ISSN-0973-9122 (Print) ● ISSN-0973-9130 (Electronic)

Volume 13 / Number 2 / April-June 2019

Indian Journal of Forensic Medicine & Toxicology

Website: www.ijfmt.com

Official Organ of Indian Association of Medico-Legal Experts (Regd.)

Indian Journal of Forensic Medicine & Toxicology

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Print-ISSN:0973-9122 Electronic - ISSn: 0973-9130

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Website: www.ijfmt.com

Editor

Dr. R.K. Sharma
Institute of Medico-legal Publications
Logix Office Tower, Unit No. 1704, Logix City Centre Mall,
Sector- 32, Noida - 201 301 (Uttar Pradesh)

Printed, published and owned by

Dr. R.K. Sharma
Institute of Medico-legal Publications
Logix Office Tower, Unit No. 1704, Logix City Centre Mall,
Sector- 32, Noida - 201 301 (Uttar Pradesh)

Published at

Institute of Medico-legal Publications
Logix Office Tower, Unit No. 1704, Logix City Centre Mall,
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DOI Number: 10.5958/0973-9130.2019.00075.6

Measurement of Cranial Capacity by CT Scan & Its Forensic Significance: A Multi Center Study

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Abstract

Craniometry is the scientific measurement of the skull applied to anthropometry and in forensic practice. The present study was undertaken with the aim to measure the cranial capacity in unknown crania and to highlight its forensic significance. The present study was conducted on 68 dry human crania, which were collected from the Department of Anatomy & Department of Forensic Medicine from different medical colleges of Rajasthan. Gender of each crania was determined by the gross classic anatomic features and the age was determined by recording the fusion of the closure of the sutures and dentition. The 3D-CT-Scan images of the crania were taken by a high resolution CT scanner to measure the cranial capacity. Total 68 crania were studied at different centers of Rajasthan and we identified 38 male crania and 30 female crania belonging to the different age groups. The maximum and minimum endocranial capacity of male dry crania was found in age group 40-50 years and 1479.89±136.17 cc in 30-40 years age group respectively. The maximum and minimum endocranial capacity in female dry crania was found in 30-40 years and <30 years age group which was 1445.7±352.16 cc and 1229 cc respectively. CT scan is a better technique to measure the endocranial capacity of unknown crania and hence it can be more useful in identification of the unknown crania.

Key-words: *Endocranial capacity, Craniometry, Unknown crania, Identification.*

Introduction

Since the cranial capacity is considered as a proxy for actual brain size, it is one of the most important variable in the study of human development. Endocranial capacity is an important factor in the study of racial trandformations. Craniometry is the scientific measurement of the skull applied to anthropometry and in forensic practice. The morphometric and non morphometric study of human skulls are very helpful for the identification of the sex and age in anthropological and forensic case work. Cranial dimensions and cranial indices are considered as simplest and most efficient way to indicate racial differences.

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Craniometry is generally conducted by gross methods on the dry crania and supplementation of conventional X-Ray techniques has been used since long. Recently CT & different radio-imaging techniques are most accepted as standard protocol for clinical diagnosis and surgical treatment, the anatomical landmarks of the skull can be established by using various methods such as direct physical measurement, X-ray , 2-D imaging technology & C.T-Scan , the 3D-C.T-scan technology enables to access cranio-facial morphometric data of both inner and outer anatomical landmarks for the craniometric study.

Material & Method

This prospective & observational study has been conducted on 68 human dry crania procured from department of anatomy & forensic medicine from different medical colleges of Rajasthan after obtaining official permission from the Principals & Controllers of respective colleges w.e.f July 2014 to Nov 2015 and

ethics committee of the institute. All the 68 human dry crania were specifically included in the study on gross classic anatomical features indicating and differentiating of age and gender respectively. Only those crania which were undoubtfully above the age of 25 years and without any anatomical deformations, fragmentations and fractures were included in the study, since the development of the paranasal sinuses get completed at the age of 15-25 years.[1]

To fulfil the aims and objectives of the study, all these craniums were categorized according to age and gender on the basis of gross anatomical features since the exact birth data were not available. Thereafter they were subjected for 3D-CT Scanning and the procedure was carried out twice to enhance the accuracy. Length was defined as maximum extensions in ventro-dorsal directions; Height as a maximal extension in cranio-caudal direction; and, width as a maximal extension in transverse (horizontal) direction.[2,3] Volume was calculated as the product of the three axis measurements i.e. Height (in mm) X Length (in mm) X Width (in mm).[1] Smith et al reported on a new method for automated extraction of in vivo measures of pediatric crania based on x-ray computed tomography scans (CT).[4] The data thus collected was tabulated in Microsoft excel worksheet. SPSS software was used for statistical assessment. Descriptive statistics were provided as mean with standard deviation (SD). Analytical assessment was done using appropriate statistical methods.

Results

Table-1: Age and gender wise distribution of skull samples

Age group (years)	Male (n=38)		Female (n=30)	
	Number	Percentage	Number	Percentage
< 30	5	13.33	4	13.33
30-40	13	34.21	10	33.33
40-50	16	42.10	8	26.66
>50	4	10.52	8	26.66

Out of 68 dry crania, in 16 dry crania (9 male and 7 female) the age group was determined by available visible suture examination due to non-availability of complete cranial vault. Maximum numbers of male, dry crania samples were in the age group of 40-50 years and that of female, dry crania were in the age group of 30-40 years age group.

Table-2: Age wise distribution of Volumetric measurements, mean, SD and P value of 31, male dry crania

Age group (years)	Number of crania	Height (mm)	Width (mm)	Depth (mm)	Endocrinal capacity (cc)
< 30	4	136.60±5.81	110.28±5.56	99.32±5.50	1504.8±204.88
30-40	8	138.92±6.33	112.79±4.42	94.21±2.25	1479.89±136.17
40-50	15	143.03±6.82	114.09±2.51	92.99±2.24	1517.8±112.51
>50	4	137.38±1.44	113.65±1.62	92.85±2.16	1488.8±26.66
P value		0.158	0.285	0.004	0.767

Table-2 shows the age wise volumetric measurements of endocranial capacity of 31 male dry crania in this study, where height and width increases with increase in age except in age group above 50 years, depth decreases with increasing age and is significant (p=<0.005). The minimum mean endocranial capacity was 1488.8±26.66 cc and maximum mean endocranial capacity was 1517.8±112.51 cc. Endocranial capacity was greatest in 40-50 years age group and minimum in above 50 years age group.

Table-3: Age wise distribution of Volumetric measurements, mean, SD and P value of 24, female dry crania

Age group (years)	Number of crania	Height (mm)	Width (mm)	Depth (mm)	Volume (cc)
< 30	1	130.40	108.60	86.80	1229.0
30-40	9	133.70±4.95	108.44±3.82	99.91±22.84	1445.7±352.16
40-50	6	135.97±12.01	110.23±4.45	91.72±1.84	1375.3±153.46
>50	8	125.04±15.29	110.70±3.44	99.56±12.21	1359.2±61.95
P value		0.303	0.648	0.681	0.777

Table-3 shows the age wise volumetric measurements of endocranial capacity of 24 female dry crania in this study, where height increases with increase in age except in age group above 50 years, width and depth shows no significant changes with increasing age. The minimum mean endocranial capacity was 1229 cc and maximum mean endocranial capacity was 1445.7±352.17 cc. Endocranial capacity was greatest in 30-40 years age group and minimum in below 30 years age group.

Discussion

The endocranial capacity is a measure of a volume of the interior of the cranium of those vertebrates who have both a cranium and brain. Endocranial capacity is widely used as a proxy for actual brain size, one of the most important variable in the study of human evolution. Different authors have used different terms for endocranial capacity such as endocranial volume, cranial volume, skull volume, cranial capacity and skull capacity. The endocranial capacity of modern man ranges between 1200-1800 cc and with an average of 1350-1400 cc. It is used as a rough indicator of the brain size (brain volume is about 150-200 cc less than the endocranial capacity). Cranial capacity is an important parameter in the study of racial differences. Cranial capacity of the female is about 11% less than that of male,[5] hence it can be used as parameter for gender determination.

The endocranial capacity attains its peak at the age of 16-20 years after going through a segmental pattern of volumetric changes, thereafter it does not change its size during rest of the life, hence we have planned this study by selecting the dry crania samples who were above 25 years on gross anatomical basis. Before the application of radiological techniques, the endocranial capacity was measured by using Broca's method, modified Welcker's method, Breitinger E. method. They used various media like Millet seeds, Canary seeds, Lentil seeds, Mustard seeds, Lead shots as filler for the endocranium after sealing the various foramina of the cranium. Their results are summarised and depicted as Table 5 and 6.

Table-4: Endocranial capacity of human skulls by different authors of different regions of the world

Year	Author	Region	Range(cc)	Mean(cc)
1926	Morant	English and Scottish Neolithic series	-	1533.0
1934	Szombathy	Lower Austria and Moravia	-	1465.0
1935	Lebzelter	Hungary	-	1390.0
1946	Hooton	Modern Australian Skulls	-	1294.0
1954	Keen	Cape coloured population male skulls	1000-1750	1355± 117.9
1962	Chaturvadi	Jaipur(India)	-	1296.6± 138.8
1966	Shukl	Kanpur(India)	1200-1457	1371.0
1984	Routal	Surat(India)	950-1520	1215±125.3
1986	Ricklan	Zulu Skulls Male Female	 - -	 1373.3±107.4 1251± 101.1
1995	Hwang	Korean Skulls Male Female	 - -	 1470±107 1317±117
2009	Shepur MP	Karnataka Male Female Male and Female	 1021-1706 1045-1515 1021-1706	 1367±127 1255±113 1329±133

Table-5: Various Volumetric measurements by different authors of Endocranial capacity Prior to C.T Scan Technology

Year	Region	Author	Method	Mean
2012	Bhopal (India)	Lalwaniet al	Mustard seeds	Male: 1302.95±108.8 Female: 1179.92±97.08
2014	South Indian Study	Murlidhar et al	Millet Seeds	Male : 1367.3 ml Female : 1255.2 ml
2014	Nigeria	Nzotta et al	Anthropometric tools	Male: 1636.59±109.94 cc Female: 1632.59±149.44 cc

In the present study we have conducted volumetric measurements in 52 dry human crania by 3D-CT Scan imaging. Out of them 31 were male and 24 were female dry crania. The minimum and maximum endocranial capacity in male dry crania was 1488.8±26.66 and 1517.8±112.51 respectively, and in the female, the minimum and maximum endocranial capacity was 1229 cc and 1445.7±352.17 cc respectively. The mean endocranial capacity in male and female dry crania was 1497.4±122.95 cc and 1390.2±228.36 cc respectively.

The endocranial capacity measured by various workers by using filler material instead of radiological techniques has been depicted in Table-5 and 6. Morant (1926), Szombathy (1934), Lebzelter (1935), Hooton (1946), Keen (1954), Chaturvadi (1962), Shukl (1966), Routal (1984) have evaluated endocranial capacity in general without any gender differentiation, and reported the minimum endocranial capacity 1215±125.3cc and maximum 1533 cc. Our study is in agreement with Lebzelter(1935), Hooton(1946), Keen(1954),

Chaturvadi (1962), Shukl (1966), Routal (1984). Ricklan (1986), Hwang (1995), Shepur MP (2009),[6], Lalwani et al (2012),[7] Nzotta (2014)[8] segregated male and female dry crania and evaluated the endocranial capacity. The minimum endocranial capacity of male and female was 1302.95±108.8 cc and ±1251±101.1cc. The maximum endocranial capacity in male and female was 1317±117 cc and 1632.59±149.44 cc respectively. Our study is in agreement with Ricklan, Hwang Shepur[6] & Lalwani et al.[7]

According to a study conducted by Shepur et al[5] at SMS Medical College, Jaipur on 150 adult skulls the endocranial capacity ranged between 1015-1670 cc with a mean of 1296.6 cc, has significant difference as compared to our study for which it is quite explainable that, out of 80 skulls measured for endocranial capacity 72.8% belong to the microcranial group, 17.3% to the mesocranial group and 9.9% belong to megacranial group in the study conducted at SMS Medical College, Jaipur.

We have come across the study carried out by using CT Scan technology in the living subjects by Shepur[6]and Nzotta.[8] The results of Shepur MP(2009)[6] are in agreement with our study since this study has been carried out in Karnataka state of India. The measurements of Nzotta(2014)[8] are higher as compared to our study since this study has been carried out in the Negro subjects in Nigeria, who has higher craniometric indices. In general the Endocranial capacity in female is about 11% less than that of male.[5] In our study the mean endocranial capacity in male and female dry crania was 1497.4±122.95cc and 1390±228.36 cc respectively, which is in accordance with Shepur MP et al.[6] Further the endocranial capacity measured by methods other than radiology by Ricklan (1986), Hwang (1995), Shepur MP et al (2009)[6] too are in accordance with our study. Kalanjati VP explained that the cranial capacity can be used to estimate the brain volume and can be correlated to the growth and development in children.[9] Manjunath studied the different methodologies to estimate the cranial volume.[10]

Conclusion

The 3D-CT Scan imaging is useful in volumetric assessment of endocranial capacity with precise measurements and greater accuracy which can act as a forensic tool for identification of skeletal remains. The Endocranial capacity of dry crania with mean±SD in males and females were 1497.4±122.95 cc and 1390.2±228.36 cc respectively. The endocranial capacity of male dry crania was found to be 10.79% higher than that of female dry crania. The present study shows that the CT scan is a better technique to measure the endocranial capacity of unknown crania and hence it can be more useful in identification of the unknown crania.

Source of Funding: Nil.

Conflicts of Interest: None

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DOI Number: 10.5958/0973-9130.2019.00076.8

A Study for Estimation of Age According to Risser's Sign in Regional Indian (Bengali) Population

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Abstract

Proof of age of a person is needed for legal purposes. In 1936 Joseph C. described the concurrence of attachment of the iliac crest and completion of vertebral growth. Since a Bengali standard bone age chart has not still been established for adolescents aged 10–25 years, especially for those over 18 years, for the evaluation of age as an aid to identification; we attempted to conduct this preliminary study on this age group in our hospital.This study was conducted on the applicability of Risser's sign for estimation of chronological age in regional Indian population. From our study conducted at Calcutta National Medical College among patients who were brought for examination of hip due to various medical reasons, 100 cases were selected randomly and we obtained the following results. As per the Risser's stages among the 100 cases, 18 cases were stage 0, 5 cases were stage 3, 17 cases were stage 4, 60 cases were stage 5. Then we correlated the stages as per Rissers's sign with the age groups in the population. We found that all cases over the age of 17-18 years were stage 4 and above except 1 case. The Chi-square test value is shown to be significant [P value is less than 0.001].We found that the mean age of achieving stage 4 in males is 16.28 and for females is 16.60, for achieving stage 5 in males is 22.03 and for females is 22.31. So, from our study we conclude that Risser's sign can be used as an adjunctive for determination of age in forensic practice.

Keywords: *Risser's sign, Pelvic Radiograph-Forensic age estimation, Indian Bengali*

Introduction

The change in degree of skeletal development is a reflection of the change in level of physiological maturation during pubertal development.[1] The chronological age is determined by using skeletal age to ascertain developmental status. To evaluate the developmental status of children and adolescents in the community, a height-weight-age table and bone age chart is used.[2]

Different ossification centers serve as maturity indicators as they tend to appear and develop regularly in a well-defined order in a definite population. Numerous methods are used to assess the skeletal maturity involving the different parts of skeleton. The methods that have been described by Tanner et al. and Greulich and Pyle are based on the hand and wrist;[3,4] the Hoerr et al. method, on the foot;[5] and the Pyle and Hoerr method, on the knee.[6] All the above-mentioned methods are used for subjects who are less than 18 years of age.

In 1936 Joseph C. described the concurrence of attachment of the iliac crest and completion of vertebral growth.[7] Many studies were conducted to assess the reliability of Risser's sign and most of them found it good.[8] Physicians who treat adolescent idiopathic scoliosis use markers that correlate with skeletal maturity to assist them in diagnosis, including chronologic age, skeletal age, and stage of development of the iliac crest apophysis (Risser stage).[9] Among these, the Risser stage is most widely used marker for skeletal maturity.

Proof of age of a person is needed for legal purposes. The level of birth registration in India is 63.8% as per

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2005 provisional national estimates, which means that out of the estimated 26 million births taking place per year, approximately 9.4 million children (36.2%) remains unregistered.[10]

To deal with child sexual abuse cases (that regards any sexual activity with a child below 18 years a crime), the Government of India has implemented in a special law, The Protection of Children from Sexual Offences (POCSO) Act, 2012.[11,12] Victims who seek justice under this act face a lot of difficulties if they don't have a proper birth certificate or other authentic documents to prove their age.

Since a Bengali standard bone age chart has not still been established for adolescents aged 10–25 years, especially for those over 18 years, for the evaluation of age as an aid to identification; we attempted to conduct this preliminary study on this age group in our hospital.

Materials and Method

The present work was conducted by the examiners of Department of Forensic and State Medicine, Calcutta national medical college, Kolkata. Study was conducted on the patients brought for X ray examination of pelvis at Calcutta national medical college digital x ray centre i.e., 1st January to 19th March 2017.Study will be conducted on the patients brought for digital x ray examination of pelvis for various reasons at Calcutta national medical college digital x ray centre

Inclusion Criteria:

1. Age between 10 and 25 years at the time the X ray was obtained

2. Good quality radiographs

3. AP spine and proximal pelvis radiographies. All subjects had stable hemodynamic

Status and normal pelvic radiograph

Exclusion Criteria:

1. congenital, endocrine or other serious diseases or who were under 25 percentiles or over 75 percentiles in weight and height.

2. Overlapping or unclear radiographs

Parameter Used:

The iliac wing is divided into quarters and is composed of the following six Risser's grades (American)

Grade 0, no ossification;

Grade 1, ossification within the first quarter (25%) of the crest;

Grade 2, ossification extending into the second quarter (25%–50%) of the crest;

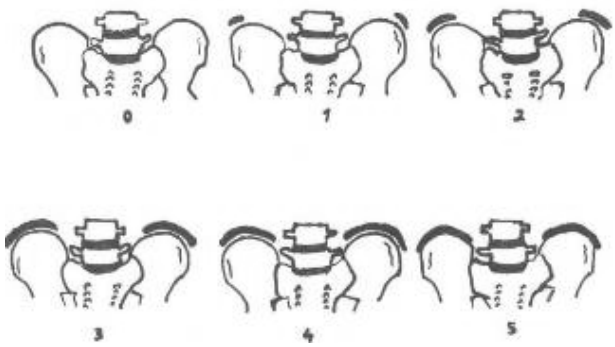
Grade 3, ossification into the third quarter (50%–75%) of the crest;

Grade 4, ossification into the fourth quarter (>75%) to completion of the apophyseal line excursion;

Grade 5, fusion of the apophyseal ring to the ilium from the start of the process posteromedially to completion.

Risser's sign is defined by the amount of calcification present in the iliac apophysis and it measures the progressive ossification from the anterolateral part to the posteromedial part.

A Risser's grade 5 means the iliac apophysis has fused to the iliac crest after 100% ossification.



Risser's grading system.

Fig.1 X-Ray plates of the pelvis showing the ossification of iliac crest

Results

From our study conducted at Calcutta National

Medical College among patients who were brought for examination of hip due to various medical reasons, 100 cases were selected randomly after considering the inclusion and exclusion criteria from age 10 to 25 years, we obtained the following results. The distribution of population was below 10 years, 6 cases; 11-12, 4 cases; 13-14, 11cases; 15-16, 9 cases; 17-18, 9 cases; 19-20, 12 cases; 21-22, 23 cases; 23-24, 18 cases; 25 and above, 8 cases, which is displayed in table 1. As per the Risser's stages among the 100 cases, 18 cases were stage 0, 5 cases were stage 3, 17 cases were stage 4, 60 cases were stage 5 as shown in table 2. Then we correlated the stages as per Rissers's sign with the age groups in the population. As shown in table 3, we can see that all cases over the age of 17-18 years were stage 4 and above except 1 case. The Chi-square test value is shown to be significant[P value is less than 0.001] as shown in table 4. From table 5, we can see that the mean age of achieving stage 4 in males is 16.28 and for females is 16.60, for achieving stage 5 in males is 22.03 and for females is 22.31.

Table 1

AGE GROUP					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	1=10	6	6.0	6.0	6.0
	11-12	4	4.0	4.0	10.0
	13-14	11	11.0	11.0	21.0
	15-16	9	9.0	9.0	30.0
	17-18	9	9.0	9.0	39.0
	19-20	12	12.0	12.0	51.0
	21-22	23	23.0	23.0	74.0
	23-24	18	18.0	18.0	92.0
	25 and above	8	8.0	8.0	100.0
	Total	100	100.0	100.0	

Table 2

Stage					
		Frequency	**Percent**	**Valid Percent**	**Cumulative Percent**
Valid	.00	18	18.0	18.0	18.0
	3.00	5	5.0	5.0	23.0
	4.00	17	17.0	17.0	40.0
	5.00	60	60.0	60.0	100.0
	Total	100	100.0	100.0	

Table 3

AGE GROUP * Stage Crosstabulation						
Count						
.00		Stage				Total
		3.00	4.00	5.00		
AGE GROUP	1=10	6	0	0	0	6
	11-12	4	0	0	0	4
	13-14	7	0	3	1	11
	15-16	0	2	7	0	9
	17-18	1	2	5	1	9
	19-20	0	0	2	10	12
	21-22	0	1	0	22	23
	23-24	0	0	0	18	18
	25 and above	0	0	0	8	8
Total		18	5	17	60	100

Table 4

Chi-Square Tests			
	Value	**df**	**Asymptotic Significance (2-sided)**
Pearson Chi-Square	147.339[a]	24	.000
Likelihood Ratio	145.058	24	.000
Linear-by-Linear Association	67.067	1	.000
N of Valid Cases	100		
a. 30 cells (83.3%) have expected count less than 5. The minimum expected count is .20.			

Table 5

Descriptive Statistics				
Dependent Variable: Age				
Sex	**Stage**	**Mean**	**Std. Deviation**	**N**
1=Male	.00	12.4167	1.37895	12
	3.00	17.7500	3.09570	4
	4.00	16.2857	2.21467	7
	5.00	22.0323	2.42877	31
	Total	18.8333	4.59183	54

***Cont...* Table 5**

2=Female	.00	11.8333	3.25064	6
	3.00	17.0000	.	1
	4.00	16.6000	1.83787	10
	5.00	22.3103	1.83427	29
	Total	19.5870	4.34397	46
Total	.00	12.2222	2.10198	18
	3.00	17.6000	2.70185	5
	4.00	16.4706	1.94029	17
	5.00	22.1667	2.14845	60
	Total	19.1800	4.47299	100

Discussion

Usually Risser's sign is used in orthopaedics for determination of scoliosis and its treatment. Its application as a tool for forensic purposes has rarely been explored. Our study which is the first of its type in Eastern Indian population, we have tried to demonstrate the importance of this sign in forensic estimation of chronological age. We have used the Rissers's grading system used in USA for our study. From previous studies done we can see that our data is in line with Schmidt et al.[13] who investigated iliac crest ossification by sonography. Diedrichs et al. assessed 515 X ray images of 154 patients between 10 to 24 years and found that mean value for US Risser's stage 5 of 17.09 years in girls and 18.03 years in boys which when compared to our data shows we can see that the mean age of achieving stage 4 in males is 16.28 and for females is 16.60, for achieving stage 5 in males is 22.03 and for females is 22.31. So a difference exists in the achievement of maturation of ossification among western and Indian population.

In contrast Izumi analysed the accuracy of Risser's sign in 89 patients and compared them to anterior posterior radiographs.[14] 42% discrepancy was found between the Risser's sign using conventional methods and posterior anterior radiographs. In our study, we did not do this as we have used only the conventional method because of better image quality and better visualisation of the iliac crest on

Conclusion

From our study, we can conclude that achievement of stage 4 and 5 in Indian Bengali males and females is significant in drawing a inference regarding achievement of age of more than 16 years and 22 years respectively. As per the recent modifications of Indian Penal Code and CrPC, 16 years has been made criminally responsible for heinous crimes. Therefore, this use of the Risser's sign can be considered to be an important adjunct in the furtherance of justice. Further studies with large multicentric populations can be helpful to standardise the parameters in forensic science and thus increase its practical applicability.

Source of Funding: Nil

Conflict of Interest: None

The current study was placed before the Institutional Ethics Committee (CNMC) and approved.

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DOI Number: 10.5958/0973-9130.2019.00077.X

CT Scan of Maxillary Sinus: A Useful Tool for Forensic Identification

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Abstract

The maxillary sinus is the largest paranasal sinus and represents a complex anatomical structure with significant inter-individual variations. Measurements of the maxillary sinuses in computed tomography (CT) scans can be used for determination of age and gender when other methods are inconclusive. This prospective study was conducted in the department of Forensic Medicine, RNT Medical College, Udaipur, Rajasthan during the year of 2014-15. The 68 human crania were collected from the department of anatomy and forensic medicine of different medical colleges of Rajasthan and the crniomatry of the right and left both maxilary sinuses were done with the help of a high resolution 3D-CT scanner. The height, width, depth and volume of maxillary sinuses were measured and the results were analyzed to conclude the usability in forensic identification. In the present study, volumes of maxillary sinuses tends to increase with increasing age, even after attaining puberty. The volume of maxillary sinus was found statistically significant ($p<0.05$) for gender identification. The volumetric parameters of both maxillary sinus were found statistically significant for gender identification.The present study shows that the 3D-CT Scan imaging is useful in volumetric assessment of paranasal sinuses with precise measurements and greater accuracy which can act as a forensic tool for identification of skeletal remains.

Key-words: *Crania, Maxilary sinus, CT Scan, Identification, Forensic Science.*

Introduction

Identification of human skeletal remains is a routine forensic procedure, which can be conclusive with determination of sex and approximate age of the individual. On the basis of comparison between antemortem and postmortem data different methods have been developed for human identification.[1-3] The identification of the human by traditional methods becomes difficult or even impossible when the corpses are severely decomposed or mutilated or charred.[4-8] The advanced radiological techniques including radiographs and CT-Scanning of paranasal sinuses can provide reliable data for the identification of the suspect, especialy in those cases where traditional methods of identification are not helpful.[9-11] Craniometry of maxillary sinuses by high resolution CT-Scan is a reliable and established technique for sex determination of the individuals, as this part of the skull remains intact even when the skull and other bones are badly damaged.[12-13]

Age estimation is one of several indicators employed to establish identity in forensic cases. On review of literature regarding anthropometric measurements of maxillary sinus for the purpose of surgical and/or forensic application, we didn't came across any method except a prospective study carried out in western Uttar Pradesh,[11] where lateral cephalograms were taken in living subjects, area and perimeter were measured using AutoCAD 2010 software for determination of gender. CT Scanning has many advantage over the conventional radiography particularly in visualising the 3D images of structures, hence in the present study, we have carried out 3D-CT imaging of maxillary sinuses to identify the CT scan as a tool for forensic identification.

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Material and Method

The present prospective and observational study was conducted in the department of Forensic Medicine RNT Medical Colleges, Udaipur, Rajasthan during the period from 2014 to November 2015. After taking the permission from the institutional committee, 68 dry human crania, which were intact and above the age of 25 years were collected from different medical colleges of Rajasthan and subjected to the 3D-CT scanning at same center in Radiology department to measure the dimensions of both left and right maxillary sinuses. The Maxillary sinus reaches their mature sizes at the age of about 20 years and hence we have selected the specimens of dry crania in this study which are above 25 years on gross anatomical basis. In this study, we have applied 3D-CT scan imaging to 68 dry crania, out of which 60 dry crania were selected for right maxillary sinus and 62 dry crania were selected for left maxillary sinus to determine various parameters of maxillary sinus like height, width, depth and volume of both sides. The data were collected in predesigned proforma and and SPSS software was used for statistical assessment. Finally the data were used to determine the gender of an individual for forensic identification.

Observations & Results

TABLE-1: Distribution of the mean, SD, and P value of Right Maxillary Sinus Parameters in 33 Male dry crania

Age group (years)	Number of crania	Height (mm)	Width (mm)	Depth (mm)	Volume (cc)
< 30	1	26.00	18.67	22.20	10.77
30-40	12	29.18±2.13	19.87±1.37	26.10±3.61	15.11±1.80
40-50	16	31.81±2.91	21.80±4.30	23.72±3.25	16.66±6.22
>50	4	31.02±0.66	21.40±2.38	23.75±1.72	15.67±0.82
P value		0.021	0.422	0.149	0.576

Table-1 shows the age wise volumetric measurements of Right maxillary sinus of 33 male dry crania in this study, where height, width and volume increases with increase in age except in age group above 50 years. The increase in volume of right maxillary sinus with increase in age was evident except in age group above 50 years with minimum mean volume 10.77 cc and maximum mean volume 16.66±6.22 cc.

TABLE-2: Distribution of the mean, SD, and P value of Right Maxillary Sinus Parameters in 27 Female dry crania

Age group (years)	Number of crania	Height (mm)	Width (mm)	Depth (mm)	Volume (cc)
< 30	4	27.43±2.19	20.02±0.61	22.72±2.49	12.40±0.76
30-40	8	28.20±3.22	18.60±1.94	22.92±2.81	12.00±2.38
40-50	7	29.98±4.28	21.37±5.42	23.41±2.29	14.23±7.97
>50	8	27.06±4.27	20.12±0.94	22.10±2.54	12.10±2.77
P value		0.915	0.385	0.796	0.764

Table-2 shows the age wise volumetric measurements of Right maxillary sinus of 27 female dry crania, where insignificant relationship were found in height, width and depth of this sinuses with increase in age. The minimum mean volume 12.00±2.38cc and maximum mean volume 14.23±7.97 cc of right maxillary sinuses in females. Minimum volume of right maxillary sinus was in 30-40 years age group and maximum in 40-50 years age group.

TABLE-3: Distribution of the mean, SD, and P value of Left Maxillary Sinus Parameters in 36 Male dry crania

Age group (years)	Number of crania	Height (mm)	Width (mm)	Depth (mm)	Volume (cc)
< 30	4	25.20±8.64	27.72±12.49	18.18±7.38	11.36±4.77
30-40	12	29.83±2.63	20.60±1.68	25.10±2.25	15.46±2.57
40-50	16	31.53±3.78	22.27±5.51	23.39±3.72	16.89±8.59
>50	4	31.02±0.59	22.22±2.37	23.02±1.22	15.81±1.09
P value		0.060	0.192	0.025	0.481

Table-3 shows the age wise volumetric measurements of left maxillary sinus of 36 male dry crania in this study, where height and width and depth shows no significant change with increase in age. Width and depth values are significant with $p<0.05$. Minimum mean volume of left maxillary sinus was 11.36±4.77 cc and maximum mean volume 16.89±8.59 cc.

TABLE-4: Distribution of the mean, SD, and P value of Left Maxillary Sinus Parameters in 26 Female dry crania

Age group (years)	Number of crania	Height (mm)	Width (mm)	Depth (mm)	Volume (cc)
< 30	2	29.37±3.07	19.52±1.24	21.65±4.88	12.30±2.28
30-40	9	27.59±3.15	20.71±7.75	20.75±6.07	11.73±3.38
40-50	7	27.48±4.53	20.98±5.08	23.71±2.74	14.65±9.02
>50	8	26.07±3.25	20.66±1.70	22.62±2.74	12.11±1.83
P value		0.654	0.990	0.592	0.713

Table-4 shows the age wise volumetric measurements of left maxillary sinus of 26 female dry crania in this study, where height decreases with age and width increases with increase in age except in age group above 50 years. Depth shows no significant variation in different age groups. The minimum and maximum volumes of left maxillary sinus were11.73±3.38 cc and 14.65±9.02 cc.

TABLE-5: Gender wise Distribution of the mean, SD, and P value of Right Maxillary Sinus Parameters

Gender	Number of crania	Height (mm)	Width (mm)	Depth (mm)	Volume (cc)
Male	33	30.59±2.78	20.95±3.29	24.54±3.01	15.79±4.55
Female	27	27.43±3.57	19.98±3.03	22.78±2.46	12.65±4.38
P value		0.00	0.241	0.017	0.009

Table-5 shows gender wise distribution of various parameters of right maxillary sinus by 3D-CT Scan. The height, width, depth and volume of right maxillary sinus was more in male than in female dry crania. The p-value of height, depth and volume were significant. The mean volume of right maxillary sinus of male was 15.79± 4.55 cc while of female was 12.65± 4.38 cc.

TABLE-6: **Gender wise Distribution of the mean, SD, and P value of Left Maxillary Sinus Parameters**

Sex	Number of crania	Height (mm)	Width (mm)	Depth (mm)	Volume (cc)
Male	36	30.21±4.30	22.31±5.66	23.33±4.05	15.68±6.21
Female	26	27.23±3.50	20.68±5.14	22.19±4.26	12.68±5.09
P value		0.005	0.248	0.287	0.047

Table-6 shows gender wise distribution of various parameters of left maxillary sinus by 3D-CT Scan. The height, depth and volume of right maxillary sinus is more in male than in female dry crania. The p-value of height and volume is significant. The mean volume of left maxillary sinus of male dry crania was 15.68± 6.21 cc while in female it was 12.68± 5.09.

