-γ and also increases the serum levels of IgE and IL-4. It was observed that serum IgE and bronchoalveolar towards Th2-dependent responses are associated with childhood asthma.[6,7] Association between lead and asthma has been reported in several studies of children in different countries.[3,8,9] However, there are so many scientific papers that have not found significant associations.[3] Therefore, the contribution of lead pollution in the occurrence of respiratory disorders such as asthma has not fully understood. The overall goal of this systematic review was to better clarify the association between lead exposures and childhood asthma with focus on the related epidemiological studies.

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METHODOLOGY AND SEARCH STRATEGY

The basis of methodology was done according the PRISMA P statement.[10]

SEARCH STRATEGY

The search was done in two electronic databases: PubMed and Google scholar. Article selection was done in May 2018, and no date restriction was considered to articles selected. Studies selection were limited to those on humans and to English-language journals. The search terms included: (lead exposure OR lead poisoning) AND asthma.

SELECTION CRITERIA

All the manuscripts related with lead exposure OR lead poisoning and occurrence of childhood asthma were selected. Other respiratory disorders associated with lead were excluded. The exclusion criteria were non-human studies, narrative and systematic reviews. In the first step, the cited articles were screened independently by two investigators of our team. The first, paper's titles were evaluated and then their abstracts were reviewed. The third step of selection was done after reading the full paper. All duplicate papers were eliminated.

DATA EXTRACTION

Data that were extracted included: year of publication, nationality of the studied individuals, number of participants, type of study and outcome of studies and main conclusions were summarized.

RESULTS

STUDY SELECTION

After the initial search of the above-mentioned databases identified 1545 articles. Then, the duplicates (n = 828) were excluded and 717 papers were considered according on the titles, the selection was decreased to 82 full-text articles. Subsequently, papers (n = 77) with missing results or without parallax with inclusion or exclusion criteria were rejected. Eventually, 5 papers were included in the present systematic review.[11-15]

STUDY CHARACTERISTICS

All of the articles were observational studies focusing on the blood lead levels (BLLs) in children with asthmatic symptom. The cross-sectional and cohort studies were included. The studies were published in 2005 to 2018. The largest paper is from USA.

LEAD POLLUTANT AND ASTHMA IN CHILDREN

The progression of childhood asthma is influenced by several environmental agents. Lead is one of the major pollutants that markedly affects children's health.[16-19] The cohort study examined racial differences in the relation of blood lead level (BLL) with asthma between 4634 African American and Caucasian children at 1-3 years of age after adjust for average annual income per person, birth weight, and sex. The cutoffs used for BLL in the study were ≥5 μg/dl and ≥10 μg/dl. The findings indicated that among African Americans, BLL ≥5 and BLL ≥10 μ/dl were not related to asthma in children. The association of BLL≥5 μ/dl with asthma among between Caucasians was insignificantly increased.[11] The relation of BLL with prevalence of asthma have been evaluated in 1788 children from the National Health and Nutrition Examination Survey 2005-2006. The numeral mean of BLL was 1.13 μg/dL (95% confidence interval (CI). The outbreak of asthma was 11.8% (95% CI: 9.5, 14.2).[12] Regression models adjusted for season, age, sex, nationality, education, secondhand smoke exposure, and body mass index. According to these models, there was an 11.1% (95% CI: 5.6, 16.9) elevation in IgE per 1 μg/dl elevation in BLL. In independent stratified analyses, lead was found to increase IgE among non-Hispanic whites, but not other children. Lead was not associated with asthma.[13] The cross-sectional study investigated the association between BLLs in 200 children at 5-14 years old with bronchial asthma, and relation to asthma severity after adjustment for age and sex. The cutoffs used for BLL in the study was >10 ug/dl. The results indicated that there was insignificant difference in the BLL between asthmatic and non-asthmatic children. In addition, it was indicated that the serum levels of immunoglobulin E significantly increased in patients with BLLs>10 ug/dl compared with patients with BLLs <10ug/dl. Patients of asthma with increased blood lead levels had higher grades of severity of asthma versus those with blood lead levels <10 ug/dl. BLLs are not significantly related to diagnosis of asthma but elevated BLLs seem to be associated with increased asthma severity.[14] The associations between Pb exposure and allergic diseases has been investigated in kindergarten children nationwide from Taiwan. The required data on the allergic diseases and environmental exposures was gathered by questionnaire. The BLL was measured by

using coupled plasma mass spectrometry. The logistic regression was used to assess the association between BLLs and the prevalence of asthma. The association between BLLs and serum IgE levels was investigated by using generalized linear models. Blood samples were collected of 930 children. The positive association was observed between BLLs and the prevalence of asthma. BLLs were also positively related to serum IgE levels (β=0.26 kU/l; 95% CI 0.009-0.50 kU/l), after regulating for main confounders. Analyses stratified by gender indicated that BBLs correlated with IgE only in boys (β=0.40 kU/l; 95% CI 0.03-0.76 kU/l). It was found that 38% of the effects of lead on the progression of asthma may be related to the serum levels of IgE.[15]

DISCUSSION

The present systematic review was designed to provide an overview of the literatures demonstrating the relation of lead exposure in early life (1-14 years old) and the occurrence of asthma. This review is mostly based on observational studies on children. However, most studies were not found association between lead exposure and childhood asthma. Joseph et al., 2005 has been done a cohort study on the association of lead exposure with asthma in African American and Caucasian children. They found an increased risk of asthma among children exposed to lead, although these associations were not statistically significant. They suggested that BLL was not a suitable predictor of asthma and did not affect the incident of asthma. Because lead poisoning and asthma have similar risk factors, it is not easy to obtain an unbiased estimate of the true association.[11] The cross sectional study conducted by Wells has not indicated the relation between lead exposure and the prevalence of asthma among children from USA. They suggested that immunotoxic effects of lead occur during exposure prenatally or in early childhood. They also concluded that the cross-sectional design of study limited to found that exposure to lead occurred before the progression of asthma during prenatal stage. However, the lack of an association between concurrent BLLs and asthma status does not confirm the association of prenatal lead exposure with the development of asthma in later childhood.[12] The cross sectional study by Mohammed et al relied on BLLs taken at ages 5–14 years, which also does not found significant correlation with asthma diagnosis. The above findings are not consistent with other cross sectional study of lead exposure and asthma in Michigan.[13] Pugh Smith and Nriagu studied the association between lead exposure and asthma among inner city, low-income children from Michigan. The findings indicated that asthmatic children are over 5 times more likely to have elevated BLLs than non-asthmatics. They concluded that the modest sample size limited the better adjust for potential sample selection bias. They also mentioned to better evaluate childhood lead poisoning and asthma, macro- level, or neighborhood, risk factors should be considered. They suggested due to the modest sample size, the findings from the study should be considered as a pilot study and not generalized beyond the specific population characterized by the study participants. In addition, the study provides insight into prevalence of low income and minority children co-morbid with both lead poisoning and asthma. The other study should be done on a more broad population.[14]

The study conducted by Wang et al also indicated the association between BLLs and asthma in kindergarten students from Taiwan. Additionally, it was observed that lead exposure was associated with IgE and might increase the risk of asthma in children. They suggested that lead may increase IgE levels and cause asthma.[15]

CONCLUSION

This systematic review summarizes the current studies on the association between lead exposure and childhood asthma. However, due to methodological differences, we suggest to do the international, multicenter, multiethnic studies with larger sample size to evaluate the association between lead exposure and asthma**.**

Confilict of Interest: None

Ethical Clearance: Not Applicable

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The Need for the Governance of Healthy Views on Climate Change

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ABSTRACT

Introduction: The most important challenges of the last century are global warming and climate change worldwide. One of the fundamental aspects of human life that is affected by climate change is the health, which is a consequence of changing the pattern of diseases and increasing the burden of some diseases. The purpose of this study is to look at climate change and its impact on human health.

Materials and Method: The present study is a library review, which has been done with the aim of reviewing published articles on climate change and its effects on human health, in electronic science bases and the desired articles were chosen.

Results: Climate change has been fluctuated in recent decades towards air temperature warming, an effect on rainfall and lower air quality. These climate changes have led to severe storms, floods, droughts and dust, and the dispersal of grasshoppers. The pattern of diseases is affected by these conditions, and the incidence and prevalence of some diseases are increasing.

Conclusion: Climate change has negative effects on human health and planning is needed to moderate and mitigate its effects.

***Keywords**: Climate change, Pattern of diseases, Health*

INTRODUCTION

According to the report of the (IPCC) Intergovernmental Panel on Climate Change in all countries, climate change has begun and its effects are gradually being observed.[1] In October 2008, the World Health Organization issued a resolution aimed at protecting human health from the effects of climate change. The members of the committee issued their request of the member states on the formulation and implementation of appropriate activities to reduce the impact of climate change on human health. The main focus of this resolution is on health sector capacity building, aimed at assessing vulnerability to climate change, in order to actively prepare for the effects of climate change on health.[1] Mean changes in meteorological parameters during the long term statistical period are called climate change. The main reasons for climatic changes are increasing input energy from the sun and global warming due to the intensification of greenhouse effects.[2] Throughout the history of the planet earth, the planet's climate has always undergone a change due to natural processes, but wider and more intense changes have been occurring than were seen in the history of Earth in the last few decades.[3] Many researchers believe that the phenomenon of climate change, especially in the

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second half of the twentieth century, is due to a growing trend of the Earth's average temperature.[4,5] Climate change has increased natural hazards, including floods, droughts and dust.[6] The emergence of these conditions always has a strong impact on livelihoods and the destruction of the living environment at the local scale.[7] Climate change often results in many consequences, including the abundance of natural hazards, such as floods and drought and dust.[8] One of the fundamental aspects of human life that is affected by climate change is health, which happens by changing the pattern of diseases and increasing the burden of some diseases. The aim of this study is to look at climate change and its impact on human health and changing the pattern of diseases, which aims to provide useful information for planners in this field.

MATERIALS AND METHOD

This study is a library review, which examined the studies over the past three decades (1986-2016), on climate change and its effects on human health and the pattern of diseases. The articles have been extracted and searched based on the search with the keywords of climate change and the pattern of diseases, in combination and separately in Iranian and foreign electronic sources such as SID, MAGIRAN, Irandoc, Pub Med, ISI Web of Science, Scopus, science direct Ovid, ProQuest, google scholar IRANMEDEX, ISI Web of Science, MEDLIB, ISC and the keywords of climate change, human health and diseases.

RESULTS

Impact of climate change on human health and disease pattern change

Climate change creates certain conditions that affect human health and the pattern of disease in different forms. Increasing drought, increasing floods, and the occurrence of severe storms are among the conditions that cause changes in the incidence and prevalence of various diseases in humans. In general, the change in the pattern of diseases due to climate change can be studied in several main areas:

1. Increased infectious and contagious diseases

2. Increased respiratory and cardiovascular diseases

3- Increase human injury caused by natural disasters

4. Increased burden of diseases due to socio-economic reasons and climate change

Increased infectious and contagious diseases

The disease carriers (mosquitoes and ticks) are very sensitive to climate variables, such as temperature and humidity. Therefore, any change in the mean and dispersion of these variables will occur and affect the geographical distribution of many infectious diseases that are sensitive to climatic variables. Climate changes have a direct and indirect impact on human life. These changes are observed both in the tropics and at the poles. Climate conditions increase the spread of diseases, both through the water and through the air, which include insect-borne diseases. So, climate-sensitive diseases may be among the deadliest diseases in the world. Climate change increases the risk of these diseases by affecting the life cycle of the carrier, environment and ecology, animal pathogens, and human behaviors.[1] Malaria, Leishmania (cutaneous and visceral), and the Crimean-Congo hemorrhagic fever are transmitted diseases through the carrier and will be under the influence of temperature. Temperature affects both the carrier's life cycle and the disease factor, and these effects are proven in the laboratory environment.[1] the transmitted diseases through water and food are also heavily influenced by climate variables. Several evidences describe the effects of climate on certain pathogens, diarrhea.[1] The main health indicators of water, which are affected by temperature and rainfall, include access to safe drinking water and the microbial quality index of drinking water. In defining and in general terms, decreasing rainfall reduces access to drinking water, and rising temperatures increase the concentration of microbial contaminants in drinking water.[9]

Increased respiratory and cardiovascular diseases

The burden of heart and respiratory diseases is closely related to air quality. In the effects of climate change, the quality of air has been decreasing over the past years, especially in major cities and in the world's driest regions, and terms like the microscopes have also been added to the meteorological literature, which can be considered as an emerging phenomenon. Polluted air has increased the incidence of asthmatic attacks, causing many respiratory problem (10). The effects of air pollution on health include a wide range of physiological

and biochemical changes, which are manifested by sneezing, coughing, wheezing, and exacerbation of respiratory and cardiac diseases. The result of these effects is an increase in medical attendance, emergency services and medical emergencies, and even early deaths in societies (11). The effects of poor air quality on health cover a wide range, but its greatest effect is on the respiratory and cardiovascular system. The results of a study conducted in Tehran in 2004-2005 show that there is a direct relationship between the increasing the concentration of carbon monoxide pollutants and suspended particles and the occurrence of heart attacks.[12]

Increased human injury caused by natural disasters

Global data are indicative of the fact that, over the past two decades, natural disasters have occurred with a lot of repetition of the past and have had many destructive effects.[13] The effect of disasters in 2013 has been enormous on the global community, because an average of around 330 natural events has been recorded every year around the world, causing deaths of 97 people per one Million populations, economic damage of more than $ 12.5 billion, and a total of 12610 deaths.[14]

Increased burden of diseases due to socio-economic reasons and climate change

Disease and death of farmers' livestock and environmental degradation, especially in vulnerable and unstable areas, have negative effects on human health.[15] Particularly, rural households, who have a poor economy and are dependent on natural resources, are directly affected by the consequences of climate change.[16] The climate, in turn, affects agriculture, the environment and water resource systems. The effects of climate change have been identified in many parts of the world for different crops.[17]

Climate change strongly affects the economy of the countryside and non-urban areas with the effect on agriculture and livestock, decreasing agricultural and livestock revenues, and decreasing revenues also has a direct relation with lack of access to health system services, and, on the other hand, boosts immigration and urbanization, which also adds to marginalization (18).

The poor economic-social conditions affect health throughout life. People at lower social levels are at least twice more likely to have serious illness and early death than those in higher classes (19). Even among the administrative staff, those who are of the lower class are more likely to suffer from illness and early death than those in the upper class. Social and psychosocial causes, such as low-income families, low education, uncertain jobs, and living in inappropriate homes, contribute to creating these differences (20). Ultimately, their effects can lead to illness or early death. The longer people live in a tense socioeconomic situation, the more they suffer from the same physical level, and will enjoy less health in the old days.[21]

Climate change has led to a decline in water resources, which is the basis of agriculture and livestock farming in recent years, and this has caused many people to suffer from job insecurity or unemployment. Job security increases the health, well-being and job satisfaction. Higher unemployment leads to illness and early death (22). Unemployment threatens health and the risk increases in areas where unemployment is spreading. Evidence suggests that unemployed people and their families are significantly at risk of early death.[23] the effects of unemployment on health will be as a result of mental-psychological and financial issues (24). These effects begin when a person feels that his job is in danger, even before he really gets unemployed (25). This suggests that anxiety about occupational insecurity is also one of the determinants of health.[26]

CONCLUSION

What has been learned from various studies on climate change is that climate change has been increasing in recent years and has been moderately affecting all parts of the world. These climatic changes affect various aspects of life, including effects on human health and changes in the pattern of diseases. Climate change has fluctuated in recent decades towards warming the air temperature, affecting rainfall and reducing air quality. These climate changes have led to severe storms, floods, droughts and dust, and the dispersion of micro-organisms in the air. The pattern of diseases has changed as a result of these conditions, and the incidence and prevalence of some diseases are increasing. In places of the world where floods occur, the quality of safe drinking water and access to it has been reduced, therefore, the likelihood of transmission of diseases through water and food, such as Eltor increases, and these diseases may become epidemic, or pandemic from the endemic mode in these areas. In places where drought

is occurring due to reduced rainfall, the probability of poverty, migration and marginalization increases, and this is a source of social damage and mental illness. The presence of microorganisms in the air and its association with air pollution in the big cities increases the burden of respiratory and cardiovascular diseases, and in the long run, it may also increase the incidence of cancers, skin and eye diseases. On the other hand, it is believed that climate change increases the incidence of natural disasters and natural disasters are also associated with human casualties. Clearly, climate change has a negative effect on human health and planning should be done to mitigate and reduce its effects.

Conflict of Interests: None

Ethical Clearance: Ethical matters e.g. plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc. have been totally observed by the authors.

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Evaluation of Diagnostic Value of Amniotic Fluid Ferritin and Its Relation to the Pregnancy Complications

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ABSTRACT

Introduction: The first step in preventing pregnancy complications is the early identification of women at risk and treatment for these women during prenatal care; therefore, a proper diagnostic and screening test that is inexpensive and useful for all pregnant women is necessary.

Method: The present descriptive-analytical study was conducted on all pregnant women referring to the clinic of Ami al-Momenin Hospital of Zabol in 2016. The inclusion criteria include pregnant mothers with the gestational age of 20 weeks, singleton pregnancy, and willingness and satisfaction to enter the study.

Results: In the present study, the mean level of ferritin in women suffering from preeclampsia was 92.25±14.81. The mean level of ferritin was significantly higher than that of the healthy women in the control group. the mean level of ferritin in women suffering from diabetes was 33.28±8.38. However, the mean level of ferritin in diabetic women was not significantly different from that of the healthy women in the control group. The mean level of ferritin in women suffering from oligohydramnios was 46.0±10.29. , the mean level of ferritin in women suffering from placental abruption was 35.5±9.19. The mean level of ferritin in women suffering from premature rupture of membranes was 88.90±15.32.

Conclusion: The findings of the present study indicate that the mean level of ferritin in women suffering from preeclampsia as well as women with premature rupture of membranes were significantly higher than that of healthy women having no pregnancy complications. However, the ferritin level of women with other pregnancy complications (including pregnancy diabetes, fetal abnormalities, placental abruption, and oligohydramnios) was not significantly different from that of the healthy women in the control group.

Keywords: *Ferritin, Amniotic Fluid, Pregnancy.*

INTRODUCTION

The health of the child is in close relation with the health of the mother and her access to health care.Among these services, it is possible to perform prenatal care with the aim of identifying risk factors and predicting and preventing pregnancy complications [(1, 2)] . One of the complications of preterm labor is premature delivery and one out of each ten births are preterm [(3)] . Low birth weight is another complication of pregnancy; the death rate of LBW infants is 4 to 8 times more than healthy infants [(4-7)] . According to the latest available statistics, the prevalence of low birth weight in our country is 10% and its prevalence in urban areas of Isfahan province was 6.4%and 7.4% in rural areas in the first six months of the year [(8-10)] . Eclampsia and preeclampsia are other complications which might develop during pregnancy. Annually, around 50,000 women worldwide die

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from pregnancy due to hypertension, and close to the same number due to complications of preeclampsia, such as brain hemorrhage, kidney failure and other cases and the number of patients developing serious complications is much higher than the actual mortality rate of the disease[11]. Preeclampsia is one of the complications of pregnancy and is known as the main cause of morbidity and maternal mortality [12]. The prevalencen of preeclampsia, which is characterized by hypertension and protein excretion in the urine after 20 weeks, is about 4-5%. In case of the development of seizures or hemolysis, increased liver enzymes and platelet counts (hale syndrome), preeclampsia can cause eclampsia[13] Several studies have been conducted on the diagnostic tests of preeclampsia; however, there is currently no reliable, valid and economical screening test for preeclampsia, and preeclampsia can only be diagnosed through planned pre-natal care. The first step in preventing pregnancy complications is the early identification of women at risk and treatment for these women during prenatal care; therefore, a proper diagnostic and screening test that is inexpensive and useful for all pregnant women is necessary.

METHOD

The present descriptive-analytical study was conducted on all pregnant women referring to the clinic of Ami al-Momenin Hospital of Zabol in 2016. The inclusion criteria include pregnant mothers with the gestational age of 20 weeks, singleton pregnancy, and willingness and satisfaction to enter the study. Moreover, the exclusion criteria include dissatisfaction to participate in the study, mothers suffering from diagnosed systemic infection, diabetes, hypertension, pre-pregnancy kidney diseases, internal diseases, mental diseases, smoking, non-Iranian nationality, taking *Corticosteroids and immunostimulants over the past 4 weeks, and taking* non-steroidal anti-inflammatory drugs. After collecting the required data, the data analysis was conducted in SPSS-18 and they were analyzed through using descriptive data in tables of frequency and diagrams.

FINDINGS

In the present study, as many as 100 pregnant women were investigated. The women's gestational age was 20 weeks. These women had referred to the clinic of Ami al-Momenin Hospital of Zabol in 2016. The mean age of these women was 29.86±6.22 years.

Table 1. The comparison of Ferritin mean in pregnant women suffering from preeclampsia and Eclampsia and healthy pregnant women

Group	Ferritin	P value
With preeclampsia	92.25±14.81	0<0001
Without preeclampsia	37.48±13.29	

In the present study, the mean level of ferritin in women suffering from preeclampsia was 92.25±14.81. The mean level of ferritin was significantly higher than that of the healthy women in the control group. Table 1

Table 2. The comparison of mean ferritin in pregnant women with or without pregnancy diabetes

Group	Ferritin value	P value
With diabetes	33.28±8.38	0.268
Without diabetes	37.48±13.29	

In the present study, the mean level of ferritin in women suffering from diabetes was 33.28±8.38. However, the mean level of ferritin in diabetic women was not significantly different from that of the healthy women in the control group. Table 2

Table 3. The comparison of mean ferritin in pregnant women with or without oligohydramnios

Group	Ferritin value	P value
With oligohydramnios	46.0±10.29	0.219
Without oligohydramnios	37.48±13.29	

In the present study, the mean level of ferritin in women suffering from oligohydramnios was 46.0±10.29. However, the mean level of ferritin in women suffering from oligohydramnios was not significantly different from that of the healthy women in the control group. Table 3

Table 4. The comparison of mean ferritin in pregnant women with or without placental abruption

Group	Ferritin value	P value
With placental abruption	35.5±9.19	0.605
Without placental abruption	37.48±13.29	

In the present study, the mean level of ferritin in women suffering from placental abruption was

35.5±9.19. However, the mean level of ferritin in women suffering from placental abruption was not significantly different from that of the healthy women in the control group. Table 4

Table 5. The comparison of mean ferritin in pregnant women with or without fetal abnormalities

Group	Ferritin value	P value
With fetal abnormalities	31.0±6.24	0.311
Without fetal abnormalities	37.48±13.29	

In the present study, the mean level of ferritin in women suffering from fetal abnormalities was 31.0±6.24. However, the mean level of ferritin in women suffering from fetal abnormalities was not significantly different from that of the healthy women in the control group. Table 5

Table 6. Sensitivity, specificity, positive predictive value, and negative predictive value of Ferritin

Complication	Sensitivity	Specificity	Positive predictive value	Negative predictive value
Preeclampsia and eclampsia	100%	43%	32%	100%
Pregnancy diabetes	59%	29%	18%	73%
PROM	100%	66.2%	45.8%	100%
oligohydramnios	0	54.2%	0	100%
placental abruption	0	44.1%	0	100%
Fetal abnormalities	41.3%	39.7%	23.4%	96.6%

In the present study, the mean level of ferritin in women suffering from premature rupture of membranes was 88.90±15.32. The mean level of ferritin in women suffering from premature rupture of membranes was significantly different from that of the healthy women in the control group. Table 6

DISCUSSION

The child's health is closely related to the mother's health and her access to health services. These services include conducting pre-pregnancy cares with the purpose of diagnosing risky cases, predicting pregnancy complications, and preventing them. The present study was conducted to investigate the diagnostic value of amniotic fluid ferritin and its relationship with pregnancy complications in pregnant women with the gestational age of more than 20 weeks. These pregnant women had referred to the Ami al-Momenin Hospital of Zabol in 2016. In the present study, the mean age of pregnant women was 29.86±6.22 years. In the present study, the mean level of ferritin in women with preeclampsia was 92.25±14.81. The mean level of ferritin in pregnant women with preeclampsia was significantly higher than that of the healthy women in the control group. In this study, the mean level of ferritin in women with pregnancy diabetes was 33.28±8.38. However, this mean was not significantly different from that of the healthy women in the control group. The mean level of ferritin in women with oligohydramnios was 46.0±10.29. However, this mean was not significantly different from that of the healthy women in the control group. The mean level of ferritin in women suffering from placental abruption was 35.5±9.19. However, this mean was not significantly different from that of the healthy women in the control group. The mean level of ferritin in women with fetal abnormalities was 31.0±6.24. However, this

mean was not significantly different from that of the healthy women in the control group. The mean level of ferritin in women with premature rupture of membranes was 88.90±15.32. This mean was significantly different from the mean level of ferritin in healthy women in the control group.

CONCLUSION

The findings of the present study indicate that the mean level of ferritin in women suffering from preeclampsia as well as women with premature rupture of membranes were significantly higher than that of healthy women having no pregnancy complications. However, the ferritin level of women with other pregnancy complications (including pregnancy diabetes, fetal abnormalities, placental abruption, and oligohydramnios) was not significantly different from that of the healthy women in the control group.

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Conflict of Interest – Nil

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E-Learning in Medical Education: Are we Compromising with Traditional Education System

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ABSTRACT

Introduction: Teaching and Learning is the main aspect of any academic institution around the globe. Recent revolution of Computer and other Information Technology resources is helping academic institution to serve the community in a better way. Computers are increasingly used in medical education.

Literature Review: Electronic learning (elearning) is moving from textbooks in electronic format[9]. However, the delivery of medical education is evolving. Lecturing, for many years the typical mode of learning and teaching in university courses, has received much criticism in pedagogic circles in recent years. It has been suggested that lecturing promotes surface learning rather than deep learning, and that there is no real rationale for its use[15]. New styles of teaching, such as problem-based learning, are being used around the world and at all levels of medical education[10]. It seems that the traditional teaching resources are suffering at the cost of newer techniques of applied to the institutes. Traditional Teaching is still applicable at prestigious institutes [13]. In this article we will review and discuss advantage and disadvantages of both traditional teaching and E-learning.

Conclusion: It is concluded that both traditional classroom teaching and Teaching with the use of newer E-Learning techniques do have their own advantages and disadvantages. In this scenario, Integration of E-Learning with traditional teaching methods [Blended Approach] into medical education at any institute can be regarded as a catalyst to educate the students.

Keywords: *E-Learning, Teaching, IT, Information, Technology.*

INTRODUCTION

Teaching and Learning is the main aspect of any academic institution around the globe. Recent revolution of Computer and other Information Technology resources is helping academic institution to serve the students in a better way. Howsoever the traditional teaching resources are suffering at the cost of newer techniques of applied to the institutes. E-Learning is one of the most important component of Teaching and training at any institute. E-learning currently occupies a high position in the universities and academic institutes and given priority by the departments in educational institutions[7]. Learning management systems—also referred to as course management systems and virtual learning environments—such as Moodle and Blackboard allow educators to deliver the same educational content electronically instead of through traditional methods. These systems save work, energy, and valuable time that can be used for patients instead[10]. Students are using blogs, cellular telephones, e-mails, personal digital assistants, twitter, and Wikis to communicate instantly and efficiently with peers and professors[12].

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Literature Review: Advantages and Disadvantages

It has been observed that the first generation of e-learning programs focused on presenting physical classroom-based instructional content over the internet with very little attention given to the peculiar nature of this delivery program in comparison to the tradition classroom lesson [1, 2]. Blended learning was often associated with simply linking traditional classroom training to e-learning activities; however, the term has now evolved to encompass a much richer set of learning strategies or dimensions. It is the combination of two or more of these dimensions that is today referred to as a blended learning [1, 2].

Despite the recent impressive development and expansion of higher education in KSA, there are still not enough places in the universities to accommodate the large number of applicants and meet the growth of the population [1]. It is necessary to pause and give careful thought to certain issues with far-reaching consequences before embarking on full-scale national-certified E-learning programs[1].

The integration of e-learning into medical education can catalyze the shift toward applying adult learning theory, where educators will no longer serve mainly as the distributors of content, but will become more involved as facilitators of learning and assessors of competency[4]. The application of Information and Communication Technologies (ICTs) is already changing the organization and delivery of higher education. The pedagogical and socio-economic forces that have driven the higher learning institutions to adopt and incorporate ICTs in teaching and learning include greater information access; greater communication; synchronous and asynchronous learning; increased cooperation and collaboration, cost-effectiveness and pedagogical improvement[5]. E-learning is utilized by public and private schools in the United States. Some E-Learning environments take place in a traditional classroom, others allow students to attend classes from home or other locations. There are several states that are utilizing cyber and virtual school platforms for E-learning across the country that continue to increase[6]. Experience shows that students and faculty are mostly in favor of adopting e-learning side-by-side with traditional learning, and the advantages far outweigh the likely discomfort associated with adoption of this new method[8]. Many institutes have successfully applied Blended teaching methods [13]. Traditional lecture style teaching is associated with significantly higher student achievement [14]. Lecturing enables learning in higher education to proceed in a constructivist manner in which students see their course as a whole, rather than an accumulation of unrelated activities and classes [15].

DISCUSSION

The traditional teaching is suffering at the cost of newer techniques of applied to the institutes as the advocates of newer teaching methods somehow neglect traditional teaching, the reason may me they label it as old method. In this scenario it has been a question that whether application of newer IT resources in E-Learning is beneficial for the students or not. Traditional lecture style teaching is associated with significantly higher student achievement. Traditional teaching has its own style of learning process in which the teacher is center of the learning process. The Teacher, being human, is prone to have human errors. In E-Learning environment the chances of error are minimized with a greater share of responsibilities on the teacher and hence the freedom of the teacher is compromised. The practical experience which is a very important component of medical teaching is also compromised. E-learning facilities are available developed as well as developing countries. Many institutes has successfully adopted ultra-advance E-Learning techniques. The integration of e-learning into medical education can catalyze the shift toward applying adult learning theory, where educators will no longer serve mainly as the distributors of content. Blended learning is associated with simply linking traditional classroom training to e-learning activities, which is a better approach to teaching and learning. The discussion is endless as we have different approaches of teaching in teachers.

CONCLUSION

It is concluded that E-learning is a piece of art work at any institute, which greatly potentiated the teaching methodologies globally. Teaching with the use of newer E-Learning techniques have their own advantages and disadvantages. On the other hand traditional teaching also have their own advantages and disadvantages. If both are used together in according to the need of the hour, than only it is very much beneficial to the students pursuing their studies at any institute. In

this scenario, Integration of E-Learning with traditional teaching methods [Blended Approach] into medical education at any institute can be regarded as a catalyst to educate the students.

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Evaluation of Nurses' Commitment to Ethical Codes in Patients Care

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ABSTRACT

Background: Nurses are faced daily with different and difficult issues and dilemmas in clinical practices which need fast and accurate decision making. Ethics provides a set of standards for behavior that helps us decide how we ought to act in a range of situations. **This study aims to:** Evaluate the nurses' commitment to codes of ethics. Determine the relationship between Nurses demographic characteristics and their commitment to codes of ethics. **Method:** A descriptive design has been carried out to evaluate nurse's commitment toward nursing ethics in Al-Hussein Hospital on 100 staff nurses. Self-report questionnaire was used to collect data from participants. The questionnaire consists of two main parts as follows: part one; socio-demographic characteristics sheet which is consist of (5) items, Part two; consists of 38 questions to evaluate nurse's commitment toward nursing ethics. **Results** showed that participated nurses had moderate commitment to codes of ethics. **Conclusion:** nurses' needs frequent training to enforce their commitment and attitudes toward nursing ethics control. **Recommendations** Create a code of ethics for Iraqian nurses to suit the Iraqian culture.

Keywords: *Ethics, code of ethics, decision making models, nursing practice.*

INTRODUCTION

Nurses are faced daily with different and difficult issues and dilemmas in clinical practices which need fast and accurate decision making. There are many changes in nursing profession overtime which need different decisions; some of them are ethical decisions. But despite these changes nurses still have stable expressions, applications, commitments of nursing, and central ethical values based on codes of ethics [(1)]. Ethics is tied in with making "right" or "great" decisions and the reasons that we give for our decisions and activities. Morals advances intelligent practice in the conveyance of human services [(1)].

The term ethics may be gotten from the Greek expressions "ethos" (signifying "character") and the latin statement "mores. " (signifying "traditions") [(3)]. Ethics would the planned examination under principles from claiming beneficial and terrible direct, for uprightness and awful habit, and about great Also clever Concerning illustration they recognizing for lead Also human thriving, those ability to a chance to be moral, will decide, What's more on go about clinched alongside a ethically legitimized [(3)].

Ethics provides for a strategy about measures should lead that urges us to lift how we ought to act On a degree from claiming states. You quit offering on that one might state, we might state that morals need aid all for admiration to settling looking into choices, Also around providing for reasons the reason we ought further bolstering settle on these decisions. Morals are a part of the occasion when conflated or blended dependent upon to Different methodologies to settling for choices, including religion, theory alternately good personal satisfaction. Different religions propel moral key activity yet don't to the mossycup oak part deliver the full degree of the beneficial decisions that we face. A respectable strategy for theory ought further bolstering a chance to be moral, make that Likewise it may, the

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theory might bring a troublesomeness occasion when orchestrating or sanctioning measures On a few essential domains. , and Possibly move back to address new issues. Both law Furthermore ethics manage appeal about how we ought to live independently with others, nonetheless, morals would throughout in such as way thought with apply to how people demonstration in spite of At others would excluded. [4].

The standard based way to deal with morals joins components of both utilitarian and deontological hypotheses and offers particular activity guides for training. The Beau-champ and Childless standard based way to deal with bioethics recognizes four key standards: self-rule, non-perniciousness, value, and equity. Numerous attendants include devotion, veracity, responsibility, security, and classification to this rundown since they assume a focal part in the convention of nursing (and therapeutic) morals and guide the conduct of medicinal services experts toward patients and their families [5].

Medical caretakers focused on excellent care construct their training with respect to proficient principles of moral direct. How do medical attendants take in the guidelines for proficient moral conduct? In any event, medical caretakers ought to distinguish and build up the basic components of moral office, develop the ideals of nursing, comprehend moral hypotheses that direct and legitimize proficient lead, and be acquainted with bioethical models for proficient nursing conduct [6].

According to the American Nurses Association (2001), people who progress toward becoming medical caretakers are depended upon not solely to hold quick to the moral measures of the calling yet, moreover, to clutch them as a component of being a specialist. The ethical tradition of nursing is self-astute, persevering, and unmistakable. A code of morals is an arrangement of rules that mirror the essential objectives, qualities, and commitments of the calling [7].

OBJECTIVES

1. Evaluate the nurses' commitment to codes of ethics.

2. Determine the relationship between Nurses demographic characteristics and their commitment to codes of ethics.

METHODOLOGY

A descriptive design has been carried out to evaluate nurse's commitment toward nursing ethics in Al-Hussein Hospital. The study was initiated from January, 2018 to April, 2018. 100 staff nurses are selected for the present study with probability systemic random sampling technique. Self-report Questionnaire might have been used to gather information from. participants. The questionnaire consists of two main parts as follows: part one; socio-demographic characteristics sheet which is consist of (5) items, they include age, gender, education level for nurses, and unit\ward. Part two; consists of 38 questions to evaluate nurse's commitment toward nursing ethics and scored as follow Yes=3, I don't know=2, No=1.

The questionnaire validity and reliability was done and necessary modifications done accordingly. The validity tested through a committee consists of five of experts in nursing field. Reliability was done by inter rater method, calculation was done by kappa correlation formula and the reliability coefficient of the tool was 70% and this consider reliable.

Data analysis was done by using descriptive and inferential statistics.

A pilot study was conducted on (10) staff nurses in Al-Hussein Teaching Hospital to ensure the clarity of the tool; they were from another unit differ from sampling units.