Discussion

The maxillary sinus is the largest of the paranasal sinuses and at 10 weeks in utero, is the first to develop. After birth, the sinus continues to pneumatise into the developing alveolar ridge.[14] It is acknowledged that the maxillary sinuses are appearing in most individuals up to the age of five when the sinus area undergoes changes in shape and volume until the age of 18-20 years due to the development of permanent dentition, however it reaches to adult size at 15 years.[15] The Maxillary sinus reaches their mature sizes at the age of about 20 years, when permanent teeth are fully developed.[16]

In this study we have carried out volumetric measurements of maxillary sinus by applying 3D-CT Scan imaging on 68 dry crania, out of which 60 dry crania were selected for right maxillary sinus and 62 dry crania were selected for left maxillary sinus to determine various volumetric parameters of maxillary sinus, which are tabulated in table number 1-6. Table-1&3 depicts the volumetric measurements of right and left side of male dry crania, while the age wise volumetric measurements of right and left maxillary sinus in male dry crania is shown in respective tables. Our findings suggests that after the age of puberty there is no age wise changes in the volume of the maxillary sinus but after the 4-5th decade of life there is decrease in the volume of maxillary sinuses. In our study in the right side it has decreased from 16.66±6.22 cc to 10.77 cc and on left side it has decreased from 16.89±8.59 cc to 11.36±4.77 cc in male dry crania, in female dry crania it has decreased from 14.23±7.97 cc to 12.00±2.77 cc on the right and 14.65±9.02 cc to 11.73±3.38 cc on the left side, and so over all there is decrease in the gender wise volume of the maxillary sinus about 1-2 cc, which is in agreement with Hameed et al.[17] During the life shapes and sizes changes especially due to loss of teeth, then after the maximum growth period, the volume of maxillary sinuses decrease in both genders. This may be caused by the loss of minerals in the bone matrix of the entire body structure, which contracts the maxillary sinus and results in decrease in the maxillary sinus volume.[17] Similarly some workers found that volume of maxillary sinus decreases with age and agrees with our study, and they stated that this might be related to the skeletal size and physique.[18] Others reported that the volume of the paranasal sinuses increases regularly with age in both gender that disagree with current study.[19]

Statistical correlation between the maxillary sinus volume and other three dimensions viz height, width and depth has not been carried out in our study due to smaller sample size, but various workers has carried out CT scan based study of maxillary sinus in the living persons for their applied surgical aspects. According to them strongest correlation was with the width and height, while the weakest correlation was with the depth in dentate group. Height of the maxillary sinus is the primary determinant of the volume of maxillary sinus, and the depth is the second most important variable. Strongest correlated variable with the volume was the width of the maxillary sinus and the height was second.[20]

In our study, we have also carried out comparison of the volumetric measurement of right and left side of maxillary sinus in either of the gender. The results are depicted in Table-5 & 6. If dry crania with a volume range of right and left maxillary sinus 15.68±6.21 cc to 15.79±4.55 cc respectively most likely belongs to male dry crania whereas volume range of right and left maxillary sinus 12.65±4.38 cc to 12.68±5.09 cc most likely belongs to female dry crania. An MRI based study in the European population carried out by Bargouth et al[21]and he has measured the dimensions of maxillary sinus at different ages under 17 years, which are not in agreement in our study probably due to racial differences. In either of the gender the male have larger volume of paranasal sinuses. The present study shows that the male dry crania have significantly larger sinus volume than the female dry crania, which was found statistically significant in right and left maxillary sinuses with p=0.009 and p=0.047 respectively. The possible explanation of this variation is based on the physiology accordingly males tend to have correspondingly bigger lungs to support their relatively more massive muscles and body organs.[14]

Conflicts of Interest: None.

Source of Funding: Nil.

Conclusion

In the present study, volumes of maxillary sinuses tends to increase with increasing age, even after attaining puberty. The volume of maxillary sinus was found statistically significant ($p<0.05$) for gender identification. The height of both maxillary sinuses were found significant in genderwise distribution. There was no statistically significant difference in volumetric parameters of either side of maxillary sinuses. The volumetric parameters of both maxillary sinus were found statistically significant for gender identification. The present study shows that the 3D-CT Scan imaging is useful in volumetric assessment of paranasal sinuses with precise measurements and greater accuracy, which can act as a forensic tool for identification of skeletal remains.

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DOI Number: 10.5958/0973-9130.2019.00078.1

Role of Latent Palm Prints Present on Documents in Establishment of Individuality

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Abstract

Personal authentication is the key of security and reliability in society. Reliability of personal identification depends on various sources of evidences recovered from the crime scene. The evidences are recovered in several plights which carry information about the person involved in crime. Among physical evidences, impressions are considered most important clue about the individuality due to its nature. Latent palm prints which are encountered at scene of crime in form of questioned documents such as wills, property documents, official papers etc. The development of these latent palm prints not only provide conclusive identification of an individual, but also provides unique minutiae details for authentication. In this study, 80 samples including male and female were studied from Northern part of India to establish the identification of an individual through the intensification of latent palm prints present on documents. The fixed four parameters and 12 sub-parameters from this study increase the evidential value of such lateral palm prints. It can also be placed at par with fingerprints in court of law on the top of other scientific evidences.

Keywords: *Identification, Questioned documents, evidence, latent prints, individuality, etc.*

Introduction

It has been noted that Palm prints and fingerprints are equally valuable evidence. Evidential value of palm print is clear as about 30 percent of the latent recovered from crime scenes are from palms which play a vital role in the identification of an individual [(1) (2)]. The ridges are studded with sweat pores which secrete sweat. However, it must remember that while writing or preparing works of art, one cannot help touching or holding the surface or part of the hand resting on the writing surface to give support and facilitating the movement of the hand. Since Palm has raised lines and furrows having sweat pores which keeps ridges moist, and as it touches the surface, it is expected to leave their impression on writing surface [(3) (4)]. Especially when we sign, Hypothenar area of the palm comes in the contact of the surface. Since sweat is apparently colorless fluid, so the prints left behind are not visible to the naked eye; the visibility of the prints are enhanced by various methods.

This inherent relation of signatures with the lateral palm prints lead the identity & increase the reliability of questioned documents examination [(5)]. By studying the developed palm prints and obtained 12 parameters from fresh and old samples of minutiae details [(6)], it was noticed that the identification of subject is possible. Although the natural variation occurs, but parameters were capable to provide the authenticity of an individual [(7)].

In handwriting examination, If a person try to disguised his handwriting, then the class characteristics are examined, whether For the dilatation of authorship in handwriting, numerous standard signatures are required [(8) (9)].

Along with the characteristics of forgery, the culprit will also leave their latent palm prints on the document. During the development process numerous prints will be visualize [(10) (11)]. If the author is genuine, then the prints are encountered below the signature. If latent prints are not on the paper, it may be because of

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disease, weather, atmospheric, age or wearing gloves in hands. It's very rare that the latent palm print does not occur on documents and very hard to believe[12]. During examination if such conditions are faced then, the identity will be established by these parameters. Some variation in the writing which will be observed, which is the indication of genuineness.

Material and Method

When an individual write's or put their hand over the paper to support it, palm prints in latent form will transfer below to the signature on papers. All the subjects were asked to write or put their signature over the paper after a time interval to examine that an individual put their signature/ or write in analogous way or not? and identification is possible from the intensified palm prints or not?

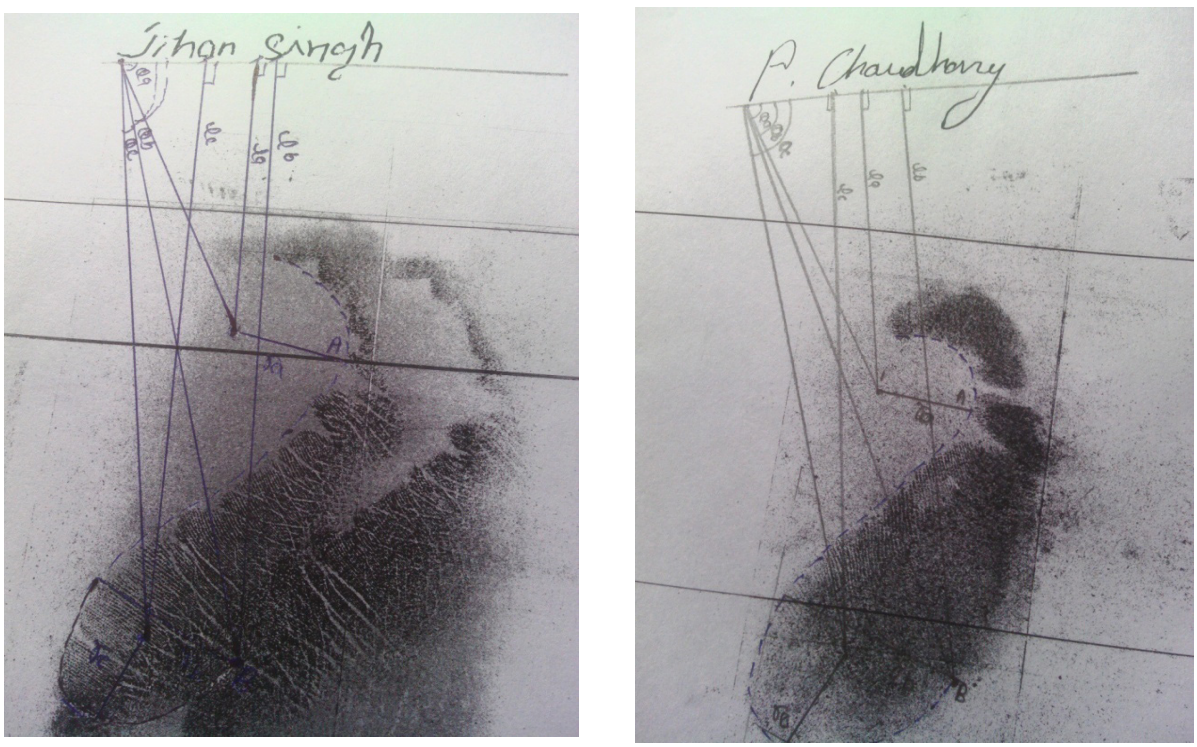
Samples collection

In this study, 80 samples including male and female from age group of 15 -55 years were studied. All the samples were collected from the loacal jaat's resident of western Uttar. All samples were selected randomly. The sample collection procedure took place in two phases named fresh and old samples. Old samples were collected in October 2012 while fresh samples were collected in March 2013. All samples were collected on the white paper sheet written by blue ball pen.

Method

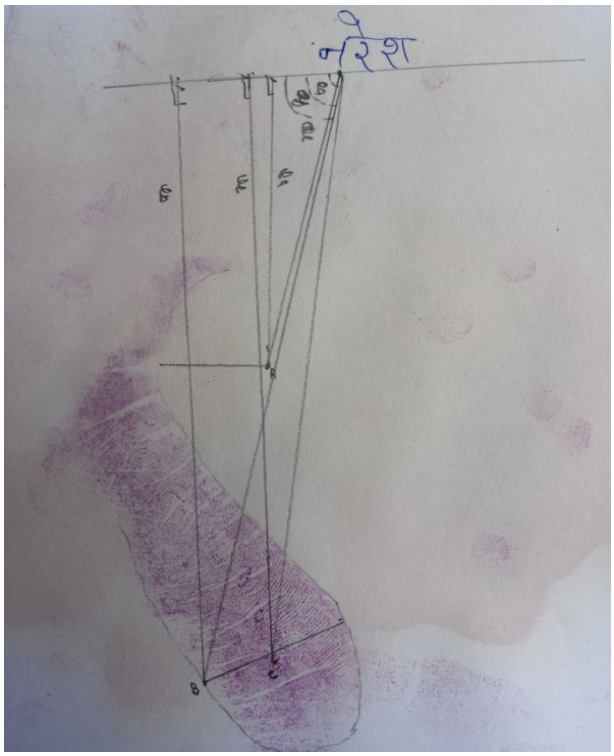
The selection criteria of all individuals were random, and consent was taken. The details about an individual such as Age, sex, Address, occupation and their educational qualification were noticed. The subjects were asked to sit on the chair at ease and to put the paper on a table which was up to the height of elbow. Then the individuals were asked to put their signatures on the sheet at calm and congenial atmosphere.

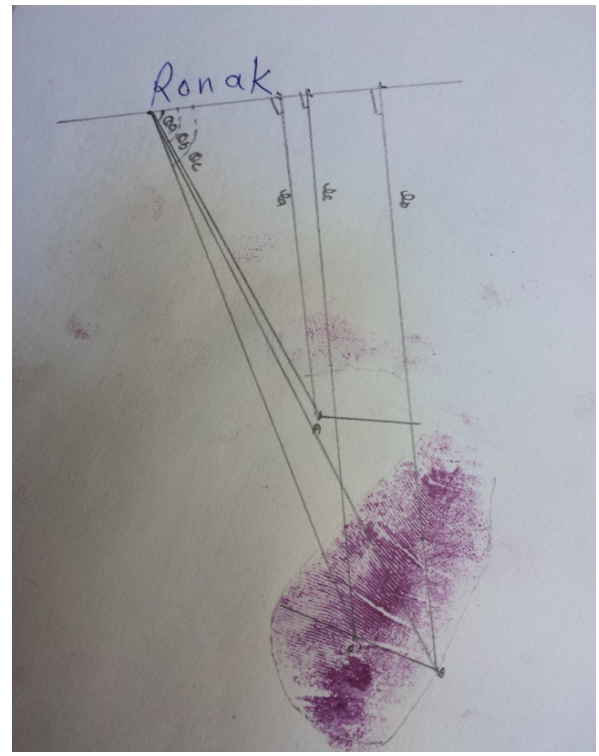
After samples collection, samples were preserved in white paper envelope to prevent paper from dust, atmospheric ingredients and other effects at room temperature. All fresh samples were treated by black powder while old samples were treated by ninhydrin method. Intensified palm prints by black powder are given below in figure no-1 & 2-



Figures 1& 2; Intensified palm prints present on documents by black powder

The intensified palm prints present on document by ninhydrin are given below in figure no.-3 & 4-





Figures 3 & 4; Intensified palm prints present on documents by ninhydrin

Statistical Analysis

Identification of an individual was based on the obtained aggregate information of the latent palm prints. Firstly, we allocated three centers of curvatures in the intensified palm prints which were correlated with line of writing, where signatures were put on [13] [14]. To allocate the center of curvature, firstly, two tangential lines were drawn, where lines intersects each other from that point a corresponding line is also drown. Now from the corresponding line up to the deepest point A, it will be the radius of centre of curvatures A. Thus, all three centers (A, B, C) and the radius of respective centers were allocated. Now a straight line along with the signatures was drawn, which will correlate palm prints with the signatures. For all the of three centers A, B, C and their radius, r_a, r_b, r_c, were measured, the angle of the centre of curvature from the line of writing θ_a, θ_b, and θ_c were taken. Inter-distance of three centers AB, BC, CA was measured, and the normal distance from line of writing of centers of curvatures la, lb, lc was determined. The correlation of these points with respect of writing's line is cumulative and measurable. It's also considered that all the obtained parameters were enough for identification of an individual [15].

For this study, paired students t- test and SPSS were used. A hypothesis was established that; H_0 will be rejected in favor of H_a.

Result and Discussion

During the observation of parameters, it was seen that the variation in the angle of center of curvature from line of writing Θ_a, Θ_b, & Θ_c is up to ($\pm 5^0$) in comparison of both samples which is due to natural variation. Angle of center of curvature from line of writings, is noticed higher in male than female, If author is left handed then the angle Θ_a, Θ_b, & Θ_c of center of curvature will be more than right handed [16] [17]. Details of sample no-1 is given below in table no.-1.

Table no. -1; Observation table of intensified palm print on document for sample no. 1.

Subject	Radius of Curvature(Cm.)				Normal distance of curvature from Line of Writing (cm.)			Angle of centre of curvature from line of writing			Inter-distance of centre of curvature (cm.)		
S.no.	r_a	r_b	r_c		la	lb	lc	θ_a	θ_b	θ_c	AB	BC	CA
Sample No.1	1.4	1.9	1.6	4.7	8.7	8.3		73	75	81	3.7	1.6	3.5
	1.2	2.0	1.5	4.7	8.5	8.0		70	73	80	3.8	1.4	3.3
Mean	1.3	1.95	1.55	4.7	8.6	8.15		71.5	74	80.5	3.75	1.5	3.4
Appro.	1.3	1.9	1.6	4.7	8.6	8.2		72	74	82	3.8	1.5	3.4

When mean values both samples of subject no. 1 were taken, it was seen that the obtained mean values of radius of Curvature (r_a, r_b, r_c) gives the significance of natural variation which is in parameters up to (±0.3cm.). In the normal distance of center of curvature from line of writing (l_a, l_b, l_c), l_a is always smaller than l_b ,l_c , and in comparison of female, obtained distances were higher in male. The variation was noted to the limit (±0.2cm). In parameter of inter distance between centre of curvatures AB, BC & CA, the distance between the centers B & C are relatively smaller than AB, CA. Inter-distance may vary, it depends on the health of subjects. These variations were observed up to the limit of (±0.2cm). Same observations were noted in other subject no. 23's samples also. The error in measured distance is within the limits of (±0.2cm), which can be attributed to instrumental error/constant error and are due to natural variation [18].

During the analysis of the remaining samples, such similarities were observed. As, it can be seen in table no.-2 given below for sample no. 23-

Table no. -2; Observation table of intensified palm print on document for sample no. 23.

Subject	Radius of Curvature(Cm.)			Normal distance of curvature from Line of Writing (cm.)			Angle of centre of curvature from line of writing			Inter-distance of centre of curvature (cm.)		
	r_a	r_b	r_c	la	lb	lc	θ_a	θ_b	θ_c	AB	BC	CA
Sample no. 23	2.1	3.2	2.4	3.0	7.2	7.5	50	55	68	5.0	1.6	4.6
	2.1	3.3	2.4	3.1	7.2	7.5	55	59	68	5.1	1.8	4.6
Mean	2.1	3.25	2.4	3.05	7.2	7.5	52.5	57	68	5.05	1.7	4.6
Approx. Mean	2.1	3.2	2.4	3.1	7.2	7.5	53	57	68	5.0	1.7	4.6

The statistical data for all fresh samples is given below in table no.-3, while the statistical analysis of old samples are given below in table no. -4.

Table No.-3; Statistical an alysis of intensified fresh samples

Subjects	Radius of Curvature(Cm.)			Normal distance of curvature from Line of Writing (cm.)			Angle of centre of curvature from line of writing			Inter-distance of centre of curvature (cm.)		
S.no.	r_a	r_b	r_c	la	lb	lc	θ_a	θ_b	θ_c	AB	BC	CA
Mean	1.8	3.0	1.8	5.5	9.9	9.7	70.5	72.5	81.5	4.7	1.8	4.2
Variance	0.15	0.17	0.07	1.10	2.36	1.41	111.99	91.24	89.59	0.24	0.30	0.27
Standard Dev.	0.39	0.41	0.27	1.05	1.53	1.91	10.5	9.55	9.46	0.49	0.55	0.52
Standard Error	0.06	0.13	0.04	0.16	0.24	0.19	1.69	1.52	1.51	0.07	0.08	0.08
Coefficient of var.	0.22	0.13	0.15	0.18	0.15	0.12	0.15	0.13	0.11	0.10	0.29	0.12

Table No.-4; Statistical analysis intensified of old samples.

Subjects	Radius of Curvature(Cm.)			Normal distance of curvature from Line of Writing (cm.)			Angle of centre of curvature from line of writing			Inter-distance of centre of curvature (cm.)		
S.no.	r_a	r_b	r_c	la	lb	lc	Θ_a	Θ_b	Θ_c	AB	BC	CA
Mean	1.8	3.0	1.9	5.6	10	9.7	73.5	76	83	4.8	2	4.3
Variance	0.11	0.19	0.06	1.07	2.21	1.49	94	89	88.7	0.25	0.29	0.29
Standard Dev.	0.34	0.44	0.26	1.03	1.48	1.22	9.69	0.47	9.41	0.50	0.54	0.50
Standard Error	0.05	0.07	0.04	0.16	0.23	0.19	1.55	1.51	1.50	0.08	0.08	0.08
Coefficient of var.	0.18	0.14	0.13	0.18	0.14	0.12	0.13	0.12	0.11	0.10	0.26	0.12

All the samples were analyzed at statistical level at 90% of confidence level. During this study, it was observed that out of 12 sub-parameters, 8 were highly significant and only 4 sub-parameters were demonstrating the level of variation. Significance level table no.-5 is given below-

Table No.-5; Significance level of the palm prints at p<0.10.

Subjects	Radius of Curvature(Cm.)			Normal distance of curvature from Line of Writing (cm.)			Angle of centre of curvature from line of writing			Inter-distance of centre of curvature (cm.)		
S.no.	r_a	r_b	r_c	la	lb	lc	Θ_a	Θ_b	Θ_c	AB	BC	CA
P -Value	-1.39	-0.46	-2.24	-0.25	-0.12	-0.28	-1.29	-1.48	-1.00	-0.17	-1.26	-0.64
T- Value	0.08	.02	0.013	.40	0.45	0.38	.09	0.07	0.015	.43	.10	.06
Significance	**Y**	**Y**	**Y**	N	N	N	**Y**	**Y**	**Y**	N	**Y**	**Y**

The observation of parameter one, all values; p-values for sub-parameters (r_a, r_b, r_c, **0.08, 0.02, 0.001 <p <0.10**) represent that it will remain same and don't change on different type of implementation of hand over any surface. While at second parameter, all values were not significant at **p <0.10.** it may be a cause of special attention during the preparation of letters, distance between writing surface, age, health issues to individual etc. Third parameter represents the significant values at 90% of confidence level. The obtained values of Θ_a, Θ_b , Θ_c (0.09, 0.07 & 0.001 < **p <0.10**) were highly significant and demonstrate that a person cannot change the way how do they put their hand over paper during preparation of work of art. The fourth parameter, is significant at two sub-parameters (**p<0.10**) while at one point, it represents the variation. The obtained values at sub-parameter AB (0.43 > p <0.10) is not significant while at two sub-parameters (BC & CA) are 0.10 0.06 <**p< 0.10** are highly significant.

Based on all the above observation, it was concluded that since human cannot work similar and represent the symbol of natural variation.

Conclusion

In this study, it was observed that when an individual writes something, along with handwriting characteristics; unknowingly lower part of the palmar surface comes in the contact of it. It's very rare that latent palm print doesn't occur on documents and very hard to believe that when we are writing, our hand/part of palm do not rest on paper. Since, the ridges have sweat glands which perspiration the sweat and the latent prints are left behind which require a careful intensification by using the appropriate method. Sometime, the smudged prints are also recovered, and identity left questionable? But from this method, the parameters and sub-parameters were capable to identify the author. Even this method could detect the forgery for the fixation the identity of individual. In a very few cases it was observed that latent prints were not on the paper that may be a cause of disease, weather, atmospheric, age or wearing gloves in hands. This method can be useful to individualize the person in forgery, smudged prints, anonymous letter and can be put on the par of other evidences. This will help to nab the suspect or minimize the number of suspects during an investigation.

Conflict of Interest: NA

Source of Fuudning; NA

Ethical Clearance: NA

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DOI Number: 10.5958/0973-9130.2019.00079.3

Medicolegal Importance of Consent in Medical Practice : A Study in Tertiary Medical Centre of Barabanki U.P.

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Abtract

Introduction: The Term consent means voluntary agreement, compliance or permission. section 13 of the Indian Contract Act lays down that two or more persons are said to consent when they agree upon the same thing in the same sense(meeting of the minds). From the times immemorial, medical practitioners played paternalistic role and were trusted with the responsibility of deciding the best treatment for their patients. With time, doctor patient relationship has changed from paternalistic to service provider and consumer type relationship. Patient being the consumer of services provided by the medical practitioner , have the right to full information concerning their diagnosis, treatment options, prognosis and possible complication.

Informed Consent is the back of Patient's Autonomy. The advancement in medical technology has further increased its importance. In the developing countries including India, general physicians play a vital role in providing health care to the patients but unfortunately majority of them are unaware about the ethical aspects of Medical Practice.

Method: Objective: To determine the level of awareness about consent among faculty members in Tertiary Medical centre of Barabanki U.P. **Period of study**: 2Month. **Material and method**: A questionaire exploring the awareness about consent was offered to the faculty member of MIMS , Barabanki U.P. **Results**: The survey revealed that 12 questionaire were given to RMP of MIMS, out of 12 questions in 7 questions more than 50% of RMP were aware of correct response and in 5 questions more than 50% of RMP were unaware of requirement /procedure obtaining consent in various clinical situations. **Conclusions**: They were aware of only those situations which are discussed and debated at various forums.

Keywords: *Consent, Patient autonomy, Medical negligence*

Introduction

"Every human being of adult years and sound mind has a right to determine what shall be done with his own body, and a surgeon who performs an operation without patient's consent commits an assault for which he is liable in damages" in a famous Judgment given by Justice Cardozo[1].Section 90 of IPC define consent in negative terms-explains that if the consent is obtained by coercion (under fear of injury), under influence, fraud, misrepresentation or misconception of fact, consent get vitiated[2].To be legally valid , it must be given after understanding what it is given for and of risks involoved [3] .Clinical Medicine is thought to be shifting towards a patient oriented contracts and in this model, a patient's right to autonomy as expressed by the term "Informed decision"[4].General Practitioner's perception about bioethics , it is apparent that although they feel that patient have right to knowledge about disease status but a high proportion of general practitioners do not consider it necessary to explain the details of the treatment advised to patients[5]. The survey was conducted on awareness among faculty members of Mayo Medical College,

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Barabanki regarding the importance of consent.

Material and Method

This prospective cross-sectional study was conducted in a Mayo Medical College and Hospital Barabanki, Uttar Pradesh is a 736 bed tertiary care hospital from August 2017 to September 2017 ; It is also a teaching hospital for medical students . The study was carried out amongst 187 RMPs including Professors, Associate professors, Assistant professors, Senior Residents and Tutors and data was collected by means of 12 Questionaire .Questions were related to the importance and requirement of proper consent in various clinical situations. Prior approval of the Institutional Ethics Committee was taken.

Results

A Total of 187 RMPs participated in the survey, out of which 67.91% (127) were male and 32.09%(60) were female. Designation wise, there were 15.50% professors, 18.72% Associate Professor, 30.48% Assistant Professor, 19.25% Senior Resident and 16.05% Tutors. Gender and Class of Respondents (Table1) and Question wise responses (Table 2).

Q.1 Consent is required in pathological Autopsy

100(53.4%) RMP knew consent is required in pathological Autopsy

Q.2 Examining the patient without consent amounts to assault

127(67.92%) Participants were well aware of importance of consent in examining patient

Q.3 Consent is Psychiatric patient is given by Guardian

140(74.8%) Clinicians were well aware

20(10.69%) RMPs gave incorrect response

27(14.44%) Do not know

Q.4 Blanket consent is consent taken at the time of admission to do any surgery.

27(14.44%) Physicians were about blanket consent

Q.5 Minimum age to Consent for organ donation for therapeutic Purpose 18 Years.

160(85.6%) were aware of age to consent

Q.6 Consent is required in case of MTP in an adult woman is only self(woman)

70 (37.43%) RMPs Answered as self

110 (58.56%) Given incorrect

7 (3.74%) Did not attempted the question

Q.7 A 20 years young male patient ,in compos mentis , presents with acute cholecystitis for which surgical intervention is planned consent given by patient only.

70(37.43%) were aware of this condition.

Q.8. In sterilization procedure consent of both patient and spouse is mandatory

90(48.13%) RMPs knew consent of both patient and spouse required.

Q.9. Minimum age of patient to give consent for routine withdrawal of blood is 12years

90(48.13%) RMPs were knew the minimum age for consent for physical examination.

Q.10 Medico legal Examination of victim of rape can be done without consent

Only 47(25.13%) RMPs were aware of Medico Legal examination cannot be done without consent victim of rape.

Q.11 A unconscious Road traffic Accident case who is not accompanied by any relative and in need of urgent below knee amputation to save his life, then the doctor can perform surgery without consent for the benefit of the patient.

137(73.26%) were aware that in emergency situation doctor can perform life saving procedure without the consent

Q.12 In India MinimumAge for Consensual sexual Intercourse For Female is 18years

137(73.26%)

Table 1: **QUESTION WISE RESPONSE**

Response	Question wise Response of participants (In%)											
	1	2	3	4	5	6	7	8	9	10	11	12
Incorrect	32.09	21.39	10.69	53.47	10.70	58.82	56.15	42.78	48.13	69.52	67.90	16.05
Correct	53.47	67.92	74.87	14.44	85.56	37.43	37.43	48.13	48.13	25.13	16.05	73.26
Do not know	14.44	10.69	14.44	32.09	03.74	03.74	06.42	09.09	03.74	05.35	16.05	10.69
TOTAL	100	100	100	100	100	100	100	100	100	100	100	100

Table 2: **GENDER AND CLASS OF RESPONDENTS**

GENDER	N=187
MALE DOCTORS	127(67.91%)
FEMALE DOCTORS	60 (32.08%)
CLASS	
PROFESSOR	29
ASSOCIATE PROFESSOR	35
ASSISTANT PROFESSOR	57
SENIOR RESIDENTS	36
TUTORS	30

Discussion

In the present questionnaire based study we observed that the most of the situations given are frequently encountered in routine practice by RMPs with only a few uncommon situations. In our study we have observed that the majority of RMPs were gave correct response to Consent of relatives is required in pathological autopsy[6] . Examining a patient without consent amount to assault Supported by report of Ministry of Health New Zealand[7].Consent in psychiatric patient is given by guardian/in charge of patient appointed by court supported by Christian P Selinger[8] .Minimum age for organ donation for therapeutic purpose is 18years[9].

Individual above 18 years of age with compos mentis can give valid consent to suffer any harm(surgery), which may result from an act not intended or not known to cause death. This is also applicable for minor surgical procedure or minor invasive procedure like routine withdrawal of blood[10].

In MTP cases consent of self is sufficient but we received majority of incorrect response from participants because they think it is a simple procedure and most of the cases are hidden[11].

Majority of RMPs were knew consent of both husband and wife required for sterilization procedure because it is commonly discussed at various seminars ,CME etc.

In our study majority of RMP were gave incorrect answer that if victims of the sexual offences cannot be examined without written consent even the court also cannot compel such cases to undergo medical examination[12] .

In emergency situation like surgery consent in life saving situation137(73.6%).section 92 of IPC that the act done in good faith for benefit of a person without consent is not and offence if the circumstances are such that it is impossible for that person to signify consent or other person in lawful in lawful charge of him from whom it is possible to obtain consent in time for the things to to be done[13] .

In our study majority of RMPs 73.26% were aware of age for consensual intercourse is 18 years and rest gave incorrect response as they were not updated regarding Criminal law (Amendment) Act 2103[14] .

Conclusion

This study was genuine endeavor to assess the knowledge of RMPs conducted in Tertiary Medical Care centre in Barabanki about ethics, consent and Medico-legal issues. Overall majority of the doctors at teaching hospital were aware of various aspects of consent in routine day practice.

Recommendations:

Medical associations should increase their participations in holding Seminars, CMEs, for the doctors to increase awareness of medico-legal issues in medical practices.

During Postgraduate implication ,thorough literature review of malpractice cases should be considered compulsory and hospital cases with possible legal implications should be discussed.

Limitation-

It was conducted in one Institute in urban setting and the study period is restricted to 2month,we cannot comment on the knowledge from private healthcare sector.

Source of Funding : Self

Conflict of Interest : None declared.

Ethical Approval : Prior clearance and Approval was taken.

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DOI Number: 10.5958/0973-9130.2019.00080.X

Recovery of Fingerprint Ridges from Crime Scene; Percentile of Actual Implemented Ridges Details in Each Quadrant and its Feasibility

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Abstract

Forensic science helps us to understand the actual value of evidences, their relationship with victim, suspect to prover their authenticity. As the crime arises, scientist and researcher come out with new scientific investigative tools to solve the crime. When the advance technology has taken over the traditional methods, yet, we rely over the manual examination process in some forensic respects such as fingerprints, questioned documents etc. Numerous studies have been carried out over the fingerprints ridge densities, gender discrimination etc. which were carried out with the help of rolled prints. While at crime scene, the prints are recovered in a few details from any part of fingers. This study was carried out to determine actual implementation of ridge details over the surface, to find out the percentage of ridges from the quartile of a finger. In this study, any kind of similarity between the ridges between male and female. As the resultant of the present study, it was observed that thumb impression, little finger impression for both of genders shows the significant difference of their presence over any surface. The ridge details show that females have highly significant lesser number of ridges in comparison of males. In both of fingers (thumb and little finger) both of genders, females have high chances in which no. of ridges may be absence. This study may be useful to get an idea about the gender and to get an idea about the finger from which it may be implemented over the object.

Keywords: *Fingerprints ridges, gender discrimination, crime scene, percentage, feasibility etc.*

Introduction

In last few decades, investigation and identification procedure to an individual has changed; the modern technology has taken over the traditional process of investigation [(1) (3)]. In this era of advancement, since the digitalization has minimized time duration of process yet [(2)], we do the final submission after manual examination in few of forensic aspects i.e. fingerprints, questioned documents etc. fingerprints and palm prints which are perpetual, unique and ubiquitous by nature, i.e. play a vital role in identification of an individual and investigation [(4) (5)]. These finger prints and palm prints carry tremendous information about suspect, gender, an approximation of the age. numerous Scientists and scholars carried out a lot of research over finger prints and palm prints over distinct populations [(6)].

As per the exists studies of scientists, these prints are recovered in various forms and only few details are noticed. When someone writes, prepare of work of art, or take the support of wall and the ridge and furrows of the palm that have sweat pores which keep them moist. Individual put their hands against the surfaces, nobody help them to support or facilitate the movement of hands and unknowingly their identity left behind over the surface in latent form [(7) (8)]. By this time, it has been observed that only a few ridges are encountered belong to any part of palmar surface [(9)]. When an individual put their hand against any surface, the outer edge of thumb, tip point of index finger, while the middle portion of

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middle finger and ring finger comes in the contact of that surface. In case of little finger, it repeats the same manner like of thumb and only outer edge details are recovered from surfaces [10]. It is frequently observed that partial information is obtained from the intensified prints and the identity left often in question.

According to a research of federal Bureau of Investigation, the probability of any similarity in two fingerprints is about $1.9x10^{15}$ which is very rare and have not reported yet. This study was conducted to obtain an information about the implementation of ridge details over any object and to determine the portion of any finger [11]. Will the implementation give any discrimination between two genders? Or both of genders will have equal probability for implementation of their fingerprints ridges over any surface. For which all the ten fingerprints were divided in to four quadrants (1st, 2nd, 3rd and 4th quadrant) from the center of pattern because of any occurrence of ridge, only middle portion is recovered.

Methodology

In this study, 100 samples including male and female were collected from the population of Jharoda, Najafgarh areas of Haryana from the age group 18-35 years. All the samples were collected from March -April 2017 at the temperature in between 18-35^0 C. All the subjects were informed about the purpose of study and consent was taken earlier. Samples were collected by simple random sampling method [12]. All the samples were preserved in simple A4 size Brown envelope at room temperature to avoid any kind of degradation such as moisture, dirt. To determine the percentile of samples, each fingerprint samples were divided into four quadrants from the center of pattern. Shown below in figure-1.

Figure 1: fingerprint divided in to four quadrants from the center of pattern.

Material

All lateral fingerprints were collected on white A4 sheet by applying black fingerprints ink over the fingers. Subjects were asked to implement their fingerprints as such as it is put over any documents without following any specific manner. All the samples were preserved for further analysis procedure. For examination of sample, 10 X lens was used and all samples were photographed with the help of Samsung 7s model -13 mega-pixel camera. For statistical evaluation SPSS software latest version 17.0 was used. A hypothesis was established for the conclusion of result whether, the occurrence of all quadrants will implement in equal proportion or only a few ridges from any quadrant will present.