RESULT

Table (1): Conveyance from claiming nurture agreeing their demographic aspects.

Socio-demographic	Groups	Freq.	Percent
Age Groups	19< 25	27	27
	25<30	30	30
	30<35	26	26
	35<40	7	7
	40<45	5	5
	45<50	3	3
	More than 50	2	2
Mean ± SD		30.8 ± 8.7 yrs.	
Gender	Female	55	55
	Male	45	45
Level of Education	Nursing school	71	71
	Nursing institute	26	26
	university	3	3
Unit of work	Medical unit	23	23
	Surgical unit	19	19
	Burn unit	19	19
	ICU	15	15
	Operating room	24	24

Table (1) show that (30%) of the study sample are within age group (25-30) years old, regarding of gender the result of study show that more than half of the study sample (55%) are females. Also the study results show the majority of study (71.0%) is graduated from nursing school. Less than twentieth of them (18.0%) work in medical unit.

Table (2): Nurses' Commitment to code of ethics

Commitment to code of ethics	Low		moderate		High		Overall Mean
	No	%	No	%	No	%	
Toward patients	20	20	65	65	15	15	2.51
Toward hospital policy	40	40	50	50	10	10	2.51

Table (2) shows that the Mean of scores of the nurses' commitment toward nursing ethics. It reveals that more than half of nurses reflect a moderate patients' care. In addition the same table shows that half of nurses reflect a moderate commitment to codes of ethics regarding hospital policy.

Table (3): Association between Sample Socio-Demographical Characteristics with their Overall Commitment to code of ethics

Main Domain	Demographic characteristics	Approx. Sig.	C.S.(*)
Demographical variables	**Age Groups**	0.77	NS
	Gender	0.95	NS
	Level of Education	0.29	NS
	Setting of Unit	0.08	NS

HS : Highly Significant at P<0.01 ; S : Significant at P<0.05 ; NS : Non Significant at P>0.05;

C.S=correlation significant

DISCUSSION

Therapeutic attendants are ever-progressively confronted with complex worries Previously, their preparing. Codes for ethics would the vital heading for nursing the same amount.of different callings. Medical caretakers are mindful to give their customers/patients with the fantastic care. They are point of fact went up against various good challenges in their master rehearse, so they should be OK with ethic understood principles and the essentials of good fundamental administration [8].

The results of this study revealed that the mean age of the studied subjects was 30.8 ± 8.7 yrs. As for the overall commitment to ethical codes toward patients it can be observed that nurses demonstrate moderate commitment toward patients as they demonstrate fairness to the wellbeing and development of all patients when they convey mind, for instance, among the patients in the gathering of patients that they are dealing with. Care was reasonably, legitimately, and impartially conveyed among a gathering of patients.

This result was in disagreement with Borhani (2009) and Hassanpour (2011) as they have demonstrated attendants' shortcomings in the information of morals and its application practically speaking in Iran [9,10].

Regarding the overall commitment to ethical codes toward hospital policy half of studied nurses have moderate commitment toward hospital policy as they provide concerns to apply the hospital policy regardless apply balance between patients' rights and the policy; this may be results from difficulty in application of some of codes as it inconsistent with the culture of Iraq. This result was in accordance with Negarandeh etal (2005) as they found in their qualitative study that the medical attendants distinguished "absence of code of morals" as a hindrance to persistent support in Iran [11].

As regards for the relationship between the demographic characteristics of nurses and their commitment to codes of ethics there were no relations with any of the characteristics. This may be due to numerous medical caretakers do consider the code of expert morals when looked with moral issues, yet don't follow up on it. Much of the time, they don't have the power and support to respond as per the code, and here and there they basically don't recognize what to do.

This outcome was as per Bijani etal 2017, as they found no huge contrasts between the normal scores of nursing understudies and expert medical caretakers with respect to their adherence to moral codes identified with clinical administration arrangement and they meaning that the nursing understudies clung to these moral codes more than the working attendants [12].

CONCLUSION

The findings of this study shed light on the commitment of nurses towards codes of ethics. This study has shown that participated nurses had moderate commitment to codes of ethics.

Recommendation:

Design training programs for nurses about codes of ethics to improve nursing profession.

Create a code of ethics for Iraqi nurses to suit the Iraqi culture.

Ethical Considerations - Prior permission was taken from the Dean Nursing college ethics committee before conducting the study.

Source of Funding- Self funding

Conflict of Interest - Nil

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The Prevalence of Behavioral Disorders and its Related Factors in Elementary School Children in Ilam City in 2011-2012

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ABSTRACT

Introduction: In every society, the health of children and adolescents is of particular importance and their mental health helps them to be healthy and physically healthy and play their social role better. Therefore, this study was conducted to determine the prevalence of behavioral disorders and its related factors in elementary school children in Ilam city in the years 2011-2012.

Materials and Method: This cross-sectional study was performed on all children aged 12-6 years old in primary and non-profit primary schools in Ilam, among which 400 children were selected by cluster sampling method. The DSM-IV questionnaire and other demographic information questionnaire were used for research. Data were then analyzed using SPSS-20.

Results: In this study, 161 (53%) of the samples were male and 143 (47%) were female. Among the five disorders studied in this study, 27 (8.8%) with disorder 1 (attention deficit / hyperactivity disorder type), 20 (6.5%) with disorder 2 (hyperactivity disorder) / Attention deficit hyperactivity disorder), 13 (4.2%) with impaired number 3 (hypoactivity / attention deficit deficiency), 78 (25.6%) were suffering from disorder 4 (coping disorder) and 3 (0.98%) had impaired 5 (conduct disorder) Which had the highest disability score of 4 and the least was related to disorder number 5.

Conclusion: Considering that the prevalence of coping disorder in this study was more than other types of disorders, Therefore, the necessity of screening in school age children, as well as causation by conducting further studies and providing educational and counseling services to children and parents, seems necessary.

Keywords: *behavioral disorders, children, students, elementary school, prevalence*

INTRODUCTION

Every society needs people physically and mentally healthy for the advancement and growth of various economic, social, and cultural aspects. As today's children are the immediate owners of the future of the community, their health and illness will significant affect the health and illness of tomorrow's society and future generations. Indeed, children compose a major part of the world's population, so that in developing countries, the share of this stratum reaches about 50% of the population [1, 2]. Children and adolescents health is of great importance in any society and attention to their mental health helps them be healthy and physically healthy and fulfill their social role better [3]. Mental health of the child has a significant relationship with mother's

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mental health and mother-child relationship [4]. Various factors threaten the health of the child [5, 6]. Measuring the health status of the child plays an effective role in improving the health status of the society [7-9].

Behavioral problem means all repetitive, abusive and annoying behaviors such as sucking finger, nail chewing, ticking, stammering, beating, trampling, and so on that impair the function of the individual and the family associated with negative effects on learning and their social relationship and efficiency [12]. Considering the relationship between the mental health of the mother and the child, the mental problems of the children can be the result of the mental status of the mother [13].

Evidence shows that many behavioral and psychological problems exist mildly in children without family or teachers even being aware of them, which appear only when they are intensified in the child by various reasons coming from the treatment of those around and the events such as parents' deaths and divorces, school problems, and so on [14]. Studies have shown that behavioral disorders are the result of child interaction with the environment and thus should be studied in the context the family, peers, school and community [15].

Attention to the health of the child is critical [16, 17] and according to the results of previous studies, nurses play a key role in children's health [24-18] and can reduce children's pain and anxiety by proper interventions [25]. Indeed, it is impossible to have a proper understanding of the problem without sketching a proper picture of the conditions and characteristics of the child and the family [26]. Since there have been few reports on the prevalence of behavioral disorders in children and the factors affecting it in Iranian families so far, we decided to conduct study a study on the prevalence of behavioral disorders along the effects of type of nutrition and type delivery on behavioral disorders.

METHODOLOGY

The study was cross-sectional conducted in 2011-2012 to determine the prevalence of behavioral disorders in school age children in Ilam and its related factors. The population was all children aged 6-12 years old studying in public and non-profit primary schools of Ilam, from among whom 400 children were selected by cluster sampling method. Thus, the name of all the elementary schools in Ilam were gathered and divided into the state and non-profit categories according to the type of schools and to girls and boys according to gender. Then, considering their address, they were placed in four groups of geographical areas (first stage), then the percentage of each group was determined relative to the total number of schools in the city. Based on this, the number of students in each class was calculated from the total sample of 400. In the last stage, some schools were selected completely randomly (second stage) considering the number of students and after entering the schools from the list of classes, the equal numbers from each of the first to fifth grades was selected randomly (thirt stage) and the questionnaires were sent to their homes and were collected after being completed by their parents.

Data collection method

DSM-IV questionnaire was used for the study along another demographic questionnaire. The first questionnaire was delivered to the teachers and the second questionnaire was given to the students to have their parents complete them and was collected after being completed.

Children's Symptom Inventory (CSI-4) is a behavioral grading scale, which was first designed in 1984 by Sprafkin Voghado based on a DSM-III classification called Slug to screen 18 behavioral and emotional disorders in children aged 5 to 12 years. Later on, in 1987, CSI-ZR form was developed after DSM-III-R classification and was revised in 1994 with a fourth edition of DSM-IV with a slight revision and was published as CSI-4. This questionnaire has the same form as previous ones: parent and teacher. The parental form has 112 questions, designed to screen 18 behavioral and emotional disorders, and the teacher's form, containing information on the educational environment and educational efficiency, includes 77 questions designed to screen 13 behavioral and emotional disorders. This study used only questions about three disorders: conduct disorder (CD), attention deficit hyperactivity disorder (AD / HD), and oppositional defiant disorder (ODD) of the teachers form. During the completion of the questionnaire, the teachers were asked to read the questions carefully and show their agreement or disagreement with any of the questions by selecting one of the options: never, sometimes, often, and most of the time. This questionnaire has features such as ease of implementation and ease of comprehension. In addition

to these benefits, two rating methods have been designed. Screening score and scoring method according to the intensity of symptoms. The screening method is scored on a 4-point scale: never = 0, sometimes = 0, often = 1, and most of the times = 1, whereas the scoring method based on the severity of the symptoms has a 4-point scale: never = 0, sometimes = 1, often = 2, and most of the times = 3 (Sprafkin Gadu, 1994). In the present study, we used cut-off screening for scoring teachers' answers to the questions: 1-9 for AH/HD of lack of attention type, questions 9-18 hyperactivity disorder / attention deficit disorder, questions 1-18 hyperactivity disorder / combination factor deficit, questions 19-26 for ODD and questions 27-41 for behavioral disorders. In addition, the total score of people with a cut-off point of 6 was compared and only those with a score equal to or greater than 6 from hyperactivity/ attention deficit of lack of attention type questions were considered as children with alck of attention. The score of 6 or higher in hyperactivity disorder / attention deficit disorder were considered as hyperactive, those with score of 12 or higher in questions of hyperactivity / combination factor deficit were considered as the ones with combined type, and the ones with score of 4 or higher ODD questions were considered as the ones with this disorder. Moreover, the score equal to or greater than 3 in the question of behavioral disorders were considered as the ones with this problem from among the children with this disorder.

RESULTS

In this study, 161 (53%) subjects were male and 143 (47%) were female. Concerning the five disorders in this study, 27 (8.8%) had disorder 1 (Attention deficit / hyperactivity disorder of inattention type), 20 (6.5%) had disorder 2 (Hyperactivity / attention deficit of hyperactivity disorder), 13 (4.2%) had disorder 3 (Hyperactivity / attention deficit of combined type), 78 (25.6%) had disorder 4 (ODD) and 3 (0.98%) had disorder 5 (Behavioral disorder) with the highest frequency related to disorder 4 and the least was related to disorder 5 .

Of the nine signs studied, 36 (11.8%) subjects had symptom 1 (Interest in eating inappropriate substances), 10 (2.3%) symptom 2 (Urinary and fecal incontinence), 19 People (6.2%) symptom 3 (Enuresis), 42 (13.8%) symptom 4 (chewing nails), 10 (3.2%) symptom 5 (Stammering), 41 (13.4) symptom 6 (leaving activities unfinished), 7 (2.3%) symptom 7 (ticking), 53 (17.4%) symptom 8 (embarrassment) and 27 (8.8%) symptom 9 (withdrawal) .

There was a significant relationship between type of toy and disorder 1 (Attention deficit / hyperactivity disorder of inattention type) (P<0.01) and disorder 4 (ODD) (P<0.001). The results showed that in students with disorder 1, the most frequently used toys were dolls (44%) and in disorder 4 gun (42.3%) .

There was a significant relationship between parent's education and symptom 1 (P<0.51), symptom 3 (P<0.07), symptom 4 (P<0.49), symptom 5 (P<0.52), symptom 6 (P<0.63), symptom 7 (P<0.08), symptom 8 (P<0.07). There was no significant relationship between parents' education and symptom 2 (P<0.01) There was a statistically significant relationship symptom 9 (P <0.03) .

There was a significant correlation between the type of film and symptom 1 (P<0.003), whereas there was no significant relationship with other signs (P>0.05). The results showed that students with symptom 1 watched 4.44% action films. There was a significant relationship between the type of symptom and the toy between symptom 1, 6, 8, and 9, so that the most used toys for children with symptom 1 was gun, symptom 6 guns and dolls, and symptom 8 and 9 dolls .

DISCUSSION AND CONCLUSION

The health of the child is very important in the health of the community[33,34,35,36]. Children and adolescent with behavioral disorders have negative feelings causing mistreatment to others, in most cases leading to be rejected both by teachers and classmates, who in turn leads to loss of educational opportunities and worsening the disorders in these children [27]. The present study was conducted to determine the prevalence of behavioral disorders and their related factors in elementary school students in Ilam.

The results showed that the highest percentage of behavioral disorders was related to ODD (25.6%). The results also show that the prevalence of behavioral disorders in male students is higher than that of the female students, which is consistent with the studies by Khodam [28] and Kushan et al. [1]. Moreover, in many studies, the likelihood of behavioral disorders increases in male gender [28]. Thus, as in the present study, the most observed behavioral disorder in male students was

ODD; perhaps one of the most important causes of it can be in the inherent violence and power of the male gender. However, the results showed that the frequency of withdrawal and embarrassment in girls is more than that of boys. The highest prevalence of behavioral disorders was in the fourth grade elementary school students.

In the present study, no correlation was found between parent education and behavioral disorders in students that was inconsistent with the results of other studies.

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Source of Funding : Self

Ethical Clearance: Informed consent**,** No cost to the patient

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Investigating Musical Effects and Aromatherapy on Anxiety and Pain in Patients Undergoing Surgery

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ABSTRACT

The present study is a clinical trial study performed on 90 subjects (total 90) of male and female general surgery (cholecystectomy) in 2017. The study was conducted in three groups of music therapies, aromatherapy and control. In the scent group, patients 8 and 16 hours after surgery, 10 drops of rose water at a concentration of 12%, after rubbing the palms of the hands, in a distance of 5-5 / 2 cm in the nose for 3 minutes. In the music therapy group, music for nature sounds (water and birds) was broadcast to patients for 8-15 and 16 hours after the operation, using a headphone type marshall for 15-15 minutes. The control group received routine interventions. Data were analyzed by SPSS / descriptive software (frequency, percentage, mean and standard deviation), and inferential statistics (one way ANOVA and Tukey post test). Comparison of changes in pain and anxiety scores in the three groups indicated that the changes in pain score (mean of pain reduction of 8 hours (1.6 ± 0.26) and 16 hours (1.01 ± 0.86) after surgery) and In the case of anxiety (mean anxiety reduction of 8 hours (4.2 ± 3.57) and 16 hours after surgery (1.93 ± 1.81) in the aromatherapy group with control and music therapy groups (P> 0.05). The pain and anxiety levels decreased 8 and 16 hours after the surgery in the aroma group more than the control and music therapy groups. The results show a positive effect of the aromatherapy on pain and anxiety reduction in the patient 8 and 16 hours after the surgery. The effect of the aroma on the pain and anxiety of the patient is 8 and 16 hours after the surgery is more than the effect of music therapy.

Keywords: *Anxiety, Pain, Music Therapy, Ayurveda, General Surgery.*

INTRODUCTION

Alternative and alternative therapies include the set of actions and beliefs that patients take to prevent and treat illnesses or to raise their health and improve their overall condition along with conventional treatments[1]. Due to differences in the views and cultural backgrounds of each ethnic group, the use of complementary methods is very different[2,3]. Some experts believe that all alternative and complementary therapies are not harmless to the general public, and many treatments and prescriptions have serious and sometimes fatal side effects[4]. Others also consider the use of these methods to delay the patient in diagnostic and therapeutic procedures. On the other hand, many patients do not inform the physician of their complementary therapies, and the risk of complications such as drug interactions and errors in interpreting the results of the tests increases[5]. The use of complementary therapies has been increasing as treatment methods, but the standards of these methods and how they relate to the principles of conventional medicine are obscure[6]. The prevalence of using at least one of the complementary therapies in the world is as follows: England (33%), Australia (46%), the United States (34%), Belgium (66-75%), France (49%), the Netherlands (18%) and Germany 20-30%).

The need for standardization of complementary medicine is essential because the demand for the use of complementary medicine is increasing[6]. Complementary Medicine is defined by the National Center for Complementary Medicine and Alternative Medicine, a group of different types of medicine and health care systems and experiences, and technologies that are not currently defined as part of conventional medicine[7].

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Alternative medicine or complementary medicine includes a variety of therapeutic or prophylactic therapies that are different and different from traditional or biological medicine. In alternative medicine, the physician treats the patient as a whole, rather than emphasizing a particular disorder or illness.

Alternative medicine is more and more accepted every day, and it is estimated that one out of every three people uses these treatments for life-threatening illnesses such as lumbar problems, headaches, anxiety and depression[8]. Many nurses and physicians do not have much knowledge about this medicine, and, on the contrary, many physicians and even non-nurses benefit from this method in the treatment of diseases. Therefore, in addition to the popularity of these methods, information and attitudes of nurses and physicians are very important in this regard[9]. Some of the complementary medicine branches that are more commonly used among patients include acupuncture, traditional medicine, homeopathy, stoopy, reflexology, chiropractic, hypnosis, energy therapy, exercise therapy, therapeutic motion, music therapy, massage therapy, image therapy, herbal medicine , Herbal remedies, yoga, use of vitamins, meditation, face to face counseling, support groups, etc. [10,11].

Type of research

This research is an interventional study of clinical trial type. The empirical study is the strongest type of study to prove the causal relationship. Experimental studies performed on humans are called clinical trials. Clinical trials are controlled experimental studies used to compare the effects of different medical interventions in humans. Today, clinical trials have been accepted as the strongest scientific method for evaluating various therapeutic approaches. The reason for the importance of the clinical trial lies in the fact that many studies have shown that many patients recover even without prescribing an effective medication and only by helping to create a feeling of being supported and treated in patients. Perhaps it can safely be said that the modern clinical trial is the best medical indicator of the twentieth century from other ages[34]. Based on the definition presented at the WHO website, a clinical trial is a study that is conducted in a prospective manner to evaluate the effect of a specific intervention on the health of individuals. In those participants, the study is usually grouped into two or more groups, and one of these groups is the group that intervenes there. The interventions are not limited to drugs, but a wide range of interventions such as the use of stem cells in treatment, biological products, surgical procedures, diagnostic methods, devices used for treatment in the human body, behavioral techniques Treatment, delivery methods and prevention methods. Clinical trials are a method that can be used to test new therapies and to demonstrate safety, efficacy and higher standardization of the new method. This approach may be used to evaluate a new drug, a new combination of existing therapies, a new approach to therapeutic approaches, new therapies or prevention methods, ways to help manage symptoms or methods to improve quality. This is a clinical trial that examines the effects of independent music and aromatherapy variables on dependent variables of pain and anxiety caused by general surgery. In the present study, the patients were divided into three groups: non-interventional, aromatherapy group, and music therapy group. The anxiety and pain groups were compared and compared in the studied groups.

Research community

The research community includes all items that have the characteristics and characteristics of the research. The population of this study was 15-55 years old women and men underwent general cholecystectomy.

Research sample

Sample is part of society. In the conventional sense, they are part of the whole, which has the characteristics of the whole. In selecting the sample, care must be taken to select the sample representative of the community. The sample consisted of 90 male and female patients undergoing general cholecystectomy referred to the Tabriz Educational Center, which had inclusion criteria. They were randomly divided into three groups without intervention, 30 with aesthetic and 30 music therapists).

Sample size

The number of participants in a study is called the sample size. The sample size is the number of participants planned to be present in the research and determined using the statistical power calculation. The sample size should be sufficient to provide a high probability of diagnosis as a measurable impact size of a given value, if indeed such an effect exists. According to the preliminary study, 30 patients in Tabriz Sina

Educational Center, considering α = 0.05 and power = 0.8, were sample size for each group of 30 patients.

Sampling

Simple random sampling is the most important type of probabilistic sampling. When the studied community is homogeneous in terms of the trait, ie the difference between the population of the population in terms of the trait is low, we use a simple random sampling method in which each member of the community has equal and independent chances to be elected Have samples.

RESULTS

In this section, the data were analyzed by descriptive statistics (frequency, percentage, mean and standard deviation) and inferential statistics (Chi-square test, one-way ANOVA and Tukey's post-test). In order to investigate the results of the research, this chapter first describes the socio-social characteristics of the participants in the study, then, to answer the study's objectives, to investigate the effects of music and aromatherapy on the pain and anxiety of patients undergoing general surgery, using One-way analysis of variance (ANOVA), changes in the pain and anxiety levels of patients in the three groups were compared in different times, using Chi-square test, and then using the Tukey post-test, the mean of changes in the studied groups was two Two cases were compared.

Surveying the personal and social characteristics of patients undergoing general surgery:

In this section, the individual and social characteristics of the participants are examined. In this study, 90 patients underwent general surgery, of which 30 (33.33%) were in the control group, 30 (33.33%) in the aromatherapy group and 30 (33.33%) in the music therapy group were placed. In Table 1, some personal and social characteristics of the participants are shown in the three groups of control, aromatherapy and music therapy. ANOVA and Chi-square tests on these data showed that there was homogeneity between the participants in the three groups of control, aromatherapy and music therapy (p> 0.05).

Table 1: Some personal and social characteristics of the participants in the three groups of control, aromatherapy and music therapy

Statistical test	controlN(%)	Music Therapy(N%)	Curative AromaN(%)	Variable Levels	variable
p=267/0 df=2 , = 731/0	(60)18	(50)15	(3/53)16	men	Gender
	(40)12	(50)15	(7/46)14	women	
p= 114/0 df=4 , = 442/7	(7/6)2	(20)5	(3/3)1	Single	marital status
	(3/93)28	(7/76)23	(7/96)29	Married	
	(0)0	(3/3)1	(0)0	divorced	
p=436/0 df=8 , = 976/7	(7/16)5	(10)3	(3/13)4	illiterate	Education level
	(3/23)7	(3/13)4	(10)3	Elementary	
	(30)9	(7/26)8	(3/13)4	Tips	
	(7/16)5	(7/26)8	(7/36)11	High school	
	(3/13)4	(3/23)7	(7/26)8	Academic	

Cont... **Table 1: Some personal and social characteristics of the participants in the three groups of control, aromatherapy and music therapy**

p= 779/0 df=14 = 772/9	(0)0	(3/3)1	(0)0	Unemployed	Occupation (man and woman)
	(10)3	(3/3)1	(3/3)1	Worker (man (	
	(3/23)7	(30)9	(3/33)10	housewife	
	(20)6	(7/16)5	(10)3	Working at home	
	(3/13)4	(3/13)4	(3/13)4	Out of work	
	(3/23)7	(20)6	(7/16)5	Free	
	(3/3)1	(10)3	(20)6	Employee	
	(7/6)2	(3/3)1	(3/3)1	Retired	
p= 912/0 df=4 , = 984/0	(3/53)16	(3/63)19	(60)18	Equal cost	Income
	(3/13)4	(3/13)4	(10)3	More than spending	
	(3/33)10	(3/23)7	(30)9	Less expensive	

In the mean and standard deviation of the studied groups, it can be seen that the pain and anxiety level of the patients after the surgery in the control and musical therapy group decreased with time, which could be due to postoperative recovery, but in the treatment group Compared to control and musical therapy groups, pain and anxiety after surgery were reduced with time, which could indicate a positive effect of the aroma on reducing pain and anxiety after surgery.

Table 2: Comparison of mean and standard deviation of pain and anxiety in patients undergoing surgery in the three groups before and 8 hours after surgery

statistical test	Confidence interval	Standard deviation	Mean changes in pain and anxiety	group	Variable
p= 000/0 df=2 F=14/59	(01/1-66/0)	46/0	83/0	Control	Pain
	(53/3-61/2)	23/1	06/3	Aromatherapy	
	(51/1-03/1)	64/0	26/1	music therapy	
p= 000/0 df=2, F=479/49	(84/0-42/0)	55/0	63/0	Control	Anxiety
	(63/3-57/2)	42/1	1/3	Aromatherapy	
	(65/1-08/1)	76/0	36/1	music therapy	

Mean and standard deviation of changes in pain and anxiety levels before and 8 hours after surgery in the three groups showed a significant difference ($p < 0.05$) and to determine the difference between groups Tukey test is used.

Table 3: Comparison of mean differences in pain and anxiety levels before and 8 hours after surgery among the groups using Tukey test.

statistical test	Average variation of groups	Groups	Variable
p= 121/0	43/0	Control - Music Therapy	Pain
p= 000/0	23/2	Control - Aroma	
p= 000/0	8/1	Music Therapy - Heartburn	
p= 014/0	73/0	Control - Music Therapy	Anxiety
p= 000/0	47/2	Control - Aroma	
p= 000/0	73/1	Music Therapy - Therapeutic Therapy	

The changes in pain (mean pain reduction 8 hours after surgery) were not statistically significant in the control group with the music therapy group (p> 0.05). Which can indicate that the therapeutic effect of muscle therapy does not affect the patient's pain 8 hours after surgery.The changes in the level of anxiety (mean reduction in anxiety 8 hours after surgery) were significantly different in the control group with the music therapy group (p <0.05) and the level of anxiety in the music therapy group was higher than that of the control group. Can indicate the positive effect of music therapy on reducing anxiety in the patient 8 hours after surgery. The changes in the amount of pain and anxiety (mean pain and anxiety reduction 8 hours after surgery) were significantly different in the aromatherapy group with the control and music therapy groups (p <0.05) and the pain and anxiety reduction of 8 hours After surgery, the aromatherapy group was more than the control group and music therapy, which could indicate the beneficial effects of the aroma on reducing pain and anxiety of the patients 8 hours after the surgery, and the effect of the aroma on the reduction of pain and anxiety of the patient 8 The hour after surgery was more than the effect of music therapy.

Comparison of mean differences in the amount of anxiety before and after 16 hours after surgery revealed that there was a significant difference between the control group - music therapy (0/00), the control (0%), and the medical certificate (0/00).Comparison of mean differences in pain intensity 16 hours after surgery between groups showed that there was a significant difference between control group - music therapy (0.02), control - therapeutic smell (0.00) and (0/00) has it.

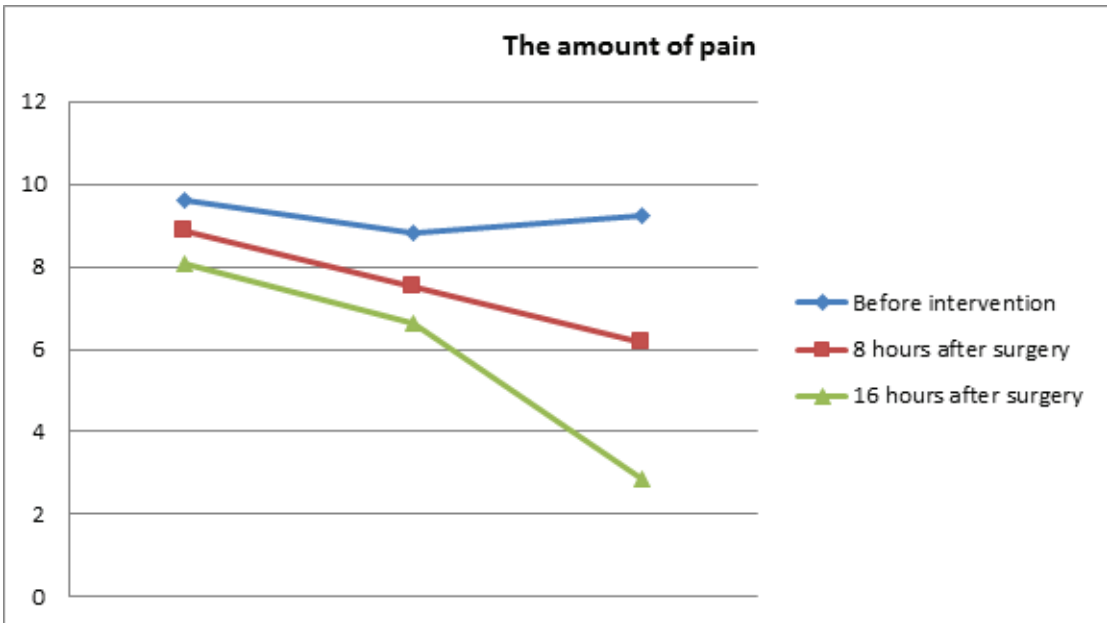

Figure 1: Linear chart The mean of pain in the studied groups at different times

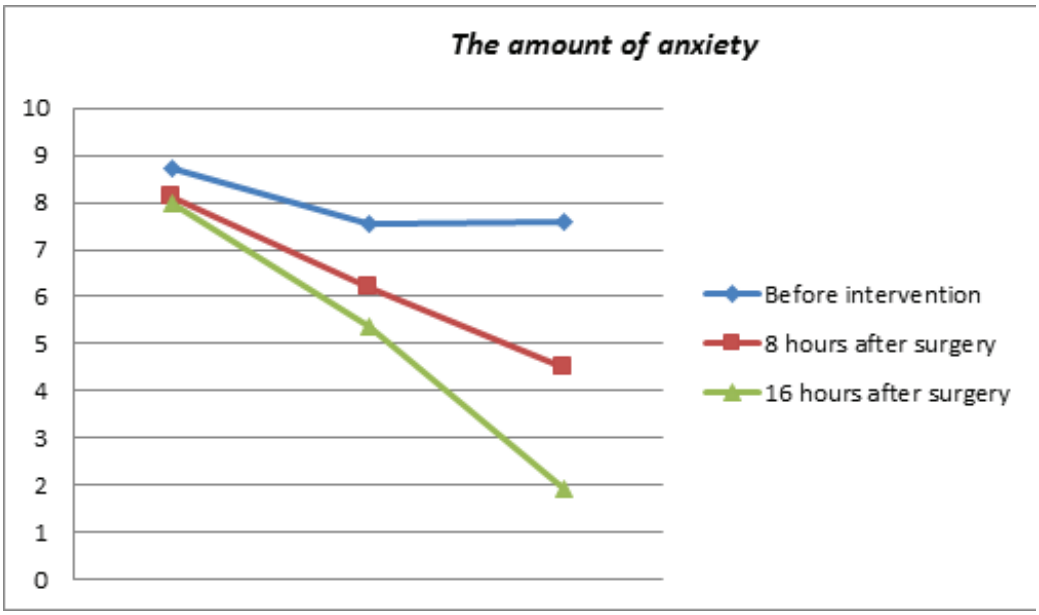

Figure 2: Linear graph The average amount of anxiety in the studied groups at different times

The changes in the amount of pain and anxiety (mean pain and anxiety reduction 16 hours after surgery) were significantly different in the control group with the music therapy group ($p < 0.05$). The amount of pain and anxiety reduction 16 hours after surgery in the music therapy group is more than the control group, which can indicate the positive effect of music therapy on reducing pain and anxiety in the patient 16 hours after surgery.

CONCLUSION

The aim of this study was to investigate the effect of music and aromatherapy on the anxiety and pain of patients undergoing general surgery that was performed at the Sina Educational Center of Tabriz University of Medical Sciences. This chapter is intended to interpret and interpret the findings. In this chapter, a summary of the results of the study, which was presented in the previous chapter, is compared with the results of several similar studies. Then, by examining the results discussed, the final result is identified and based on the application of the findings and suggestions in this regard. Also, reference is made to the research constraints and suggestions for future research. Reviewing the literature suggests that although past studies have examined the effects of music and aromatherapy on the anxiety and pain of patients in various types of diseases, they have reported contradictory results. In the present research, the first hypothesis is "The level of anxiety in the intervention group (musical and aromatherapy) with the control group is different." Concerning the above hypothesis, the results of the present study confirmed this hypothesis, so that in patients receiving musical interventions and aromatherapy, the anxiety of patients has decreased. In this study, the findings of the research indicate that the implementation of musical and aromatherapy interventions will reduce pain and anxiety in patients undergoing cholecystectomy after receiving interventions.

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Source of Funding: There is not funding in this paper.

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Investigating the Antimicrobial Activity of Different Root Canal Filling Pastes in Deciduous Teeth

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ABSTRACT

Purpose: The antiseptic property of root canal filling materials seems very important for the removal of residual pathogens from root canals. The aim of the current study was to investigate the antimicrobial activity of Mineral Trioxide Aggregate (MTA), Calcium Hydroxide (CH), Metapex, Zinc Oxide Eugenol (ZOE), and CEM-cement.

Materials and Method: Four standard bacterial strains including Staphylococcus aureus, Enterococcus faecalis , Pseudomonas aeruginosa , Bacillus subtilis and a type of fungus called Candida albicans were used. On five plates containing Brain Heart Infusion (BHI) agar, five cavities were made.Then,the plates were cultured by 0.1 ml of bacterial suspension with a concentration of 0.5 McFarland. Afterwards, the cavities were completely filled with the tested materials and were incubated at 37 °C for 24, 48, and 72 hours. Diameters of microbial inhibition zones were then measured.

Results: The highest mean diameter of growth inhibition zones was observed around ZOE and then CH and CEM-cement.

Conclusion: CH was a viable alternative to ZOE.

Keywords: *Filling Materials, CEM-Cement, Calcium Hydroxide, Mineral Trioxide Aggregate.*

INTRODUCTION

Pulp therapy in children is widely used to prevent deciduous teeth loss. Loss of deciduous teeth due to dental caries can lead to problems such as loss of arch length, inadequate space for permanent teeth [1].

The main goal of pulp therapy is to remove microorganisms from root canals and prevent their subsequent infections[2].

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The complex morphology of root canals in deciduous teeth makes mechanical cleansing and rinsing difficult [3].

The most common materials for filling root canals of deciduous teeth include:

1) Zinc Oxide Eugenol (ZOE)

2) Iodoform-based pastes

3) Calcium hydroxide(CH) [3]

ZOE as the most commonly used material recommended for the treatment of deciduous teeth was recommended by the American Academy of Pediatric Dentistry (AAPD) until 2008[4].

To improve its characteristics and success rate, it has been combined with various materials such as formocresol, cresol. These compounds increase its success rate, but they do not make it more resorbable than ZOE alone [5,6].

Pabla et al. evaluated the antimicrobial activity of ZOE and Iodoform, KRI, and Maisto pastes on the necrotic deciduous teeth and concluded that the Vitapex paste had the highest antimicrobial activity [7].

In a clinical study, the mixture of zinc oxide, calcium hydroxide, and 10% sodium fluoride solution was used. It was detected that the rate of resorption of root canals obturated by this mixture was pretty similar to the rate of physiologic root resorption in deciduous teeth[8].

Pitts et al. examined the resorption nature of calcium hydroxide and found that the highest rate of resorption of apical plug of this material occurred during the first month[9].

In a study conducted by Gupta et al. forty-two necrotic deciduous teeth were selected.the success rate of ZOE was 85.71% and that of Metapex was 90.48% [10].