Result and Discussion

This study is mainly focused to study the occurrence of quadrant of fingers which is confronted at scene. When a left- handed person takes support of wall, write over a writing surface or prepare work of art, the outer edge of thumb (2nd & 4th quadrant) comes in the contact of surface [13][14]. While in Index finger, all four quadrants have equal chance of occurrence, in Middle finger, ring and little finger have equal proportion of occurrence. The proportion of a male left-handed person's ridge details are given below in table No.-1 below-

Table No.1: Male fingerprints ridge detail from each quadrant of left hand.

Male Left- Hand Finger prints																				
	Thumb				Index				Middle				Ring				Little			
Qudt.	1 Qd	2 Qd	3 Qd	4 Qd	1 Qd	2 Qd	3 Qd	4 Qd	1 Qd	2 Qd	3 Qd	4 Qd	1 Qd	2 Qd	3 Qd	4 Qd	1 Qd	2 Qd	3 Qd	4 Qd
Total	2	50	3	50	50	42	50	42	50	48	50	48	50	50	50	50	49	43	48	43
%	4	100	6	100	100	84	100	84	100	96	100	96	100	100	100	100	98	86	96	86

When the male individual is right-handed, in that case the chances of a finger quadrant occurrence changes. During the study of ridge detail of a thumb prints, the quadrant (1st & 4th) have most probability of occurrence while in rest of finger it is almost similar. The ridge details for a right -handed subject is given below in table no-2.

Table No.2: Male Fingerprints ridge detail from each quadrant of right hand.

Male Right hand fingerprints																				
Qudt.	Thumb				Index				Middle				Ring				Little			
	1 Qd	2 Qd	3 Qd	4 Qd	1 Qd	2 Qd	3 Qd	4 Qd	1 Qd	2 Qd	3 Qd	4 Qd	1 Qd	2 Qd	3 Qd	4 Qd	1 Qd	2 Qd	3 Qd	4 Qd
Total	50	1	50	1	41	50	41	48	50	50	47	50	50	49	49	48	49	48	47	48
%	100	2	100	2	82	100	82	96	100	100	94	100	100	98	98	96	98	96	94	96

During this study, it was observed that the females have similar number of ridges in thumb as the males had. Composure of the fingers have a slight bit variation present in the male study. The dossier for left-handed female is given below in table no.-3

Table No.3; Female fingerprints ridge detail from each quadrant of left hand.

Female Left-hand fingerprints																				
Qudt.	Thumb				Index				Middle				Ring				Little			
	1 Qd	2 Qd	3 Qd	4 Qd	1 Qd	2 Qd	3 Qd	4 Qd	1 Qd	2 Qd	3 Qd	4 Qd	1 Qd	2 Qd	3 Qd	4 Qd	1 Qd	2 Qd	3 Qd	4 Qd
Total	1	50	1	50	48	44	47	46	50	47	50	48	48	47	47	50	45	45	47	45
%	2	100	2	100	96	88	94	92	100	94	100	96	96	94	94	100	90	90	94	90

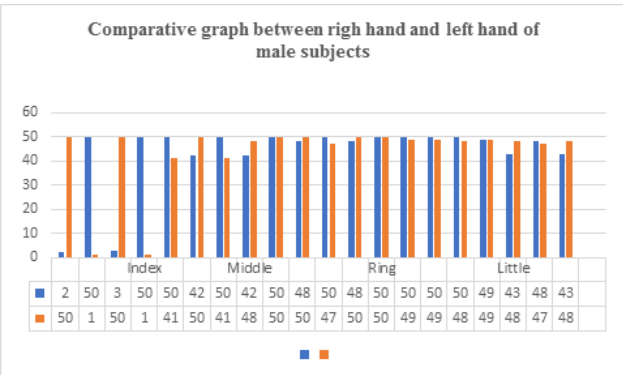
The dossier for right-handed female has some similarity like of right-handed males. The details are given below in table no-4-

Table No.4; Female fingerprints ridge detail from each quadrant of Right hand.

Female Right -hand fingerprints																				
Qudt.	Thumb				Index				Middle				Ring				Little			
	1 Qd	2 Qd	3 Qd	4 Qd	1 Qd	2 Qd	3 Qd	4 Qd	1 Qd	2 Qd	3 Qd	4 Qd	1 Qd	2 Qd	3 Qd	4 Qd	1 Qd	2 Qd	3 Qd	4 Qd
Total	50	1	50	0	45	47	49	47	47	49	46	50	49	47	48	50	43	49	44	46
%	100	2	100	0	90	94	98	94	94	98	92	100	98	94	96	100	86	98	88	92

According to this study, the males of both of handed show 100% chance of higher probability of ridge details in 2nd and 4th quadrant of left hand's thumb while less probability in 1st and 3rd of right hand's thumb [15]. Whereas, only 4% population showed the presence of ridge details of fingerprints in 1st quadrant of thumb and only 6% population showed the presence of ridges in 3rd quadrant of thumb. For index finger, male showed 100% presence of 1st and 3rd quadrants whereas 6% population showed the absence of ridges in 2nd and 4th quadrant. In analogous manner, middle finger's ridges showed 100% presence in 1st and 3rd quadrants present in the whole selected samples whereas only 4% population showed the absence of the 2nd and 4th quadrants. The ring finger shows the similar percentage of ridges as in middle finger, it was 100% of all the quadrants were present in the ring finger while for little finger 2% for 1st quadrant, 14% for 2nd quadrant, 4% for the 3rd and 14% for the 4th quadrant showed the absence, in the left hand.

In the dossier of right-handed males, the percentage was only 2% in 2nd and 4th quadrant of samples in thumb while for 1st and 3rd quadrant 100 % occurrence was observed. For index finger, the presence of ridges in 1st & 3rd quadrant was 82% while in 2nd 100% ridges were present and in 4th quadrant 4% ridges were absence. In case of middle finger, 100% ridge details were observed in 1st,2nd and 3rd quadrant while in 4th quadrant only 6% ridges were absence. In 1st and 3rd quadrant of ring finger showed the presence of 100 % ridge details while in 2nd and 4th only 4% were absence. For little finger of right handed males, in 1st quadrant 2% ridges were absence while in 2nd and 4th quadrant shows 4% of absence and 6% ridges were absence in 3rd quadrant of fingers.

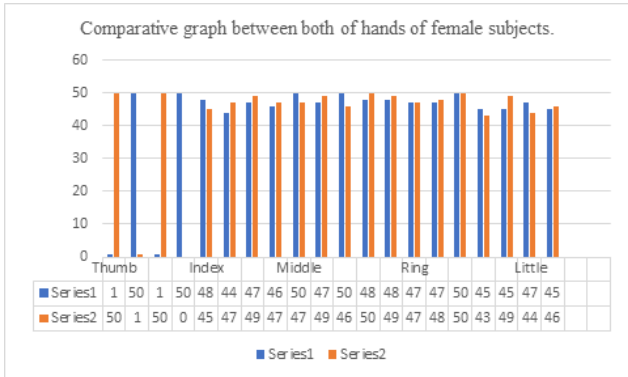


Graph1: the comparative study between both of hands of male subjects.

According to the dossier of this study, there is 100% chance of showing higher probability of ridge details in 2nd and 4th quadrant of the left hand's thumb while less probability; 2% only in 1st and no occurrence of 3rd quadrant of the Left hand's thumb. For index finger, male showed 96% & 94% presence of ridges in 1st and 3rd quadrants whereas 12% and 8% population showed the absence of ridges in 2nd and 4th quadrant. In analogous manner, middle finger's ridges showed 100% presence in 1st and 3rd quadrants present in the whole selected samples whereas only 6%, 4% population showed the absence of the 2nd and 4th quadrants.

The ring finger distinguish percentage of ridges as in middle finger, it was 96% for 1st quadrant, 94% for 2nd and 3rd quadrant and 100% for 4th quadrant. For little finger 10% for 1st quadrant, 10% for 2nd quadrant, 6% for the 3rd and 10% for the 4th quadrant showed the absence, in the left hand.

In the dossier of right-handed females, the percentage of ridges were; 98% and 100%% in 2nd and 4th quadrant of the samples in thumb while for 1st and 3rd quadrant 100 % occurrence was observed. For index finger, the presence of ridges in 1st & 3rd quadrant was 90% & 98%% while in 2nd 90% ridges were present and in 4th quadrant 90% ridges were present. In case of middle finger, 94%, 98% and 92% ridge details were observed in 1st,2nd and 3rd quadrant while in 4th quadrant 100% ridges were present. In 1st and 3rd quadrant of ring finger showed the presence of 98 & 96% % ridge details while in 2nd and 4th only 2% and 8% were absence. For little finger of right handed males, in 1st quadrant 14% ridges were absence while in 2nd and 4th quadrant shows 2, 12%% of absence and 8% ridges were absence in 3rd quadrant of fingers.



Graph2: the comparative study between both of hands of female subjects.

Conclusion

Fingerprints, palm and sole prints are used to establish the identity of an individual since so long

in the history of investigation [16]. Implementation of tremendous change in traditional methods and advancement has changed the investigation procedure of crime scene. A lot of studies have been carried out for the gender discrimination over various population in India, although these studies dealt with the information obtained from the tip of fingers while at scene of occurrence only a part of prints is encountered [17]. Often, the outer part of thumb impression and inner part of index finger is encountered in various forms are observed. If the ridges are examined carefully and the investigator could determine the hand/ finger to which the ridges belongs, it will be helpful for investigation and no suspect will be able to escape from nabbing. Identification can be done based-on minutiae details among the ridges selected in an area followed by international standard. It will be further help the analysts to direct search a particular gender will eventually save the time of investigating officer.

Conflict of Interest; NA

Source of Funding: NA

Ethical Clearance: NA

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DOI Number: 10.5958/0973-9130.2019.00081.1

Cheiloscopy: A Lip Print Study

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Abstract

Introduction: Cheiloscopy is a study of pattern of lines on the red part of human lips, which are unique for each individual, just like the other identification methods e.g. finger print and teeth and bite mark etc. It can be very supportive in crime scene investigation when probability of retrieving other evidences is sparse. Apart from personnel identification, lip prints are also known to fix the gender of an individual.

Aim: The aim of the present study was to document varieties of lip prints along with an objective of deciding its uniqueness in terms of identification of an individual.

Material and method: This study was conducted on 200 medical students of Parul Institute of Medical Sciences and Research, Parul University, Vadodara, Gujarat. In which 100 male and 100 female medical students were included. The lip prints were obtained by application of lipstick evenly on both lips, prints were obtained on thin bond paper and on plain glass slide. Lip prints obtained on plain glass were retrieved and matched with the first one by two examiner to identify each person on the basis of it.

Result: Lip prints of 187 of 200 individual were correctly matched, thus identification of the person was successful in maximum students.

Conclusion: The study revealed that the lip prints of the maximum experimental subjects matched with the individual. So it was concluded that lip prints behold the potential of fix the identity of a person.

Keywords: *Lip prints, Identification, Forensic science, Cheiloscopy.*

Introduction

Identification means fixation of individuality of a person on the basis of physical and behavioural characteristics. It is required not only for personal, social, educational, job and legal reasons but also for the birth and death registration. The traditional methods include primary, secondary and comparative data, out of which most common method of identification is dactylography. Usage of different methods is depending upon the availability of the type and nature of evidences in context to crime scene investigation. In cheiloscopy 'Cheilos' means 'lips' and 'Scopy' means 'to examine', so cheiloscopy is the study of the lip prints or the pattern of lines present over them.

Lip prints are permanent, unique and do not change during the entire life of a person[1]. They are recoverable if there is any alteration due to trauma, inflammation or diseases like Herpes etc. They remain unaffected

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by environmental factors[2]. The lip prints of parents and children and those of siblings have shown some similarities but never identical except in monozygotic twins[3]. They are identifiable as early from the sixth week of intrauterine life. It has also been found that there is similarity in pattern among males and females which could help not only in personal identification but also in sex determination[4, 5].

Lip prints were described for the first time in 1902 by Fisher[6] .In 1950, Le Moyne Snyder, a forensic expert suggested the concept of wrinkles in lips to identify people in his book entitled "homicide investigation". He is also called, 'The Father of Cheiloscopy'[7.] There are so many classifications provided by the many research personals for example – Martin Santos classification (1966)[8], Suzuki and Tsuchihashi classification (1970)[9], Renaud's classification (1973)[3], Afchar – Bayat classification (1979)[3], Kasprzak classification[6] and Classification of lips based on their thickness etc. The area is called Klein's zone which is covered with wrinkles and grooves that form a characteristic pattern called lip print [10].

The grooves present in the zone of transition of human lip, between the inner labial mucosa and outer skin on human lips (Sulci labiorum) are unique to each person and can be used to determine identity [11]. It is interesting to note that the use of lip prints is dispensable. Ball states that the vermilion border has minor salivary glands and the edges of the lips have sebaceous glands with sweat glands in between[12]. Thus, one may assume that secretions of oil and moisture from these enables development of 'latent lip prints' analogous to latent fingerprints in most crime scenes where close contact between the victim and culprit has occurred[13].

Forensic science has developed up to an extent where retinal scans are being used for identification. Lip prints can be very useful in crime scene investigation when probability of retrieving other evidences like fingerprints or blood for DNA analysis is sparse. Traces of lip prints can be found over multiple things like utensils, walls, clothes, glass, papers and cigarette buds.

Material and method

Materials

A dark coloured lipstick

White bond paper

Simple glass slide

Cellophane tape

Magnifying lens (10X type)

Starch powder modified by adding black colour powder.

Method

This study was carried out at Department of Forensic Medicine, Parul Institute of Medical Sciences and Research, Parul University, Vadodara, Gujarat after obtaining approval from Institutional Ethical Committee. All the participants were briefed about the purpose of the study and written informed consent was obtained from each individual. This study was conducted on 200 subjects, which includes 100 males and 100 females, in age group of 18-21 years. Subjects who were having congenital lesions, defects, diseases and injuries over the lips and persons with known hypersensitivity to lipstick were excluded.

The lipstick was applied by the investigators with a single straight motion, evenly on the lips. The subject was asked to rub both the lips smoothly to spread the lip stick. After few minutes, first lip impression was taken directly on folded white bond paper to record the pattern of the lips and second lip impression was taken on the simple glass slide, modified starch powder was then spread on the taken lip prints, excess powder was blown out with the help of empty syringe and lip prints from glass slide were developed / preserved and transferred on another bond paper and cellophane tap applied over it.

In this study, we followed the classification of patterns of grooves on lips as per Suzuki and Tsuchihashi .(Table -1) (Image -1) [14] (Image - 2 and 3)

Table-1. Suzuki and Tsuchihashi Classification of lip prints

Type I	Clear cut vertical grooves that run across the entire lips
Type I'	Similar to type I but that do not run across the entire lip ends half way
Type II	Branched groove (branched y pattern or fork type)
Type III	Intersected grooves
Type IV	Reticular grooves
Type V	Undetermined

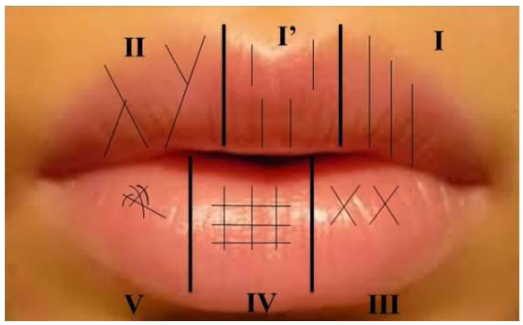

Image -1:- Suzuki and Tsuchihashi Classification of lip prints

Image -2:- Lip print

Image -3:- Lip print

Each lip print was divided into six quadrants as Upper Right (UR), Upper Middle (UM), Upper Left (UL), Lower Right (LR), Lower Middle (LM) and Lower Left (LL). Different patterns were counted by using 10X magnifying glass in each part of every print of all 200 subjects and data tabulated for each participant. The same method was applied on reserved lip print patterns. To avoid bias, all the lip prints were analyzed and interpreted by two examiners individually to determine the identity of the individual. Because of numerically superiority of properties of the lines in the middle part of lower lip is taken into account (10 mm wide), this fragment was selected for the study area and as well as this portion is always visible in any trace. If more than one pattern predominates it is typed as undetermined.

The anthropometric landmarks also do present on the lips like –

Cheilion - most lateral points of oral opening.

Labrale superius - highest point of upper lip margin in mid sagittal line.

Stomion - contact point of upper and lower lips in mid sagittal line.

Labrale inferius - lowest point of lower lip margin in mid sagittal line[15].

Results:-

At the end of study we observed the below mentioned things -

Every lip print is not only different but also unique for each person.

No two lip prints were matched with each other.

Out of 200 subjects 187 subjects were correctly identified out of which 92 were males and 95 were females. r=1 (r denotes Pearson's Correlation Coefficient). It indicates there is highly significant correlation between person's identification among males and females. (Table -2)

Most common pattern of lip print was Type IV – 58 students (29%) followed by Type I - 39 students (19.5%). Least common pattern of lip print was Type V – 14 students (7 %). As far as gender is considered Type I' – 27 and Type II – 24 were common in females and Type IV - 58 was found common in males. (Table -2)

Table-2. Types of lip print and their frequency

Type of lip print	Males	Females	Total
Type I	10	18	28(14 %)
Type I'	12	27	39(19.5%)
Type II	17	24	41(20.5%)
Type III	13	07	20(10 %)
Type IV	41	17	58(29%)
Type V	09	05	14(7 %)

Discussion

Identification is must for unknown deceased person whether death is natural, unnatural as a result of bomb blast, earth quack or any mass disaster, etc., and for living individual who are missing or criminal to decide their fate. If it would become possible to store ante mortem data of lip prints of all individual later on it can be used for matching the details when identification is in question[2]. The F.B.I. and the Illinois State Police consider that lip prints are unique like fingerprints and are a positive means of identification [16].

Osama et al conducted a study on the duration and reliability of lip prints as physical evidence at scene of crime. They concluded that the lip prints on white paper are reliable for up to 12 weeks and on glass for up to 6 weeks if exposed to surrounding ambient condition[17].

Singh signify that vermilion and indigo being natural, non-toxic and cost effective can replace the already existing chemical reagents like Sudan black, Sudan III, oil red O, Nile red, as the ability of these natural dyes to develop recent lip prints are comparable to Sudan black[18]. The print taken is directly photographed or covered by a cellophane tape to maintain a permanent record. Nowadays, Softwares are being used for the recording of lip prints.

Dongarwar et al concluded that the lip prints of all the experimental subjects did not match with each other but able to convey that lip prints behold the potential of determination of the sex and identity of the person[19].

Shenoi Remya and Nadankutty found that majority of the study population belonged to Type IV (26%) and Type I' (23.5%) ranking next. Type V (7.5%) was the least type of lip print in the present study group. Type II (33%) was common in females and Type IV (38%) was common in males which was statistically significant in determining the gender[20].

Kannan S, Muthu K, Muthusamy S, Sidhu P also suggested the same thing that Cheiloscopy can be used in par with other standard methods of crime investigation in future[21].

Demerits with lip prints

The print is traced manually which causes problems in reproduction and introduces some subjectivity at the time of the comparison.

The Lip print pattern is on the vermilion border, which shows a little bit movement and lip prints may differ from original according to the pressure used, direction of movement and method used in taking to developing the print.

If lip stick is not used evenly or properly over the lips, may affect the printing pattern.

Also other factors as pathological conditions suppose to be kept in mind like Lymphangiomas, Congenital Lip Fistula, Lip Scleroderma, Melkersson – Rosenthal syndrome, Syphilis, Lip Cheilitis etc. can invalidate the cheiloscopic study[22].

Conclusion

The study has concluded that cheiloscopy hold the potential to identify an individual because of their uniqueness. As lip prints are signature mark for an individual for life time, it may be used as a record of an individual along with the fingerprints and other data. However, much more areas needed to be explored in regards to cheiloscopy. Inclusion of lip prints within existing biometric system based on fingerprints or iris scan can be the upcoming era to fix the individuality.

Conflict of Interest: - The authors declare that they have no conflict of interests.

Source of Funding: - All funding was done by authors only.

Ethical Clearance: - Ethical clearance was taken from the Parul University – Institutional Ethical Committee for Human Research (PU-IECHR),

Vadodara, Gujarat, in advance before starting of the study.

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DOI Number: 10.5958/0973-9130.2019.00082.3

Demographic Profile of Pesticide Poisoning Cases in SAIMS, Indore

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Abstract

It was a prospective study conducted at Shri Aurobindo Medical College, Hospital, Indore during 1st January 2012 to 20th August 2013. Total 110 cases were studied with the history of pesticide poisoning. 10 cases were excluded as they were LAMA after 1-2 hrs of admission. Data were obtained from case sheet record of patient. Demographic data of patient was collected by taking interview of them. Verbal consent of patient was taken for research without disclosing their names.

Most of the peoples in India are dependent on agriculture for their lives. Worldwide pesticide poisoning cases are very common. Malwa region the surrounding area of Indore is rich in agricultural land and villages all over. Many pesticide producing industries are present in Indore region. So pesticides area easily available in this area. The aim of this study was to collect the data of poisoned patient and do the demographic study.

Keywords: *Demographic profile, pesticide, poisoning*

Introduction

Poison is a substance which it introduced in the living body can cause ill health or death (K.S. Narayan Reddy)[1]. As per Krishnan Vij[2] pesticide is a substance physical, chemical or biological agent that will kill or repel an undesirable or trouble some animal, plant or microoragnism.

As per VV Pillai[3] pesticides are compounds that are used to kill pests which may be in seats, rodents, fungi, nemotodes, mites, ticks, mollusc or unwanted weeds and herbs. Hanging and poisoning are the commonest methods of suicide all over the India. Ingestion of poison specially insecticides poisoning are very common methods of suicide. Accidental poisoning is also very common as it is some time taken by mistake as medicine or taken by children unknowingly. Celphos/alphos is easily available in the grossery shop as it is used to prevent grains from insect like wheat, all over the India.

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Material and Method

Patient with history of pesticide poisoning admitted at SAIMS Hospital, Indore were taken for study. Chemical analysis of gastric lavage was conducted in the Department of Forensic Medicine and Toxicology of SAMC. 100 cases were studied using self designed questionnaire. The family, friends and patient were interviewed. Verbal consent was taken before interview.

Results

Among 100 patients, 60 were male and 40 were females. Most of the cases i.e. 46% were between 21 to 30 years age. Least affected age group was below 10 years (Table 1). Most affected religion was Hindu (84%). It may be due to the reason that most of the population in the surrounding area was Hindu. Urban population was most affected i.e. 68% others were from rural area i.e. 32%. As many peoples came to the hospital from Indore city (Table 2).

73% peoples were admitted for less than 4 days. Average stay in hospital was 3.97 days. 91% patients

were of self poisoning, 9% accidental poisoning. 26% peoples poisoned themselves due to family related matters. 17% due to love affairs, 10% due to financial problems (Table 3). 44% people were having graduation and above literacy. 1% was illiterate (Table 4). It may be due to the reason that maximum population was from urban area. Educational facilities are easily available in these area. 39% cases were students, 26% housewives or unemployed, 26% working in other firm and 9% were self employed (Table 5). 51% were bachelor, 48% married and 1% divorcee (Table 6). 53% people poisoned themselves between 12 p.m. to 6 p.m. Least 12 a.m. to 6 a.m. i.e. 1%. 41% poisoned in rainy season, 39% in winter and 20% in summer season. 68% consumed poison in liquid form, 13% in powder and 12% in tablet form. 64% consumed insecticide, 14% rodenticide.

Table 1 : Age and sex wise distribution of poisoning cases

Age	Male	Female	Percent
1-10	1	0	1%
11-20	9	14	23%
21-30	30	16	46%
31-40	13	7	20%
41-50	5	2	7%
51-60	1	1	2%
> 61	1	0	1%
Total	**60**	**40**	100%

Table 2 : Area wise distribution of poisoning cases

Area	Male	Female	Percent
Rural	21	11	32%
Urban	39	29	68%
Total	**60**	**40**	**100%**

Table 3 : Precipitating reasons for poisoning

Precipitating reasons	Male	Female	Percent
Love-affair	10	7	17%
Financial problem	9	1	10%
Family matter	10	16	26%
Job/business stress	3	0	3%
Illness	4	3	7%
Unemployment	2	2	4%
Study problems	1	4	5%
Unintentional	13	4	17%
Unknown	8	3	11%
Total	**60**	**40**	100%

Table 4 : Educational Status

Education	Male	Female	Percent
Illiterate	1	0	1%
Primary	4	2	6%
Middle school	6	7	13%
High school	10	6	16%
Higher secondary	9	11	20%
Graduate	15	7	22%
Post-graduate	15	7	22%
Total	**60**	**40**	**100%**

Table 5 : Occupation

Occupation	Male	Female	Percent
Student	22	17	39%
House wife/ Unemployed	7	19	26%
Self employed	9	0	9%
Working	22	4	26%
Total	**60**	**40**	100%

Table 6 : Marital status

Marital Status	Male	Female	Percent
Married	29	19	48%
Bachelor	31	20	51%
Divorcee/ Widow	0	1	1%
Total	**60**	**40**	**100%**

Discussion

Age group involved in the poisoning was similar to study conducted by Ch Shrinivas Rao et al[4] two third of patient were less than 30 years old, 57% were male. SA Kora et al[5] found highest number of cases involved were in the age group between 21 to 30 years (46.62%). AA Moghadamnia et al[6] in their study found greatest number of cases in the age group of 16 to 25years.

Findings of age group were consistent with Navin Kumar et al[7] who found age group involved was maximum between 21 to 30 years and males

outnumbered females. Palimar V et al[8] also found most of the peoples involved in these poisonings were male. Puneet Khurana et al[9] also found most of the males were involved and most common age group was between 21-30 years. Most religion involved was same in the study of Navin Kumar et al (90.20%)[7] and K Bharath et al[10] (90.83%). But Puneet Khurana et al[9] found (56%) Sikh cases. It may be due to distribution of more Sikh in that area.

Urban population (68%) was involved in this study. But Navin Kumar et al[7] and David Gunnell et al[11] found lesser number of peoples from urban area.

Average stay in hospital was round 4 days in current study while SA Kora[5] described 5 days of average stay in hospital in his study.

Manner of poisoning was suicidal in 91% cases in current study. Which were similar to SA Kora[5] (95.94%), Ch Shrinivas Rao[4] (96%), V Palimar et al[8] (98.2%). While DA Razak et al[12] found 73% cases, Aftab Turabi[13] found 60.45 cases of intentional poisoning. Findings were also similar to the findings of S Budhathoki et al[14] who found accidental poisoning common in children below 5 years.

2nd highest affected group was housewives which is similar with the study of Navin Kumar et al[7].

In this study as well as study conducted by Agarwal SB[15] almost equal poisoning was found in married as well as in bachelors. D Pokhrel et al[16] found intentional poisoning was more common in married males i.e. 57%.

SA Kora et al[5], V Palimar et al[8] found that the poison was mainly consumed in the afternoon which is similar to current study.

Most poisoning was in rainy season in current study while SA Kora et al[5] found common poisoning in winter.

Bharat K et al[10] found maximum poison was liquid from while Ashu Mathai[14] found 60% of the poison was consumed in the unexposed form of tablet.

8% patients were died which are different in different studies.

S. Buthathoki et al[13] found 87.4% survival rate. SA Kora[5] found 4.72% mortality rate. SB Agrawal[15] found 6.3% cases died Ch Shrinivas Rao[4] found overall fatality rate was 22.6% while V Palimar et al[8] found even more i.e. 25.8% mortality rate. Anshu Mathai et al[14] found 59.3% mortality rate.

Conclusion

Mortality rate of the cases was only 8% it may be due to early diagnosis of poisoning. Facility for chemical analysis is available only in this hospital in whole Madhya Pradesh. ICU and tertiary treatment facilities are available in this hospital, so success rate of cure is more. Poisons are easily available in grossery shape for sell. It should be banned. Poisons should be kept away from the children, social counselling is helpful in lowering the stress and suicidal tendencies. Day by day poisoning cases are increasing in developing countries like India. The aim of this study was to provide the data so that it can help the clinicians and other peoples to find out the most vernelable age group, period, season etc.

Source of Funding: Self designed questions, ICU files of patients.

Ethical Committee Clearance: Taken from ethical committee of SAMC, Indore (M.P.).

Conflict of Interest: Nil

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DOI Number: 10.5958/0973-9130.2019.00083.5

Stature Estimation Using Craniometric Analysis in the Adult Population of Dakshina Kannada-A Cross Sectional Study

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Abstract

Stature estimation is very valuable in helping to identify the person to whom the human remains belong. Together with sex and age stature is one of the essential biological characteristics that can be evaluated from the skeleton even many years after death. The challenging task of establishing positive identification for the Forensic experts is usually encountered in cases of mass disaster, explosions, putrefied or skeletonised remains, dismembered bodies. The present study was conducted on 50 males and 50 females, a total of 100 deceased individuals brought for medico-legal autopsies in the Department of Forensic Medicine, K.S.Hegde Medical Academy, Mangaluru during September 2015 to September 2017 a period of 2 years. It was also observed that out of the two measurements taken, the maximum cranial length and maximum cranial breadth, the maximum cranial breadth shows a correlation with the height of the individual and it was statistically significant. The results were compared with previous studies and discussed.

Keywords: *Identification, Maximum cranial breadth, Maximum cranial length, Putrefaction, Stature.*

Introduction

Estimation of stature is an important tool in forensic examination of skeletal remains in highly decomposed, fragmented and mutilated human remains[1]. Being one of the criteria of personal identification, stature helps in narrowing down the investigation process of identification and thus provides useful information to the investigating forensic pathologist. The identification process generally begins with formulation of four biological profile, specifically, estimation of age, sex, ethnicity and stature[2]. The Forensic Pathologist often uses stature as a criterion to identify the deceased.

The anatomical and mathematical methods are two important techniques for estimation of stature[3]. The anatomical method involves the direct reconstruction of stature by measuring and adding together the lengths of all skeletal elements and figuring a correction for soft tissues. The mathematical method is based upon the proportion of certain bones to living stature or cadaver length. Although the anatomical method is believed to provide best approximation when it is applied. However, it is not always possible to obtain the whole skeleton, therefore mathematical methods are more often used.

The present study attempts to find out the correlation between maximum cranial length and maximum cranial breadth of head and body height in the adult population of Dakshina Kannada district, Karnataka.

Materials and Method

The present study will be conducted on 50 males and 50 females, a total of 100 deceased individuals brought for medico-legal autopsy in the Department of Forensic Medicine, K.S.Hegde Medical Academy, Mangaluru for a period of 2 years.

Type of study: Cross sectional study.

The age of the deceased will be obtained from the

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relatives, police records or identification documents of the individual produced at the time of conducting autopsies. During the autopsy, the stature will be measured as the length of the body from the vertex (the highest point on head in mid saggital plane) to the heel in centimetres with the heel, buttocks, back of the shoulder and the head in contact with the autopsy table. A block is placed below the neck so as to extend the head, then coronal incision is made extending from one mastoid process to the opposite side, and then the scalp is separated anteriorly and posteriorly exposing the cranium. Ethical clearance was obtained from Institutional ethical committee of K S Hegde Medical college, Mangaluru before the study.

The following measurements are taken in cm to the nearest millimetre in the study.

1. Maximum cranial length-distance between the glabella and opisthocranion in the mid saggital plane measured in a straight line using a spreading calliper.

2. Maximum cranial breadth-distance between both euryon perpendicular to the mid sagittal plane using spreading caliper.

Inclusion criteria:

1. Deceased of age group between 25years -60 years of Dakshina Kannada nativity

2. Gender of the deceased is known.

Exclusion criteria:

1. Subject with recent or known history fracture skull or long bones

2. Subjects with congenital deformities of skull, spine and limbs

3. Subjects with known history of orthopedic and cranial surgeries

4. Decomposed, charred, mutilated bodies

5. Unknown/unclaimed bodies

6. Non-native population of Dakshina Kannada District

7. Age less than 25 and more than 60 years.

Statistical Analysis

Data collected was entered in MS- Excel-2010 and was analysed using SPSS Version 16. Quantitative variables such as age, Maximum cranial length, Maximum cranial breadth, height of the individual were expressed in terms of mean and Standard Deviation. After appropriate testing of normality distribution of the data using Shapiro Wilk test. Qualitative variables such as gender, age groups of the individual were expressed using percentages and proportions.

Inferential Statistics of:

Independent t test was used to determine statistical significance among males and females at p value < 0.05. Pearson's correlation was used to correlate the craniomteric measurements and the height: subsequently multiple logistic regression was applied to arrive at the formula to determine height using craniometric measurements.

Observation and Results

The two cranial measurements, maximum cranial length and maximum cranial breadth were taken using appropriate instruments after all the criteria for inclusion in the studies were appropriately met. The study is directed at developing a regression formula for stature estimation for the native population of males and females of the Dakshina Kannada district based on cranial measurements taken. The following are the results of the study.

Table 1: Frequency Distribution Table of Age Range of the study subjects

Age group	Sex		Total(n)
	Male(n)	Female(n)	
25-34	18	21	39
35-44	14	12	26
45-54	8	5	13
>55	10	12	22
Total	50	50	100

Table 2: Mean and Standard deviation of various measurements taken for males and females

Measurements in centimeters	SEX	Mean & Std. Deviation	T value	Statistical significance
MAXIMUM CRANIAL LENGTH	Male	16.1± 1.32	4.35	0.000*
	Female	15.1± .9150		
MAXIMUM CRANIAL BREADTH	Male	11.8± 1.20	2.33	0.02*
	Female	11.3± 1.16		
*Statistical significance <0.05,Independent t test				

The mean and standard deviation values of maximum cranial length and maximum cranial breadth and the length of the body is tabulated in Table no 2.

Table 3.: The mean and statistical significance of each of the cranial measurements is displayed

	Correlation- coefficient (beta)	T value	Significance
(Constant)	63.639	5.377	<0.001*
MAXIMUM CRANIAL LENGTH (CM)	0.482	0.644	0.521
MAXIMUM CRANIAL BREADTH (CM)	1.596	2.745	0.007*
*Statistical significance 0.05, Pearson's correlation			

It was observed that maximum cranial breadth show a correlation with the height of the individual and was significant.

The stature of the body is the dependent variable.

Discussion

Cranium is an important bone that has gained considerable interest among forensic anthropologist in the past. Several studies on anthropology taking various population and measurements of different bones have been done bearing on age, ethnicity and sexual dimorphism. Various studies have shown that biological profiling pertaining to age, sex, race/ ethnicity can be estimated if cranium is available.[4]

In this study on stature estimation using craniometric measurements, maximum cranial breadth shows stronger correlation with stature of an individual among the two measurements.

One of the earliest study published by Sarangi and coworkers (1981)[5] was done on 220 autopsied Indian cadavers. The results did not show significant correlation between maximum anterior-posterior length, maximum breadth with stature (p> 0.5). In the present study, the results did show significant correlation between maximum cranial breadth and stature of an individual.