In a study by Subramaniam et al. entitled "Endoflas, Zinc Oxide Eugenol and Metapex as root canal filling materials in primary molars—a comparative clinical study", forty-five primary molars were selected for pulpectomy.Finally, there were no significant differences between the three groups [11]. Consequently, the aim of the present study was to investigate the antimicrobial activity of root canal filling pastes in deciduous teeth in Ahwaz, Iran.

MATERIALS AND METHOD

In this study, the following strains were prepared as lyophilized vials from Iranian Research Organization for Science and Technology: Enterococcus faecalis (ATCC 29212), Staphylococcus aureus (ATCC 6538), Bacillus subtilis (ATCC 6633), Pseudomomas aeruginosa (ATCC 27853), and Candida albicans (ATCC 10231).

To activate bacterial strains, the vials were poured into Trypticase Soy Broth (TSB, Merck, Germany) and were incubated for 48 hours at 37 °C. Then, to provide a colony of bacteria, they were cultured for 48 hours on a solid medium of Brain Heart Infusion Agar-BHIA (Merck-Germany).

Then, using these colonies and with the help of physiologic serum, a suspension with a concentration of approximately 0.5 McFarland (1/5) was prepared. To provide a bacteria-containing agar medium, the BHIA medium was heated to 45-50 °C and then was poured into sterile disposable plates with a diameter of 10 cm, so the thickness of agar reached 4 mm. After the mixture was cooled, in each container using a sterile punch, five cavities with identical intervals and a diameter of four millimeters were formed. Then, the 0.5 McFarland suspension was used to culture plates with a spread plate method. Into each cavity of a plate, the following materials were respectively put:

Pro Root MTA (Dentsply), Calcium Hydroxide (Kimident), Zinc Oxide Eugenol (Kemdent), Metapex (Tejarat pars-Corea), and CEM-Cement (Tjarat pars-Iran).

ZOE,MTA, CH, and CEM-cement pastes were prepared based on their manufacturers' instructions, and the Metapex syringe was also available.The plates were incubated at 37 °C in the incubator. After 24, 48, and 72 hours, a millimeter ruler with a precision of 0.5 millimeters which was independent of each observer in two locations perpendicular to each sample was used to measure the diameter of growth inhibition zones for each material in millimeters.

The results of each sample were entered into the statistical software of SPSS version 19 and analyzed by Kruskal-Wallis and Friedman tests. Besides = 0.05 was considered as the basis for statistical judgments.

FINDINGS

The results of the Kruskal-Wallis test showed that on the antimicrobial activity against:

- P. aeruginosa for 24 hours,the CH was 20 mm and that of ZOE was 27 mm, and the significant level was 0.039 and Chi-square was 10.102.

-E. faecalis bacterium for 24 hours, the CH was 14 mm and that of ZOE was 19 mm, and the significant level was calculated to be 0.018 and Chi-square was calculated to be 11.859.

-S. aureus bacterium for 24 hours,the ZOE was 35 mm, and the significant level was calculated to be 0.008 and Chi-square was calculated to be 13.796.

The results of the Kruskal-Wallis test showed that on the antimicrobial activity for 24 hours of the five types of pastes against :

- B. subtilis bacterium:the CH was 17 mm and that of ZOE and CEM-cement were 25 and 14 mm respectively, and the significant level was calculated to be 0.027 and Chi-square was calculated to be 10.922.

-C. albicans bacterium:the CH was 20 mm and that of ZOE and CEM-cement were 47 and 15 mm respectively, and the significant level was calculated to be 0.041 and Chi-square was calculated to be 90.941.

-P. aeruginosa bacterium ,the CH was 18.66 mm and that of ZOE was 27 mm, and the significant level was calculated to be 0.032 and Chi-square was calculated to be 10.531

The results of Friedman test on comparing the antimicrobial activity of the CEM-cement paste at different times, regardless of the type of bacterium, showed that the mean antimicrobial activity in 24, 48, 72 h were 1.93, 1.93, and 1.86 respectively, and the significance level was calculated to be .156 and Chi-square was calculated to be 3.714.(diagrams 1a to c)

Table 1. Antibacterial activity of the tested materials (millimeters) on 5 types of bacteria at different times.

Microorganism	Time (h)	MTA- Metapex	CH	CEM	ZOE
P aeruginosa	24 48 72	0 0 0	20 19 17	0 0 0	27 27 27
S aureus	24 48 72	0 0 0	0 0 0	0 0 0	35 33 32
E faecalis	24 48 72	0 0 0	14 14 14	0 0 0	19 18 17
B subtilis	24 48 72	0 0 0	17 17 16	14 14 14	25 24 24
C albicans	24 48 72	0 0 0	20 17 17	15 15 14	47 46 45

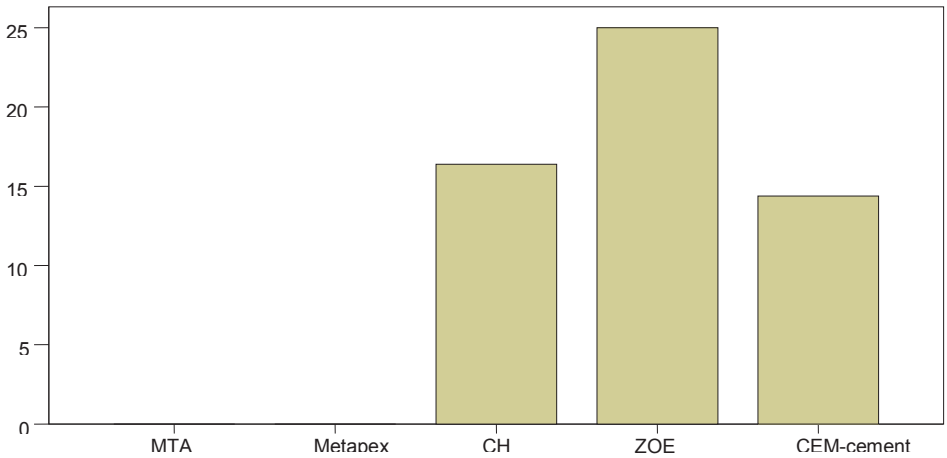
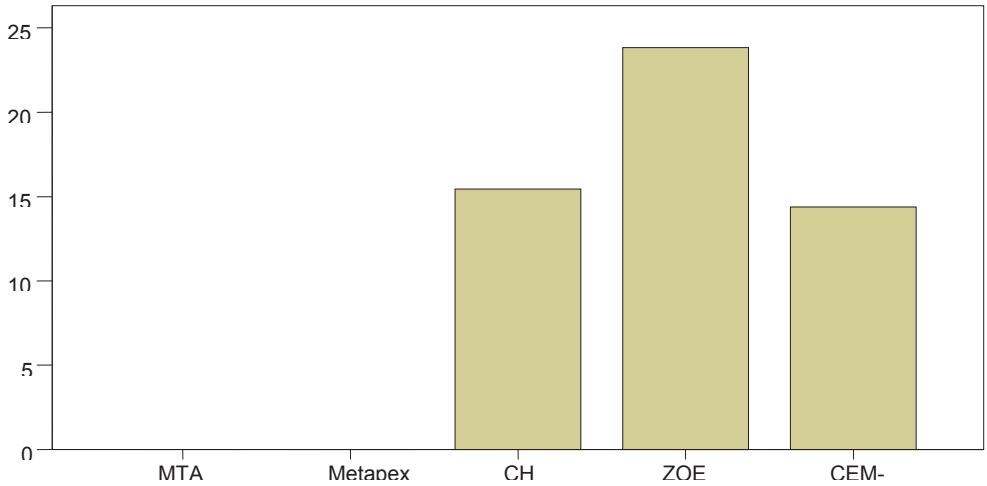
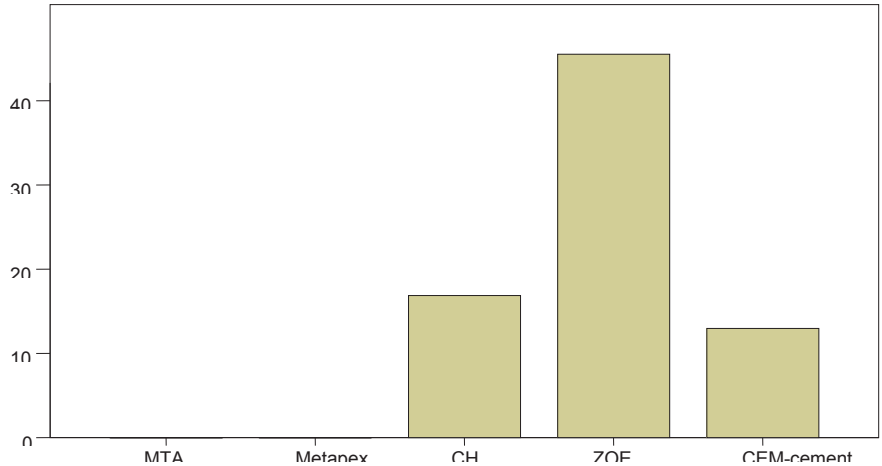


Diagram1.a Mean antimicrobial activity of the materials in the first 24 hours against B. subtilis



1b. Mean antimicrobial activity of the materials in the first 72 hours against S. aureus



1c. Mean antimicrobial activity of the materials in the first 72 hours against C. albicans

CONCLUSION

The results of Asgary et al.'s study were in line with those of the present one and they concluded that among calcium hydroxide, MTA, and Portland-cement, the highest antimicrobial activity after 24, 48, and 72 hours was observed in calcium hydroxide. The most antimicrobial activity in all groups was found against Enterococcus faecalis . the difference was probably due to the type of the used culture medium [12].

In a study by Lilian et al., it was concluded that calcium hydroxide had antimicrobial activity against S. aureus, E. faecalis, P. aeruginosa, B. subtilis, and C. albicans and the rate of this activity was more than that of MTA. Vitapex had no antimicrobial activity [13].

Estrela et al. determined that calcium hydroxide had higher antimicrobial activity than MTA, Portland, Sealapex, and Dycal against S. aureus, E. faecalis, B. subtilis, and S. aureus. In this study, a fluorescence spectrometer was used.Before incubation, they were incubated at environmental temperature for one hour and then incubated at 37 °C for 48 hours [14].

In a study carried out by Tchaou et al., like the present study, ZOE had a greater antibacterial effectiveness than calcium hydroxide and Vitapex. The bacterial, were collected from necrotic teeth of patients. For data analysis, non-parametric Friedman and Tukeys HSD tests were used [15].

COX et al. in a study did not show the antibacterial activity of ZOE on E.coli, S.aureus, or S. viridan.

Difiore did not demonstrate both antimicrobial activity of calcium hydroxide against S.sanguis and Grossman and antimicrobial activity of calcium hydroxide against S.faecalis [16].

Holan and Fuks showed that the clinical efficacy of root filling with iodoform-containing paste (KRI) was superior to ZOE.ZOE irritated the periapical tissues around the root of teeth and undergone resorption later than the root tissue. Its toxicity may be due to Eugenol. In this study, the antimicrobial activity of ZOE and Zinc Oxide was similar, so Zinc Oxide could be applied instead of ZOE[17].

Mortazavi et al. in their study concluded that the success rates of Vitapex and ZOE were 100% and 78.5%, respectively.Fisher's exact test was used to evaluate the data. Due to the more convenient application of Vitapex and its absorption in tissues around the root, this material can be a good alternative to ZOE, especially when there is a doubt on the patient's return for follow-up [18].

In a study by Khoramian et al., they discovered that Diapaste, a calcium hydroxide root canal filling paste, had more antibacterial activity against E. faecalis than ZOE and Sealapex, a calcium hydroxide sealer. This study was performed in a laboratory and Kruskal-Wallis and Mann-Whiteny tests were used to measure the antimicrobial properties of the materials only in the 48-hour interval [19]. According to the results of this study, calcium hydroxide-based root canal filling materials demonstrated their antimicrobial property by releasing the hydroxyl ion. Both Diapaste and Sealapex cement are calcium hydroxide-based sealers[20].

In a study carried out by Fabiane et al., it was concluded that MTA had high levels of antimicrobial activity at different times, and no antibacterial activity was observed for ZOE and two calcium hydroxide-based products including Caien and L&C.direct exposure test was used[21].

Ramar et al. in a study depicted that Endofloss compared with Metapex and ZOE was a better material in the treatment of deciduous teeth. This study was conducted clinically [22].

In the study by Queiroz et al., the antimicrobial activity of ZOE was approved to be greater than that of Sealapex, a type of calcium hydroxide-based material [23].

In the study by Subramaniam et al., the highest clinical success rates were seen in Metapex (100%).all three materials were in a statistically significant level and the study was carried out clinically [24].

Nadkarni et al. in their study concluded that the use of calcium hydroxide in the treatment of deciduous teeth was more successful than the use of ZOE and calcium hydroxide could be used as an alternative to ZOE. The study examined clinical and radiographic success rates[25].

In a clinical study conducted by Barcelis et al., it was concluded that the use of Vitapex and Sealapex in the treatment of deciduous teeth had a similar success rate [26].

In the study by Asgari et al., the antibacterial activity of calcium hydroxide and CEM-cement was similar and more than that of MTA [27].

In this study, the following results were obtained:

- The antibacterial effectiveness of ZOE was greater than that of other materials.
- The antibacterial strength of CEM-cement was higher than that of MTA.
- Metapex and MTA showed no antibacterial activity at any time interval.
- The most resistant bacterium among these five microorganisms was E.faecalis.
- As an alternative to ZOE, calcium hydroxide and then CEM-cement substitute can be considered.

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Pain Assessment Tools in Children Undergoing Mechanical Ventilation in Intensive Care Units

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ABSTRACT

Background: Pain assessment and management in children continue to remain as a problem that necessitates an investigation into aggravating factors of pediatric pain. According to the World Health Organization (WHO), children still suffer from pain in hospitals and better pain prevention, assessment, and treatment measures are required. This review study intended to investigate pain assessment tools in children in intensive care units (ICU).

Materials and Method: This review study searched relevant articles published in Ovid, Science Direct, Scopus, PubMed, Cochran, and CINAHAL databases within 2003 and 2016, using keywords of pain management, pain care, pediatric pain, and pediatric intensive care unit.

Results: Finally, 31 relevant articles and one book were found. Four major pain assessment tools for children in ICUs are FLACC, COMFORT-B, MAP, CAAC Scales.

Conclusion: Among the four major pain assessment tools, COMFORT-B is the most commonly used scale in ventilated children. It is worth noting that other tools are also effective in pediatric pain assessment and pain management in children.

***Keywords**: Pain Management, Pain Care, Pediatric Pain, Pediatric Intensive Care Unit*

INTRODUCTION

Pain is the most common psychological stress faced by human beings. The International Association for the Study of Pain defines pain as a latent feeling and emotional experience associated with acute or potential tissue damage, and emphasizes this definition as a biological and psychological experience and a sign of tissue destruction.[1] Pain is a personal experience affected by many factors including previous experience of pain, culture, and social support network.[2] Pain elements have physiological, behavioral, and psychological facets[3].Children may be incapable of understanding and communicating their pain and unable to create a relationship with their therapist, which may be affected by their feelings and cognitive progress.[2] Pain assessment in children continue to remain as an issue that necessitates an investigation into aggravating factors of pain in children.[3] According to the World Health Organization (WHO), children still suffer from pain in hospitals and better pain prevention, assessment, and treatment measures are required. The American Pediatric Association (2001) believes that ongoing assessment of the presence and severity of pain and the child's response to treatment are essential to treat pain adequately.[4]

Behavioral distresses, such as irritability, agitation, and restlessness are among psychological signs of pain in children. Changes in physiological indicators of pain, such as heart rate, respiratory rate, and oxygen saturation,

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provide information about pediatric pain.[5]Today, the American Pain Society (APS) emphasizes the importance of pain by presenting the idea of recording and reporting pain as the fifth vital sign.[6]

In the course of pain, [production of] stress hormones, such as cortisol and catecholamine, results in tissue destruction, fluid retention, reduced frequency of bowel movement, weakened immune system, and incidence of cardiovascular responses like tachycardia, hypertension, ischemia, and ventricular arrhythmias.[7] More than 82.2% of children in ICUs frequently experience moderate-to-severe degrees of pain.[8]

Children are a vulnerable group and their lack of ability in understanding and control of pain can affect them in a long run. [9] Hospitalization of children in ICUs exposes them to many painful and stressful events.[10] Medical conditions, such as surgery or other medical treatments for acute diseases, routine procedures in ICUs (e.g. mechanical ventilation), taking care of catheters and tubes, drug complications, position change, suction, and light and noise may result in the appearance of pain and stress in patients.[11]The lack of pain relief can lead to important changes in quality of life, sleeping habits, self-confidence, depression, and disappointment, and impairs natural growth and evolution in children.[1,9,12](1, 12) The lack of knowledge about long-term effects of inadequate treatment of pain, fear of addiction to opioids, fear of respiratory depression or death, , the lack of standard pain assessment tools in ICUs, the lack of pediatric pain control protocol and guideline, and the lack of recorded measures taken for pain assessment are among barriers against pain assessment and control. [9, 13] Pain assessment in ICUs is often delayed due to changes in the level of consciousness following the use of sedatives, head trauma, and physiological conditions.[14] Pain assessment of children undergoing mechanical ventilation is difficult for many reasons, including age, intubation, sedation, and potential inability to express non-verbal signs of pain.[15] Pain assessment and adequate administration of opioids are essential for the comfort, health, and safety of ventilated children, and make them more adjusted to the ventilator during the course of treatment.[16] As compared to other children, further assessment of pain in ventilated children, using valid tools, is necessary.[17] Nurses are responsible for pain assessment, taking pain management measures, and monitoring the effectiveness of those measures.[18]

Pediatric pain assessment tools were developed to assess physiological and behavioral variables of pain in ventilated children.[19] Pain assessment in intubated and ventilated patients in ICU is a very complicated clinical task. The use of valid pain assessment tools can be helpful in the assessment of observations and improvement of pain management.[20]

MATERIAL AND METHOD

This review study searched relevant articles published in Ovid, Science Direct, Scopus, Pub med, Cochran, and CINAHAL databases within 2003 and 2016, using keywords of pain management, pain care, pediatric pain, and pediatric intensive care unit.

RESULTS

In the past two decades, more than 40 pain assessment tools have been developed to facilitate pain assessment and measurement in children and neonates, who are unable to communicate their pain. [21]

Search results included 31 clinical, quasi-experimental, and descriptive articles, and one book. Among them, 28 articles addressed common pain assessment and management methods and tools.

Four common tools for pain assessment and monitoring in ventilated children in PICUs are FLACC Scale (Face, Leg, Activity, Cry), COMFORT Behavioral Scale, MAP Scale (multidimensional assessment of pain scale), and CAAS (the cardiac analgesic assessment scale). The validity and reliability of these tools have been proved by different researchers in various countries.

The FLACC was developed by Markel in 1998, where F stands for face, L for legs, A for activity, C for cry, and C for censurability.[14] This scale includes five behavioral categories scored from 0 to 2. The total score of this scale ranges from 0-10.Chen assigned 0-3 to no pain-mild pain, 4-7 to moderate pain, and 8-10 to extreme pain. Merkel et al. (1997), approved the reliability and validity of this tool in Chinese children.[12] This tool was also introduced with high accuracy in measuring the degree of pain in children hospitalized in ICUs following a trauma or surgery.[14]

Jinbing et al. (2012) investigated the validity and reliability of FLACC and COMFORT Behavioral scales in pain assessment in 170 children after heart surgery in ICU. Findings also suggested that these two tools can

help therapists in identifying the need of children in ICU for pain management, and in making decision, planning, and implementing pain treatment algorithm. [12]

Voepel - Lewis et al. (2012) studied the validity and reliability of FLACC in assessment of acute pain in children in ICU.FLACC scores were made by three ICU nurses before administration of analgesic and during painful procedures. Results indicated high validity and reliability of this tool in pain assessment of children in ICUs.[22]

Voepel- Lewis et al., (2003) examined the validity and reliability of this tool in children who were unable to communicate their pain. They confirmed its usefulness in facilitating decision-making in medical measures to reduce pain in children unable to communicate their pain.[23] It is a widely approved tool that is translated into French, Chinese, Portuguese, Swedish, and Italian.[15]

Ambuel developed COMFORT-B in 1992. This scale included two physiological dimensions, namely heart rate and blood pressure, and six behavioral dimensions, namely alertness, calmness, respiratory response (in intubated children), crying (in children with spontaneous respiration), muscle tone, facial tension, and physical movement. Each item is scored from 1 to 5.The total score is in a range of 6-30.Scores equal to or higher than 17 indicated the need for pain reduction.[12,24] This scale has been recommended for pain assessment in children in ICUs, and proven to have high validity and internal consistency.[25]

Abou Elella et al. (2013) investigated the effectiveness of COMFORT-B in improving pain management protocol in 110 children undergoing mechanical ventilation after heart surgery. Pain assessments were conducted by two nurses every 2 hours in the first day after surgery and every 4 hours in the second day after surgery until extubation. Based on the protocol, the patients received fentanyl infusion and intravenous paracetamol until extubation. Results showed reliability of this instrument in pain assessment of post-operative ventilated children; in addition, the use of this protocol reduced pain and the length of ventilation and hospital stay.[26]

Boerlage et al. (2009-2010) performed a study, entitled 'The COMFORT-B scale detects clinically meaningful effects of analgesic and sedative treatment,' on patients (0-18 years old) hospitalized in ICU. In a course of 12 months, 94315 examinations were carried out on 180 children, using COMFORT-B, and their pain scores before and after pharmaceutical interventions were obtained. Results showed that the mean scores before and after the intervention were 20±3.7 and 14.1±4.7, respectively. The mean score showed up to a 5-point decline in 63% of observations, a fixed 5-point decline in 27%, and an increase in 10% of observations despite intervention. The COMFORT-B score dropped to below 17 after a pharmacological intervention in 747 examinations. Results showed that COMFORT-B can be used as a guide in specifying the effectiveness of opioid and/or sedative treatments in critically ill patients in ICUs.[24]

The Multidimensional Assessment of Pain Scale (MAPS) is used for pain assessment in ventilated children. This scale was developed by Ramelet et al. (2007) as a pain assessment scale.[27] The MAPS includes five categories, namely vital signs (heart rate and blood pressure), respiratory pattern, facial expressions, body movements, and state of alertness (calmness or sleep, hyperactivity, silence). Each item is scored between 0-2. The total score of the five items ranges between 0 (painless) and 10 (severe pain). Results from their study, "Development and preliminary psychometric testing of the Multidimensional Assessment of Pain Scale: MAPS," suggested this tool as a highly valid pain assessment panel for children in the pediatric intensive care units. Data collection was conducted randomly by eight nurses at bedside, using video clips at certain times. Data analysis was done by the researcher. The intervention was made after stabilization of the children conditions. Heart rate, blood pressure, and respiratory rate were alternately controlled using monitoring devices. Results from examination of body parts and neuromuscular blockade were also recorded. Findings confirmed internal validity of this tool. [28]

Ramelet et al. (2007) investigated clinical validity of MAP in 20 post-operative intubated children in ICU. Pain assessment and completion of the questionnaire were done by a nurse before pharmaceutical intervention and administration of morphine bolus. Reassessment of pain was conducted 15, 30, and 60 minutes after the intervention. Findings also showed significant reduction of MAPS score and change in physiological responses presented by reduced degrees of vital signs and behavioral responses, and appropriate pain management after the intervention. This tool was recommended

to improve clinical judgment and determine pain management plans and opioid titration. It also indicated the simplicity of its application.[27]

The Cardiac Analgesia Assessment Scale (CAAS) is used for assessment of pain and adequacy of administered opioid in post-operative ventilated children. This instrument was developed by Souminen et al. (2004). [15]

CONCLUSION

The majority of stages in the course of disease and intervention in children are associated with pain. Pain assessment has a key role in understanding the pain condition in critically ill children. Pediatric pain assessment requires valid and reliable tools that conform to the age and communicational capacity of children. In such patients, who are unable to communicate, the application of observable behavioral and physiological indices during pain assessment is essential.

The CAAS, FLACC, COMFORT-B, and MAP scales have been evaluated for pain assessment of ventilated children in intensive care units.Among the four major pain assessment tools, COMFORT-B is the most commonly used scale in children undergoing mechanical ventilation. It is worth noting that other tools are also effective in pediatric pain assessment and better pain management in children.Moreover, the use of pediatric pain assessment tools in ICUs is highly important and thus requires head nurses, educational supervisors, and ICU head nurses to hold educational classes on the importance of pain assessment and management in children, aiming to improve the knowledge of nurses in their departments. In addition, the application of such tools in PICUs can reduce pain-associated complications and their irreparable effects on children.

Conflict of Interest : The authors declare that there is no conflict of interest.

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The Effect of Orem's Self-Care Program on Adherence to Treatment among the Elderly Patients with Type II Diabetes in Ilam in 2018

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ABSTRACT

Introduction: Diabetes self-care program leads to higher adherence to treatment and reduction of retinopathy in the elderly. The aim of this study is to determine the effect of Orem's self-care program on the adherence to treatment among the elderly with type II diabetes.

Method: This study was a quasi-experimental intervention with control group which was done on 66 patients with type II diabetes. Data collection tools was a four-section questionnaire including demographic information, examining self-care activities, examining adherence to treatment and in the fourth section examining and recognizing Orem. Before the pretest administration, the educational intervention was done for the experiment group and one week and one month after the intervention, the questionnaire was completed by two groups. In this study data were analyzed using SPSS v.20.

Findings: the effect of intervention program was significant at the level of 5%. There was a significant difference between the average score of pretest adherence to treatment among the elderly one week and one month after the intervention (p=000). The comparison of mean scores showed that the score of adherence to treatment is significantly better in one month after the intervention compared to one week after, and better in one-week after compared to the pretest (p=000).

Conclusion: the present study shows that nurses can employ Orem's self-care program and play an important role in the adherence of patients with type II diabetes to their treatment.

Keywords: *Diabetes, Elderly, Self-care*

INTRODUCTION

Old age is a main problem of today's world[1]. The growing population of the elderly is important so far that the WHO pointed that today, a revolution in the population of the world is occurring. With a look at the statistics, the depth and severity of this issue becomes clear, as they show that about 600 million elderly over the age of 6o are living around the world, and this figure will be doubled in 2025 rising to two billion people in 2050[2, 3].

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Orem's self-care program is one of the most complete self-care theories which provides a suitable clinical guide for planning and administering self-care principles[4-6] .Self-care education for Diabetes is effective for the improvement of blood sugar, adherence to treatment and health outcomes[7, 8]. Diabetes self-care program leads to higher adherence to treatment and reduction of retinopathy in the elderly[9, 10]. Adherence to treatment is considerably associated with the need to severe care and the chance of hospitalization and acute complications (including hyperglycemia, hypoglycemic, and Diabetes mellitus) and reduces the number of visits to the doctor. Adherence to treatment generally involves costs associated with diabetes and reduces them[11].

Considering the chronic condition of diabetes and its high prevalence among the elderly and the effect of adherence to treatment in preventing the complications of diabetes, this study was to determine the effect of Orem's self-care program on adherence to treatment among the diabetic elderly patients in Ilam.

METHOD

This experimental study was conducted in ShahidMostafa Khomeini Hospital in Ilam city in 2018. The population consists of patients with diabetes. The sample size was determined as 66, according to the formula obtained from comparing the average scores (scores of self-care before and after the intervention) with $\alpha = 0.05$, $\beta = 0.10$ and $SD_1 = 3.4$, $SD_2 = 4$, $\mu1 = 14.86$, and $\mu2 = 20.73$; considering that the intervention can improve the score of adherence to treatment by 3 points. Ultimately, 72 patients were selected which included 10% probable dropping out via convenience sampling method from among the elderly with diabetes who had the inclusion criteria of the study.

The inclusion criteria includes age over 60 years, type 2 diabetes diagnosis by the physician since at least one year ago, uniform level of hemoglobin A1c in the past 30 days (obtained from patients file). The exclusioncriteria includes the diagnosis of any cardiovascular disease, being under psychiatric treatment and absencein two sessions of intervention. After obtaining permission from the research committee of Ilam University of Medical Sciences and presenting it to the authorities of ShahidMostafa Khomeini Hospital, the permissionfor conducting this study was obtained.

Data collection tool was a questionnaire consisting of four subscales. The first section about the personal characteristics(including age, sex, marital status, education level, employment status, economic status, duration of diagnosis, family record of diabetes, complications of diabetes, type of drug and history of hospitalization) was completed based on the patient's records and statements. The second part of the scale was to examine the diabetes self-care activities for which thediabetes self-care questionnaire was completed.

This is a 15-item self-report scale that examines patients'self-care criteria over the past seven days and includes various aspects of the diabetes treatment plan including thegeneral and specific nutritional diet for diabetes (5 questions), exercise (2 questions), blood sugar test (2 questions), injection of insulin or anti-diabetes pills (1 question), foot care (4 questions) and smoking (1 question), which was developed by Tubert et al. (2000). On this scale, with the exception of smoking behavior, were scoredfrom zero to one for each behavior, and the total score were obtained by calculating the scores ofall question. The total score is between 0 and 99 (poor self-care = 0 to 33, average self-care= 34-67, strong self-care 68-99)[12]. In the third part, Morisky scale was used for collecting data on adherence to treatment. The MMAS-8 drug adherence scale was developed by Morisky, Ang, Wood and colleagues (2008). The questionnaire has 8 items; only item 8 is scored based onLikert scoring (always (0), usually (0), sometimes (1), never/rarely (1). And in the rest of the items, it is scored as yes = 1 and no = 0[13, 14]. Items 5 and 8 were scored in reverse of other items. All items of the questionnaire were calculated the total score. The total range of scores was between zero and eight, in which the scores above two were taken for poor adherence to treatment, one and two for an average adherence, and a zero indicated high adherence. In the fourth section,Orem'sassessmentform including demographic features, self-care deficiencies (general self-care needs, individual care needs in terms of health deviation, and care needs for growth and development) was completed only in the experiment group.

The researcher collected data from the departments of the hospital every day. The subjects participated in the study after receiving the full explanation of the purpose of the study, and with consciousawareness. Also, it was emphasized that withdrawal at each stage of the study is allowed and on the confidentiality of the collected data was assured. The patients whose hospitalization date was in even days were put in the control group and patients who were admitted in the odd dayscomprised the experiment group. Out of 72 people, six people who did not complete the questionnaire one week and one month after the intervention were excluded from the study and 66 subjects remained (33 in the experimental group and 33 in the control group). Orem's self-care program was performed in three stages before intervention (pre-test), intervention and after intervention (the first post-test one week after intervention, and the second post-test or the follow-up one month after). The intervention program was completed in six 45-minute sessions of Orem's comprehensive self-care program over six consecutive days, in morning and evening shiftsbased on patients' hospitalization days. It was presented face-to-face and

individually, based on the needs of patient, as well as via short speech and answer-questionand showing images by the researcher. At the first session, the research tool was completed by patients (pre-test) and an overview of the Orem model and diabetes, including types of diabetes, clinical symptoms, diagnostic methods, and diabetes complications were given to the subjects. In the second session,the patient was examined based on Orem's assessment form, and nursing diagnoses and the plansfor four 45-minute sessions of intervention, including diabetes control methods, blood sugar monitoring, nutritional diet, adherence to drug therapy, eye care and foot care, and physical activity were developed. During the intervention sessions, the deficiencies of care, general care needs, individual care needs in terms of developmental and health deviations extracted from Orem'sassessmentform were taught to the patients.At the end of the last session, an educational pamphlet was provided to each member of the experiment group. One week and one month after the end of the intervention, the adherence to treatment scale and diabetes self-care scale were completed by the researcher in the experiment and control groups (the first and second post-tests). Data analysis was performed in SPSS v20 using descriptive statistics (frequency, mean And standard deviation) and inferential statistics (ANOVA with repeated measures) to compare the treatment adherence in the experimental and control groups before, one week after and one month after the intervention.

FINDINGS

In this study, 66 elderly people with diabetes entered the study and 33 patients in were placed in the experimental group and 33 in the control group. The demographic characteristics of participants are provided in Table 1.

Table 1: Demographic characteristics of patients in the experiment and control groups

Variable		Expermintal group N(%)	control group N(%)	Chi-Square
Age (year)	64-60 69-65 74-70 75-79 More than 79 years old	6 (18.18) 11 (33.33) 6 (18.18) 6 (18.18) 4 (12.12)	11(33.33) 8(24.24) 10(30.30) 1(3.03) 3(9.09)	0.155
Sex	Man Female	18 (54.54) 15 (45.45)	16(48.48) 17(51.51)	0.622
marital status	Single Married Widow	1 (3.03) 22 (66.66) 10 (30.30)	1 (3.03) 22 (66.66) 10 (30.30)	1.000
Level of Education	illiterate Elementary Tips Diploma	24 (72.72) 3 (9.09) 2 (6.06) 4 (12.12)	18(54.54) 4(12.12) 5(15.15) *6*(18.18)	.443
Duration of disease (year)	1-5 years 5-10 years old More than 10 years	11 (33.33) 13 (39.39) 9 (27.27)	11(33.33) 9(27.27) 13(39.39)	.483
The history of diabetes in the family	Yes No	23 (69.69) 10 (30.30	24(72.72) 9(27.27)	.786
Complications of diabetes	Yes No	18 (54.54) 15 (45.45)	22(66.66) 11(33.33)	.314

According to this table, there was no significant difference between the two variables in the intervention and control groupsbefore the intervention.

Table 2: Comparison of the mean and standard deviation of self-care questionnaire in three stages before, one week and one month after intervention

Stage	**control group** M(SD)	**Expermintal group** M(SD)
Before intervention	55.4848±12.41250	51.9394±10.33785
One week after the intervention	53.8485±11.61390	72.6667±9.60035
One month later, intervention	54.5455±10.98889	77.6364±8.82050

Table 3: Comparison of the mean and standard deviation of MMAS scale in three stages before, one week after and one month after the intervention

stage	**control group** M(SD)	**Expermintal group** M(SD)
Before intervention	3.7273±1.64455	4.0303±1.44665
One week after the intervention	3.0606±1.43482	1.1818±..91701
One month later, intervention	3.0606±1.36792	.1515±.36411

In order to evaluate the difference between the mean scores of adherence to treatment of elderly patients with diabetes in three stages of pre-test, one week after intervention and one month after intervention, repeated measures ANOVA was used. Initially, sphericityassumption was tested by Mauchly's test of sphericity. The results showed that sphericityassumption is not established P = 000. Therefore, the corrected variance analysis using the Greenhouse Geissertest should be used. The results of the repeated measures ANOVA for the scores of adherence to treatment withoutsphericityassumption is provided in Table 3.

Table 4: Results of repeated measures ANOVA for treatment adherence scores

Source of change	**F**	**Mean Square**	**df**	**Sum of Squares**	**P**
	30.788	110.626	1	110.626	.000
Between groups	149.082	117.964	1.589	187.434	000
Inside the group	70.604	55.867	1.589	88.768	.000
reaction		.791	101.690	80.465	
Error	83.491	94.819	1.392	128.942	.000

According to the results of Table 4, the calculated F-value for the effect of the intervention program is significant at thelevelof 5%. There is a significant difference between the mean scores of adherence to treatment at the pre-test, one week after intervention, and one month after intervention in the elderly with diabetes, as provided in the following diagram.

Table 5: Comparison of paired adherence to treatment scores

(I) factor1	(J) factor1	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
1	2	1.758*	.132	.000	1.433	2.082
	3	2.273*	.168	.000	1.860	2.685
2	1	-1.758*	.132	.000	-2.082	-1.433
	3	.515*	.108	.000	.250	.780
3	1	-2.273*	.168	.000	-2.685	-1.860
	2	-.515*	.108	.000	-.780	-.250

The results of Table 5 show that there is a significant difference between the scores of adherence to treatment in the pre-test stages with one week after the intervention and one month after the intervention. The difference between the scores one week after the intervention and the scores one month after the intervention was also significant. Comparison of the mean scores shows that the scores of adherence to treatment were significantly better in one month compared tothe scores ofone week after intervention, and the scores of one-week after the intervention is better than the pre-test stage; therefore, self-care intervention program based on Orem's model has improved adherence to treatment in the elderly with diabetes.