A study was done by Ryan and Bidmos (2007)[6], to derive a correlation coefficient relation between maximum cranial length, maximum cranial breadth and other cranial measurements to estimate the stature of indigenous South African population, using 99 complete skeletons (50 males and 49 females) between the age group of 25-70 years. The results suggest that maximum cranial length and maximum cranial breadth showed correlation with the stature of the individual. However, our study showed positive correlation with the total skeletal height only for maximum cranial breadth and

not for maximum cranial length.

A study was done by Seema et al (2011)[7] among the Punjab zone population and a similar study was done by Hansi et al (2013)[8] on the population belonging to Bulandshahar region of Uttar Pradesh, to derive a correlation between the personal height and head length. The correlation coefficient between the stature and head length was found to be statistically significant and positive in both males and females. In our study, we could not find correlation between maximum cranial length and stature of the individual.

A study analysed by Sumita et al (2014)[9] among 800 medical students (400 males and 400 females), ranging from the age group of 17-25 years of Western U.P, to find a correlation between the stature and cranial measurements found a correlation coefficient between the stature and maximum cranial length. However, in our study, correlation coefficient was found between maximum cranial breadth and stature of the individual.

In a study done by Shrestha R et al (2015)[1] among 200 autopsied body (148 males and 52 females), to derive a correlation between stature and maximum cranial length and maximum cranial breadth, did not find a correlation between maximum cranial breadth and stature of an individual. Our study concluded that there is positive correlation between maximum cranial breadth and stature of the individual.

The stature estimation is of great help in establishing the biological profile of the deceased individual along with other methods of estimation of sex, age and ethnicity from the examination of the cranium.

The present study is of great importance in the sense that it provides data of the autopsied sample on Dakshina Kannada population which can be helpful in the identification of mutilated and dismembered skeletal remains especially when only the skull vault is brought for examination.

Conclusion

The cranial measurement like maximum cranial length and maximum cranial breadth were taken using appropriate instruments after all the criteria for inclusion in the study were appropriately met.

It was observed that maximum cranial breadth shows a correlation with the stature of the individual and was found to be statistically significant.

There are a lot of variations in estimating stature from cranial measurements among people of different regions and ethnicity. So, the present study was directed on developing a regression formula for stature estimation for the native population of males and females of Dakshina Kannada district based on maximum cranial breadth taken.

If measurements are available or known, it will be useful for the Anthropologists and Forensic Medicine experts. It will also be helpful in establishing the identity in civil cases.

This study has established definite correlation between stature and maximum cranial breadth. The regression equation has been established. It will be of great help for many medico-legal cases in establishing identity of an individual when only some remains of the body are available for examination as in cases of mass disaster, bomb explosion, accidents etc.

Conflict of Interest: None

Financial Assistance: None

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DOI Number: 10.5958/0973-9130.2019.00084.7

Autopsy based Study of Poisoning Cases in Kalaburagi

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Abstract

Background: Increasing trend of poisoning is leading to unnatural premature death in working population of developing country. Analysis of poisoning can help stakeholders to take measures for prevention of poisoning. **Objective:** To assess the magnitude of unnatural death due to suspected poisoning and to find out its correlates. **Methodology:** Record based cross-sectional study was performed in the department of Forensic Medicine of Gulbarga Institute Medical Science involving the victims of unnatural death due to suspected poisoning during year 2017. Information pertaining to sociodemographics, place and time of occurrence of poisoning and death after poisoning, background cause of poisoning etc. was collected from the postmortem report, police inquest and treatment history, if any using a predesigned proforma. **Results:** Overall, 87.93% of unnatural deaths, 27.12% were due to suspected poisoning. In our study we found that in overall unnatural deaths due to poisoning, male proportion was higher (68.5%) compared to female and age group of 15-30 years was with highest death rate (39.4%). Majority of poisoning cases happened during summer (35.0%). Care could be sought in higher number of cases where occurrence took place within premises (87.69%) and in morning (92.16%). Most(44.9%) of poisoning cases found during summer season . Majority of poisoning cases were documented in Hindu population 84.9% followed by Muslim. Marital status wise distribution of poisoning cases showed, maximum number of poisoning cases in married people 65.3%. **Conclusion:** Counseling in different life situations and strict legal enforcement in selling and handling of agrochemicals is the need of the hour to avoid premature loss of human resource from unnatural deaths due to poisoning.

Key-words: *unnatural death, suspected poisoning, domestic conflict, seasonal variation*

Introduction

In developed countries, the rate of mortality from poisoning varies from 1 to 2%, while in India the incidence is shockingly high at 15-30%[1]. Rural India has poisoning as the fourth most common cause of mortality[2]. The nature of poisoning varies from one region to another based upon the exact nature and availability of the poison, as well as the knowledge of the local population regarding the poisonous properties of these compounds. In South India, plant poisoning and organophosphates are generally quite common, whereas in the northern parts of the the country, aluminium phosphide and organophosphates are the common culprits. Irrespective of the chemical nature of a particular compound, these substances have been developed as pesticides to curb the menace of pests, and yet unfortunately they have become a major contributor in the causation of poisoning fatalities in human beings[3]. Unnatural death in forensic medicine point of view is a death that is caused by injury or poisoning. Poisoning includes death due to intentional injury such as homicide or suicide, and death caused by unintentional injury in an accidental manner[4]. As on the basis of autopsy finding different cause of death give rise to various trend of unnatural death so need to a

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descriptive study on trend of unnatural death especially poisoning in Kalaburagi[2] .

Method and Materials

The materials for the present study were cases brought for medico legal autopsy from various police stations of Kalaburagi District (Karnataka) at the Forensic Medicine Department, GIMS, Kalaburagi. During the study period (Jan 2017 to Dec 2017) total 604 cases were autopsied, out of which 542 cases were un natural deaths. The majority of unnatural deaths (127) were poisoning in nature next to RTA. The information regarding manner of poisoning based on the history, provided by the accompanying relatives or police. Further, information regarding the socio-demographic, mode of suicides, time of incidence, place of incidence, occupation, etc were gathered from the police papers like inquest report, dead body challan etc, and through detailed interviews of the relatives, neighbours, friends, and police officials accompanying the dead bodies. In case of hospital deaths, hospital papers were also examined. Collected data was analyzed and results are presented in the form of table and figures.

Results

Total 542 unnatural deaths were autopsied in the autopsy centre during the period of one year (Jan 2017 to Dec 2017). Out of these, 127 unnatural deaths were due to poisoning in nature.

Table 1 shows trends of deaths, there were 542(89.73%) unnatural deaths and 62 (10.27%) natural deaths of total 604 cases autopsied. The Table 2, shows trends in unnatural deaths. Out of 542 unnatural deaths, deaths due to poisoning outnumbered compared to other causes, and being the most common cause next to RTA. The age and gender distribution of suicide poisoning was described in Table-3 and Table 4, with the majority of victims of males and age group were between 15years to 30 years, accounting for majority of the total suicidal poisoning.

Our analysis further revealed (Table 5) that majority of cases took place during summer season closely followed by rainy season.

TABLE: 1; TRENDS OF DEATHS AT AUTOPSY

CAUSE OF DEATH	**NUMBER OF DEATHS**
UNNATURAL DEATHS	542(89.73%)
NATURAL DEATHS	62(10.27%)
TOTAL	604

TABLE: 2: TRENDS OF UNNATURAL DEATHS IN 2017

CAUSE OF UNNATURAL DEATHS	**NUMBER OF UNNATURAL DEATHS**
POISONIG	127(27.12%)
HANGING	47(8.67%)
BURNS	66(12.17%)
DROWNING	24(4.42%)
ROAD TRAFFIC ACCIDENTS	178(32.80%)
RAILWAYS	42(7.74%)
ASSAULTS	30(5.53%)
SNAKE BITES	10(1.84%)
ELECTRIC INJURIES	4(.73%)
FIREARMS	1(.18%)
OTHER ACCIDENTS	13(2.39%)
TOTAL	542

TABLE: 3: AGE WISE TRENDS IN DEATHS DUE TO POISONING

AGE	**DEATHS DUE TO POISONING**
<14 yrs	12(9.4%)
15-30yrs	50(39.4%)
31-45 yrs	31(24.4)
46-59yrs	23(18.1)
>60yrs	11(16.5)
Total	127

TABLE: 4: SEX WISE TRENDS IN DEATHS DUE TO POISONING

SEX	NUMBER OF POISONING CASES
MALE	87(68.50%)
FEMALE	40(31.50%)
TOTAL	127

TABLE: 5: SEASONAL TRENDS IN DEATHS DUE TO POISONING

SEASONS	NUMBER OF UNNATURAL DEATHS
SUMMER (APRIL-JUNE)	57(44.9%)
RAINY(JULY-NOVE)	41(32.3%)
WINTER(DECE-MARCH)	29(22.8%)
TOTAL	127

TABLE:6: MARITAL STATUS IN DEATHS DUE TO POISONING

MARITAL STATUS	NUMBER OF POISONING CASES
MARRIED	95(74.8)
UNMARRIED	27(21.3)
UNKNOWN	5(3.9)
	127

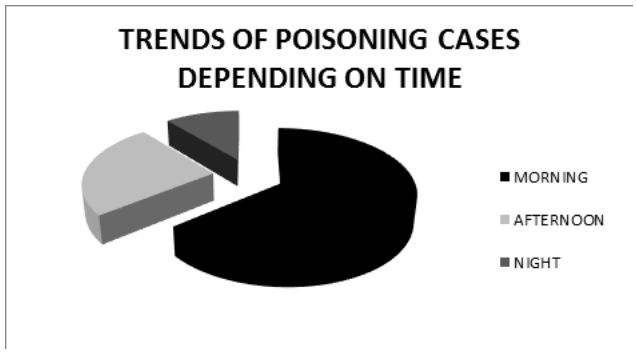
TABLE :7: PREVALENCE OF RELIGION IN DEATHS DUE TO POISONING

RELIGIONS	NUMBER OF POISON-ING CASES
HINDU	83(65.4)
MUSLIM	22(17.3)
CHRISTIAN	2(1.6)

TABLE 8: TYPE OF POISON CONSUMED

Type Of Poison No. Of Cases	No. of cases
Organophosphorus	76
Organocarbamate	19
Aluminum Phosphide	14
Alchohal	11
Others	7

PIE CHART



Conclusions

Prevalence unnatural death

Unnatural death is one of the major indicators of the level of health status of community. Responsibility for prevention of unnatural deaths in our society does not rest only on the law enforcement. Public health and other human service agencies must assist in preventing deaths as they have done to prevent other major causes of morbidity and mortality. The similar results (85.5%) were found in the study done by Bansude *et al.,*[1].

Cause of death as poisoning

Table 2 shows that distribution of unnatural death pattern, road traffic accident 32.8% contributes major cause of death followed by poisoning (27.12%) which coincides with the of study conducted in Chandigarh, northern India ,Sharma *et al.,*[5].

Age

According to age wise distribution of poisoning cases the most common age group 15 to 30 year (39.4%)[3,6,7,8,9,10]. Public health departments, public authorities and other human service agencies also must

assist with honest effort in searching the primary cause of unnatural deaths and their prevention. Other studies also found similar results ,study by Gannur Dayanand *et al.*[6],. and , Belayet Hossain Khan *et al.*[3],.

Sex

In present study sex wise distribution of poisoning cases shows that males outnumbered 68.5% female 31.5%.The huge difference in sex can be explained many ways. This high proportion of poisoning among males might be due to change in the lifestyle, cultural patterns in this area and psychological and financial problems. Other study by Bansude *et al.* [1] *,and* Mrinal Haloi et al[11], also found similar results.

Religions

In our study we found majority of poisoning cases in Hindu population 84.9% followed by Muslim 2.9% and Christian 0.2%. In other study also Hindus were more 87.26% than Muslims 12.74% i.e. ratio being 6.84:1,Bansude *et al.* [1]. This difference is due to difference in religions population in Gulbarga.

Marital status

In our study, marital status wise distribution of poisoning cases showed that maximum number of poisoning cases in married people 65.3%, may be as a result of marital conflicts. The cause behind 21.25% poisoning cases in Unmarried group may be multifactorial, depression, peer pressure, unemployment, love failure etc. Other study also found that married were outnumbered unmarried, Bansude *et al*[1]*.,*

Seasonal variation

In our study **s**easonal variation wise distribution of unnatural deaths showed that major cases in summer season 44.9% followed by rainy season 32.3% and in winter season 28.7%.This may be due to lack of employment followed by failure of crops especially in agricultural population[11,12,13,14].

Type of poisoning

In our study we found that Organophosphorus (OP) compounds poisoning was most common followed by alluminium phosphide and carbamates. Similar pattern was observed in studies on deaths due poisoning in southern, central India [14]. In northern India, aluminium phosphide causes most deaths [15,16,17,18].

Conflict of Interest: Nil

Source of Funding: This research was not financially supported by any funding agencies.

Ethical Clearance: The present study was approved by "Institutional Ethical Committee" of Gulbarga Institute of Medical Sciences, Kalaburagi . All the information has been taken under consideration of medical ethical committee.

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DOI Number: 10.5958/0973-9130.2019.00085.9

A Study to Evaluate the Reliability of "Henssge Nomogram" Method for Estimation of Time Since Death in Tropical Climate of Central India

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Abstract

Background – There are numerous methods available for estimation of time since death (TSD) in early post-mortem interval. But, precise determination of TSD is always a big challenge. There are some methods available which can be used for precise determination of TSD, but those have been used in temperate climatic region, such as Henssge nomogram method and Moritz formula. This paper is a humble trial to test the reliability of Henssge nomogram method in tropical climate of central India. **Methodology** – A cross sectional study was carried out on 173 randomly selected cadavers which were brought for autopsy in department of Forensic Medicine & Toxicology, Gandhi Medical College, Bhopal. After collecting routine demographic data like age, gender, height, weight etc. following data were also collected – ambient room temperature, rectal temperature, known TSD and determined TSD by Henssge nomogram. Data was analysed by using SPSS software. **Conclusion** – Henssge nomogram method is a reliable way to determine TSD in 24 hour time frame in cold weather i.e. <23 ºC but not in summer weather i.e. >23 ºC and in the fourth time slot of 18-24 hours in the present study circumstances.

Keywords: *Algor mortis, rectal temperature, time since death, Henssge nomogram.*

Introduction

Estimation of time since death is one of the most important objectives of postmortem examination. Time since death can be determined by physical and biochemical methods. Physical methods are rigor mortis, livor mortis, algor mortis, adipocere, mummification, and progress of decomposition. Biochemical methods constitute changes in blood, serum, cerebrospinal fluid etc. Out of all the methods employed no single method is yet capable of telling TSD precisely. Algor mortis is the cooling of cadaver, which happens due to difference of temperature between the cadaver and environment. There is heat dissipation from cadaver to environment at a certain rate, which is 1.5 degree centigrade per hour in temperate climate and 0.7 degree centigrade per hour in tropical climate[1] is called as rate of cooling. Various routes of temperature monitoring from cadaver are–rectal, infra-hepatic, tympanic membrane, cribriform plate, out of which rectal route is the ideal route for measurement of core body temperature. Rectal temperature ranges from 36.5 degree to 37.5 degree centigrade[1]. In order to determine precise TSD there are several methods based on algor mortis and Henssge nomogram is one of them which has been used in temperate climatic region. This study aims to test applicability of Henssge Nomogram in tropical climate of central India.

Henssge modified the 'two exponential' formula of Marshall & Hoare in 1981[6]. He presented a simplified method to determine the Newton's cooling coefficient, & determined statistical figures of the deviation between calculated and real death times for cooling

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under standardized conditions[3, 4, 8]. The Nomogram Method is based on a single measurement of the rectal temperature[2]. Nomogram: – a diagram representing the relations between three or more variable quantities by means of a number of scales, so arranged that the value of one variable can be found by a simple geometrical construction[5].

The nomogram is related to the chosen standard i.e. naked body extended lying in still air. Cooling conditions differing from the chosen standard may be proportionately adjusted by corrective factors of the real body weight, giving the corrected body weight by which the TSD is to be read off. Factors above 1.0 may correct thermal isolation conditions, and factors below 1.0 may correct conditions accelerating the heat loss of a body[6]. Henssge further found evidence of a non-linear dependence of corrective factors of body weight upon the body weight[7]. The dynamics of the dependence increases with the thickness of thermic insulation [7]. Corrective factor are given in Table 1[7].

Corrective weight was calculated by the given formula:–

Actual measured weight (w) * corrective factor = corrective weight (w´)

Henssge nomogram is a picto-graphical method for deduction of TSD on the basis of ambient temperature and rectal temperature of cadavers with the help of weight and clothings of the cadavers, it is designed in 2 types:–

For ambient temperature > 23ºC, having maximum temperature limit of 35ºC. It is used when ambient temperature is from 23ºC to 35ºC i.e. for summer season. Figure 1.

For ambient temperature <23ºC, having minimum temperature limit of -10ºC. It is used when ambient temperature is from 23ºC to -10ºC i.e. for winter season. Figure 2.

It suggest that one can determine TSD, only when ambient temperature is between -10ºC to 35ºC.

Method

A cross-sectional observational study was conducted at department of Forensic Medicine & Toxicology, Gandhi medical college, Bhopal during the period of July 2015 to August 2016.

A total of 173 cadavers brought for medico-legal autopsy were randomly selected for this study. Those cases in which time of death was known and documented were included and those in which time of death was not known and the temperature at the time of death was either high or sub-normal were excluded. The post-mortem requisition form, along with the inquest papers, were received from the police. The dead bodies were studied in the same condition in which they were brought. No disturbances was done as far as possible with regard to clothings and coverings.

Exact time since death was recorded from hospital records and police documents. After noting the external appearance, the clothings were removed and rectal temperature was recorded in supine position, after spreading both legs apart exposing the perineal region. Laboratory thermometer of length 32 centimetres with a temperature range of 0 to 50 degree centigrade was inserted 10 centimetre deep in rectum of cadaver. The reading was noted down two minutes after keeping the thermometer inside the rectum, then thermometer was taken out. Simultaneously ambient temperature was also recorded with ambient temperature thermometer. Further details such as age, gender, built, height, weight, actual time of death, time of reading of rectal temperature etc. were noted down from the documents and history.

Actual TSD (in hours) was calculated by subtracting the time of recording of rectal temperature from actual time of death. Then determination of TSD was done by plotting graph on Henssge nomogram.

To use the nomogram a line was drawn between the rectal temperature and the ambient temperature – then another line was drawn between the centre of the circle and the bisection point of the two lines on the nomogram. The TSD was then read at the point corresponding to the corrected weight of the body.

Data was analysed by using SPSS software.

Results

In the present study total number of cases were n=173 out of which number of samples in <23°C ambient temperature were n=44 have a mean known TSD of 11.5 and in >23°C n=129 and mean known

TSD is 11.8. TSD determined by Henssge nomogram in ambient temperature of <23°C is found to be reliable, which were found to be statistically significant (p<0.05). But TSD estimated by Henssge nomogram in ambient temperature of >23°C is not reliable (p=0.965) Table 2.

It was also found that when ambient temperature was <23 °C, Henssge nomogram can be a reliable method for determination of TSD in 24 hour time frame and also in three time slots of 0-6, 6-12 and 12-18 hours, which was found to be statistically significant (p<0.05). But it cannot be used in fourth time slot of 18-24 hours which was found to be statistically not significant (p>0.05) Table 3. But when ambient temperature was >23 °C Henssge nomogram cannot be used in 24 hour time frame, and also cannot be used in fourth time slot of 18-24 hour, which was found to be statistically not significant (p>0.05), rather it can be used in other time slots of 0-6, 6-12 & 12-18 hours which was found to be statistically significant (p<0.05) Table 4.

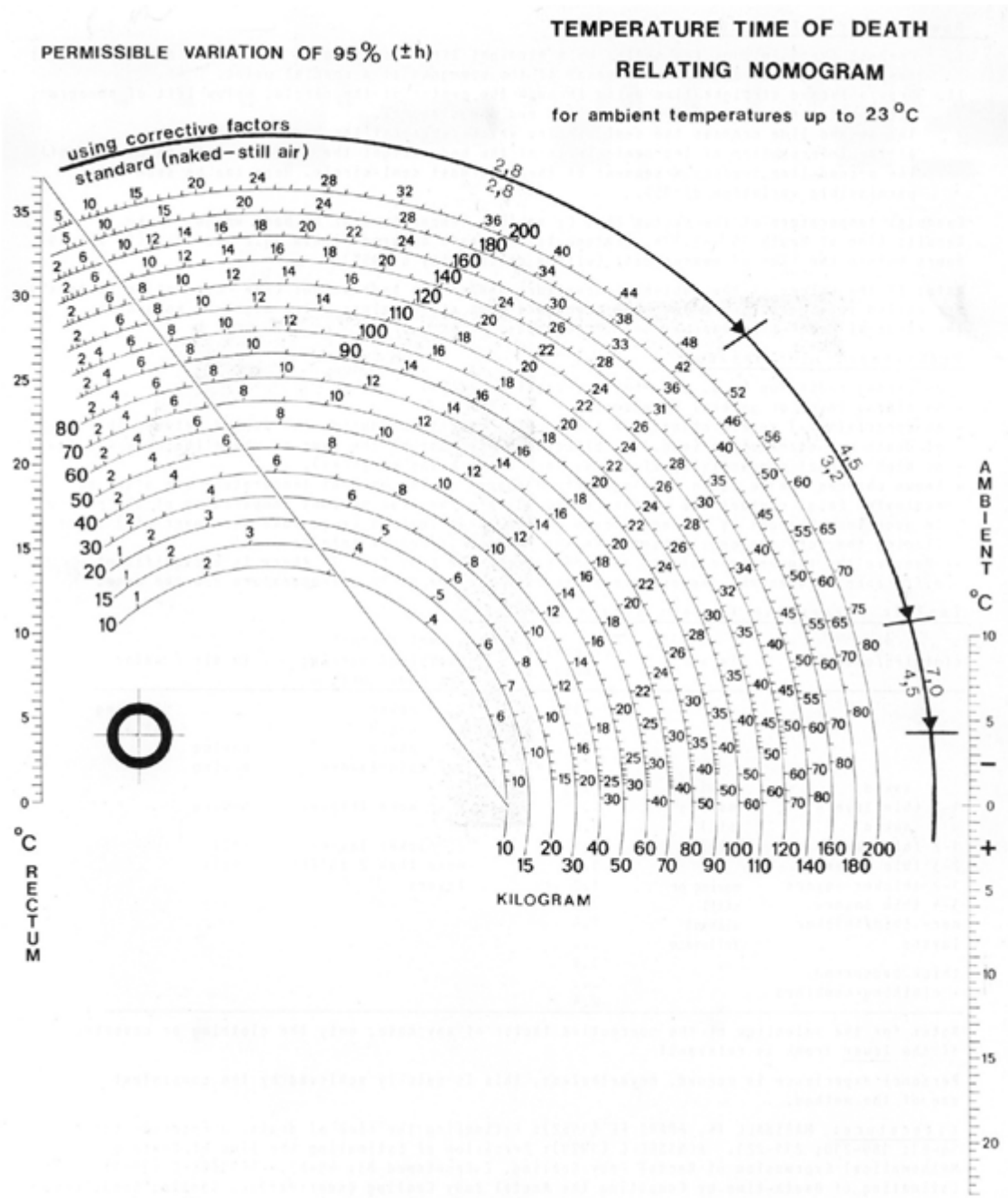

Figure 1

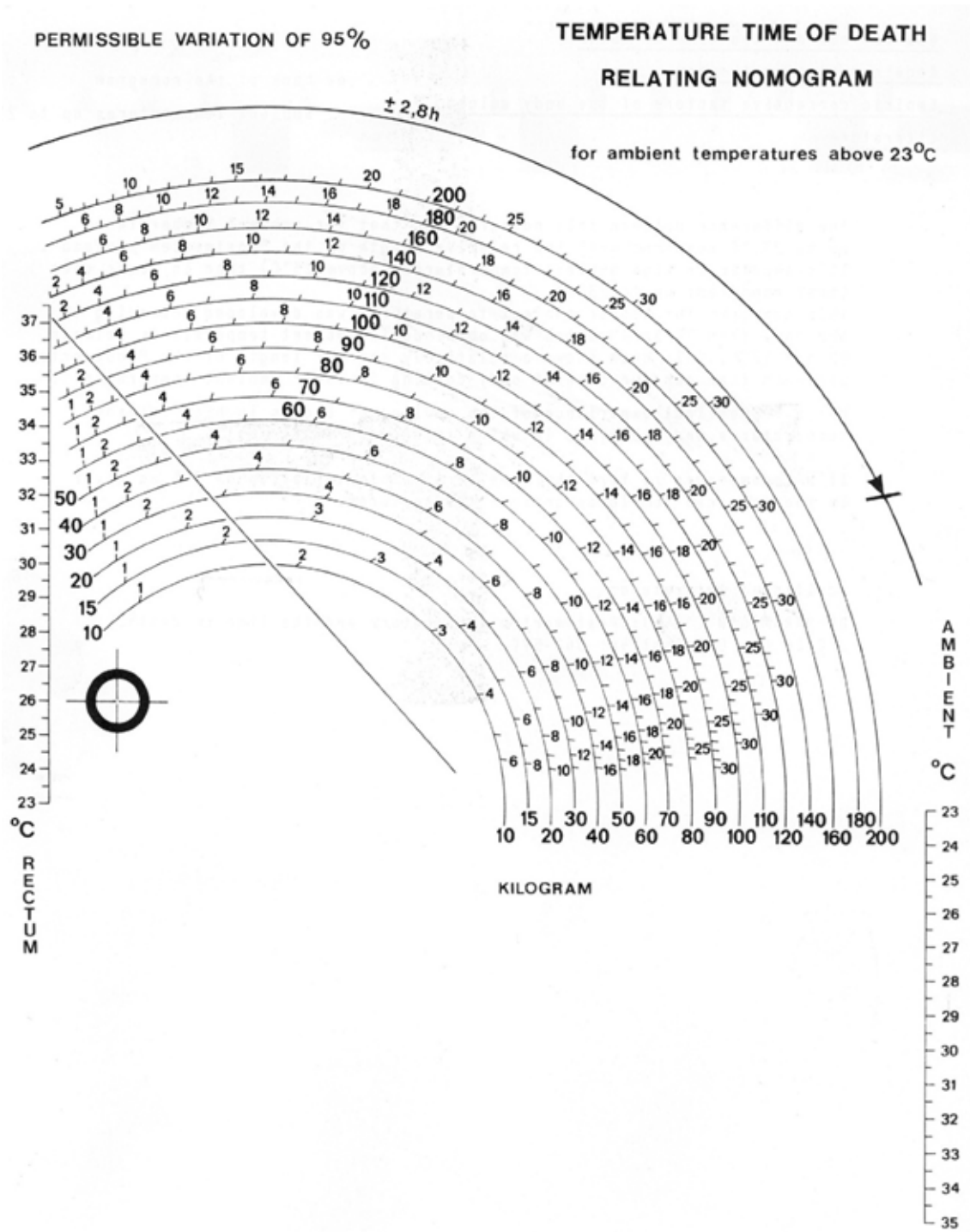
PERMISSIBLE VARIATION OF 95%
TEMPERATURE TIME OF DEATH
RELATING NOMOGRAM
±2,8h
for ambient temperatures above 23°C
°C
RECTUM
AMBIENT
°C
KILOGRAM

Figure 2

Table No. 1 : Corrective Factor proposed by Henssge

Dry clothing/ covering	In air	Corrective factor	Wet through clothing/ covering wet body surface	In air	In water
		0.35	Naked		Flowing
		0.50	Naked		Still
		0.70	Naked	Moving	
		0.70	1-2 thin layers	Moving	
Naked	Moving	0.75			
1-2 thin layers	Moving	0.90	2 or more thicker	Moving	
Naked	Still	1.00			
1-2 thin layers	Still	1.10	2 thicker layers	Still	
2-3 thin layers	Moving or still without influence	1.20	More than 2 thicker layer	Still	
1-2 thick layers	Moving or still without influence	1.20			
3-4 thin layers	Moving or still without influence	1.30			
More thin/thicker layers	Moving or still without influence	1.40			
Thick bed spread	Moving or still without influence	1.80			
Thick bed spread + clothing combined	Moving or still without influence	2.40			

Note- For the selection of the corrective factor of any case, only the cooling or covering of the lower trunk is relevant.

Table 2: comparison between known TSD and Henssge nomogram TSD in 24 hour time frame in <23°C & >23°C ambient temperatures.

Ambient Temperature & number of samples	Mean time since death		P value
	Known	Henssge nomogram	
< 23 °C, n=44	11.5	24.4	0.000
> 23 °C, n=129	11.8	16.8	0.965

Table 3: Comparison between known TSD and Henssge nomogram TSD in 6 hour time slots in ambient temperature <23 °C.

Time slot & number of samples	Mean time since death		P value
	Known	Henssge nomogram	
0 to 6 hours, n=12	4.08	11.2	0.001
6 to 12 hours, n=11	9.6	21.7	0.000
12 to 18 hours, n=16	15.75	33	0.000
18 to 24 hours, n=5	20	34.6	0.109

Table 4: Comparison between known TSD and Henssge nomogram TSD in 6 hour time slots in ambient temperature >23 °C.

Time slot & number of samples	Mean time since death		P value
	Known	Henssge nomogram	
0 to 6 hours, n=29	4.1	9.06	0.001
6 to 12 hours, n=36	9.4	15.5	0.000
12 to 18 hours, n=42	15.2	20.9	0.000
18 to 24 hours, n=19	21.1	22.4	0.144

Discussion

This cross-sectional study conducted on 173 postmortem samples for estimation of time since death by the algor mortis in early post-mortem interval. In this study rectal temperature and weight were measured of those corpses whose time of death is known. The data obtained was analysed and results and observations were done. TSD was calculated by Henssge nomogram method and compared with known TSD in 24 hour time frame and also in different time slots in < 23 °C & > 23 °C ambient temperatures.

Henssge nomogram was not useful in present study circumstances when the ambient temperature was >23 ºC i.e. in warm climate, which leads us to conclusion that this discrepancy may have come due to temperature difference from temperate climate, as to support this point in our study Henssge nomogram can be used in ambient temperature <23 ºC i.e. in cold climatic conditions. Thus Henssge nomogram can be used to estimate TSD in temperate climate but not in tropical climate.

De Saram, et al[9, 10, 11] in 1955 as he mentioned in his paper that "The time of death can be assessed by means of this formula with reasonable accuracy if the first observation is made within eight hours after death. Thereafter the accuracy of the estimation of the time of death diminishes", but in our study usefulness of Henssge nomogram was found till 18 hours in both types of ambient temperature conditions i.e. <23 & >23 °C.

It can be concluded here that this study will be beneficial with respect to determination of TSD by Henssge nomogram with some restrictions such as it may be less accurate in 18-24 hour time slot and also in hot climate, for which it can be further evaluated.

Ethical Clearance- Taken from Institutional ethics committee, Gandhi Medical College, Bhopal on 05/03/2015.

Source of Funding- Self.

Conflict of Interest – Nil.

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DOI Number: 10.5958/0973-9130.2019.00086.0

Comparing the Potential Role of Palatal Rugae Pattern in Paternal Testing- A Cross Sectional Study

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Abstract

Aim: To determine if there is any similarity in palatal rugae patterns of offsprings and their parents.

Objective: To investigate the potential role of palatal rugae in personal identification and paternity testing.

Materials and Method: This study consisted of 50 pairs of participants which include the parents and their son or daughter. Occlusal photographs were taken using intraoral mirror. The palatal rugae pattern were traced in the photographs and classified according to Thomas and Kotze classification (1983). The data was subjected to contingency coefficient score determination and spearmans correlation and the similarity was statistically analysed.

Results: The average number of palate rugae on the basis of length, shape and the prevalence on both left and right side were found to be similar in both parents and offsprings. The chi square test showed that there was a significant relationship between the palate rugae patterns of offsprings and parent. Further analysis by Pearsons correlation test and spearmans rho correlation coefficient test confirmed the same.

Conclusion: The results of the study show that the palatal rugae pattern is a structure inherited and hence can be used as a tool in paternity testing and in personal identification. The palate rugae pattern hence can become one of the easiest, most efficient tool in forensic dentistry in the presence of an antemortem record.

Keywords: *palatal rugae, paternal testing, forensic, Thomas and Kotze, personal identification*

Introduction

The common forensic methods of identification are fingerprints, DNA profiling and dental comparison.[1] Although fingerprints and DNA are accurate in identification they still have many limitations. The technique may be very expensive and always needs an antemortem record to compare them to. The DNA samples can be easily contaminated by extraneous DNA or destroyed by heat, trauma and decomposition. Furthermore, the DNA extraction and identification is a lengthy process.[2] Thus the need of alternative method which had to be quick and cost efficient for identification is required. Transverse palatine folds or palatal rugae are asymmetrical and irregular elevations of the mucosa in the anterior third of the palate, arranged in a transverse direction from the palatine raphe located in the mid-sagittal plane. [3] Palatal rugae are also called "plicae palatinae transversae" and "rugae palatine". [4] Their purpose is to facilitate food transportation through the oral cavity, prevent loss of food from the mouth and participate in the chewing process.[5] Due to the presence of gustatory and tactile receptors, they contribute to the perception of taste, the texture of food qualities and tongue position.[5] PR also assists speech and suction in children.[6] Winslow was the first to describe about

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the palatial rugae in 1732[7] Application of palatal rugae patterns for personal identification was suggested by Allen in 1889. The term "Palatal rugoscopy" was first proposed by the Spanish investigator Trobo Hermosa in 1932.[8]

There are between three to seven PR bilaterally, and none of these crosses the midline raphe.[9] Generally, there is no bilateral symmetry in the number of primary rugae or in their distribution from the midline. It has been found that there are slightly more rugae in males and on the left side in both genders.[5]

Palatal rugae appear during the third month of intrauterine life from the connective tissue covering the palatine process of the maxillary bone.[2]

At the 550 mm stage of embryonic development, there are five to seven rather symmetrically disposed ridges, with the anterior ones beginning at the raphe, the others more laterally, towards the end of intra-uterine life, the pattern of rugae becomes less regular, posterior ones disappearing and those anterior become considerably more pronounced and compressed. [9]

The growth and development is controlled by epithelialmesenchymal interactions. The characteristic pattern of the palatal rugae does not change as a result of growth and remain stable from the time of development until the oral mucosa degenerates at death. It was proved by Van Der Linden that the anterior rugae do not increase in length after 7 years of age.[2] Histologically, the rugae are stratified squamous (layered scales), mainly parakeratinized, epithelium on a connective tissue base, similar to the adjacent tissue of the palate.[10] Once formed, they do not undergo any changes except in length, due to normal growth, remaining in the same position throughout the entire person's life. The palatal rugae pattern remains are unchanged and are not altered by chemicals, heat, diseases, or trauma.[8] Studies to determine the thermal effects and the decomposition changes on the palatal rugae have concluded that most burn victims with panfacial third degree burns did not sustain any palatal rugae pattern changes, and when changes were noted, they were less pronounced than the generalised body state.[10] The anatomical position of palatal rugae is such that it is surrounded by cheeks, lips, tongue, buccal pad of fat, teeth and bone which keeps them well-protected from trauma and high temperature. Hence, they can be used as a reference landmark for forensic identification. The form, layout, and characteristics of rugae are not affected by either eruption or loss of teeth.[5] They are stable and resist decomposition for up to 7 days after death.[7] Even if palatal rugae are destroyed due to any trauma; they are reproduced exactly on the same site.[5]

Sassouni also stated that no two palates are alike and are constant even during growth.[11] Also since the rugae dimensions are related to the palate dimensions and since palatal dimensions are passed through the generations, there is an indication that rugae dimensions are indeed inherited.[12] Thus, palatal rugae have the ideal characteristics to act as a tool in personal identification and paternal testing.

Materials and Method

This cross sectional study was conducted in Department of Pedodontics, Saveetha dental college. Total of 50 pairs of occlusal photographs were obtained from the healthy children and the mother or father accompanying them. The occlusal photographs were taken with the help of high resolution camera and intraoral mirrors as proposed by Ahmed et al.[13] The palatal rugae pattern was traced using 'brushes redux version 3.2'. The palatal rugae patterns were classified by Thomas and Kotze classification (1983) based on the length, prevalence on left and right sides and pattern types like straight, wavy, circular, curved, diverging, converging etc.[14] (Table 1) The data obtained was statistically analysed using contingency coefficient test and spearman correlation coefficient tests using SPSS software version 20.0.

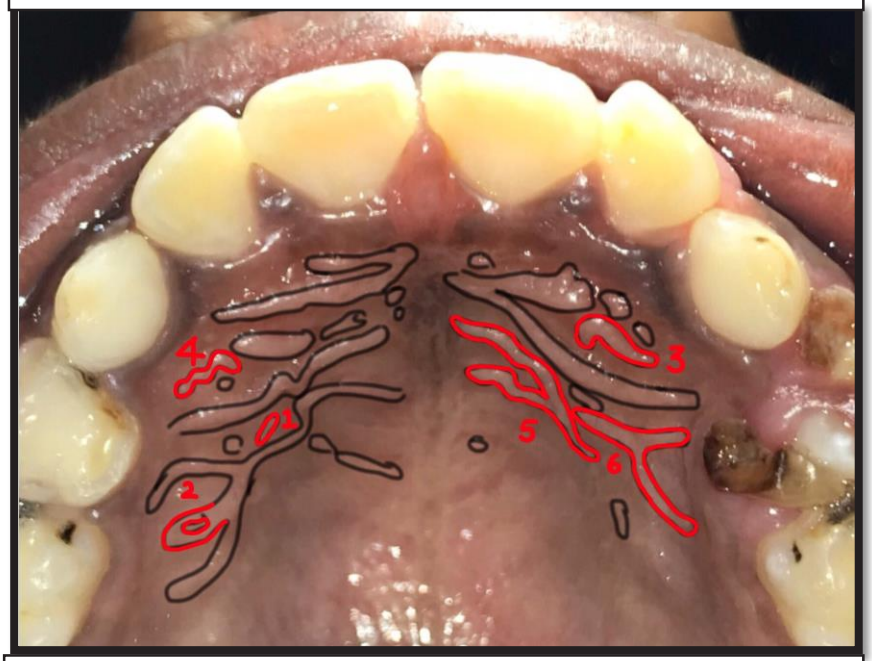
Inclusion criteria:

- Parents either mother or father or both with offspring of age between 7-18 years
- Subjects not undergoing removable or fixed orthodontic treatment

Exclusion criteria :

- Subjects with congenital abnormalities, palate and lip defect,
- Subjects wearing partial dentures and braces
- Subjects with previous orthodontic surgery or arch expansion procedures
- Subjects with deformity, scars and trauma of the palate
- Subjects with palatal lesions like ulceration, torus palatine, cystic lesion, palatal fracture, oro-antral fistula, smoker's palate, etc.

Picture 1: Tracing of different palatal rugae pattern in occlusal photograph



Palatal rugae pattern (Thomas and Kotze 1983): 1- straight; 2- circular; 3- curved; 4- wavy; 5- divergent; 6- convergent.

Results

Table 1: Mean number of palatal rugae patterns in offsprings and parents.

		Average for offspring	Average for parents
right	primary rugae	2.68	2.62
	secondary rugae	1.08	0.86
	fragmentary rugae	0.98	0.72
left	primary rugae	2.74	2.8
	secondary rugae	1.1	0.76
	fragmentary rugae	0.94	0.64
total	primary rugae	5.42	5.42
	secondary rugae	2.18	1.62
	Fragmentary rugae	1.92	1.36
right	straight	0.9	0.68
	circular	0.5	0.56
	curved	1.58	1.32
	wavy	0.68	0.86
	diverging	0.22	0.24
	converging	0.72	0.28
	unspecified	0.12	0.16

Cont... **Table 1: Mean number of palatal rugae patterns in offsprings and parents.**

left	**straight**	**0.86**	**0.82**
	circular	**0.46**	**0.4**
	curved	**1.44**	**1.32**
	wavy	**1**	**0.92**
	diverging	**0.38**	**0.26**
	converging	**0.58**	**0.34**
	unspecified	**0.02**	**0.14**
total	**straight**	**1.76**	**1.5**
	circular	**0.96**	**0.96**
	curved	**3.02**	**2.64**
	wavy	**1.68**	**1.78**
	diverging	**0.6**	**0.5**
	converging	**1.3**	**0.62**
	unspecified	**0.14**	**0.3**
right	**number**	**4.74**	**4.14**
left	**number**	**4.76**	**4.22**

Table 2: Statistics to determine the similarity between palatal rugae patterns of offsprings and parents.

		Pearson chi square	Pearsons R	Spearmans correlation
right	primary rugae	0.695*	0.721	0.848
	secondary rugae	0.44*	0.283	0.344
	fragmentary rugae	0.281*	0.241	0.552
left	primary rugae	0.225*	0.696	0.579
	secondary rugae	0.322*	0.108	0.09
	fragmentary rugae	0.658*	0.172	0.337
total	primary rugae	0.792*	1	0.935
	secondary rugae	0.091*	0.083	0.06
	Fragmentary rugae	0.578*	0.125	0.382
right	straight	0.678*	0.252	0.267
	circular	0.224*	0.751	0.248
	curved	0.576*	0.278	0.185
	wavy	0.484*	0.312	0.391
	diverging	0.39*	0.851	0.779
	converging	0.018	0.001	0.003
	unspecified	0.603*	0.598	0.742
left	straight	0.953*	0.825	0.729
	circular	0.696*	0.683	0.794
	curved	0.465*	0.616	0.478
	wavy	0.679*	0.68	0.839
	diverging	0.307*	0.334	0.246
	converging	0.051*	0.042	0.083
	unspecified	0.03	0.027	0.027
total	straight	0.342*	0.365	0.387

Cont.... **Table 2: Statistics to determine the similarity between palatal rugae patterns of offsprings and parents.**

	circular	0.388*	1	0.421
	curved	0.442*	0.366	0.176
	wavy	0.648*	0.732	0.76
	diverging	0.475*	0.568	0.429
	converging	0.039	0.001	0.003
	unspecified	0.123*	0.113	0.241
right	number	0.196*	0.045	0.057
left	number	0.32*	0.068	0.15
total	number	0.31*	0.023	0.063

Null hypothesis: There is similarity in palatal rugae patterns between offsprings and their parents. Alternate hypothesis: There is no similarity in palatal rugae patterns between offsprings and their parents. * p value > 0.05 . Hence there is significant relationship between the palate rugae pattern of offsprings and parents. Strength of Association of Pearsons R value; 0.1 < | r | < .3- small correlation; 0.3 < | r | < .5- medium/moderate correlation;| r | > .5- large/strong correlation. Positive spearman value indicates association of ranks.

Discussion

Kamala et al extensively studied rugae pattern and its use in personal identification in 1000 individuals and found that the average number of rugae in each individual was 8.7 of which 4 to 5 rugae on each side of the palate. Regarding shape of the palatal rugae, out of the total 8695 rugae found in 1000 individuals, curve type of rugae were maximum in number followed by wave type of rugae found to be, then straight type of rugae followed by unification converging type and unification diverging type. Circular and nonspecific were observed to be negligible in number. In our study the curved type of pattern was seen most number of times followed by straight pattern and then the wavy type.[15] Converging patterns were the next most common and then followed by the circular type, diverging type and the unspecified type. The distribution of rugae shape in the population was seen as wavy pattern to be highest in number followed by curved and straight. Unification patterns constituted the next commonest whereas circular and non specific type were in negligible quantities.[16] Similar results were given by Kapali et al (1997); Fahmi et al (2001); Nayak et al (2007); Venegas et al (2009). and Sharma et al (2009). They concluded that most common shapes of palatal rugae were wavy and curve forms, whereas straight and circular types were least common.[17-21] Madhusudan et al in his study on examination of 30 families concluded that there was statistically significant resemblance of offspring palatal rugae patterns with parent's palatal rugae patterns.[22] Rajesh et al also studied on the inheritance of palatal rugae pattern. In his study, there was a statistically significant relationship between the palate rugae pattern between the parent and offspring.[23] Indira et al in her article stated that the rugae pattern among the family members were not identical and hence cannot be used in ascertaining the hereditary. [24] There was an another study in accordance stating that comparison of rugae patterns in siblings with their parents and in identical twins revealed that there was no similarity in rugae patterns suggesting that heredity may not play a role in determining the rugae pattern an individual.[25]

Conclusion

The results of the study show that the palatal rugae pattern is a structure inherited and hence can be used as a tool in paternity testing and in personal identification. The palate rugae pattern hence can become one of the easiest, most efficient tool in forensic dentistry in the presence of an antemortem record. In the presence of a digital storage device, large amount of data can be stored and quickly retrieved which may assist in immediate and effective identification of an individual. It would be beneficial to conduct further studies in large samples and taking more parameters for palatal rugae analysis in all races of the world, so that a national data can be prepared.

Conflict of Interest: no conflict of interest

Funding: Self

Ethical Clearance: committee:Saveetha Board of Research

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DOI Number: 10.5958/0973-9130.2019.00087.2

Implementation of Virtual Autopsy in Forensic Medicine

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Abstract

Dead bodies are frequently encountered at the scene of crime and it is essential to determine the cause of death, manner of death and to find any injury or disease present on the body.[1] For this purpose, highly trained and qualified surgeons are appointed to conduct post-mortem on the cadaver. Since many social communities do not permit this as it violates their ethical and religious values, therefore causing the hindrance in solving the particular case. To overcome this drawback a new technique has been introduced called virtual autopsy also known as Virtopsy. With the help of this technique we can figure out minute details on different parts of the body where even radiological rays cannot reach. It will help in better understanding of the deceased person and can be used in various medico-legal cases.

Keywords: *Radiology, imaging, virtual, autopsy, dead bodies, techniques, pathologist*

Introduction

In past few decades forensic science has came across many innovations and advancement in terms of techniques and methodologies. One of the recent invention in clinical autopsy is of virtual autopsy. Virtual autopsy is an autopsy conducted virtually. Virtual autopsy is also referred as Virtopsy which is derived from the Latin word virtus, which means, "useful, efficient, and good."[2]It helps in obtaining the information which cannot be obtained through a standard autopsy. Moreover, it does not require a scalpel to examine the corpse. Different techniques are used to obtain a 3-Dimensional view of the cadaver hence helping in better examination and aids in giving a better opinion or conclusion. It can be massively used as an alternative to conventional autopsy and it would not upset the family of the deceased and also secures religions sentiments.

The idea of virtual autopsy was developed by Richard Dirnhofer, former Director of Forensic Medicine, Berne, which was then continued by Michel Thali and his colleagues at the University of Berne's Institute of Forensic Medicine situated in Switzerland.[3] In1990s the Institute of Forensic Medicine started it in the collaboration with the Scientific Service of the City Police of Zurich.[4] The aim was to document the surfaces of objects and bodies in a three-dimensional view. After the century, the Institute of Forensic Medicine began it in collaboration with the institutes of Diagnostic Radiology and Neuroradiology of the University of Bern. The ultimate aim of this new research project called Virtopsy was to detect forensic findings in dead bodies using radiological techniques such as CT and MRI and to compare these with the data obtained by standard autopsy.

The Virtopsy was initially begun with the surface documentation by 3D photogrammetry which was based on optical surface scanning, CT and MRI.

Over the period of time, it was developed and other methods such as post-mortem biopsy and angiography were implemented on it.[5] It was not a success in the initial phase but after sometime its importance was realised among the radiologists and pathologist and teaching of courses on the use of the Virtopsy methods began in 2006.

It can be useful in the countries where crime rate is huge and is constantly increasing day by day like India,

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and other countries. It can help in giving reports in few minutes rather than hours. In this way, it will not only help in obtaining the internal findings but will also help in increasing the pace of judiciary to serve justice of the respective country. This can be the most important change in the daily routines of many pathologists, radiologists, scientists, etc. This emerging technique has gained some popularity recently and people around the world are curious to find out more about its significance.

IMAGING TECHNIQUES

Presently, forensic imaging comprises of cross-sectional techniques i.e. CT, MSCT, MicroCT, MR microscopy, MRs, MRI etc, which are combined with minimally invasive techniques such as post-mortem angiography and biopsy, and 3D photogrammetry which is based on optical surface scanning.[6] These methods are described briefly below.

COMPUTED TOMOGRAPHY (CT)

Computed tomography is the most frequent used imaging tool in forensic pathology apart from X-ray. With modern scanners, 2D and 3D reconstructions based on slice thicknesses of 0.5 mm are possible and have become routine standards. Apart from the examination of the soft tissues, the main advantage is in the detection and depiction of foreign ingredients, fracture lines, gas and fluid accumulations, etc. It can also show calcifications and vessels easily. Since it is difficult to evaluate the size vessel occlusion or a vascular rupture, therefore, for this post-mortem angiography is used.

MULTISECTION CT

CT was performed on a four– or six–detector row scanner. Whole-body scans were performed with a collimation of 1 or 1.25 mm which provides 1200 axial images with a section thickness of 1.25 mm and an increment of 0.7 mm in soft-tissue and osseous kernels. For areas of special forensic importance which includes special fracture systems, teeth, foreign bodies, etc additional raw data were acquired with a collimation of 0.5 mm and 0.625-mm-thick sections were calculated. Acquisition time was approximately 10 minutes.

MICRO-CT

In special situations, bone-tissue specimens were examined on a micro-CT system which was developed and built at the Institute of Medical Physics in Erlangen, Germany. This scanner can image a 3D volume with an isotropic resolution ranging from 10 to 100 µm. The system allows the examination of samples with diameters ranging from 4 to 40 mm.

MR MICROSCOPY

MR microscopic studies were performed at room temperature on a Bruker DMX spectrometer (Bruker Biospin MRI, Billerica, Mass) coupled to a wide-bore magnet operating at 9.4 T (400 MHz for protons). For instance, formalin-fixed eyeballs were washed in phosphate-buffered saline solution, blotted dry, and then placed in a 25-mm glass tube filled with Fluorinert prior to imaging. 3-dimensional anatomic images were acquired with a fat-suppressed rapid acquisition with relaxation enhancement (RARE) T1-weighted imaging sequence (repetition time msec/echo time msec = 200/8, number of signals acquired = 16, acquisition time = 9.5 hours). Voxels were typically 78 µm in size.

MAGNETIC RESONANCE IMAGING

Although CT is the method which shows foreign bodies, fractures and gas, though it is bounded by certain restrictions which are related to the assessment of soft tissues and internal organs. In comparison to MRI,MRI can depict soft-tissue injuries and pathologies very clearly. Being non-ionizing in nature, it is also the imaging method of choice when examining living victims of assault, such as in the cases of manual strangulation.

MAGNETIC RESONANCE SPECTROSCOPY (MRS)

Magnetic resonance spectroscopy (MRS) is another useful technique in Virtopsy which helps in determining the metabolic concentrations in the tissues and also helps in estimating the time of death. MR microscopy is a micro-imaging technique which is also used to study the soft tissue injuries like retinal haemorrhage, etc.

POST MORTEM BIOPSY

The word postmortem biopsy has the part ‘bios’ which is from the ancient Greek meaning ‘life’ and is therefore, not applicable for a post-mortem method, this terminology has established itself in forensic pathology in analogy to biopsies performed in clinical medicine. With a biopsy gun, samples of organs of interest or specific pathologies seen at CT or MRI, and can be taken

and examined through histological preparations. Tissue and fluid samples can be collected for toxicological and microbiological examinations.

3 D PHOTOGRAMMETRY-BASED OPTICAL SURFACE SCANNING

With a surface-scanning unit, which projects a fringe pattern onto a surface and is recorded with the help of two cameras, a 3D image can be obtained using special software. Digital photography of the surface from various angles can then be added to the data, thus enabling a true color 3D surface reconstruction. This very accurate documentation, which depends on the applied resolution, can document structures less than 1 mm in size.

APPLICATIONS OF VIRTUAL AUTOPSY

In Virtopsy, there is the combination of the technologies of 3D imaging techniques and 3D surface scan which records and documents the 3D image of the body surface area in detail.

The first step in performing a Virtopsy involves the preparation of the cadaver for imaging. It is accomplished by placing small disks by the personnel along the exterior of the body, so that the surface scan and the interior scans could be aligned easily. These disks mark points are used for obtaining the images into a single cohesive image. Virtibot which are robotic machine helps in accomplishing this task.[7] Therefore, making the results of Virtopsy more standardized and accurate.The markers are used by the computer processors to calibrate the exterior scan of the cadaver and then matches with the internal imaging processes.

After the placing of markers by the virtibot, it creates a 3D color model of the dead body. The scanner utilizes stereoscopic cameras to capture the color image along with, the projector is used to cast a mesh pattern on the body. These cameras have a resolution of 0.02 mm. The robot moves over the body creating a 3D image and the total time taken in this process is about 10s.

After the surface scan, the body is brought to the CT and MRI station which is usually double-covered inside a blue bag through which X-rays pass. It is done in order to prevent any contamination, then the body is laid on the sliding table of the CT, MRI, and MRS equipment simultaneously. The bag will remain closed while the body is scanned both the sides. It is mainly done to respect privacy of the dead, to maintain hygiene and to remain undisturbed by any non-forensic background person present inside the room. The body then undergoes a CT scan which is a procedure that finishes in 20 s and acquires up to 25,000 images; each image is a slice or cut through the body. Then, the corpse is also subjected to MRI and MRS scans. The information from the interior and surface scans are stored in powerful computers where in data are combined, further rendered using computer-aided drafting-style programs and ultra-powerful graphics processors. In a short span as 10 min a detail images of bone and tissue are reconstructed using those computers, from the data which represents thin X-ray slices of the body. Different tissues, foreign materials and bodily substances absorb the scanner's X-rays in different amounts and the different absorption levels are presented into a 3D visual of different colors. The computer can also assign the density differences of any color, but this is usually standardized as blue for air pockets, beige for soft tissues, red for blood vessels, and white for bones. A pathologist is not bounded by any restriction to peel through the layers of virtual skin and muscle with just a click of the computer mouse.

Pathologists and radiologists can depict and study the different patterns. At the same time, images can be manipulated up and down and rotated at various angles, providing instant flexibility that is absent in conventional autopsy. After analysis of the 3D model, internal and* surface scans, a needle biopsy can be done if internal body samples are needed. Virtibot, when used, alleviates the need to expose someone's hand under the CT scan to extract the biopsy. All the data scanned are then captured and saved on compact discs.

The Virtual Autopsy can be applied in a wide number of fields in forensic sciences, such as thanatological investigations; carbonized and putrefied body identifications, mass disaster cases, age estimation, skin lesion analyses etc[8]

For instance, in the cases of drowned bodies, the CT information about the volume, density, size of the lungs and the amount of liquid observed in them which can help in diagnosing the cause of death.

Similarly in cases of firearm projectile injuries which are often difficult to examine because either sometimes the bullet is absent in the body, or diverted

by an anatomical structure, or it can be in unknown body parts. Therefore, knowing the location of the projectile before the autopsy is performed facilitates the examination.

Even in the cases of odontology field, Oesterhelweg described a case where the victim was struck by respiratory obstruction from food bolus. The differentiation of the obstructive structure was performed with combined CT and MRI. In conventional autopsy examinations the greatest difficulty is to predict the depth of the foreign object. The virtual autopsy provides this information with full accuracy and clarity. Another specific odontological application for the Virtual Autopsy is on the comparison between AM orthopantomograms and PM reconstructed panoramic overviews of cranial CT images. This way PM dental evidences can easily be related to the AM data of the expected missing person. Birngruber reported a positive identification case based on the superimposition of post-mortem CT reconstructed images on ante-mortem radiographies.

Dedouit stressed the importance of the presence of dentists in the forensic identification team in particular to determine the age of disfigured bodies. Other studies also relate the role the forensic Odontologist on age estimations. Through the CT analysis of the Australian bushfire victims, the forensic experts obtained substantial information for human identification based on age estimation techniques.

Studies on restorative materials are also related on the virtual technique. Through the analysis of the restoration materials density, Jackowski performed pioneering researches on Odontology in Virtual Autopsy. These authors expressed in Hounsfield Units the different density of restoration materials, such as composites, temporary fillings and ceramics, by ultra-high-resolution CT imaging. Furthermore, the author verified the course of restoration materials under high temperatures by CT images, simulating a fire mass disaster.

FEASIBILITY OF VIRTUAL AUTOPSY

Virtual autopsy is feasible upto a great extent as it provides 3D illustration which are easy to interpret and easily accessible. It allows a digital re-examination of the body and even of putrefied corpse decades later. It takes much less time (almost in few seconds) than the traditional autopsy and hence gives better diagnosis by providing respect to religious sentiments. These make it a reliable technique to get forensic records. The results provided are highly sensitive, specific and accurate. [9] It is non-invasive and non-destructive in nature. It simplifies the work as it identifies the identity, detects foreign bodies and easy demonstration for the court of law.

Though it has many modifications but it does has its own loopholes which needs to be fixed such as the lack of physiological senses of anatomical pathologist like touch, feel, texture and smell senses.[10] The concerned personnel are restricted as there is no direct contact with the dead body. Hence, making it is less feasible in the underdeveloped and developing countries.

FUTURE ADVANCEMENT AND BENEFITS

At present, there are only few institutions in the world who have recognized the feasibility and possible impact of cross-sectional imaging in post-mortem investigation and that have invested efforts in its implementation. For example, the Office of the Armed Forces Medical Examiner (Washington, DC; Dover, Del), the Institute of Forensic Medicine (Copenhagen, Denmark), and the Victorian Institute of Pathology (Sydney, Australia) have already installed their own CT scanners, and in Japan, the Society for Autopsy Imaging was founded in 2003. In future, the use of CT technology will become more widespread at distinguished institutions of forensics and pathology.

Even robotic machine called Virtobot will use all the techniques by fusing surface and body volume data acquisition within a single 3D space. Robotic arms will do a precise and automatic placement of injection tools or biopsy needles.[11]

Recent developments in MR imaging technology such as whole-body or parallel imaging (total imaging matrix) will also significantly reduce examination times for forensic MR imaging examinations, which can still require 3 hours or more per corpse.

If other countries also take initiative to adapt this technology then it can be proved to be a milestone in the field of forensic science.

Conflict of Interest- Nil

Source of Funding- Self

Ethical Clearance- Not required

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DOI Number: 10.5958/0973-9130.2019.00088.4

Profile of Medicolegal Cases Registered in the Casualty of Dr. B.R. Ambedkar Medical College and Hospital, Bengaluru

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Abstract

Medicolegal case is any medical case with legal implications. This study was aimed to know the profile of medicolegal cases registered at the casualty of Dr.B.R.Ambedkar medical college, Benaluru, Karnataka. This study was conducted from January 2015 to June 2015. A total of 819 medicolegal cases were studied and analyzed. We found that males were involved in 68.74% cases and females in 31.25% cases and the male to female gender ratio was 2.19 : 1. Common indications for registering medicolegal case were assault (50.3%), poisoning (18.43%), Road traffic accident (RTA-12.33%), medical check-up of accused (6.83%) and drunkenness certification (6.22%). The commonly used weapon for assault was hard and blunt weapons (63.83%). Victims riding two wheelers accounted for 51.48% of RTA. Most common manner of poisoning was suicidal (83.44%).

Keywords:- *Medicolegal case, Casualty, Assault, Road traffic accident, Poisoning.*

Introduction

A Medicolegal case (MLC) is defined as "any case of injury or ailment, where the attending doctor, after history taking and clinical examination considers that investigations by law enforcement agencies are warranted to ascertain circumstances and fix responsibility regarding the said injury or ailment according to the law or the case itself brought as MLC by law enforcing agencies for medical or surgical care. Medicolegal cases are an integral part of medical practice that is frequently encountered by medical officers[1].

Profiling of medicolegal cases is an essential aspect for the prevention of preventable casualities in the future and to study the genuine crime in the area. It would also be helpful to the medicolegal expert and law enforcing agencies such as the police and the judiciary and ultimately in the process of scientific crime detection and proper administration of justice at large in such cases[2].

It is purely the responsibility of an attending doctor to decide, when to label a case as medicolegal. The police should be informed in all medicolegal cases. Any failure to report the occurrence of a MLC may invite prosecution under sections 176 and/or 202 of IPC[1].

Material and Method

This is a record based cross-sectional study involving medicolegal cases which came to the casualty of Dr.B.R.Ambedkar medical college, Bengaluru from 1st January to 30th June 2015. All the reported MLC cases in the medicolegal case register were included in this study. Cases found as non – medicolegal and those with incomplete entry were excluded. Information regarding gender, age and manner of causation was collected from the medicolegal case register. The collected data was analyzed, observations discussed, tabulated and compared with other studies.

Observations and Results

Total of 819 medicolegal cases were included in

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the study from the medicolegal case register. Out of 819 medicolegal cases studied, 563 (68.74%) were male and 256 (31.25%) were female. Male to female gender ratio being 2.19 : 1. In the present study, maximum number of cases were reported in the age group of 21 – 30 years (43.22%) followed by age group of 31 – 40 years (21.24%). The minimum number of cases was reported in the age group of 1 – 10 years (1.22%) followed by >60 years age group (1.83%). The individuals of geriatric age group were also involved in the medicolegal cases.

Most of the medicolegal cases registered were due to assault (50.3%) followed by poisoning (18.43%) and RTA (12.33%). Medical check-up of accused accounted for 6.83% cases and drunkenness certification accounted for 6.22% cases. Cause of MLC was fall from height (15) in 1.83% cases, hanging(13) in 1.58% cases and burns (10) in 1.22% cases. The male to female ratio varied with the type of medicolegal case. Males were predominantly involved in most of the medicolegal cases except for poisoning, burns and electric shock.

In the present study we observed that most of the medicolegal cases due to assault were from the age group of 21 – 30 years (44.17%) followed by 31 – 40 years (23.3%). Males were more in number (70.38%) than females (29.61%). The commonly used weapon for assault was hard and blunt weapons (263, 63.83%) followed by sharp edged weapons (149, 36.16%).

Of all the RTA'S, victims riding two wheelers (52) accounted for 51.48% cases, out of which 44 were male and 8 were female. 24 victims (23.76%) were in a 3-wheeler of 4-wheeler, out of which 19 were male and 5 were female. Pedestrians were the victims in 19(18.81%)cases, out of which 13 were male and 6 were female.

Among the total poisoning cases, 62 (41.05%) were male and 89 (58.94%) were female. Most common age group involved in poisoning was 21 – 30 years (48.34%) followed by 11 – 20 years (25.16%) and 31 – 40 years (23.17%). Most common manner of poisoning was suicidal (126, 83.44%) followed by accidental (25, 16.55%).

Most common cause of MLC in the age group of 1 – 10 years was RTA followed by assault. In all other age groups, assault was the most common cause.

Table 1: Age and gender wise distribution of medicolegal cases.

Age in years	Male	%	Female	%	Total	%
1 – 10	07	70.0	03	30.0	10	1.22
11 – 20	116	71.6	46	28.4	162	19.78
21 – 30	238	67.23	116	32.76	354	43.22
31 – 40	118	67.81	56	32.18	174	21.24
41 – 50	55	72.36	21	27.63	76	9.27
51 – 60	18	64.28	10	35.71	28	3.41
>60	11	73.33	04	26.66	15	1.83
Total	563	68.74	256	31.25	819	100%

Table 2 : Various indications for medicolegal cases.

Indication for medicolegal case	Male	Female	Total	%
Assault	290	122	412	50.3
Poisoning	62	89	151	18.43
Road traffic accident	80	21	101	12.33
Medical check-up of accused	56	0	56	6.83
Drunkeness certification	48	03	51	6.22
Fall from height	11	04	15	1.83
Hanging	08	05	13	1.58
Burns	02	08	10	1.22
Brought dead cases	05	03	08	0.97
Wall collapse	01	0	01	0.12
Electric shock	0	01	01	0.12
Total	563	256	819	100.0

Table 3: Age and gender wise distribution of Assault, Poisoning & Road traffic accident cases.

Age group in years	Assault		Poisoning		RTA	
	Male	Female	Male	Female	Male	Female
1 – 10	1	1	0	0	6	2
11 – 20	56	14	11	27	22	2
21 – 30	127	55	28	45	25	6
31 – 40	63	33	20	15	8	2
41 – 50	31	12	0	2	13	4
51 – 60	8	5	1	0	4	3
>60	4	2	2	0	2	2
Total	290	122	62	89	80	21

Discussion

A case is made medicolegal by the Medical officer whenever an injured, poisoned, burnt cases are brought to the casualty for treatment irrespective of the history of the case. This is done on the presumption that it is the duty of the doctor to assist the police in the proper investigation of the case, to help catch the accused, and also to prevent any untoward incident in society. In every case of injury all observations and details of examination of the injured person must be entered in the accident register by the medical officer with appropriate sketches and diagrams[3].

A similar study done at a tertiary care hospital in Miraj showed that males were the dominant group (79.4%). Most of the victims were of the age group 21 – 30 years (35.2%). Most of the medicolegal cases registered were due to assault (27.2%)[4]. These findings are similar to our study findings.

A study done by researchers in Jamnagar, Gujarat, has shown that road traffic accidents (31.97%) constituted the majority of medicolegal cases followed by assault (24.20%). This finding is in contrast to our findings. In their study, majority of the victims were males (72.77%) and maximum number of cases were in the age group of 21 – 30 years (32.10%)[5]. These findings are consistent with our study findings.

A similar study done in Kolhapur district, India, showed that common indications for registering MLC were assault (28.90%). Males were involved in 80.66% cases and maximum cases (35.00%) were from age group of 21 – 30 years[6]. All these findings are similar to the present study.

Study done by a group of doctors in Puducherry, India, showed that majority of cases were RTA's (936). This finding is in contrast to the present study. Males (1596) were predominantly involved and the 21 – 30 years age group (28.9%) showed maximum number of cases[7]. These findings are similar to the present study.

In a study done at Ballari, Karnataka, RTA constituted 31.77% cases followed by assault cases (26.71%)[8]. This analysis regarding cause for MLC differs from our study finding.

In a similar study done by Dileep kumar R et al, maximum number of cases were male (72.83%) and majority of cases were from age group of 21 – 30 years (53 cases)[9]. These findings are consistent with the present study.

The common observation in our study and the above mentioned studies is most of the victims were males and maximum number of cases were in the age group of 21 – 30 years. The probable reason for the same can be that males are more involved in outdoor activities and usually the main bread winner for the family, so this makes them more vulnerable to accident, assault or injury. Individuals in 21 – 30 years age group lead more active life, involve themselves in sports, adventurous and thrilling events and recreational activities and they take risk during this age[8].

Conclusion

In the present study maximum number of medicolegal cases were due to assault, followed by poisoning and RTA. Majority of the victims were young adult males. Proper counseling for developing positive attitude and controlling the aggression in youth have to

be promoted. Training of doctors who are involved in handling medicolegal cases is need of the hour because poor opinion is no good than any opinion at all, as the latter can mislead the case and leads to administration of injustice.

Financial Assistance – None

Conflict of Interest – None

Acknowledgement – The authors express their gratitude to Mr.Jaykumar.B, Dr.Basavaraj.B.Huddar, Mr.Nagaraj and Mr.Mahendra for helping us in this study.

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DOI Number: 10.5958/0973-9130.2019.00089.6

Suchey-Brooks Method of Age Assessment in Haryana Population

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Abstract

Of the various identification parameters age assessment of an living individual, decomposed bodies or skeletonised remainsis an integral part of any medico legal case. In case of skeletonised or decomposed remains where visual identification is not possible bones are a valuable source of information regarding identification parameters. Pubic symphysis is one of the bony regions which provide information regarding age even after the epiphyseal closure of long bones. The age assessment from bones varies in different populations. The present study was conducted in Haryana population using six phase system of Suchey-Brooks. The phases in the present study have a large and overlapping age interval. Population specific data of any age assessment method should be made available to use in that particular population

Key words: *Suchey-Brooks method, pubic symphysis, age estimation, Haryana population*

Introduction

Age is one of the inevitable parameter pertaining to any medico legal case. Various methods are used to establish the age in the living person. But in case of skeletonised remains the bones serve as a only valuable source of identification. In adults the fusion of cranial suture(sagittal , coronal , lambdoid spheno-frontal and spheno-parietal sutures), the morphology of the ribs (the depth of the pit, the regularity of the rim edges, and the bone quality), the morphology of auricular surface of iliac bones, microstructure of bones, tooth, and pubic symphysis.

Researchers have formulated different methods to ascertain the age from bones of which pubic symphysis is commonly used. In the year 1920 Todd examined pubic bone collections in Hamman museum and formulated ways to assess the age of the pubic bone. He made a ten phase system of classification. Initially he made his study in American male pubic bones then on male negro white, white female and female negro white pubic bones.[9,10]

Few decades later the ages assessment formulated by Todd was reviewed by Suchey-Brooks and they made their study on mixed population comprising a large sample pubic bones (male = 739; female = 273) from individuals autopsied at office of chief medical examiner Los Angeles and the actual age of the bone was derived either from death or medical certificate. The samples were first analysed using linear regression analysis. They found that the components in the three component system formulated by Mc Kern and Stewart did not vary independently and such a complex technique is not required. They modified the Todd ten phase systems into 6 phases.[11]

The features that were present in pubic bones according to the modified phases were:[11]

Phase I

Symphyseal face had ridges and furrows. horizontal ridges clearly seen and ventral bevelling begins to form. Ossific nodules may be present on the upper extremity. The main difference between this phase and phase II was the lack of definition of the two extremities

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Phase II

The symphyseal face still had ridge formation. Definition of lower and/or upper extremities began and ossific nodules may or may not be present. The ventral rampart may be in beginning phases.