DISCUSSION

One of the important measures in controlling diabetes is taking the prescribed drugs. Nursing interventions improve patient health[15, 16], Therefore In this regard, the effect of Orem's self-care program on the effectiveness of this program in adherence to treatment was examined. The results showed a significant increase in adherence to drug among patients in the experiment group compared to the control group after the educational program. In this regard, the results of Murray&BajuShahin 2016 showed that diabetes self-care program in the elderly patients with diabetes improves usingmedications and prevents retinopathy[9].

The mean score of adherence to treatment was 4.0303 ± 1.44665 before the intervention, indicating an unfavorable condition of adherence to drugin the elderly with diabetes.This finding was consistent with the report of BehzadGholam Ali that drug adherence is poor in 59.4% of patients with diabetes[17].

In this study, the educational intervention was performed individually and the obtained results were consistent with the study of Leila Rafi'eiVardnejati, who has investigated the effect of multistage self-care on adherence to treatment in hemodialysis patients[18]. In the studies conducted to determine the effect of self-care education on patients, the findings show that the mean of HBA1C and FBS decreased after the intervention, indicating the positive effect of this intervention and is consistent with the results of the present study[8, 19].

CONCLUSION

The present study shows that nurses can employ Orem's self-care program and play an important role in the adherence of patients with type II diabetes to their treatment.

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A Survey of Nurses' Issues in Adopting Self-Control Behaviors in Stressful Situations

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ABSTRACT

Introduction: The aim of this study was to assess nurses' issues in adopting self-control behaviors in stressful situations.

Materials and Method: The present cross sectional study was conducted on 84 nurses in 22 Bahman and Hakim hospitals in Neyshabur were selected as research population that were selected using stratified sampling method with appropriate matching.

Results: The results showed that the mean age of participant nurses was 29. 57 (67.9%) were female and 27 (32.1%) were male. Heavy workload, lack of a consultant and advisor, and unfair discrimination between nurses in evaluations were issues with high frequency which participants mentioned in their answers.

Conclusion: Based on results if we could change the knowledge and attitudes of the managers about anxiety and stress among employees and empower them such that they could make decisions about environmental it eventually leads to improved organizational productivity through improvements in the quality of life among nurses and effects on the whole organization.

Keywords: *Nurses' Issues; Adopting; Stressful Situations.*

INTRODUCTION

Nursing profession is stressful in nature and this tension affects the quality of life and health of these professionals [1-3]. Among 130 studied professions by professional safety and health agency, nurses ranked as 27 in dealing with professional mental problems. Also, nursing is in top of 40 professions with the highest prevalence of tension associated disease [4-6]. By tuning attention and thinking processes, individuals could modify the effect of anxiety on cognitive function. When adequate self-control is achieved, people could concentrate on their work and therefore their stress level is diminished and adverse effects of anxiety will have no effect on their functioning [7-8].

Self-regulation is important in health and people are constantly guided through their behavior. Therefore, proper behavioral monitoring and tuning could be effective in achieving health and lack of this could result in health problems [9]. Semiarian (2002) states that Mayer and Salovey (2003) introduced self-control as "proper use of excitements" and believe that the power of regulating feelings leads to increased personal capacity for self-relief, understanding anxieties, depressions and common frustrations [10].

The concept of self-control in social learning theory refers to the fact that self-control as a concept is interpretable and learnable [11]. Learning self-control leads to stress and anxiety improvement [12].

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Since some stressful factors in nursing profession are unavoidable and also considering the necessity of preventing the behavioral and mental effects of stress, measures in order to improve the quality of work life and to educate the coping methods is among responsibilities of managers in health care service organizations [13-14].

Since the nature of nursing profession is full of stressful situations and considering the high incidence of anxiety among nursing staff and the importance of adopting self-control behaviors in stressful events, we aimed to assess nurses' behaviors in stressful situations and their problems in adopting self-control behaviors in such situations because if nurses fail to adopt proper self-control behaviors in face of these events, mental and psychological problems occur and the quality of their work life is diminished which lead to reduced productivity among these professionals.

METHOD AND MATERIALS

This descriptive-analytical study was conducted in order to determine the issues that nurses encounter when adopting self-control behaviors in stressful situations and solutions were suggested. Nursing staff in 22 Bahman and Hakim hospitals in Neyshabur were selected as research population and 84 nurses were selected using stratified sampling method with appropriate matching.

To construct the questionnaire in order to examine nurses' behaviors in stressful situations, 15 clinical nurses were interviewed. Two questions were asked: in which situations do you feel stressed? What would you do to control your stress?

Using the resulting items from these questions and literature review and also by use of related questionnaires such as Tanji self-control inventory and Lazarus and Folkman coping strategies questionnaire (CSQ) and the experience of research and development team, a questionnaire to assess self-control behaviors adopted by nurses in stressful events was developed.

The questionnaire for assessing self-control behaviors adopted by nurses in stressful events includes two questions: 1. when having anxiety, how often do you show this behavior? Which included 42 behaviors.

2. In order to avoid anxiety, how often do you show this behavior? Which included 16 behaviors.

After evaluating the questionnaire and making some changes including adding stress negative and coping behaviors, it was distributed among 84 participants with at least a bachelors' degree and one year of clinical work experience.

The revised questionnaire included 3 questions:

Q1: in case of anxiety, how often do you exhibit this behavior? Which included 60 behaviors with functional, mental, psychological, spiritual, continence, avoidant and escape-avoidance areas.

Q2: in order to avoid anxiety, how often do you exhibit this behavior? Which contained 15 behaviors in spiritual, accountability, individual motivational, psychological and functional areas.

For each behavior in each area, 4 options (always, often, sometimes and never) were considered with 0 points for never and 3 points for always.

Q3: which issues prevent you from adopting appropriate behaviors in order to control anxiety? Issues in executive management area included 3 questions, in educational-cognitive area included 3 questions, in communication area included 3 questions, in individual motivational area included 2 questions and in environmental and equipment area included 2 questions with yes or no options for each item. Validity was examined by content validity method and reliability was calculated as $\alpha = 80\%$.

RESULTS

The results showed that the mean age of participant nurses was 29. 57 (67.9%) were female and 27 (32.1%) were male. 62 (73.86%) were married and 22 (26.2%) were single. The majority of participants had 1-9 years of work experience. 96.3% had bachelors' degree and 3.6% had masters' degree in nursing. Remaining silent (57%), taking a deep breath (55%) and asking for help from a co-worker had the highest frequency among behaviors in functional area, respectively. in mental area, the most frequent behaviors included problem analysis (57%), problem acceptance (56%) and finding a solution. In psychological area, trying to calm down had the highest frequency (55%). In direct coping area, demonstrating emotions (52%) and anger (51%) were most frequent behaviors. In spiritual area, the highest frequency related to saying prayer (50%). In self-control area, hastily decisions (48%), in avoidant area, "I behave like nothing has happened" (42%) and avoiding

the problem (38%), and in escape-avoidance area, delegate the problem to another person (36%) were more frequent (Table 1).

Table 1: Frequency distribution of nurses' behaviors in dealing with anxiety situations in each area.

	Action	number	Frequency
Functional field	Take silence	145	57%
	Deep breath	141	55%
	Ask helping from colleagues	122	48%
Subjective field	Problem analysis	145	57%
	Problem acceptance	143	56%
	Solution creation	141	55%
Psychological field	Try to keep calm	141	55%
	Compose yourself with positive words	114	45%
	Console yourself	109	43%
Counteract field	Emotions expression	130	52%
	Anger expression	74	51%
	Work without thinking	74	29%
Spiritual field	Saying Salavat and remembrance of God	128	50%
	Praying	122	48%
Continence field	Trying not to act in hurry	122	48%
	Hasty decision	120	47%
	Loss control	109	43%
Avoidance field	I behave like nothing has been happened.	105	42%
	Put aside the problem	98	38%
	I don't do anything special to control anxiety	94	37%
Elusion field	Assign the problem solving to another person	92	36%
	Drinking coffee or tea	85	33%
	Inability to solve the problem	85	33%

In part two with questions related to anxiety prevention, the highest frequency related to trust in God (75%), in spiritual area. Familiarity with routine plans in new wards (69%) in accountability area, self-motivation (69%) and increased self-confidence (66%) in motivational area, positive thinking (69%) in psychological area and brief and regular resting (48%) in functional area had the highest frequency (Table 2).

Table 2: Frequency of behaviors adopted by nurses to prevent anxiety

field	Action	Number	Frequency
Spiritual field	Trust in God	191	75%
Responsibility field	Acquaint with routine programs of new ward	176	69%
	Trying to gain skill in my duties	174	64%
Individual motivational field	Motivate myself	163	69%
	Increasing the self-confidence	161	66%
Psychological field	Optimism	132	64%
	Relaxation	131	52%
Functional field	Short and regular resting	123	48%
	Physical health improving	123	48%

In part 3 with questions related to nurses' issues when adopting self-control behaviors, heavy workload (58%), lack of a consultant and advisor (57%), unfair discrimination between nurses in evaluations (57%) and lack of enough time (44%) were issues with high frequency which participants mentioned in their answers. Table 3 shows the frequency of issues in each area.

Table 3: Ranking of nurses' problems in adopting self-control behaviors in different dimensions

Dimensions	Problems	Number	Frequency	Rank in dimension	Rank in total
Management/ executive	Lot of works	49	58%	1	1
	Lack of counsellor and guidance	42	57%	2	2
	Inequitable and unfair distinction between nurses in evaluation	42	57%	2	2
Cognitive/ educational	Insufficient acquaintance of positive behaviors	30	35%	1	4
	Inadequate training during education	18	21%	3	9
	Lack of continuous education programs	20	24%	2	7

Cont... **Table 3: Ranking of nurses' problems in adopting self-control behaviors in different dimensions**

Individual/ motivational	Insufficient time	37	44%	1	3
	Being motiveless	21	25%	2	6
Communications	Undesirable behavior of the patient	23	27%	1	5
	Undesirable behavior of matron	19	22%	2	8
	Undesirable behavior of colleague	18	21%	3	9
Environmental/ equipment	Insufficient equipment	18	21%	3	9
	Insufficient space	17	20%	4	10

Table 4: Ranking prioritized strategies in each problem (Determining the best way based on criteria)

Row	Solution	Usage 1-5 1-5	Price 1-5	Time 1-5	Personnel satisfaction 1-5	Facilities and equipment 1-5	Work force 1-5	Total	Rank
1	Increasing knowledge of nursing managers in terms of better planning and reducing stress in the workplace	5	4	2	2	3	3	22	1
2	Use suitable color and light in the staff restroom	5	2	4	4	2	5	22	1
3	Provide appropriate space in the hospital to staff relaxation	4	2	3	4	3	5	21	2
4	Establishing a system / committee to identify the needs of staffs	5	3	3	4	3	3	21	2
5	Confer with managers to apply for a counselor or a part-time guide to attend in the hospital.	5	2	3	3	4	3	20	3

DISCUSSION

Based on the results, 13 major barriers to adopting self-control behaviors by nurses were stated and solutions were provided for each problem given the resources and the limitations in place. Suggested solutions (based on available resources and limitations) were examined in terms of practicability. Some criteria such as application, costs, time, personnel satisfaction, equipment and manpower were used for assessing the executive possibility of solutions. Then based on the highest score, the top solution was selected which was "empowering nursing managers for organizational improvement (planning for reducing work place stress) with a change in their attitudes and knowledge regarding anxiety control in employees and its effect

on the organization which leads to improvements in the whole system". Survival of every organization is highly dependent on abilities, skills, awareness, knowledge and expertise in organization especially among managers. Organizations should provide a working environment with high quality for their employees as a way of showing responsible social behavior [15].

The results of the present study showed that nurses have problems in adopting self-control behaviors. Hemati study (2005) showed that nurses have some degree of anxiety (51.4% moderate anxiety, 41.4% mild anxiety and 7.1% severe anxiety). Since in most cases, mild and moderate anxiety is controllable with special consult and training such as muscle relaxation, therefore, proving these services for health care staff could result in increased productivity [16]. In this study, the degree of anxiety was assessed and nurses' issues were not examined. The study by Rahimi et al (2004) showed high, moderate and mild tension in 44.1%, 54.1% and 8.1% of nurses, respectively. Since a high proportion of nurses have moderate tension, then solutions for coping with and avoiding occupational tension are suggested [17]. Given the results of this study, nurses have a high level of tension. In the present study, solutions for coping with and diminishing tensions were provided.

Anxiety and stress are risk factors which affect the nurses' quality of life [18]. Nurses' issues in adopting self-control behaviors were mostly managerial and administrative which in other studies, solutions have been stated to reduce stress and anxiety in this area. Khaghanizadeh et al (2008) showed that a reverse correlation exists between occupational stress and the quality of life of nurses and 81% of nurses had medium living level. Considering the results of the present study which showed higher work life quality is associated with less occupational stress, therefore, it is imperative to plan a proper training of hospital managers regarding occupational stress and work life quality [14]. Also, another study demonstrated that stress management is not only associated with personal matters but also is dependent on work environment. Along proper training methods for stress management, measures should be taken in order to reduce stress sources in organizations [19].

CONCLUSION

Therefore, if we could change the knowledge and attitudes of the managers about anxiety and stress among employees (identifying the problems and needs of the nursing staff) and empower them such that they could make decisions about environmental, motivational and structural changes and also modifications in manpower for improving the quality of work life for nurses, it eventually leads to improved organizational productivity through improvements in the quality of life among nurses and effects on the whole organization.

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Estimation of Age, in a Cadaver, by Macroscopic Examination of the Spheno-Occipital Suture

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ABSTRACT

Background: Age is a primary characteristic in the identification of the dead. The Spheno-occipital suture is a reliable indicator of a minimum age of 20 years. Macroscopic examination of the spheno-occipital suture dividing into open, semi-closed, and closed; has been developed for the estimation of age in adolescents. This technique is feasible because of its simplicity and accuracy.

Objectives: To examine the degree of closure of the basilar synchondrosis and estimate chronological age, using existing linear regression, to establish the existence of a link between suture closure and chronological age and to assess the feasibility and applicability of this technique in medico-legal practice.

Materials and Method: It is a cross-sectional study conducted on the population of Mangalore. The data was collected by measuring the length and degree of closure of the spheno- occipital suture among the 21 autopsied bodies performed in Department of Forensic Medicine, Kasturba Medical College, Mangalore. Statistical analysis was done using SPSS (Statistical package for Social Science) version 11.5.

Results: The study was conducted among **20** cadavers among which **13** were males and **8** were females. The responses are **13 (62%)** from **26-30** age group, **5 (24%)** from **20-25** age group and **3 (8%)** from **30-35** age group. It was seen that **76.92% (10)** of male sutures were closed, **15.39% (2)** were open, and **7.69% (1)** were semi-closed; **75% (6)** of female sutures were closed, and **25% (2)** were open. It was seen that in male sutures **76.92% (10)** were above **3.5 cm** in length, and **23.08 %** were above **3.0cm** and below **3.5cm**; in females **75% (6)** were above **2.5 cm**, and **25% (2**) were above **2.5cm**, but below **3.0cm**.

Conclusion: The study showed that spheno-occipital suture is an important ossification center and a reliable indicator of age in adolescents. The ossification of the Sphenoid-occipital suture shows sexual dimorphism, in characteristics like length, onset and completion of closure. However, the closure of the sphenoid-occipital synchondrosis is different races and the mean average time of closure of one race cannot denote the mean average time of closure of another race.

Keywords: *Spheno-occipital suture, Cross-sectional study, Estimation of age, Degree of closure.*

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INTRODUCTION

Age is a primary characteristic in the identification of the dead, and its estimation is of considerable importance [1]. Changing features are observed and analyzed along developmental stages analyzed to estimate the age in well preserved cadavers.

In certain cases, where only the skeletal remains of the individual are discovered, forensic anthropometry gains importance. The fusion of cranial sutures provides a fair estimate of the person's age, but aren't always reliable. The basisphenoid synchondrosis cannot be included in the class, as its fusion is a relatively reliable indicator of a minimum age of 20 years. [2]

Macroscopic examination of the spheno-occipital suture dividing into open, semi-closed, and closed; has been developed for the estimation of age in adolescents [3].

The current study is directed towards exploring the feasibility and dependability of this technique. This study targets the inhabitants of Mangalore region in the Indian population, to establish the link between suture closure and chronological age.

MATERIAL AND METHOD

Study design:

This study is a descriptive cross-sectional autopsy-based analysis of medico-legal autopsies done in the Department of Forensic Medicine of Kasturba Medical College, Mangalore.

Study sample and Inclusion Criteria:

The study was done among the dead bodies meeting the inclusion criteria among those received at District Mortuary, Government Wenlock Hospital Mortuary working in conjunction with Department of Forensic Medicine and Toxicology, KMC Mangalore. All fresh cases belonging to the age group 18-36 years, skeletonized and decomposed bodies were also included. Dismembered body remains, cases with fractures to the skull (vault, base of skull)

Statistical Analysis:

Data analysis was done using SPSS (Statistical package for Social Science) version 11.5. The data was compiled with the intention to make reasonable analysis of the spheno-occipital suture, its length and degree of closure.

RESULTS

The study was conducted on 21 autopsied bodies.

Table 1: Gender-wise Distribution of Study Samples (n=21)

Gender	Distribution
Male	13
Female	8

Table 1: Table shows the distribution of male and female study samples. It depicts the percentage of male samples **(62%)** and female samples **(38%)**.

Table 2: Age-wise Distribution of Study Samples (n=21)

Age Groups	Age Distribution
20-25	5
26-30	13
31-35	3

Table 2: Table shows age-wise distribution of the samples that were studied. Of the 21 cadavers that were studied **62 %** were of age 26-30, **24%** were of age 20-25, and **14%** were of age 31-35.