Phase III

The lower extremity and ventral rampart are about to be fully formed. Symphyseal face becomes smooth. Dorsal plateau was completely formed. No lipping was present in the dorsal side. Upper extremity is not completely formed

Phase IV

Usually the oval outline of the face was completely formed. A clear symphyseal rim ahd appeared. Lipping of margins might occur

Phase V

Complete Symphyseal rim was formed with some slight depression in the centre. There was no rim erosion. Superior ventral border might have disintegration.

Phase VI

Symphyseal face has erosions. The bone become porous with pits. The shape of the face became irregular.

This method was widely accepted because of large sample size and the study was carried out on samples from various races originating from the entire North America, Europe, South America and Asia. So such a study was considered to fit the ages assessment from all the population. Since the age assessment from bones mainly depend on the racial and factors the Suchey-Brooks method is best suited for north American population . Even though the Suchey-Brooks method was most popular method of assessing ages from pubic bone, such a study was not found Indian literature. The study aims to use Suchey-Brooks method in assessing the age from pubic symphysis.

Method and Materials

A total of 300 pubic bone belonging to Haryana population were examined. The pubic bones were collected during autopsy after informed consent. The pubic bones were boiled in water contains caustic soda till the soft tissues were sloughed off. The bones were examined for various features like ridges and furrows, formation of dorsal margin, formation of dorsal plateau, formation of ventral bevelling, formation of ventral rampart, formation of symphyseal rim, ossific nodule, formation of upper, lower extremity, lipping and rarefaction The pubic bone samples were analysed according to Suchey-Brooks method of analysis and the results were tabulated.

Results

Out of 300 pubic bones examined 225 were male bones and 75 were female bones. The metamorphic changes occurred in a sequential in a predictable fashion. The pubic symphysis showed a gradual metamorphosis. At first the dorsal margin was formed. The margin extends to form a plateau at about 22 years and 25 years in males and females respectively.

On the ventral side bevelling begins, which later transformed into rampart. As the age increases the rampart was more clear. In the present study, a complete ventral rampart occurred at 30 years in both males and females. Because of the development of both sides of symphysis the extremities became more defined and a completely formed symphyseal rim was first noticed at 40 years in males and 35 years in females. Degenerative changes occurred in the form of disintegration of symphyseal rim was first observed at 48 years and 42 years in males and females respectively.

Age changes of the pubic bone according to Suchey Brooks Method

The pubic bone samples were analysed according to Suchey brooks method of analysis and the results were tabulated (Table 1).

Phase I: In this phase no lower or upper extremity formation occurred. Only ridges and furrows were present. According to Suchey-Brooks, in this phase, the age ranged 15-23 in males and 15-24 in females. This phase in the present study had an age range of 18-23 years in males and 18-24 years in case of females with a mean of 21.14 years and 20.83 years in males and females respectively.

Phase II: In this phase, there was the formation of lower extremity and rampart formation. According to Suchey-Brooks, Phase II had a age range of 19-34 in males and 19-40 in females In the present study, phase II had an age range of 24-32 years in male samples and 25-31 in case of female samples with a mean of

25.85 and 26.93 in males(n=40) and females(n=14) respectively.

Phase III: Ventral rampart was in the process of completion at this phase. In the Suchey-Brooks, the age for this phase varied from 21 to 46 years in case of males and from 21 to 53 years in case of females. In the present study, the age of this phase ranged from 30 to 45 years in male samples and from 30 to 35 years in case of female samples with a mean of 35.67 years and 31.43 years in males(n=56) and females(n=7) respectively.

Table1: Distribution of Male and Female pubic bones according to Suchey-Brooks Method.

Suchey-Brooks phase Age range(years)	Males(Present study)			Suchey-Brooks phase	Females(Present Study)		
	Age Range (years)	Mean (years)	Samples(n)		Age Range (years)	Mean(years)	Samples(n)
I(15-23)	18-23	21.14	44	I(15-24)	18-24	20.83	12
II(19-34)	24-32	25.8	40	II(19-40)	25-31	26.93	14
III(21-46)	30-45	35.67	56	III(21-53)	30-35	31.43	7
IV(23-57)	38-48	43.76	33	IV(26-70)	32-40	38.7	10
V(27-66)	41-65	56.61	24	V(25-83)	38-52	46.2	10
VI(34-86)	48-75	62.86	28	VI(42-87)	42-80	61.09	22
	Total		225				75

Phase IV: In this phase begins at an age when the symphyseal rim is in the process of completion at times a hiatus can occur in the upper ventral rim. According to Suchey-Brooks, the age of this phase occurs at 23-57 years in males and 26-70 years in females. This phase in the present study had an age range of 38-48 years in male samples and 32-40 years in females samples with a mean age of 43.76 years and 38.70 years in males (n=34) and females(n=10) samples respectively.

Phase V: In this phase lipping of dorsal margin occur associated with symphyseal rim formation. According to Suchey-Brooks, this phase was seen from 27-66 years in males and from 25-83 years in females. In the present study, this phase had an age range of 41-65 years in male samples and 38-52 years in case of females with a mean of 56.61years and 38.70 in males(n=23) and females(n=10) respectively.

Phase VI: In this phase, symphyseal rim erosion occurs. According to Suchey-Brooks, the age for this phase ranged from 34-86 years for males and 42-87 years for females. In the present study, the age varied from 48-75 years with a mean age of 62.86 years in the male sample (n=28) and the age ranged from 42-80 years in case of female samples (n=22) with a mean of 61.09 years.

Discussion

Though the Suchey-Brooks method is used widely and recommended method for assessing the age,[12] to the best of the author's knowledge the Indian literature on this method was not obtained. Comparing the present study with the original Suchey-Brooks method, it was evident that the age range of the present study falls within the age range of the Suchey-Brooks method for both sexes. Classification of pubic bones done according to Suchey-Brooks method resulted in the larger age range for different phases and hence accurate aging of the pubic bone cannot be done satisfactorily. Even though the difference in mean ages for different phases between Suchey-Brooks study and the present study was very minimum in case of female, yet because of large and overlapping age interval accurate grouping seemed difficult.

The method was tested for its applicability in various populations. Bednarek et al. made a study on polish population using Suchey-Brooks method and found that the system was applicable to only group

containing young male bones. [13] Sarajlić et al concluded that the age ranges are lower than the original Suchey-Brooks method which is similar to our study. In each phase there is a possibility that the age may be underestimated or overestimated compared with actual age. [12] Sakaue declared that the Suchey-Brooks phases can be used as a valuable scale for assesieng the age of unknown Japanese skeleton.[14] Djuric´ et al in their study recommended that a population specific correction is required in the Suchey-Brooks method for using in Serbian population.[15] Savall et al recommendes that the with the Suchey-Brooks method they could not arrive at a conclusion on population variation , they also suggeat that reference samples shouls be created for a particular population.[16] Millan et al conducted more research should be conducted in specific population before applying in the field of forensic and archaeology.[17]the Buckberry-Chamberlain method seems to be the method that provides better estimates in terms of accuracy (percentage of hits Hartnett devised a seven pahse system after analysing the pubic bone by three observers and since there was discrepancies in observed and actual ages they revised Suchey-Brooks method and devised a seven phase system

Conclusion

The following are recommended for best results using Suchey-Brooks method on regional analysis of pubic bone [18]

1. A particular population should be involved in the study and the geographical and demographic profile should be available and any confounding factors are also required
2. Males samples should be preferably used.
3. The exact age should be known and the study should be blinded
4. A stratified sample should be used with definite age interval.
5. The complete data of each sample should be made available for others to review their work
6. Both inter and intra observer evaluation of bone evaluation is mandatory
7. Various stastical tests should be used to apply the method in the field
8. More than one method of age assessment should be used to increase the accuracy

Conflict of Interest : Declared none

Funding : None

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DOI Number: 10.5958/0973-9130.2019.00090.2

Fatal Internal Thoraco-Abdominal Injuries: Prospective Study of 216 Autopsy Cases

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Abstract

It is a prospective study of 216 autopsy cases where there were significant thoraco-abdominal injuries. Out of the total 1041 autopsies conducted during the study period there were 216 cases of thoraco-abdominal injuries. The prevalence is more amongst male in any given age group, over all male female ratios being about 4.8:1. Maximum cases are seen in the age ranges of 21 to 51 years. RTA was the most common cause of thoraco-abdominal injuries seen as many as 165 cases, 76.38%. It was followed by fall from height which was seen in 18 cases, 8.33%. In the abdominal region, internal injuries were more common than external injuries and liver was the most frequently involved internal organ seen in 135 cases out of which laceration was observed in 127 cases.

Keywords: *Thoraco-abdominal injuries, RTA, Internal Organs, Blunt force, autopsy*

Introduction

Since thorax and abdomen contain many vital organs like heart, lungs, liver, spleen, kidneys, intestine etc any injury to this region can prove quite fatal. Because of its size and anatomical position it is an important site of trauma in road accidents, railway accidents, fall from height, assaults, etc. They are one of the leading causes of morbidity and mortality leading to heavy socio-economic loss all over the world. Since abdomen is a pliable structure, it's vulnerable to sustaining injuries to internal organs even with no external sign of injury evident. So, we may easily miss deep seated underlying dangerous injuries. Injuries to the chest are common, with up to 20% of trauma patients presenting with thoracic injuries[1]. Motor vehicle accidents are the commonest cause of fatal thoraco-abdominal injuries followed by fall from height[2]. With the advancement of science and technology there is very fast change in life along with concomitant raise in the incidence of thoraco-abdominal injuries.

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Material & Method

It is a prospective study of 216 autopsy cases where there were internal injuries in the thoraco-abdominal region. We excluded all autopsy cases of thoraco-abdominal injuries due to burns & electricity. All cases where there is no important internal thoraco-abdominal injury were also excluded from the present study. Detailed information like age, sex, marital status, manner of death, survival period, cause of death etc was collected from the police inquests, relatives & hospital case sheets. All the relevant findings were tabulated, studied and compared with the works of other authors. Hemorrhagic shock was the commonest cause of death and most of the victims died on the spot or before reaching hospital.

Observation

Out of the total 1041 autopsies conducted during the

study period there were 216 cases of thoraco-abdominal injuries. There were 179 male, 82.87% and 37 female victims, 17.12% with the male female ratio of 4.8:1.

Table No.1 shows age wise distribution of cases. Maximum cases are seen in the age ranges of 21 to 51 years. Only 2cases, 0.92% were seen in the above 70yrs range. Table No.2 shows manner wise distribution of cases. For both male and female RTA was the most common cause of thoraco-abdominal injuries seen as many as 165 cases, 76.38%. It was followed by fall from height which was seen in 18 cases, 8.33%.

Amongst the important internal organs liver were the most affected organ, seen as many as 135 injuries out of which 1 was stab and 127 lacerations. It is shown in Table No.3. Spot death was seen in 82 cases, 37.96% as shown in Table No.4. Hemorrhagic shock was the commonest cause of death seen in 109 cases, 50.46% which was followed by head injuries, Table No.5.

Table No.1: Age Wise Distribution Of cases

Age in Yrs	Male	female	Total	%
0-10	3	2	5	2.31
11-20	9	3	12	5.55
21-30	39	8	47	21.75
31-40	51	11	62	28.70
41-50	49	6	55	25.46
51-60	20	6	26	12.03
61-70	6	1	7	3.24
Above 70	2	0	2	0.92
Total	179	37	216	100

Table No.2: Manner wise Distribution of Cases

Manner	Male	Female	Total	%
RTA	137	28	165	76.38
Assault	12	4	16	7.40
Fall From Height	18	0	18	8.33
Railway	5	3	8	3.7
Unknown	7	2	9	4.16

Table No.3: Cases Distribution According to Organs Involved

Organ	Contusion	Lace-ration	Stabs	Crush	Total
Heart	3	21	5	0	29
Lungs	21	58	2	0	81
Liver	4	127	1	3	135
Kidney	2	0	0	0	2
Spleen	0	3	0	0	3
Stomach	0	0	0	1	1
Intestine	5	2	0	3	10
MBV	2	3	1	3	9

N.B. :- MBV means Major Blood Vessels

Table No.4: According to Period of Survival

Time	Male	Female	Total	%
Spot Death	59	23	82	37.96
Brought Death	70	5	75	34.72
Up to 1day	14	1	5	2.31
Up to 2days	10	2	12	5.55
Up to 3days	1	3	4	1.85
Up to 1week	14	1	15	6.94
More than 1week	11	2	13	6.01
Total	179	37	216	100

Table No.5: According to Cause of Death

Cause of Death	Male	Female	Total	%
Hemorrhagic Shock	89	20	109	50.46
Head Injuries	68	8	76	35.18
Traumatic Asphyxia	5	1	6	2.77
Peritonitis	7	2	9	4.166
Septic Shock	10	6	16	7.40
Total	179	37	216	100

Discussion

In the present study there were 216 autopsy cases of death due to thoraco-abdominal injuries. The prevalence is more amongst male in any given age group, over all male female ratios being about 4.8:1. In this regard the present study is in agreement with the works of other authors[5,6,7]. Overall incidence was highest in the age range of 21 to 50yrs. This finding is also consistent with the works of Husaini Numan et al[8] and Suresh Kumar Shetty B et al[7] respectively. This sex dominance of males may be explained by the fact that males are more active and mobile to earn livelihood of their families.

So far causes of thoraco-abdominal injuries are concerned RTA emerges as the single most important cause seen in as many as 165 cases, 76.38%. This value is quite high if we compare with the works of other authors. Suresh Kumar Shetty B et al[7] observed involvement of heavy motor vehicle in 44.4%. Higher value in the present study may be due to the fact that its unique location along the GST Road, one of the heaviest traffic highways in India.

Blunt force trauma to the chest can damage the internal organ without damaging the thoracic wall. External thoracic injuries are more common than the internal, which correlates with the observations made by the previous researchers. But in the present study we selected only cases with internal injuries. Among the internal thoracic injuries, lungs were the most common organ involved followed which was by the heart. There were 81 different types of injuries in lungs, lacerations being the commonest type which was followed by contusions. The lungs occupy most of the rib cage, and thus are probably more vulnerable to injury when compared to the heart. Our findings are consistent with the earlier studies by other researchers [8].

In abdomen liver was the most frequently involved internal organ seen in 135 cases out of which laceration was observed in 127 cases. Our finding is in agreement with the works of Kaul A et al[10], Chandula R[11] and Husaini Numan et al[8] . Liver being the largest internal organ and owing to its anterior location is more often the target of blunt force trauma as reported in the earlier studies. However, Suresh Kumar Shetty B et al[7] reported kidney to be the most commonly affected internal abdominal organs in his studies.

The incidence of spot death was very high, seen in 82cases, 37.96%. It was followed by brought death cases, seen in 75cases, 34.72%. So, if we take together then most of the victims died before getting treatment in hospital. Hemorrhagic shock was the commonest cause of death as there was involvement of vital internal organs like liver laceration.

Conclusion

The thoraco-abdominal injuries require multidisciplinary approach of immediate management. Prompt transportation with facilities for adequate pre-hospital care should be routinely provided at various places for immediate care, stabilization and timely shifting of trauma victims to a well equipped trauma care centre.

Conflict of Interest: It is hereby to declare that this is an original research manuscript and it has never been submitted to any publisher for publications in any form. Further, we declare that all contents are our original works only and there will be no any conflict of interest with any author (s). In case of any conflict the sole responsibility will be borne by us.

Source of Funding: It is to certify that the present study was conducted without any fund support from any authority or organization. All expenses were borne by us. If there is any dispute we will bear all responsibilities.

Ethical Clearance: As the study was done within the purview of routine medico legal autopsy there was no any necessity of obtaining a separate Ethical Clearance Certificate from the authority.

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DOI Number: 10.5958/0973-9130.2019.00091.4

Autopsy Study of Sudden Cardiac Deaths of Adults Examined at a Tertiary Level Police Morgue of West Bengal

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Abstract

Cardio-vascular disease (CVD) is now the most common cause of death worldwide. Sudden death (SD) is mainly defined as rapid, unexpected & natural death. This investigation was designed to examine the relationship of parameters like weight of the heart (in sudden cardiac death), histopathological examinations of the heart, brain, kidney and liver to generate epidemiological data of sudden death in a semi-urban setting. Cardiac enlargement or hypertrophy is itself a risk factor for sudden cardiac death. Structurally normal heart has also been found in a proportion of sudden deaths in the present series.

Keywords : *sudden death, cardiac cause, hypertrophy, autopsy , risk factors.*

Introduction

The primary aim of post mortem examination (Medicolegal autopsy) is to determine the cause of death, the possible manner of death and carry out further investigation of unnatural deaths. Sudden death (SD) is mainly defined as rapid, unexpected & natural death.

Often sudden deaths are reported to the police as un-natural and suspicious requiring medico-legal autopsy. This is frequently encountered in settings where the death has been unattended or there was no scope for hospitalization for proper certification of cause of death. Accordingly, all these cases are examined under section 174 Cr PC (police inquest) and sent for autopsy as per Indian law. Complete autopsy along with histopathology often reveals the actual cause of death as due to some natural disease. Autopsy is also resorted to in patients who died in the hospital & the attending physician is unable to certify death from the clinical findings (pathological autopsy). Shreedhar N C in 2013 conducted an autopsy study of sudden natural deaths at KIMS Hospital, Bangalore, showing that incidence of sudden natural deaths was 88 out of 760 (11.57%) amongst medico-legal autopsies, conducted during that period[1].

Cardio-vascular disease (CVD) is now the most common cause of death worldwide. Before 1900, infectious diseases and malnutrition were the most common causes and CVD was responsible for less than 10% of all deaths.

World Health Organization has declared India the coronary artery disease (CAD) capital of the world (Madhavan SR et al,2011, and Sree Lakshmi K et al,2014)[2,3].

In a study of 1000 consecutive autopsies on individuals dying of natural disease, cardiovascular disease was responsible for 60.9% of all deaths. Coronary artery disease was not only the main cause of CVD but also the main cause of all natural deaths accounting for 45.1% of cases. Diseases of the central nervous system and respiratory system accounted for 8.7% and 8.6% respectively of natural deaths. A majority of deceased were married. Cardio-vascular

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disease was the most important cause contributing 58.73% of sudden natural deaths. These cardiac cases were mainly due to coronary artery disease, coronary thrombosis and acute myocardial infarction. About 90.49% cases were brought dead to the hospital[4] (Gupta S, Panchal R, 2011).

The present study was designed to examine the relationship of parameters like weight of the heart (in sudden cardiac death), histopathological examinations of the heart, brain, kidney and liver to generate epidemiological data of sudden death in a semi-urban setting. Furthermore the morphological and histopathological changes in heart, lung and other organs in sudden death were also examined.

Another objective of the investigation was to study the risk factors with special reference to morphological changes in heart in cases of sudden death.

Materials and Method

A longitudinal descriptive study was conducted for one and a half year after obtaining ethical clearance from the IEC. Persons who died instantaneously or within 24 hours of the onset of symptoms, and patients who were admitted to the hospital for the symptoms & died within 24 hours of the onset of symptoms were included in the study. Complete autopsy was performed at the mortuary of a tertiary level morgue will histological examination using standard protocol.

Exclusion criteria – (a) deaths occurring after 24 hours of the onset of symptoms, (b) pregnancy related deaths, (c) deaths due to mechanical injuries and burn, (d) unnatural deaths (drowning, poisoning etc.). Descriptive & inferential statistics was used to analyze data. Data was analysed using SPSS 13 for Windows.

Results

During this period, 2324 autopsies were conducted, out of which, 94 cases (4%) were sudden deaths and all these cases of sudden deaths were found to be occurring in adults, i.e. more than 18 years old.

All these 94 cases of sudden natural deaths were selected for the study based on purposive sampling.

Among 94 cases, the majority, i.e. 63 (67.02%) cases were due to cardio-vascular ailments, 8 (8.51%) were due to ailments of the respiratory system, 4 (4.26%) were due to the ailments of the gastro- intestinal system, central nervous system ailments contributed 6 (6.38%) cases, 1 (1.065) case was due to kidney ailments and in the remaining 12 (12.77%) cases, no specific cause could be attributed for their sudden deaths after extensive investigations and they thus emerged to be as negative autopsies.

Out of the 63 cases of cardio-vascular diseases, 25 cases were of dilated cardio-myopathy, 21 cases were of hypertrophic cardio-myopathy and 10 cases were of occlusive coronary disease. Out of the 8 cases of respiratory diseases, 4 cases were of pulmonary tuberculosis and 2 cases were each of bronchopneumonia and pulmonary embolism. Among the 6 cases of C.N.S. diseases, 2 cases were each of SUDEP and cerebral malaria. Undetermined cases still remained 12 cases.

Significant co-relation was observed between sex with age (p value is 0.004, which is even less than 0.01). No significant association was observed between heart weight and sex (p value is 0.225).No significant difference was observed between time interval between onset of symptoms and death with sex (p value is 0.262).

Mean heart weight of the victims of sudden death was found to be 323.68 grams. This value is significantly different from 270 grams, which is considered to be the average weight for the general population.

There was no significant (p value is 0.815) co-relation between heart weight and age.

Co-relation between heart weight of the deceased with time of death since the onset of symptoms is highly significant (p value is 0.0004).

There is significant difference between the heart weights of the victims among the rural and urban population (p value is 0.0003) as seen in Table 1.

The mean weight of heart of those subjects, dying because of a cardiac cause was significantly higher than that in the rest (p value is 0.0002).[table 2]

Table 1:Group Statistics showing heart weight

	locality	N	Mean	Std. Deviation	Std. Error Mean
Heart wt (grams).	urban	54	355.5000	54.92319	7.47410
	rural	40	280.7250	60.44832	9.55772

Table 2 :Result of t test

		N		Mean	Std. Deviation	Std. Error Mean
Heart wt.	Cardiac cause	63		357.0317	47.23448	5.95098
	Non cardiac cause	31		255.9032	51.65743	9.27795
		t	df	Sig(2 tailed)	Mean difference	Std Error difference
Heart wt.	Equal variances assumed	9.461	92	.000	101.12852	10.68878
	Equal variances not assumed	9.175	55.238	.000	101.12852	11.02246

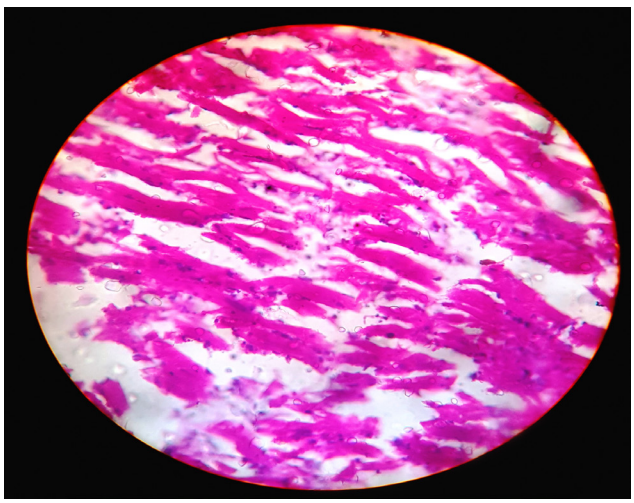

Figure 1 : Microphotograph (h/e X400) showing hypertrophy & disarray of fibrils in a case of hypertrophic cardiomyopathy.

Discussion

In the present study, age wise distribution of sudden deaths was examined. It was observed that majority (41cases/ 43.62%) of the sudden natural deaths were in the age group of 51-60 years followed by 20 (21.28%) cases in the age group 61-70 years and least (1.06%) were in the age group of >70 years. No cases were observed in the age group less than 20 years. Age range was from 27 to 77 years. Kumar et al showed the largest number of sudden natural deaths in the age group of 41-50 years[5]. Sarkioja et al showed maximum number of cases from the age group of 40-49 year[6]. Zanjad et al[7] showed that most of sudden deaths were in the age group of 31-50 years. Ambade V.N showed 20.75% peak incidence in the age group 31-40 years followed by 41-50 years[8]. From all the above studies, it was observed that the maximum numbers of sudden deaths were seen in the middle aged 31 to 50 years (Shreedhar 2013), whereas the present study indicated a somewhat elder age-group to be more vulnerable. This may be because this tertiary centre caters to a somewhat rural belt, where effects of urbanisation, which is an important factor in the causation of sudden deaths, is comparatively less than Present study is consistent with Kuller et al, the place of onset of symptoms was home in 62.4% of cases[9]. In a study by Fornes et al, sudden coronary death occurred in 83% of cases at home[10]. Durigon M and De La Grandmaison G.L showed that the sudden death occurred more frequently in males at rest[11]. In a study by Derya A.A, 67.7% were found dead indoors[12] while other studies[13] also indicate similar findings .

In the present study, among 94 cases, the majority of the sudden natural deaths (67%) were due to the diseases of cardiovascular system, followed by deaths due to diseases of respiratory system accounting to 8.51%. The diseases of Central nervous system and gastro- intestinal system constituted 6.38% and 4.26% respectively

Regarding deaths related to the cardiovascular system, dilated cardiomyopathy (DCM) and hypertrophic obstructive cardio-myopathy (HOCM) were the most common causes of sudden deaths. In this study, 39.7 % of the deaths from cardiovascular system diseases were related to DCM. Sree Lakshmi K et al also observed that coronary artery disease was the most common cause among cardio-vascular reasons. Thus from all above studies, it is seen that coronary artery disease was the most important cause not only among deaths due to cardiovascular causes but also among sudden deaths and 33.3% due to HOCM.

In a recent study from eastern India, Nayak et al 2015 have concluded that hypertrophic cardio-myopathy is a relatively common cardiac disorder in which sudden unexpected death is the most unwelcome component, occurring throughout life, often in asymptomatic patients[14]. They have emphasised on the priority to identify HCM patients who are at high risk and appropriate measures should be taken to prevent sudden death.

There was no significant (p value is 0.815) co-relation between heart weight and age. In the general population, we generally find that heart size and heart weight accordingly increase with age (Knight 2004)[15]. But, in this study, we found that younger persons too had an alarmingly large heart size and weight, which might have been a reason for their early and sudden death. Nayek et al, 2015 observed that hypertrophic obstructive cardio-myopathy was the most leading cause of sudden death[14]. So, incidental finding of a large size heart in a younger person should bring him under surveillance for greater care and protection against sudden early death. No significant association was observed between heart weight and sex (p value is 0.225). This signifies that persons of any sex may suffer from cardiac pathology with enlarged heart size and weight, which increases the risk of sudden death among them.

By taking 270 grams as the cut-off weight (prevalent among the general population) for hearts[16] (Dikshit PC), interestingly, we observed that there was significant association between the heart weights of the deceased persons, who died suddenly with that of the general normal population (i.e. 270 grams) [p value is 0.0004, which is much less than 0.01]. The mean heart weight of the deceased persons was found to be 323.68 grams, which shows the mean difference with that of the general population to be 53.68. This signifies that enlarged heart size, irrespective of any cardiac pathology or not, is always at an increased risk of sudden death. The mean weight of heart, dying because of a cardiac cause was significantly higher than that in the rest (p value is 0.0002).This finding helps us to conclude that cardiac enlargement or hypertrophy is itself a risk factor for sudden cardiac death, similar to the observation by Nayek is in agreement with other studies [17-21] that among the chronic diseases, cardio-vascular causes, as a whole, were the largest reason behind such sudden deaths, followed by respiratory, gastro-intestinal, central nervous systems .

Conclusion

Meticulous autopsy backed up by histopathology is the corner-stone of investigation of sudden death in our day to day practice.

Cardiac enlargement or hypertrophy is itself a risk factor for sudden cardiac death.

Structurally normal heart has also been found in a proportion of sudden deaths in the present series. However, we also need to formulate a comprehensive protocol to investigate sudden, suspicious and unexpected deaths giving due regard to the pathology of conduction disorders and various cardiac channelopathies in otherwise structurally normal heart.

Sudden natural death is often encountered by the forensic pathologist in routine practice.

The role of the autopsy surgeon is emerging as an important contributor to the body of research in public health.

Conflict of Interest : There is no conflict of interest, financial or otherwise of any of the authors of the present work.

Source of Funding: No funding or any form of financial assistance was obtained from any source.

Ethical Clearance: Approval of the institutional ethics committee [IEC, BMCH] was taken before commencement of the investigation.

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DOI Number: 10.5958/0973-9130.2019.00092.6

To Study the Effect of Drugs on Neuro- Muscular Movement Leading to Variation in Handwriting

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Abstract

The goal of the present study is to describe whether a simple handwriting measure can discriminate between individuals with drug addiction. Monitoring drug-induced side effects is especially important for patients who undergo treatment with antipsychotic medications, as these drugs often produce extra pyramidal side effects (EPS) resulting in movement abnormalities similar to Parkinsonism. For the experiment, we examined writings of 9 patients who were undergoing treatment at a rehabilitation centre. Participants were instructed to write a illustrated text when in normal condition as well as under drug induced condition. There were four important observations from this study: (1) Drug-induced patients exhibited impaired movement velocities and velocity scaling; (2) there was a positive correlation between the font size scaling for drug-induced condition and normal; (3) Participants displayed abnormalities in movement smoothness in the form of tremors in drug induced conditions; and (4) There was a positive correlation between pen movement and pictorial effect of the participant before and after drug induction.

Keywords: *Drug, EPS, Handwriting.*

Introduction

Writing is an acquired motor skill starting from early age and once developed, the mature handwritings remains stable over long periods of time in adult individuals. But in some cases due to repeated use of drugs, drugs-related neurological deterioration affect handwritings. Indeed, drugs can cause observable effects upon a person's handwriting and an amnesic state may occur after consumption of drugs, which raises questions of authenticity in practice.[1] On the other side, if a person consumes drugs, he may write anonymous or non-anonymous threatening notes and subsequently deny authorship.

The study of handwriting has a long history of use in neuropsychiatry, particularly for understanding neuroleptic-induced extra pyramidal side effects.[2,3] Haase (1961) was the first to demonstrate a relationship between clinical effectiveness of neuroleptic medication and EPS using handwriting analysis. He noted that as neuroleptic dosage increased, patients showed Parkinsonism.[1] Patients' handwriting slowed (bradykinesia) and decreased in size (micrographia). When decreasing the dosage, the handwriting disturbances disappeared but also the beneficial effects of the medication diminished. This relationship was referred to as the "neuroleptic threshold": the minimum dose a patient needs to obtain clinical efficacy while minimizing any of these sedating side effects.[4] Since then, clinicians have considered the extrapyramidal motor system as a reliable window into neuroleptic actions on the nervous system. The use of handwriting to assess EPS has been the focus of research primarily in Europe (Gerken, Wetzel, & Benkert, 1991; Haase, 1961, 1978; Kuenstler, Hohdorf, Regenthal, Seese, & Gertz, 2000; Kuenstler, Juhnhold, Knapp, & Gertz, 1999). Gerken et al. (1991) studied movement size (i.e., area encompassed by handwriting) in schizophrenic patients 512 M.P. Caligiuri et al. / Human Movement Science 25 (2006) 510–522 for predicting treatment response.

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Treatment with antipsychotics caused a reduction in the overall size of the handwriting samples in 33% of the treatment responders and 75% of the treatment non-responders. These results suggest that risk of developing intolerance to a neuroleptic medication can be detected prior to treatment in a majority of patients. The authors concluded that use of handwriting parameters could improve the evaluation of side effects of neuroleptic medication beyond evaluation using observer-based rating scales alone.[5,6]

Materials and Method

Sample collection

For the present study, handwriting samples of 10 individuals who were undergoing treatment at rehabilitation center (Navchaitnya vaisyanmukti, Kendra, 14, Baba Farid Nagar, Gaytri nagar, Koradi Road, Mankapur, Nagpur-440030) were taken with concern. Out of 10 samples, 5 samples were from chronic addict and 5 samples from acute addict were collected. The samples collected from 10 individuals, were in two form one before injecting the drug i.e. normal condition and one handwriting sample taken in intoxication condition(after injecting drugs).[7] The written material used for standard text was selected based on familiarity and simplicity of content, reasonably balanced number of upper–lower extender, middle zone characters, and each letter of alphabet was incorporated among the words.

These samples were collected on white paper sheet (lined or plain) with same writing instrument, same writing support, same writing position, under same lighting condition. All samples were collected with blue ball point pen.[8]

The standard text stated

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Table 1: Shows the labeling of the samples collected.

Sample	Drugs	Type of addiction
Sample-C1a & Sample-C1b	Brown Sugar	Chronic
Sample-C2a & Sample-C2b	Brown Sugar	Chronic
Sample-C3c & Sample-C3c	Ganja	Chronic
Sample-C4a & Sample-C4b	Ganja	Chronic
Sample-C5a & Sample-C5b	Ganja	Chronic
Sample-A6a & Sample-A6b	Ganja	Acute
Sample-A7a & Sample-A7b	Ganja	Acute
Sample-A8a & Sample-A8b	Ganja	Acute
Sample-A9a & Sample-A9b	Brown sugar	Acute
Sample-A10a & Sample-A10b	Brown sugar	Acute

Analysis

For the present study, handwriting comparisons and examinations were performed manually

with the help of scale, pencil, etc. Analysis is done based on class characteristics and individual characteristics. All handwriting specimens taken were assessed using a multiple-choice checklist. Checklist was used for the methodical assessment of handwriting change under the influence of drugs.[9] All these parameters were analyzed manually under proper lighting condition and with the help of same scale. The handwriting samples of an individual (normal handwriting and handwriting after intoxication) were compared among themselves based on general as well as individual characteristics such as word length, height of upper and lower case, ascending, descending character bodies, spacing between words, variation between spacing of words or characters, number of misspellings, omission, tapered ends, etc. to know the difference between normal handwriting and handwriting after intoxication. The comparison table was created for both class and individual characteristics to analyze the sample of individuals (after and before intoxication) in a tabular format.

Results and Discussions

The table given below is the internal comparison of basic criteria's used for analysis, the samples obtained were marked as C1a i.e. before injecting the drug and C1b after injecting the drug, were observed on the following basis.

Table 2: Observation table for Internal comparison of C1a and C1b

Sr. No.	Features of Analysis	Before drug injection	After drug injection
1	Word Length (cm)	2.522	2.236
2	Height of upper case character bodies	0.337	0.325
3	Height of lower case character bodies(e)	0.284	0.290
4	Height of ascending letter character bodies	0.454	0.467
5	Height of descending letter character bodies	0.536	0.514
6	Alignment	L-irregular	L-irregular
		R-irregular	R-irregular
7	Angularities	k,z	k,z
8	Tremors	Moderate	Significant
9	Number of tapered ends	2	3
10	Misspelling	2	4
11	Omission of characters	3	7
12	Omission of word	0	7
13	Abnormal use of upper case letters	3	2
13	Abnormal use of lower case letters instead of upper case letters	3	2
14	Number of corrections	8	6
15	repetition of words	0	7
16	Spacing between words	0.48	0.35
17	Variation in spacing between lines	none-remarkable	none-remarkable
18	Variation in spacing between words	Moderate	Moderate
19	Variation in spacing between characters	None-remarkable	None-remarkable
20	Writing Quality		
20-a	Speed	Medium approx. 14 min	Slow- 19 min.
20-b	Skill	Medium	Medium to low
20-c	Slant	vertical/forward	vertical
20-d	Size	Medium- 11 lines	Relatively small-8lines

Cont... **Table 2: Observation table for Internal comparison of C1a and C1b**

20-e	Space	Normal	Relatively narrow
20-f	Alignment	Horizontal/Descending	Descending
20-g	Rhythm	Poor	Poor
20-h	Line-quality	Poor	Poor
20-i	Movement	Finger	Finger
20-j	Pen pressure	Consistent	Varying

On internal comparison of samples C 1a and C1b the characteristics like Word Length, height of upper case character bodies, Height of descending letter character bodies, Spacing between words, abnormal use of upper case letters, abnormal use of lower case letters instead of upper case letters and number of corrections is found to be altered during the injected state when compared with normal state. Significant changes were observed in certain characteristics like height of lower case character bodies (e), Height of ascending letter character bodies, No. of tapered ends, Misspelling, Omission of characters, Omission of word, more prominent pen lifts and tremors were seen in later stage than in the normal condition.

In the samples C2a and C2b, the characteristics like Word length (cm), Height of upper case character bodies, Height of lower case character bodies(e), Height of ascending letter character bodies, Height of descending letter character bodies, Number of tapered ends, Misspelling, Omission of characters, Abnormal use of upper case letters, Number of corrections, Spacing between words, are more in case of writing after consumption of drugs than the normal writing. Some characteristics like Omission of word are more in case of normal writing than the writing after consumption of drugs.

For the samples C3a and C3b, it was observed that the characteristics like word length (cm), height of upper case character bodies, height of lower case character bodies(e), height of ascending letter character bodies, height of descending letter character bodies, Omission of characters, number of corrections, Spacing between words, are more in case of normal writing than the writing after consumption of drugs . Some characteristics like no. of tapered ends, misspelling, omission of word, are more in case of writing after consumption of drugs than the normal writing.

In the samples C4a and C4b, the characteristics like word length (cm), height of upper case character bodies, height of lower case character bodies(e), height of ascending letter character bodies, height of descending letter character bodies, abnormal use of lower case letters instead of upper case letters spacing between words are more in case of normal writing than the writing after consumption of drugs. Some characteristics like number of tapered ends, misspelling, omission of word, number of corrections and repetition of words, are more in case of writing after consumption of drugs than the normal writing.

In the samples C5a and C5b the characteristics like word length (cm), height of upper case character bodies, height of ascending letter character bodies, height of descending letter character bodies, abnormal use of lower case letters instead of upper case letters, spacing between words, number of tapered ends, misspelling, omission of word, number of corrections are more in case of normal writing than the writing after consumption of drugs. The characteristics like, height of lower case character bodies(e) are more in case of writing after consumption of drugs than the normal writing.

In the samples A1a and A1b the characteristics like word length (cm), height of upper case character bodies, Height of ascending letter character bodies, Height of lower case character bodies(e), Abnormal use of lower case letters instead of upper case letters, Spacing between words, Number of tapered ends, Misspelling, Omission of word, Number of corrections are more in case of the writing after consumption of drugs than normal writing .The characteristics like Height of descending letter character bodies are more in case of the normal writing than the writing after consumption of drugs .

In the samples A2a and A2b, the characteristics like Number of tapered ends, Number of corrections, Spacing between words, Height of descending letter character bodies, Height of ascending letter character bodies, Height of lower case character bodies(e), Height of upper case character bodies, Word length (cm) are

more in case of the writing after consumption of drugs than normal writing . The characteristics like Abnormal use of upper case letters, Omission of characters are more in case of the normal writing than the writing after consumption of drugs .

In the samples A3a and A3b, the characteristics like Word length (cm), Height of upper case character bodies, Height of lower case character bodies(e), Height of ascending letter character bodies, Height of descending letter character bodies, Number of tapered ends, Omission of characters are more in case of the writing after consumption of drugs than normal writing .The characteristics like Spacing between words are more in case of the normal writing than the writing after consumption of drugs .

In the samples A4a and A4b, the characteristics like Word length (cm), Height of upper character bodies, Height of lower case character bodies (e), Height of ascending letter character bodies, Height of descending letter character bodies, Abnormal use of upper case letters, Number of corrections, Spacing between words, Number of tapered ends, Misspelling are more in case of the writing after consumption of drugs than normal writing .The characteristics like Omission of characters are more in case of the normal writing than the writing after consumption of drugs .

In the samples A5a and A5b, the characteristics like font size, Word length (cm), tapered ends, omission of particular alphabets, tremors in writing, pen lifts, abrupt endings are more in case of the writing after consumption of drugs than normal writing. Spacing between words, Number of tapered ends, Misspelling are more in case of the normal writing condition then after injection of drugs.

Similar internal comparisons were performed for all the incurred samples it was observed that Number of tapered ends, Misspelling, Omission of word, Number of corrections, repetition of words, size of letter are the most affected in case of chronic drug addicts and in case of acute drug addicts tremors, misspelling, alignment and use of upper case in comparison to lower case was prominently observed. Spacing between the words and change in word length and font size was also affected in both chronic and acute drug addict samples, which in turn changes the overall pictorial effect of the handwriting due to: inconstant pressure; - inconsistency and incoherence in keeping slant left/ right; - performing individual letters with different slants, - sloppiness and mistakes (based on impaired endocrine or muscle spasticity problems); - sudden deviations, irregular amplitudes and vertically - horizontally superficiality and disorder in the general organization of writing in page; - differences in pressure between the upper and the lower zones due to exhaustion and relaxation of muscle tone; - tendency to transform the angular shapes into threaded movements.

Conclusion

As we all know that handwriting is arranged mentally and performed neuro muscularly, it is affected by alcohol consumption and consumption of drugs. The effect of alcohol and drugs specifically occurs first in the frontal lobe, which removes the superego control, and then in the cerebellum. This causes emotional, behavioral, psycho neuro-motor and cognitive changes, such as euphoria, logorrhea, an increase in self-confidence, emotional exaggeration, tremor, obvious unskillful movements, a lack of synergic movements, difficulties in pupil accommodation, ataxic movements depending upon the level of alcohol and drugs. In case of consumption of drugs or alcohol there are some writing characteristics of an individual writer is change. Characteristics such as word length, height of ascending, descending, upper case, lower case characters, spacing, alignment, etc. In case of chronic intoxication some handwriting characteristics like word length, height of ascending, descending, upper case, lower case characters were decrease as compare to normal writing, which was observed seen in sample- C1a & C1b, C2a 7 C2b, C3a & C3b, C4a & C4b,C5a & C5b. Tremors are more significant in case of normal writing in chronic addiction, due to with drawl symptoms. Misspelling, omission of characters, words, correction, etc are seen in both normal and intoxication writing but it is more significant in case of intoxication. In case of Acute intoxication some handwriting characteristics like word length, height of ascending, descending, upper case, lower case characters were found to increase as compare to normal writing, which was seen in samples- A1a & A1b, A2a & A2b, A3a & A3b, A4a & A4b, A5a & A5b. Tremors are more significant in case of intoxication writing in acute addiction. Misspelling, omission of characters, words, correction, etc are seen in both normal and intoxication writing but it is more significant in case of intoxication. During this study some

factors such as in the handwriting of illiterate person tremors are more significant in normal handwriting as well as handwriting in intoxication state. During the sample collection sometime person is not able to give handwriting sample so we are not able to collect more samples after intoxication. Further study can be carried out to get more complete and elaborated results which can be helpful in classifying a different type of drugs on the basis of the handwriting of the drug addicts. Further study can be carried out with more samples including drug addict from different educational background.

Ethical Clearance- Research progress committee

Source of Funding- Self

Conflict of Interest - No

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DOI Number: 10.5958/0973-9130.2019.00093.8

Awareness Regarding Genetic Disorder and Genetic Counselling among Adults Visiting a Tertiary Care Unit at Kochi

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Abstract

Genetic disorders have an irreversible effect in life, if once happen. So it is very important to know about the consequences of genetic disorders and its modern preventive approach in genetics by the public. The main **Objectives** of the study were to identify the awareness of adults regarding mental retardation and genetic counselling. **Methodology:** a quantitative approach with descriptive survey design was selected. The sample comprised of 200 subjects, between 20 to 45years (111 males and 89 females). Convenience sampling technique was used for sample section. The study instruments comprised of structured questionnaires on mental retardation and genetic counselling. **Results:** The study revealed that 150(75%) have good knowledge and 42(21%) of have average and 8(4%) poor knowledge regarding mental retardation. 41.5% subjects stated that mental retardation is curable and 33% subjects agreed that a mentally retarded individual becomes as capable as a normal individual. A substantial number of subjects had knowledge about genetic disorder 190(95%). 8(4%) had an average knowledge and 2(1%) had poor knowledge. Apart from this high level of awareness, 33.5% indicated that purpose of genetic counseling was to advise people about whether or not to have children or to help people understand their ancestry (37%) and half of the participants (46.5%) identified that genetic counselling helps couples have a child with desirable characteristics. **Conclusion:** The study findings highlight that the adult population have a better understanding of mental retardation and genetic counselling. But still there exist gaps/misconcepts in some aspects. It can be abolished by conducting more public awareness programmes.

Keyword: *Mental retardation, Genetic counselling, Knowledge, Adults.*

Introduction

Globally, at least 7.6 million children are born annually with severe genetic or congenital malformations; 90% of these are born in mid and low income countries. The genetic and congenital disorder is the second most common cause of infant and childhood mortality and occurs with a prevalence of 25-60 per 1000 births. Genetic diseases can vary in severity, from being fatal before birth to requiring continuous management; their onset covers all life stages from infancy to old age. Those presenting at birth are particularly burdensome, and may cause early death or life-long chronic morbidity.[1]

Common genetic disorders in Indian population are chromosomal disorders such as Down syndrome, Thalassemia, Hemophilia and muscular dystrophy (Smith et al., 2005). [2]

Mental Retardation refers to significantly sub-average general intellectual functioning resulting in or associated with concurrent impairment in adaptive behavior and manifested during the developmental

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period.[3]. It is the single largest neuropsychiatric disorder in every civilised society affecting 2.5-3.0% of the total population. Chromosomal abnormalities are the important cause of mental retardation.[4]

Historically, persons with mental retardation were only looked after to meet the needs of food, clothing and shelter in asylums meant for persons with mental illness. Over the last few years, there have been many changes in the delivery of mental retardation services including the roles of special educator, therapist, parents and community, and the management process that takes into account academics. Integration and inclusion is turning point for mentally retarded persons to mainstream in society.[3]

The awareness regarding various aspects of mental retardation will help in inclusive atmosphere both in the families and in the society in general.[3] One of the main focus of the study is to assess the awareness of adults regarding mental retardation.

Prenatal screening for genetic disorders, along with genetic counseling for those families in which there is a risk for known inherited disorders, may help reduce the risk of a child being born with inherited mental retardation.

Over the last decade, genetic testing has been transformed by an explosion of genomic data, powerful new technologies and analytical approaches . [5]

Genetic counseling aims to help people to "understand and adapt to the medical psychological and familial implications of genetic contributions to disease" (Resta et al, 2006) and is centered on promoting individual autonomy.[6] Genetic counseling is beneficial effect on inherited disease preventon.[7]

Genetic counseling can result in better outcomes when clients understand what to expect, and at least theoretically, at some point in their lifespan, anyone could be referred for or benefit from genetic counseling.[8]

Knowledge is considered one of the prerequisites of health behavior,a necessary first step in public health promotion involves increasing the general public's knowledge of the genetic risk factors of multifactorial diseases [9]. Thus, in order to identify the awareness of genetic disorders, genetic counseling and perceptions of its purpose, the researchers surveyed the adult population.

Materials and Method

The present study adopted a descriptive research study. Non probability purposive sampling was used for selection of the sample. The sample was drawn from the adults between the ages of 20 to 45 years attending selected outpatient departments of a tertiary care unit, Kochi.

Study instruments

The tool consisted of semi structured questionnaires developed by the investigators to assess awareness regarding genetic disorder and genetic counselling.

Tool 1: Socio demographic data

It included age, sex, educational status, income, occupation, family history of genetic disorder

Tool 2: Questionnaire to assess awareness regarding genetic disorder

It was be prepared by the researcher based on a study conducted by Sriram.[3] There were total 20 questions on general aspects , etiology, clinical manifestations and prevention of mental retardation**.** It was scored as >14 good knowledge, 8 to 14: average and 8> poor .The reliability as established using split half method and it was 0.7

Tool 3: Questionnaire to assess awareness regarding genetic counselling

It will be prepared by the researcher based on a study conducted by Aruna G [10]. Total 16 items which included the indications and importance of genetic counselling. It was scored as >10 good knowledge,6-9 average knowledge and <6 poor knowledge. The reliability was established using split half method and it was 0.8.

Ethical Consideration: Ethical permission as obtained from institutional ethical committee. Informed consent as obtained from the study subjects.

Results

Section 1 – Sample characteristics

Out of total 200 subjects, 131(65.5%) were in the age group of 20-35 years . There was almost equal gender representation, male 111(55.5%) and female

89(44.5%).More than half of them were married 115(57.5%) and 6(3%) were consanguineous marriage. 12(6%) of them had family history of genetic disorder.. More than half of them115 (57.5%) had heard about genetic disorder.

Section II: Knowledge regarding mental retardation

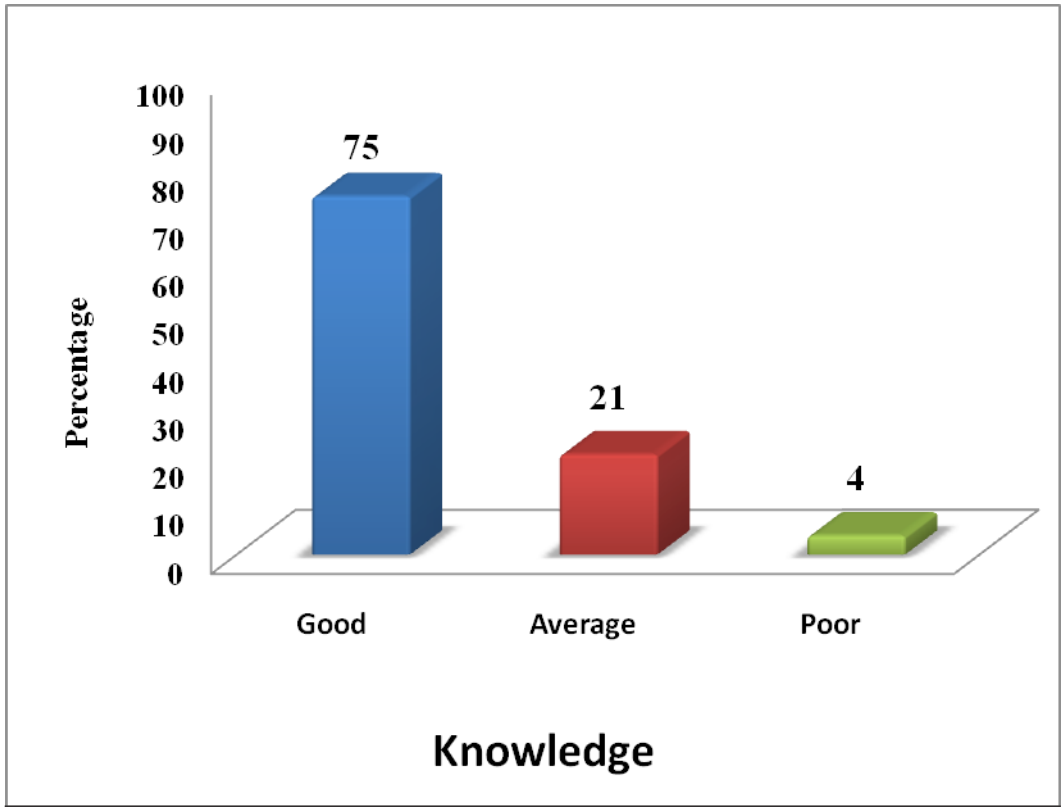

Figure 1. Distribution of subjects based on knowledge level on mental retardation

The above figure depicts that majority of the subjects 150 (75 %) had good knowledge, 42(21%) had average knowledge and only 8(4%) had poor knowledge on genetic disorders.

Table 1: Question wise response of subjects regarding mental retardation N=100

SL NO	QUESTIONS	No F (%)	Yes F (%)
1	The problem of mental retardation is found only in children	39(19.5)	161(80.5)
2	Individual differences exist among mentally retarded persons	46 (23)	154(77)
3	Mental retardation is an Infectious disease	172(86)	28(14)
4	Some of the persons with mental retardation can be as energetic as normal persons.	91(45.5)	109(54.5)
5	Persons with mental retardation are able to manage themselves to some degree.	54(27)	146(73)
6	Mental retardation is not curable	117(58.5)	83(41.5)
7	Most of the mentally retarded individuals can become capable of helping other persons in simple tasks	41(20.5)	159(79.5)
8	As the mentally retarded child grows up he/she would gradually become normal	128(64)	72(36)
9	Persons with mental retardation usually remain unhappy	142(71)	58(29)

***Cont...* Table 1: Question wise response of subjects regarding mental retardation N=100**

10	The condition of mental retardation may not always be transmitted from parents	41(20.5)	159(79.5)
11	A child with mental retardation is born due to the sins of parents	159(79.5)	41(20.5)
12	Malnutrition in pregnant women can cause mental retardation	42(21)	158(79)
13	Medicines can cure mental retardation	135(67.5)	65(32.5)
14	The mentally retarded individuals require continuous training to learn various simple activities	34(17)	166(83)
15	Many of the persons with mental retardation are capable of looking after their basic needs.	39(19.5)	161(80.5)
16	The only solution to the problem of mentally retarded person is to put him in a residential school/hostel	62(31)	138(69)
17	Involvement of the parents is essential in the training of the child with mental retardation	35(17.5)	165(82.5)
18	A mentally retarded individual can become as capable as a normal individual.	134(67)	66(33)
19	Genetic counselling helps in reduce the risk of having child with mental retardation	44(22)	156(78)
20	Intake of alcohol and drugs during pregnancy can cause mental retardation	36(18)	164(82)

From the table we can observe that around 75% are aware of mental retardation. We can infer that most of the items got positive awareness on mental retardation. Item number 3,10,12,14,17,19 and 20 got more than 80% positive response rate which indicate that the majority of the adult population were aware about the etiology of mental retardation, importance of special training / education programme for mentally retarded children and also knew that genetic counselling helps in reducing the risk of having child with mental retardation.

Some of the items got less than 40% negative response. 41.5% responded that mental retardation is curable. Eighteenth item got 33% negative responses in which the subjects agree that a mentally retarded individual can become as capable as a normal individual. From the above table we can understand that majority of the students in normal school are aware of mental retardation and very few are not aware of mental retardation.

Those who had heard of genetic diosrders (n = 115, 57.5%) had a significantly higher average knowledge score than those who had not heared about it(n = 85, 42.5%), (15.24 vs. 14.34, respectively; p =0.02).

Section III Knowledge regarding genetic counselling

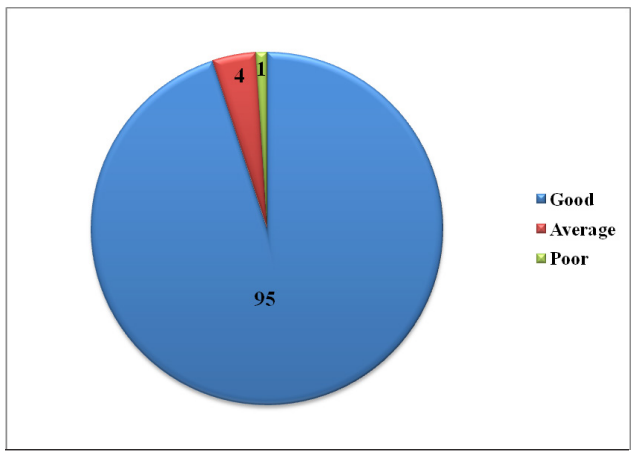

Figure 2. Percentage distribution of subjects based on knowledge level on genetic counselling

Figure 2 illustrates that most of the subjects 190 (95%) had good knowledge, 8(4%) have average and rest of 2(1%) have poor knowledge regarding genetic counselling.

Table 2. Question wise response of subjects regarding genetic counselling N=200

SL NO	Questions	True f(%)	False f(%)
1	Genetic counselling is to prevent genetic diseases or abnormalities	165(82.5)	35(17.5)
2	Genetic counselling is to help people understand their ancestry	74(37)	126(63)
3	A purpose of genetic counselling is to advice people about whether to have children	67(33.5)	133(66.5)
4	Genetic counselling provides information and support to couples planning a pregnancy	151(75.5)	49(24.5)
5	Genetic counselling provides information about the chances of your child having a genetic condition	153(76.5)	47(23.5)
6	Genetic counselling helps couples have a child with desirable characteristics	93(46.5)	107(53.5)
7	Genetic counselling provides emotional support to anyone coping with a genetic condition	166(83)	34(17)
8	Genetic counselling provides information about how genetics contributes to health problems	175(87.5)	25(12.5)
9	Genetic counselling provides an explanation of treatments for genetic conditions	178(89)	22(11)
10	Genetic counselling provides information and support to all pregnant woman who availing the counselling	170(85)	30(15)
11	Genetic counselling helps people understand their options for genetic testing	173(86.5)	27(13.5)
12	Genetic counselling provides referrals and resources for families with a genetic condition	165(82.5)	35(17.5)
13	Genetic counselling provides information and support to pregnant women whose babies may be at risk for a genetic condition	184(92)	16(8)
14	Genetic counselling provides information and support to couples planning a pregnancy which may be at risk for a genetic condition	175(87.5)	25(12.5)
15	Genetic counselling provides genetic testing to people with a family history of a genetic conditions	181(90.5)	19(9.5)
16	Genetic counselling only provided by a qualified health professional	183(91.5)	17(8.5)

Majority of respondents identified that genetic counseling could provide genetic testing for people with family histories of genetic conditions (n=165, 82.5%), information and support to couples planning pregnancies that may be at risk for genetic conditions (n=184, 92%), and pregnant women whose babies may be at risk for a genetic condition (n= 175, 87.5%). Eighty six percent (n=173) also identified that genetic counseling could help people understand their options for genetic testing. Nearly half of the participants(n= 67 ,33.5%) indicated that they thought a purpose of genetic counseling was to advise people about whether or not to have children or to help people understand their ancestry (n= 74, 37%). Three quarters of respondents (n= 141, 75%) indicated that they thought genetic counseling aimed to prevent genetic diseases or abnormalities. Half of the participants 93(46.5%) identified that genetic counselling helps couples have a child with desirable characteristics.

Discussion

The present findings revealed that a sizeable proportion of the subjects had better awareness regarding mental retardation. These findings are in

par with study findings of Sriram[3] on awareness about mental retardation among regular school children. The study revealed that a substantial number of students were aware of mental retardation, however very few number of children are not aware of mental retardation.

The present study found that majority of the subjects 150 (75 %) had good knowledge, 42(21%) had average knowledge and only 8(4%) had poor knowledge on genetic disorders. Similar findings were noted in a study conducted among Canadian population on awareness of Genetic counselling and perceptions of its purpose.[8] Most of the respondents had good had awareness on genetic counseling, and substantial proportions thought that genetic counseling aims to prevent genetic diseases and abnormalities, help couples have children with desirable characteristics, and help people to understand their ancestry. These findings were congruent with present findings which found that 67 (33.5%) indicated that they thought a purpose of genetic counseling was to advise people about whether or not to have children or to help people understand their ancestry (n= 74, 37%). Three quarters of respondents (n= 141, 75%) indicated that they thought genetic counseling aimed to prevent genetic diseases or abnormalities. Half of the participants 93(46.5%) identified that genetic counselling helps couples have a child with desirable characteristics.

Conclusion

The present study revealed that a substantial number of adults are aware of mental retardation and genetic counselling. The higher knowledge levels in our study may also be due to increased reporting of genetic and genomic research in recent years and the access of genetics into our culture, resulting in greater public familiarity. But still there exist gaps/misconcepts in some aspects. It can be abolished by conducting more public awareness programmes.

Conflict-of-Interest Statement: There is no conflict of interest among the authors in this study.

Source of Funding: Self funded.

Ethical Clearance: Ethical clearance was obtained from the institution ethical committee of Amrita Institute of Medical Sciences, Kochi and Permission also obtained from concerned departmental authorities. A detailed informed consent was obtained from the samples prior to the data collection.

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DOI Number: 10.5958/0973-9130.2019.00094.X

Cheiloscopy Aiding in Sex and Race Determination: A Pilot Study

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Abstract

Lip prints are defined as the grooves and wrinkled patterns present on the labial mucosa. They are admissible as evidence in the court of law as they are found to be unique and permanent which do not change during the life span of an individual. In this paper, a pilot study was done to ascertain the sex and race of an individual by studying their lip print patterns. The targeted experimented group included Indian(Caucasoid) and African(Negroid) students, both male and female studying at Gujarat Forensic Sciences University, Gujarat. The successful inter-comparison according to the race and sex of the exemplar was done giving a definite result that the cheiloscopy can aid in identification of an individual by establishing his or her race and gender.

Keywords- *cheiloscopy, lip prints, classification, race, gender*

Introduction

The characteristic pattern formed due to the elevations and depressions on the outer surface of the lips are known as the 'lip prints' of an individual. [1] The word 'Cheiloscopy' i.e., the study of lip prints is derived from the greek words 'Chelios' meaning lips and 'skopein' meaning see. Lip prints are observed to be unique, unchangeable and permanent just as fingerprint of an individual.[2] This principle of cheiloscopy makes it a reliable tool for the personal identification in forensic investigations.Lip prints are such evidences, whichcan be found in most of the forensic cases at the crime scene, on the victim and the culprit. It can be found on shirts, glasses, letters, cigarette buds, clothing, cups, tissue papers, photographs and most importantly on the biological materials such as skin. It may also be found near the bite marks over food or on the skin. Presence of lip prints can lead to various conclusions such as sex, race, habit, geographical variations, cosmetics used, etc. for identification, various techniques including fingerprints, retina, iris, etc were developed but in 1902, an anthropologist R. Fischer introduced the lip prints pattern identification. Diou de Lille brought the application of cheiloscopy in criminology in 1930. In 1932, Edmond Locard proved its evidentiary value. Dr. Martin Santos did the first but simple classification in 1906 by dividing the pattern into four types as straight, curved, angled and sine-shaped and also according to the thickness of the lips as thin, medium, thick and mixed. In 1950, Le Moyne Synder also known as father of cheiloscopy reveals its importance with the application of cheiloscopy in solving a case. In 1968-1971, two Japanese scientists, Y. Tsuchihashi and T. Suzuki both male and females in Japan. It was proven that the furrows arrangement can be used as the major classification factor. They divided the lips into four quadrants and formed the classification of six different patterns. Mc Donell proved in a study, even the twins seemed to have different lip print pattern. During 1985-1997, this technique had been used in almost 85 cases, which includes cases of assaults, homicide and mainly burglary. Due to its positive results, it has also been accepted as an evidence in the court of law.[3] During 2000-2013 further research in this field was done relating to the lip prints stability, age determination, sex and race identification, etc.

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Lip print classifications:

1. Martin Santos classification-

- Straight lines
- Curved lines
- Angled lines
- Sine-shaped lines

2. Suzuki and Tsuchihashi's classification-

- Type I- long vertical (complete)
- Type I'- short vertical (incomplete)
- Type II- Branched
- Type III- intersected or intercrossed
- Type IV- reticular
- Type V- undetermined

Vivek Sharma, NavinAnand Ingle, Navpreet Kaur, and Pramod Yadav researched on the "Identification of sex using lip prints : A clinical study" and stated that the patterns of lip prints showed significant sexual dimorphism between males and females. [4]Noor HazfalindaHamzah, Khairul Osman, Neo Xiao Xu, Sri PawitaAlbakri Amir Hamzah studied the "Lip Prints in Sex and Race Determination" and concluded that lip print had a potential in sex and race determination. Besides, lip print analyses do not require any complex instruments. Therefore, it is easier to be conducted and analysed. [5]Sharma Preeti, SaxenaSusmita, RathodVanita researched on "Cheiloscopy: The study of lip prints in sex identification" and concluded that lip prints thus hold potential promise as a supplementary tool along with other modes to recognize the sex of an individual. [6]LaliythaBijai Kumar, Venkatesh Jayaraman,1 Philips Mathew,2 S. Ramasamy,1 and Ravi David Austin researched on the "Reliability of lip prints in personal identification: An inter-racial pilot study" and suggested that the lip print pattern has a significant difference interracially. However, it can be used only as an additional tool for personal identification because of their uniqueness despite its limitations. [7]RachnaKaul, PS Shilpa, S Padmashree, Suraksha Bhat, Nishat Sultanadone a "Study of lip prints in different ethno-racial groups in India" and stated thatLip prints, because of their uniqueness, are valuable as evidence in criminal cases and also for personal identification and variations could be attributed to the geographic disparities that may exist in lip print with respect to the most common pattern.[8]Shobha Channabasappa Bijjargi, SowbhagyaBasavrajuMalligere, VarshaAjitSangle, Saraswathi F.K, Irfan Adil Majid, Ashwini rani S.R. researched on "A new attempt in comparison between 3 racial groups in India - based on lip prints (Cheiloscopy)" and stated that lip patterns can be used for race differentiation and also in personal identification, no two individuals had similar lip pattern. A detailed observation revealed that each type of lip pattern never occurred singly, but in combination with other types. [9]Annie Joseph Verghese and Shashidhar C. Mestri studied "the Efficacy of Lip Prints as an Identification Tool among the People of Karnataka in India" and concluded that there is ethnic and racial variation in the lip prints.[10]

Methodology

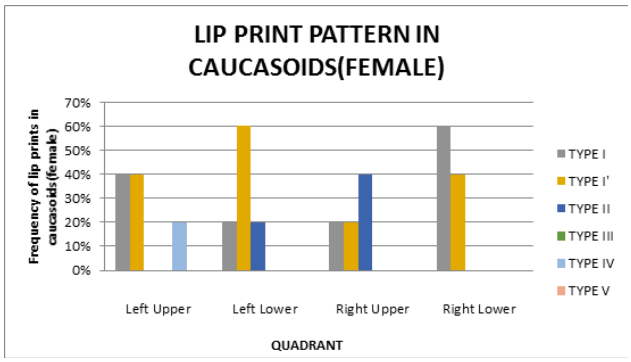
For the present study, total 20 samples were collected from the students of Gujarat Forensic Sciences University (GFSU), Gandhinagar, Gujarat with their consent for the study purpose. 10 samples from Indians and 10 samples from African students were collected, which included both male and female, each 5 in number. The exemplars were collected using Lakme Pink Colored Lipstick for females and Brown Colored Lipstick for males, as a standard for collection of prints from each individual. Firstly, the person was asked to sit on the chair and moist their lips using biotique lip balm. Then the lipsticks mentioned above were applied uniformly in a single motion on both upper as well as lower lips. The person was asked to press his/her lips against the half-folded plain A4 size paper for the collection of upper and lower lip prints separately. The collected lip prints were then preserved using a transparent cellophane tape. Two prints were collected from each person. Prints thus collected were marked into four quadrants, i.e., Left UpperLeft(LU), Left Lower(LL), Right Upper(RU) and Right Lower(RL), using a blue colored Faber castle DVD Marker and all four quadrants were designated as mentioned above. Examination of all the quadrants was conducted individually using a Hand Magnifier and Stereomicroscope. Once the analysis was done, the data was noted in a tabular format and further graphical representations were done.

Result and Discussion

It shows chances of occurrence of a pattern type in a particular quadrant for both, Caucasoid and Negroid as well as males and females individual.