Table 3: Distribution of Study Samples According to Suture Length (n=21)

Length (cm)	Distribution According to Suture Length
2.5-3.0	6
3.0-3.5	5
3.5-4.0	10

Table 3: Table depicts the distribution of suture lengths, **48%** were of 3.5-4.0cm in length, **28%** were of 2.5-3.0cm in length, **24%** were of 3.0-3.5cm in length.

Table 4: Distribution of Study Samples According to Suture Status (n=21)

Suture Status	Distribution According To Suture Status
Open	4
Semi-Closed	1
Closed	16

Table 4: Table depicts the distribution of suture status, **76%** were closed, **19%** were open, **5%** were closed.

Table 5: Distribution of Age Against Suture Status

Age Group	Suture Status		
	Open	**Semi-closed**	**Closed**
20-25	3	1	1
26-30	1	0	12
31-35	0	0	3

Table 5: Table depicting age groups and number of sutures which were open, semi-closed, and closed in each group. In age group 20-25, 3 were open, 1 was semi-closed, 1 was closed; in age group 26-30, 1 was open, 12 were closed; in age group 31-35, 3 were closed.

Table 6: Gender Comparison for Suture Status

Gender	Fusion Status		
	Open	**Semi-closed**	**Closed**
Male	15.39%	7.69%	76.92%
Female	25%	0%	75%

Table 6: It depicts that male sutures were 15.39 % open, 7.69% were semi-closed, 76.92% were closed; female sutures were 25% open, 75% were closed, and 0% were semi-closed.

Table 7: Gender Comparison with length of Suture

Gender	Length Of Suture (cm)		
	2.5-3.0	**3.0-3.5**	**3.5-4.0**
Male	0.00%	23.08%	76.92
Female	75%	25%	0.00%

Table 7: It depicts the length of sutures of male and female samples. Male samples were seen to be longer, having no less than **3** cm; **23.08%** were 3.0-3.5 cm long, **76.92%** were 3.5-4.0 cm in length. Female samples were seen to be smaller in length, having no more than **3.5** cm; **75%** were 2.5-3.0 cm in length, and **25%** were 3.0-3.5 cm in length.

DISCUSSION

Closure of various cranial sutures have been studied and correlated with the estimation of age in the dead. [4]Of these the estimation of age by macroscopic examination of the sphenoid-occipital suture is the most feasible technique. [5] The current study was focused on studying the spheno-occipital suture, and its reliability on estimation of age, differences in various characteristics, gender-wise.

In the study it was found that the suture was open during the late teenage years and achieves partial fusion during early adulthood. Similar conclusions were drawn by Madeline L A et.al.[6]

The study showed that the suture closed completely during the end of age 25-30. These results correspond to that of Kahuna T et.al [3]. During a study conducted by Akhlaghi M et.al.[5] in an Iranian population it was seen that suture closes faster in Iranian population than in Mangalore population which is the study setting of the current study.

In the current study it was found that the spheno-occipital sutures were longer (greater than 3cm) in males than in females (lesser than 3.5cm). It was observed in the present study that sutures closed earlier in females than in males, as there were more open sutures in the male samples, and it can be attributed to sexual dimorphism and earlier onset of puberty in females as observed by Shirley N R et.al.[7]

Suggestions:

Age-at-death estimation is one of the most important feature of investigative procedure. This process can be performed using various criteria among which is included, the examination of spheno-occipital suture.

This mode of age estimation becomes important in medico-legal practice because of its accuracy, feasibility, and less time consumption.

The establishment of link between suture closure and race will provide details on the development of the suture in individuals belonging to different races and ethnicity.

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Ethical Clearance: - Institutional Ethical clearance taken

Conflict of Interest: - Nil

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Epidemiology of Burn Injuries in a Tertiary Care Teaching Hospital in South India

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ABSTRACT

Aim–To study the epidemiology of burn injuries in a tertiary care teaching hospital. **Materials and methods**-This study included 100 patients treated for burn injuries by the Department of plastic surgery. The patients were interviewed when they visited the hospital for follow-up. **Results**-The largest age group was 40-49 years(46%).The smallest age group was 18-29 years(10%).Male respondents constituted 63% of the sample.Female respondents constituted 37% of the sample.60% of respondents had secured a tertiary level of education.10% of respondents were illiterate.31% of respondents were unemployed;17% were housewives.47% of respondents were single;53% of respondents were married.50% of respondents took less than 1 month's time to get back to work;5% of respondents took more than 6 months to get back to work.

Keywords : *Burn injury, epidemiology, South India*

INTRODUCTION

A burn is a catastrophic injury to the skin primarily caused by heat or due to electricity, or contact with chemicals. Globally, burns are a significant public health problem(1). An estimated 2.5 lakh deaths occur each year from fires alone, with more deaths from scalds, electrical burns, and other forms of burns, for which global data are not available.(1)Approximately 96% of deadly fire-related burns occur in low- and middle-income countries and millions more are left with prolonged hospitalization, lifelong disabilities and disfigurements, often with resulting stigma and rejection, apart from death.The data shows children and adult women to be particularly vulnerable to burns. Burns are the 5th most common cause of non-fatal childhood injuries. Inappropriate adult supervision and child abuse are significant causes of burn injuries in children. To develop interventions, programs and models of care, identification of determinants and barriers to acceptable and optimal burn outcomes is necessity.(2) However, most of these studies were conducted in developed countries, where the incidence rate, demographic patterns of burn, healthcare financing and delivery systems are largely different from those in developing countries.(3)

Burns is a major public health problem all over the world. In fact, more people die due to burn injuries than Malaria and Tuberculosis. As per the WHO report of 2014, over 10,00,000 people are moderately or severely burnt in India every year. Data gathered from 3 major government hospitals in Delhi point to approximately 1.4 lakh people dying of burn injuries annually. This comes to one death due to burns every 4 minutes.(4) In Chennai, at the Kilpauk Medical College's burns ward alone, close to 3,000 patients were admitted in 2016. Most suicidal or homicidal burns in women in India are reported as kitchen accidents resulting from gas burst, leakage or defective burners.

METHODOLOGY

This study included 100 patients (men and women) treated for burn injuries by the Department of Plastic

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Surgery, Kasturba Medical College and hospital, Manipal, Karnataka during the period October 2017 to March 2018. The protocol approval was taken from the Institutional Ethics Committee, Kasturba Medical College and Hospital, Manipal, Karnataka. Patients above the age of 18 years who could read and write English or Kannada, were willing to participate in the study and who had sustained second or higher degree of burns were included in the study. The data collected was numerically coded in SPSS software version 16.

RESULTS

The highest fraction of respondents (46%) belonged to the 40-49 year age group. The smallest fraction of respondents (10%) belonged to the 18-29 year age group. Males constituted 63% of respondents while females constituted 37% of respondents. The highest fraction of respondents (60%) had tertiary education. The smallest fraction(10%) was that of illiterates. Regarding occupational status, the highest fraction of respondents (31%) belonged to the unemployed and the smallest fraction (17%) belonged to housewives. 53% of respondents were married. 47% of respondents were single. 50% of respondents returned to work in less than 1 month. 5% of respondents took more than 6 months to return to work. 85% of respondents had thermal burns. The category of burns with the least number of respondents was chemical burns. 95% of respondents had second degree burns. 5% of respondents had third degree burns. 91% of respondents had burn injuries on the body without face parts being affected. 9% of respondents had burn injuries on the face parts without body parts being affected. 90% of patients recovered in less than 1 year. The causes of burn injury with the highest fraction of respondents (33%) was hot liquid spill and open fire with flames. The causes of burn injury with the lowest fraction of respondents (3%) was acid spill.

Table 1. Socio demographic details of respondents.

Age 18-29years 30-39years 40-49years >50years	 10(10%) 25(25%) 46(46%) 19(19%)
Gender Male Female	 63(63%) 37(37%)

Cont... **Table 1. Socio demographic details of respondents.**

Education level None at all Primary Secondary Tertiary	 10(10%) 15(15%) 15(15%) 60(60%)
Occupation Unemployed Semi-Skilled Skilled Housewife	 31(31%) 29(29%) 23(23%) 17(17%)
Time taken to return back to work <1month 1-3 month 4-6month >6months	 50(50%) 33(33%) 12(12%) 5(5%)

Table 2. Burn characteristics of respondents.

Nature of burn injury Thermal burn Electrical burn Chemical burn	 85(85%) 12(12%) 3(3%)
Degree of burns 2nd degree 3rd degree	 95(95%) 5(5%)
Site of burn injury Face with body parts Body parts without face	 9(9%) 91(91%)
Duration of recovery <1year >1year	 90(90%) 10(10%)

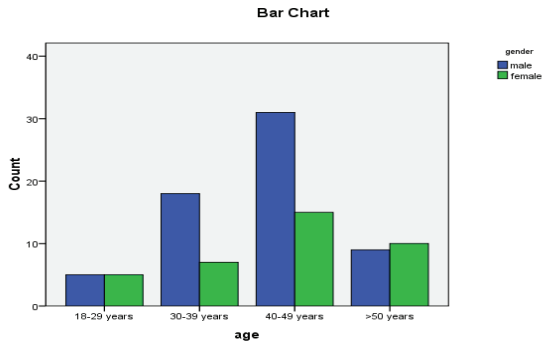

Figure 1. Distribution of age in relation to gender.

Table 3. Causes of burn injury in relation to age and gender.

Causes of burn injury	Total (%)	Age	Age	Age	Age	Gender	Gender
		18-29yrs	*30-39yrs*	*40-49yrs*	*>50yrs*	Male	Female
Stove accidents	19%	2	3	8	6	10	9
Electricity	12%	1	2	5	4	7	5
Hot liquid spill	33%	5	8	13	7	20	13
Acid spill	3%	0	2	1	0	3	0
Fire with open flames	33%	2	10	19	2	23	10
Total	100%	10	25	46	19	63	37

DISCUSSION

In the present study, 67% of respondents were male. This is similar to the results found in China by Tang et al[3],where 76% of respondents were male. It has been observed in the present study that thermal burn is the most prominent nature of the burn injury accounts for 85%.

Tripathee and Basnet, in a study with 284 patients in Nepal, found that the number of female victims was higher than the number of male victims. However,in the pediatric age group (0–15 years), the incidence of burn injury was higher in males than in females.[5] Flame burns were the commonest cause of burn injury, followed by scald burns. 54.6% of patients sustained less severe burns (<15% TBSA). Flame burn was the most common cause of burn injury, accounting for 185 cases(65.2%). Scald burn and electric burn were the other common causes of burn injury which accounted for 56 cases (19.8%) and 37 cases (13%) respectively. There were 3 cases of contact burn and 3 cases of acid burn. The incidence of flame burns was significantly higher among females whereas the incidence of electric burns was significantly higher among males. The study had 158 female patients (55.6%) and 126 male patients (44.4%) with a female to male ratio of 1.2. The most frequently hospitalized burn patients were in the age group 16–59 years, which accounted for 65.5% of patients.

Ahmad et al in a cross-sectional study conducted in Surgical Unit A of Khyber Teaching Hospital, Peshawar from July 2013 to June 2014 found that 242 patients were admitted with burn injuries in the 1 year period. The ages of the patients ranged from 1 to 91 years. 148(61.15%) patients were males and 94(38.84%) were females. Out of the 242 patients,203 sustained accidental burn injuries, while 39 sustained suicidal injuries. 64 patients(39 males and 25 females) sustained scald burns. 63 patients sustained injuries from kerosene oil. The number of patients sustaining burns from electricity, flames and gas cylinders were 37, 47, and 30 respectively. Out of a total of 94 female patients, 26 sustained injuries from kerosene oil. A mean 37.06% area was burnt in female patients, whereas 36.48% area was burnt in male patients afflicted with burns[6].

Ebenezer at al in a retrospective study conducted in Chennai on 94 burns patients admitted to the Critical Care Unit(CCU) over a period of 3 years found that 61 patients (65%) were males and 33 patients (35%) were females. A majority of the burns population, 72% (n=68), belonged to the age group of 21-50 years with a mean age of 40.50 years (SD±17.18). The Mean total body surface area involved in burns was 48.56 (SD±21.08). Thermal burns were the commonest type of burns seen in 70% patients (n=66). These included flame burns in 49% patients (n=46) and scald burns in 21% patients (n=20). 46% (n=43) patients presented to the CCU

within 6 hours post burns. Around 60% (n=56) patients had a hospital stay duration of ≤ 2 weeks. The infection rate among the patients was 62.8%. A mortality rate of 37% (n=35) was observed[7].

Nadkarni et al in a study conducted in the burns unit of the Surgery department of a tertiary care hospital in Goa, found 170 patients with burn injuries admitted in a period of 1 year. The prevalence of suicidal burns was 12.9% and that of accidental burns was 87.1%. The age group of 26-50 years accounted for 46.5% of burns patients. Females accounted for 67.1% of burns patients. 77.6% of burns patients were from rural areas. The major proportion of accidental burns were caused by "stove burst" followed by "liquid petroleum gas leakage". The total body surface area involved was higher in suicidal burns (86.4%) as compared to accidental burn injury. The major proportion of accidental burns patients (54.1%) survived and were discharged from hospital, whereas the major proportion of suicidal burns patients (86.4%) died in the hospital[8]

Ganesamoni et al in a study of 222 patients admitted for in-hospital treatment of burn injury, found that 177 patients were adults and 45 patients were <13 years of age. The female:male ratio was 1.7:1. In adults, 52.5% of burns were due to non-intentional injury and 43.9% were due to self-immolation. In patients <13 years of age, 95.6% of cases were due to non-intentional injury. The mean TBSA was 48.75%. 30.18% of patients had predominantly deep burns. The overall mortality was 60.8%. The predominant organisms colonizing the burn wound were Pseudomonas aeruginosa (81.1%) followed by Acinetobacter species and MRSA. Multivariate logistic regression analysis of factors predicting survival in patients with burn injury showed that TBSA > 30%, age > 20 years, female gender and presence of facial injury were statistically significant as predictors of risk of death. The strongest association was seen with facial injury, which increased the risk of death fourfold.[9]

Ethical Clearance- Taken from Institutional ethics committee

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Conflict of Interest - Nil

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Profile of Railway Accidents in Bellary District – A 5 Year Retrospective Study

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ABSTRACT

One hundred and thirty four railway accidents were studied over the period of 5 years between 2013 to 2017 from the autopsy done in the mortuary of VIMS, Bellary, Karnataka,India. Out of the 134 cases of railway accidents 92 cases were male and 42 were female. The majority of cases were in the 25 to 45 years age group. The manner of death was mostly suicidal of which 81 were males and 37 were females. Decapitation was the most common injury seen.

Keywords: *Railway accidents, Autopsy, Manner of death.*

INTRODUCTION

Indian railways are one of the largest transportation system in the world. The reasons for the railway deaths can be of various types. Most of the times the accidental deaths are a result of carelessness from the side of the commuters. The accidental deaths can happen due to the wrong crossing of the railway line and the unmanned railway crossing. Accidental deaths can also happen due to the passengers falling while they are carelessly standing near the door of a moving train. The accidental fall can happen while entering or alighting the train. The injuries seen in case of railway accidents are mostly as a result of blunt force impact. The suicidal injuries are most commonly decapitation injury. In the absence of details, it can be difficult to differenciate the deaths due to crossing a track, suicide, or criminal intent[1].

MATERIALS AND METHOD

The study was done from the autopsy cases done in the mortuary of VIMS, Bellary. The study was done based on the detailed study of the postmortem reports.

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RESULTS

In the present study most of the deceased were males (69%) when compared to females (31%) , the male preponderance is more in comparison to females (Table1). According to the age group the most susceptible age group is from 35 to 45 years (32.8%) followed by 25 to 35 years (26.8%) and the population below 25 years of age (18.6%) (Table2). The study shows suicide to be the most common reason for death (88%), followed by accident (11.9%) (Table3). The most common reason for death is due to decapitation (37.3%), followed by injuries to the upper extremity and thoracic cavity (27.6%), 19.4% of the population studied sustained abdominal injuries and 15.6 % of them succumbed to lower limb and pelvic injuries.

Table 1: Sex distribution

Sex	No of cases	Percentage
Male	92	69%
Female	42	31%

Table 2: Age distribution

Age in yrs	Male	Female	Total	Percen-tage
Below 25 yrs	17	08	25	18.6%
25- 35 yrs	23	13	36	26.8%
35-45 yrs	29	15	44	32.8%
45-55 yrs	18	03	21	15.6%
55-65 yrs	03	02	05	3.7%
65-75 yrs	02	01	03	2.2%

Table 3: Manner of death.

Manner	Male	Female	Total	Percentage
Suicide	81	37	118	88%
Accident	13	03	16	11.9%
Homicide	00	00	00	0

Table 4: Injuries sustained.

Injuries sustained	Male	Female	Total	Percentage
Decapitation	34	16	50	37.31%
Upper extremity and thoracic cavity injuries	28	09	37	27.6%
Abdominal injuries	19	07	26	19.4%
Lower limbs and pelvic injuries	11	10	21	15.6%

DISCUSSION

Transportation by trains have always been associated with fatalities[2]. The progress of the nation is connected with increase in the technology and the accessibility of the railways to the common population. In the present study male preponderance was more when compared to females which was seen in other studies[3]. The gender variation either signifies the male populations use of railways as a major mode of transportation or may also indicate the inability of males when compared to females to follow the safety regulations.

In many cases, injuries damaged the body and multiple body areas[3] .The present study however showed that the most common injury sustained was towards head and neck followed by upper extremity and thoracic cavity, the similar type of distribution of injuries was seen in a study conducted by wong et al (2002)[4]. Accidents were found to be the most common reason for fatality in this study which was at par with the study done by cina et al[3]. In this study even though meticulous and careful autopsy was done none of the cases were found to be homicidal in origin.

To reduce the railway accidents public awareness regarding the safety measures should be created, the government should spent more on the infrastructure which helps in creating a safe environment and a technological up gradation of the instruments used for surveillance should be done. The combination of the government facilities and public awareness can make railways safer.

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Ethical Clearance: was taken

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