Graph 1- Caucasoid: Female

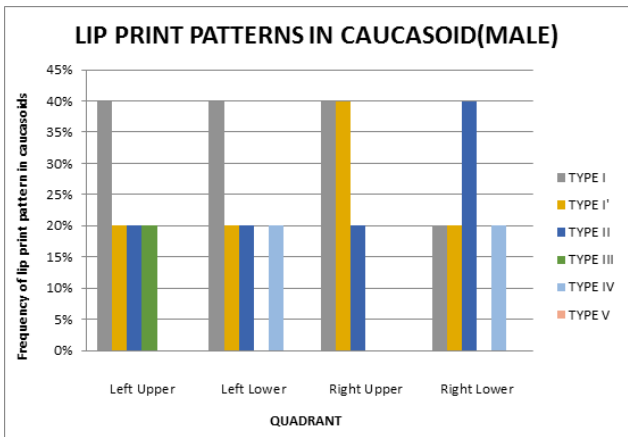
- left upper- 40% type I and I' and 20% type IV
- left lower- 60% type I' and 20% type I and II
- right upper- 40% type II and 20% type I and I'
- right lower- 60% type I and 40% type I'



Graph-1

Graph 2- Caucasoid: Male

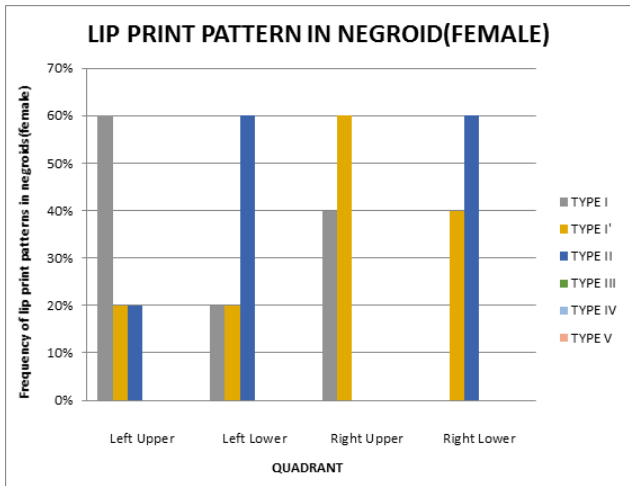
- left upper- 40% type I, 20% type I' and II and III
- left lower- 40% type I, 20% type I' and II and IV
- right upper- 40% type I and I', 20% type II
- right lower- 40% type II, 20% type I and I' and IV



Graph-2

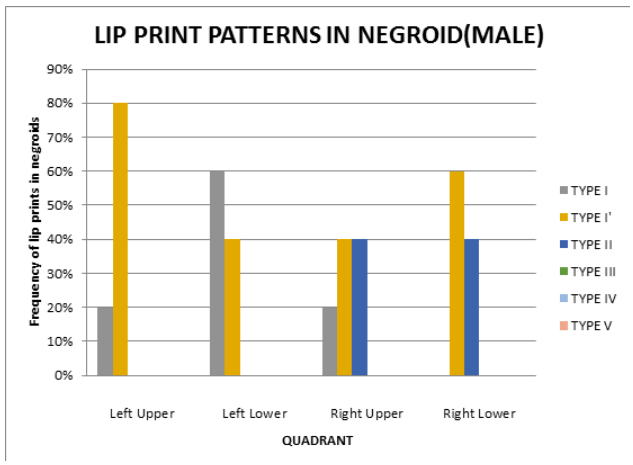
Graph 3- Negroid: Female

- left upper- 60% type I, 20% type I' and II
- left lower- 60% type II, 20% type I and I'
- right upper- 60% type I', 40% type I
- right lower- 60% type II, 40% type I'



Graph-3

- Graph 4- Negroid: Male
- left upper- 80% type I', 20% type I
- left lower- 60% type I, 40% type I'
- right upper- 40% type I' and II, 20% type I
- right lower- 60% type I', 40% type II



Graph-4

After the above results, inter comparisons were done for different aspects as mentioned below-

1. Caucasoid Male and Caucasoid Female- For left upper, males show more occurrence of type I while females show equal occurrence of type I and I'. In case of left lower, males show more occurrence of type I while females show high occurrence of type I'. In right upper quadrant, males show equal occurrence of type I and I' while females show more occurrence of type II. In case of right lower, males show more occurrence of type II while females show high occurrence of type I.

2. Negroid Male and Negroid Female- For left upper, males show very high occurrence of type I' while females show high occurrence of type I. In case of left lower, males show high occurrence of type I while females show high occurrence of type II. In right upper quadrant, males show equal occurrence of type I' and II while females show high occurrence of type I'. In case of right lower, males show high occurrence of type I' while females show high occurrence of type II.

3. Caucasoid Male and Negroid Male- For left upper, Caucasoid males show more occurrence of type I while Negroid males show very high occurrence of type I'. In case of left lower, Caucasoid males show more occurrence of type I while Negroid males show high occurrence of type I. In right upper quadrant, Caucasoid males show equal occurrence of type I and I' while Negroid males show equal occurrence of type I' and II. In case of right lower, Caucasoid males show more occurrence of type II while Negroid males show high occurrence of type I'.

4. Caucasoid Female and Negroid Female- For left upper, Caucasoid females show equal occurrence of type I and I' while Negroid females show high occurrence of type I. In case of left lower, Caucasoid females show high occurrence of type I' while Negroid females show high occurrence of type II. In right upper quadrant, Caucasoid females show more occurrence of type II while Negroid females show high occurrence of type I'. In case of right lower, Caucasoid females show high occurrence of type I while Negroid females show high occurrence of type II.

Once the comparison was done, the occurrence of lip print pattern for each quadrant according to their sex and race was formulated and concluded.

Conclusion

On the basis of the observations made during the study, it has been concluded that lip prints can be a great aid in personal identification of an individual. Depending on the frequency of the patterns occurring in the samples, one can also distinguish between the persons of different races. Even depending on the frequency of type of lip prints occurring in each quadrant, one can also relate it to sexual dimorphism.

Ethical Clearance- Not Applicable

Source of Cunding- Self

Conflict of Interest - None

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DOI Number: 10.5958/0973-9130.2019.00095.1

A Study on the Knowledge and Awareness among Dental Students of Mercury Toxicity and Amalgam Disposal

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Abstract

Dental amalgam consists of 50% mercury.An average amalgam filling consists of 1 gram of mercury which continously leaks mercury vapour due to the low vapour pressure of mercury.Mercury vapour can spread rapidly throughout the human body.It crosses cell membranes easily.Mercury can penetrate the blood brain barrier and result in mercury accumulation in the brain.Mercury is among the top three most toxic substances that affects people in large numbers.Amalgam is the largest source of mercury. As amalgam is the number one source of mercury production,dentists and dental students are at a very high risk of mercury poisoning due to repeated exposure to dental amalgam.This study intends to assess the knowledge and awareness levels among dental students of mercury toxicity and its potential risks,and the various disposal methods for amalgam. Though most of the students were aware of mercury toxicity and amalgam disposal methods as a whole,only a handful were aware about the absorption efficiency rate and the critical threshold of mercury,which was as low as 20.83% and 21.66% respectively.Almost 50% of the students interviewed had answered less than 8 out of 15 questions correctly.It is recommended that more effective methods for delivering information regarding mercury, its complications and management are deviced.

Keywords : *Mercury toxicity, amalgam disposal, dental students, knowledge and awareness*

Introduction

In dentistry,amalgam is among the most reliable dental restorative materials.It is the only source for production of waste mercury.Dental amalgam consists of 50% mercury.An average amalgam filling consists of 1 gram of mercury which continously leaks mercury vapour due to the low vapour pressure of mercury. Mercury vapour can spread rapidly throughout the human body.It crosses cell membranes easily.[1]Mercury can penetrate the blood brain barrier and result in mercury accumulation in the brain.[1]Mercury is among the top three most toxic substances that affects people in large numbers.Amalgam is the largest source of mercury.[1]

Mercury poisoning can result from inhaling mercury vapour,ingestion of mercury,injection of mercury and absorption of mercury through skin. According to the United States Environmental Protection Agency health standards(US EPA),the tolerable mercury exposure for vapour is 0.3 $\mu g/m^3$ of air.[1]An adult breathes approximately 20 m^3 of air per

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day.Therefore,the adult limit for mercury exposure is 6 µg per day.[1]The level of mercury in blood that causes mercury toxicity is 5 ng/ml.Chronic exposure to mercury through inhalation has been found to cause effects such as tremors,impaired cognition,sleep alteration,ataxic gait,convulsions,numbness of the mouth and limbs,visual field constriction and breathing difficulties.[2]According to the American Dental Association,the critical threshold level of mercury is 50 µg/m^3 of air.[2]Absorption rate of mercury .[2]

Sources of mercury in dental clinics are 2 :

1. Amalgam raw materials
2. Mixed amalgam but unhardened (Trituration)
3. Set amalgam (Unpolished)
4. Amalgam scraps
5. Removal of old amalgam restorations.

The sizes of amalgam particles may be 2 :

1. Large - 100 µm
2. Medium - 10 to 100 µm
3. Fine - <10 µm

Methods of mercury disposal 3,4 :

1. The steps for management of mercury vapour include :

a) Unused elemental mercury is to be stored in a tightly sealed container.

b) Label it as "Hazardous waste : Elemental mercury"

c) A certified biomedical waste carrier is to be contacted for recycling and disposal.

d) A mercury spill kit is to be used in case of mercury spillage.

e) Unused elemental mercury is to be reacted with silver alloy to form scrap amalgam.

f) Elemental mercury is not to be placed in garbage.

g) Elemental mercury is not to be washed down the drain or sink.

2. The steps for management of scrap amalgam include:

a) Disposable suction tips and ISO 11143 compliant amalgam separators are to be used on dental suction units.

b) The traps are to be changed weekly to prevent amalgam accumulation.

c) Only the required amount of amalgam is to be mixed.This can be facilitated by the use of premeasured amalgam capsules.

d) Extracted teeth with amalgam fillings are not to be thrown into regular garbage.

e) A mercury container is to be used to store all scrap or old amalgam either dry or in radiographic fixer solution which is then passed onto the certified biomedical waste carrier for disposal.

f) Scrap amalgam must never be stored in water.

Aim of the Study

To assess the knowledge,awareness and attitudes regarding mercury toxicity and amalgam disposal methods among clinical and preclinical dental students.

Objectives of the Study

1. To assess the knowledge and practices of mercury disposal among clinical and preclinical dental students.
2. To assess the knowledge and awareness levels regarding mercury toxicity and its complications among clinical and preclinical dental students.

Methodology

The study was conducted in a dental college in south India.

Study period

The study was conducted for a period of six months. This period included data collection,data analysis and the reporting of results.

Inclusion and exlusion criteria

Students attending pre-clinical and clinical

classes in the subjects of Conservative dentistry and Endodontics were included in the study.Students in their first year of under-graduation,interns and post-graduates were excluded from the study as they were not exposed to amalgam and mercury.The respondents in the study were given the right to withdraw at any point of time during the study without the need to give any valid explanation for their withdrawal.

Sample size

278.

Sampling frame

The sampling frame was determined from the students' attendance register which was acquired from the administrative office in the dental college.

Sampling technique

Convenience sampling.

Study design

Cross sectional study.

Study tool

Questionnaire.The questions were regarding mercury toxicity and methods for mercury waste management.

The questionnaire was analysed on a 5 point Uni-polar scale for assessing the knowledge and awareness among subjects with 1 point given to each correct answer. Table 1 illustrates this scale.

Table 1 : 5 point uni-polar scale

No. of questions answered correctly	Awareness status
0-3	Unaware
4-6	Slightly aware
7-9	Moderately aware
10-12	Very Aware
13-15	Extremely aware

The questionnaire consisted of a set of 15 closed ended questions.Out of which 7 were regarding mercury and its toxicity and 8 were regarding amalgam waste management.Necessary permissions were sought via email to use the questionnaire in the current study.[7]The question numbers 7,8,9,10 in the questionnaire used for this study have been amended to achieve the objectives of the study.The question numbers 4,5,6,11,12,13,14 and 15 in the questionnaire have been added to support the study and were not included in the original questionnaire.After the collection of the data,the scores were analysed using SPSS version 20.

Results

The Total number of subjects for which the results were analysed was 240 as the remaining subjects either denied to participate in the study or were unavailable.

The frequencies of the subjects based on the demographic variable of gender is given below.

Sex of patient

Table 2 : Gender distribution among research subjects

		Freq-uency	Percent	Valid Percent	Cumul-ative
					Percent
	male	88	36.7	36.7	36.7
Valid	female	152	63.3	63.3	100.0
	Total	240	100.0	100.0	

Table 2 suggests that out of 240 subjects, 88 (36.7%) were males and 152 (63.3%) were females.

Table 3 : Level of awareness among students

Test scores

	Freq-uency	Percent	Valid Percent	Cumulative
				Percent
unaware	5	2.1	2.1	2.1
slightly_ aware	17	7.1	7.1	9.2
moderately_ aware	109	45.4	45.4	54.6
Very aware	89	37.1	37.1	91.7
extremely_ aware	20	8.3	8.3	100.0
Total	240	100.0	100.0	

Table 3 suggests that 5 (2.1%) of the subjects were completely unaware, 17 (7.1%) of the subjects were slightly aware, 109 (45.4%) of the subjects were moderately aware, 89 (37.1%) of the subjects were very aware and 20 (8.3%) of the subjects were extremely aware.

The below given Figure.1 is a graphical representation of the number of questions answered correctly by the research subjects.

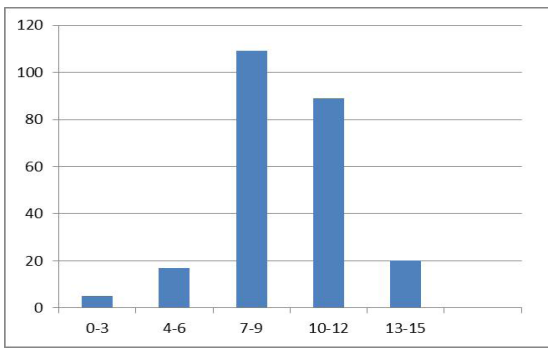

Figure 1 : Number of questions answered correctly

Questions answered for mercury toxicity and amalgam disposal

Figure 2 is a graphical representation of the number of questions that were answered correctly by the subjects regarding mercury toxicity. There were a total of 7 questions.

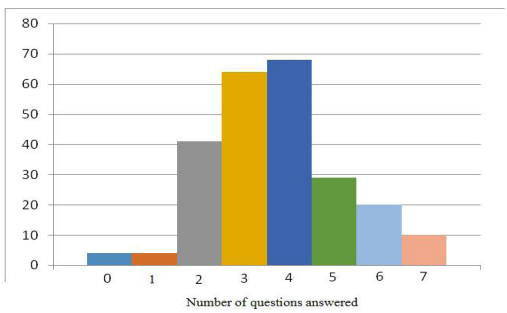

Figure 2 : Number of questions answered correctly regarding mercury toxicity

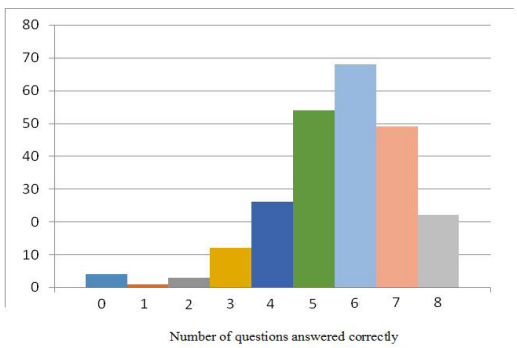

Figure 3 : Number of questions answered correctly regarding amalgam disposal

Figure 3 is a graphical representation of the number of questions that were answered correctly by the subjects regarding Amalgam Disposal. There were a total of 8 questions.

Question 1: Is the respondent aware regarding mercury toxicity?

2% responded "yes". 98% responded "no"

Question 2 : Is the respondent aware about the most toxic form of mercury?

87% felt it was vapour.

3% felt it was liquid.

10% did not respond.

Question 3 : Is the respondent aware regarding the critical threshold of mercury?

71% of respondents felt it was 5 micro gram per cubic metre.

22% of respondents felt it was 50 micro gram per cubic metre.

2% of respondents felt it was 0.5 micro gram per cubic metre.

5% of respondents did not attempt the question.

Question 4 : Is the respondent aware about the average half life of mercury?

55% of respondents answered that the half life was 5 days

30% of respondents answered that the half life was 10 days

11% of respondents answered that the half life was 15 days

4% of respondents did not answer the question.

Question 5 : Is the respondent aware about the efficiency rate of mercury vapour in the human lungs?

57% said the efficiency rate of mercury vapour in the human lungs was 50%

10% said the efficiency rate of mercury vapour in the human lungs was 65%

21% said the efficiency rate of mercury vapour in the

human lungs was 80%

12% did not attempt the question.

Question 6 : Is the respondent aware about the level of mercury required to cause toxicity?

50% said that the level of mercury required to cause toxicity was 5 ng/ml

22% said that the level of mercury required to cause toxicity was 0.5 ng/ml

10% said that the level of mercury required to cause toxicity was 10 ng/ml

18% did not attempt the question.

Question 7 : Is the respondent aware about the type of ejection tip to be used to remove amalgam?

76% responded that the type of ejection tip to be used to remove amalgam was high evacuation.

7% responded that the type of ejection tip to be used to remove amalgam was conventional.

17% did not attempt the question.

Question 8 : Is the respondent aware about the ideal evacuation system of a dental unit?

96% feel that the ideal evacuation unit of a dental unit is a common drain.

1% feel that the ideal evacuation unit of a dental unit is a collection with separator.

3% did not attempt the question.

Question 9 : Is the respondent aware that whether or not air ventilation is recommended?

87% of respondents felt that air ventilation was recommended.

1% of respondents felt that air ventilation was not recommended.

12% did not attempt the question

Question 10 : Is the respondent aware about the ideal storing method of amalgam?

44% of respondents answered that the ideal storing method of amalgam was container with fixed solution.

26% of respondents answered that the ideal storing method of amalgam was dry container.

0% of respondents answered that the ideal storing method of amalgam was container with water.

30% of respondents did not attempt the question.

Question 11 : Is the respondent aware of the ideal frequency of cleaning the suction unit?

45% of respondents answered that the ideal frequency of cleaning the suction unit was weekly.

9% of respondents answered that the ideal frequency of cleaning the suction unit was daily.

24% of respondents answered that the ideal frequency of cleaning the suction unit was monthly.

22% of respondents did not attempt the question.

Question 12 : Is the respondent aware about the approximate quantity of mercury in amalgam?

56% of respondents said that the approximate quantity of mercury in amalgam was 50%.

11% of respondents said that the approximate quantity of mercury in amalgam was 30%.

20% of respondents said that the approximate quantity of mercury in amalgam was 70%.

13% of respondents did not attempt the question.

Question 13 : Is the respondent aware about the method for disposing scrap amalgam?

93% of respondents said that scrap amalgam is disposed in a tightly sealed container with a label.

1% of respondents said that scrap amalgam is disposed in a plastic bag.

6% of respondents did not attempt the question.

Question 14 : Is the respondent aware about the ideal mercury spillage management method?

83% of respondents said that the ideal mercury spillage management method was using a mercury spill kit.

1% of respondents said that the ideal mercury spillage management method was using dry paper.

5% of respondents said that the ideal mercury spillage management method was using wet cotton.

11% of respondents did not attempt the question.

Question 15 : Is the respondent aware about the frequency for changing the suction trap?

19% of respondents said that the frequency of changing the suction trap was daily.

42% of respondents said that the frequency of changing the suction trap was weekly.

8% of respondents said that the frequency of changing the suction trap was monthly.

31% of respondents did not attempt the question.

Discussion

Windham[1] found that an individual with at least 4 amalgam fillings was exposed to 17 µg mercury/day;the exposure increased with the increase in the number of fillings.He also suggested that mercury levels in dentists were more than the mercury levels in controls by 50-300%,depending upon the length of the exposure. Among dental practitioners and assistants,50% reported signs of irritability,46% reported arthritic pain and 45% complained of headaches.[1]

Mutter found that mercury levels in blood and urine of individuals having amalgam restorations were 2 to 5 folds higher than the levels in those without amalgam restorations.[5]60-95% of mercury deposits in human tissues is due to amalgam restorations.Inorganic mercury levels of 0.02 ng/gm leads to intracellular microtubuli destruction and de-generation of axons.85% of dentists and technicians showed toxicities related to mercury in their behaviour and psychological parameters.15% of them showed an increased level of CPOX4 gene polymorphism with neurological deficits.[5]

Among the 240 respondents in the present study,236(98%) said that they were aware of mercury toxicity while placing amalgam restorations.209(87.08%) said that the vapour form of mercury was the most toxic.52(21.66%) said that 50 µg/m^3 was the critical threshold of mercury.131(54.58%) said that the half life of mercury in the body of humans was 55 days.50(20.83%) said that the absorption efficiency rate of mercury vapour in human lungs is 80%.135(56.25%) said that amalgam consists of 50% mercury on an average.120(50%) said that the amount of mercury required in blood to cause toxicity was 5 ng/ml.182(75.83%) said that high volume evacuation tip should be used to remove amalgam from the oral cavity.209(87%) said that air conditioners and proper ventilation is required in the workplace during amalgam restoration.230(95.83%) said that the evacuation system of the dental chair should open to a collection unit with amalgam separator instead of a common drain.105 (43.75%) said that scrap amalgam should be stored in a container with fixer solution for disposal.109 (45.41%) said that the suction unit should be cleaned once a week.224(93.33%) said that amalgam should be disposed in a tightly sealed container with a label on it.200(83.33%) said that a mercury kit should be used to manage an event of mercury spillage and 102(42.5%) said that the mercury traps in the suction units should be changed weekly.Over 80% of the respondents were aware about the basic guidelines for amalgam disposal.

Though most of the students were aware of mercury toxicity and amalgam disposal methods as a whole,only a handful were aware about the absorption efficiency rate and the critical threshold of mercury,which was as low as 20.83% and 21.66% respectively.

Recommendations

To device more effective methods for delivering information regarding mercury, its complications and management.

To assure that every student's awareness is tested at appropriate intervals in the form of vivas or written tests.

To enforce strict guidelines for amalgam disposal in dental clinics.

To measure the blood mercury levels of students at frequent intervals to assess mercury toxicity and to take necessary steps to deal with the same.

The use of amalgam should be abolished from the present dental curriculum prescribed by the Dental Council of India.

The use of newer advanced materials with comparatively lower health hazards such as composites,GIC,porcelain etc should be encouraged.

Ethical Clearance- Taken from Institutional ethics

committee

Source of Funding- Self

Conflict of Interest - None

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DOI Number: 10.5958/0973-9130.2019.00096.3

A Study on the Prevalence and Pattern of Abdominal Organ Injuries Without Evidence of External Injury

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Abstract

No other region in the body has been as intriguing as the abdomen in so far as its response to blunt trauma with regard to the pattern and occurrence of visceral injuries. Little wonder that surgeons of all ilk have been referring to the abdomen as a magic box. This study was carried out utilizing the data from 185 cases of autopsies involving blunt traumatic abdominal fatalities. The objective was to study the pattern and prevalence of internal organ injury without evidence of external abdominal trauma. The knowledge so gained may be beneficial both from the medicolegal as well as clinical perspective in early detection and management of abdominal trauma without external injuries. The important conclusions based on findings of this study could be summarised as follows. Nearly a third of the total number of cases (34.4%) revealed internal abdominal organ injury without corresponding external injury showing strong statistical association. Male preponderance was noted with majority of victims in the 21 to 30 year age group. Major abdominal organ involved was the liver, followed by perirenal injuries, spleen, mesentery and small intestines. Stomach and duodenum were conspicuous by an absence of injuries on them, attributable for the most part to their anatomical positions.

Keywords: *blunt trauma, abdomen, internal organ.*

Introduction

The most common causes of death in the young individual are trauma (age group between 1 and 45 years). In civilian life, injuries of the abdominal viscera are particularly common due to blunt trauma. There is a 12- 15% prevalence of organ involvement following Blunt Abdominal Trauma[1]. Closed trauma to abdomen offers a great challenge to the treating surgeon.

Abdomen is considered as a Magic Box both by the surgeons and physicians as any intra peritoneal organ may be ruptured without any external evidence of trauma. Due to soft and yielding nature of the abdominal wall, application of even a heavy force may not cause any external wound on the abdominal wall, but the transmitted force may cause serious internal injuries.[2]

It must be emphasized that apparently very trivial trauma can lead to quite serious internal organ injuries. All patients presenting with alleged history of blunt trauma to the abdomen should be carefully examined for any signs of visceral injuries to avoid charges of negligence[3].

The solid organs are much more likely to be damaged by compression from blunt forces than the hollow viscera. The solid organs such as liver, spleen, kidney, pancreas, etc., are the most vulnerable, while the hollow viscera like bladder, intestines and stomach, are less likely to be involved. . The most important complications of injury to solid organs are haemorrhage and shock, while in hollow visceral injury; shock follows the development of peritonitis, as the intestinal tract has certain fixed points, which are vulnerable to rupture.[2]

Causes of blunt injury abdomen are mainly:

Road traffic accidents: account for 75% of cases of

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blunt abdominal trauma.

Fall from Height.

Warfare injuries: can lead to visceral damage by blasts or shock waves

Battering: Is becoming an important, common but preventable cause of abdominal injuries, owing to increase in aggressive human behavior.

Martial arts**:** Karate, judo etc [4]

The injuries caused to abdominal viscera by blunt trauma include contusion or crushing, tearing or laceration of parenchyma, rupture by a bursting force due to a rise of pressure inside the organ, tearing of attachments and laceration of an organ by fractured ends of bones.[5]

In the light of the above circumstances, a study of this kind would go a long way in enhancing the surgical awareness of the ever present possibilities of abdominal organ injuries sans any external injury, which in turn would improve the clinical scope for early detection and management of abdominal fatalities.

Material and Method

One hundred and eighty five (185) cases of death due to injuries sustained from various causes involving abdominal fatalities brought for medico legal autopsy to the mortuary wing of Government Medical College, Thiruvananthapuram, were studied over a one year period. The data recorded in the post-mortem certificates of these cases were collected and analyzed statistically using SPSS software.

Results

Age Distribution

In this descriptive study, 185 subjects with blunt trauma to abdomen were enrolled. The mean age of the study population was 42.3 ± 18 years. Among the subjects, the lowest and highest age was 2 years and 90 years respectively. In the study group, majority 35 (18.9%) victims were in the age group of 21 to 30 years.

Table no 1. Age distribution of study subjects

Age (years)	n (%)
1-10	1 (0.5)
11-20	25 (13.5)
21-30	35 (18.9)
31-40	32 (17.3)
41-50	29 (15.7)
51-60	30 (16.2)
61-70	21 (11.4)
71-80	9 (4.9)
81-90	3 (1.6)

As far as **gender** of the study subjects were concerned, 164 (88.6%) were males and 21 (11.4%) were females.

Causes of Blunt trauma abdomen:

The major causes of abdominal fatalities were road traffic accidents (RTA) which included 70.3% of cases. This includes motorcyclist 35.1%, pedestrian 19.5%, pillion rider 5.9%, four wheeler driver 6.5%, back seat occupant 2.7% and front seat occupant 0.5%. Railway accidents contributed to 9.2% and fall from height to15.7% and others including assaults to 4.9%.The various causes of the injury in blunt trauma abdomen are depicted as follows.

Table No 2. Causes of blunt trauma abdomen

Cause of injury	n (%)
Road Traffic accident –Motorcyclist	65 (35.1)
Road Traffic accident- Pedestrian	36 (19.5)
Road Traffic accidents –four wheel Driver	12 (6.5)
Road Traffic accidents-Back seat occupants	5 (2.7)
Road Traffic accident –Front seat occupants	1 (0.5)
Road traffic accident - Pillion rider	11 (5.9)
Railway accidents	17 (9.2)
Assault	2(1.1)
Others	7(3.8)

External Abdominal Injuries:

Most common injury present externally over the abdomen was abrasion (37.8%) followed by a combination of abrasion and contusion 13%, contusion alone 9.7%, combination of abrasion, contusion and laceration 2.7%, laceration alone 1.1%, abrasion and laceration, contusion and laceration 0.5% each. **No external injury was noted in 34.4% of cases**. The details of external injuries are included in the following table.

Table No 3. Details of external injuries

Type of injuries	n (%)
Abrasion	70 (37.8)
Contusion	18 (9.7)
Laceration	2 (1.1)
Abrasion and contusion	24 (13)
Abrasion and laceration	1 (0.5)
Contusion and laceration	1 (0.5)
Abrasion, contusion and laceration	5 (2.7)
No External Injuries	**64 (34.4)**

Internal Abdominal Organ Involvement

Among 185 study subjects, 159(85.9%) subjects had internal organ involvement and 26(14.1%) subjects had no internal organ involvement following blunt trauma abdomen.

Table No 4. Internal organ involvement

External Injury Abdomen	Organ involvement		Total
	No	Yes	
Absent	0	64	64
Present	26	95	121
Total	26	159	185

Summary of Internal Organ Involvement

On evaluation of the internal organ involvement, it was revealed that majority were associated with liver in 52.4% of cases, followed by perirenal haematoma in 28.6% of cases, spleen in 23.8% of cases, mesentery in 16.8% of cases, kidney in 10.3% of cases, jejunum and ileum in 5.9% of cases each, transverse colon in 3.2% of cases, sigmoid colon in 2.7% of cases, ascending colon in 1.6% of cases, caecum in 1.1% and the least involvement was with descending colon which was seen in 0.5% of cases.

Table 5. Internal organs involved with injuries

Organ involved	n (%)
Liver	97 (52.4)
Perirenal hematoma	53 (28.6)
Spleen	44 (23.8)
Mesentery	31 (16.8)
Kidney	19 (10.3)
Jejunum	11 (5.9)
Ileum	11 (5.9)
Transverse colon	6 (3.2)
Sigmoid colon	5 (2.7)
Ascending colon	3 (1.6)
Caecum	2 (1.1)
Pancreas	2(1.1%)
Descending colon	1 (0.5)

Out of the 159 cases with internal organ involvement 64(34.4%) of them had no external injuries. External injuries were present in 121 cases, among them 95 cases were associated with internal injuries and 26 cases did not show any. On statistical analysis, Chi square test detected a significant association between presence or absence of external injury and presence or absence of internal injury (p value of <0.001).

Discussion

The mean age of subjects in this study was 42 years which was higher than in the previous study conducted by Subedhi et al[6] where it was 34 years. Greatest number of study participants was in the 21-30 age groups and this could be attributed to the increased activity, thrill

seeking behaviour, drunken driving and risk taking nature which is very common here[7].

88% of the subjects were males and this finding is in agreement with the studies conducted by Subedhi[6], Talving[8], and not comparable with the studies conducted by RA Curie[9], Sreekumari[10], and Vasanth Naik[11].

In the present study 34% of the study subjects with internal injuries, had no external injuries, whereas in previous studies by Kumar Shubendhu and Amuthan et al[12] the prevalence of this finding was 24% and 28% respectively. This could be explained on the basis of the syndrome known as 'seat belt syndrome', which includes injury to abdominal organs without any external injury due to the compression of abdomen caused by the constricting force of a seat belt[13].

Most common organ involved in subjects with no external abdominal injury was the liver (50%), which could be due to its position, size and friability making it vulnerable to impact[14.] This study showed spleen involvement in 24% of study participants as compared to 18 % involvement in the study of Vasanth Naik et al[12]. Kidney injury accounted for 10% of the total, which could be correlated with previous studies since kidney is the third most common organ involved in blunt trauma abdomen[15]. Perirenal haematoma was seen in 29% of study subjects; this is usually due to renal injury and is well documented in literature[16]. 1.1% of the study subjects in this study had pancreatic injury which is also at par with available literature, notwithstanding its extreme rarity[17]. None of the subjects had injuries to stomach which is as described in previous reports. This could be due to the fact that stomach is a hollow and muscular organ which can sustain a blunt trauma and need not develop injury always[18.]

In this study injuries to small intestines were present in 9.2% of the study participants which was similar to the study of Vasanth Naik et al which revealed a 10% involvement of small intestines [12]. . There were no cases of duodenal injury, which agrees with the study of Mukhopadhyay et al where duodenal involvement was less than 1%[19]. Exact reason for sparing of duodenum is not described. It could be due to anatomical position of duodenum.

Most of the study participants did not have any injury of the ascending colon, transverse colon, descending colon and sigmoid colon. This is in agreement with the study of Mehta et al[20]. 16% of the study subjects had mesenteric injury unlike previous studies of Vasanth Naik et al (7%) and Mausami et al (5%) [21] where mesenteric injury was rare after blunt trauma abdomen.

Conclusions

Blunt trauma abdomen was most common in young adult males. (18.9%)

Of all the causes analyzed, motorcyclists were the commonest group affected (35.1 %)

Liver was found to be the commonest organ involved (52.4%), while duodenum and stomach were not involved in the present study.

34 % of cases showed significant abdominal internal organ involvement with absence of any external injuries.

Statement

This study is an original self –funded research work and does not involve either issues of conflicts of interest or ethical implications. Ethical clearance has duly been obtained from the Institutional Review Board, Government Medical College, and Thiruvananthapuram.

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DOI Number: 10.5958/0973-9130.2019.00097.5

A Correlation Study of Patterns of Fingerprints with Blood Groups among the Students of S.S.I.M.S & R.C., Davangere

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Abstract

Identification of both living and dead is something in which medical evidence may play an important role, sometimes constituting the only evidence for establishing the identity of a person. The human identification is a universal process based on scientific principles mainly involving the finger printing. Both fingerprint pattern and blood group are genetically determined. This prospective study was carried out over among 300 medical students of S.S.I.M.S & R.C. Davangere to ascertain the association between fingerprints and blood groups. The study revealed that the predominant fingerprints being the loops in both male and female, next being the whorl and the least one is the arch. O positive is the most common blood group among the study groups, followed by B, A and AB. The loops and whorls showed high association with O blood group followed by B, A and AB. But arch finger print showed high association with B blood group and least with AB blood group.

Keywords: *Finger prints, Blood groups, Gender.*

Introduction

Identification of an individual is most important component in medico legal practice. It may be complete (absolute) or incomplete (partial).

Complete identification is the absolute fixation of the identity of an individual beyond doubt. Partial or incomplete identification implies the ascertaining only some facts about identity while others still remain unknown.[1]

Many factors can help in establishing the complete identity of a person and among all the available factors; fingerprint is one such easily available tool and a reliable method of identification. Study of fingerprints as a method of identification is also known as Dactylography or Dactyloscopy and at present it is also known as Henry – Galton system of identification.[2]

Similar to fingerprints, blood as a trace evidence is an extremely important entity in the medico legal practice. ABO blood group is considerably stable to the violent conditions such as heating or drying. Examination of blood group becomes imperative in relation to civil disputes like paternity and maternity issues as well as in criminal offences.

Fingerprint's being the effective method of identification; an attempt has been made in the present work to scrutinize their correlation with gender and blood group of an individual. This correlation between fingerprint pattern and these parameters may help in using fingerprints as an important aid in sex and blood group determination and vice versa, thus, enhancing the authenticity of fingerprints in detection of the crime and criminals.

Material and method

After obtaining ethical clearance from IERB, SSIMS & RC, the study has been conducted involving 300 medical students (150 male and 150 female, >18

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years of age) of S.S. Institute of Medical Sciences and Research Centre, Davangere during April-May 2018. The informed written consent was taken from the students prior to the study. Students less than 18 years and those with leprosy, electrical injury and radiation exposure which are known to cause permanent impairment of finger print patterns were excluded.

The finger prints were collected by using inkless fingerprint pad. The subject was asked to wash and dry their hands to remove dirt and grease. Then the finger bulbs were rolled on the inkless fingerprint pad - "the thumbs were rolled towards the subject's body and the fingers were rolled away from the body, i.e. thumb in fingers out method". The precaution was taken to avoid smudging.

Then the rolled impressions of each finger were obtained in the allotted space for that finger on the proforma. In this way for each and every individual the entire prints of ten fingers were prepared.

After the fingerprints were acquired, details such as name, sex and age were noted. The known blood groups were noted from their college identity cards.

The fingerprint patterns were studied with the help of a magnifying lens and were identified as: Loops, Whorls and Arches based on the appearance of ridge lines according to Henry's system of classification.

Results

A total of 300 subjects were participated in the study out of which 150 were males and 150 were females. Mean age of the selected subjects is 20.58 ± 1.24.

Out of 300 subjects, 283 (94.3%) subjects in the study were Rh positive and 17 (5.7%) were Rh negative (Table No 1).

Table No 1: Showing distribution of Rh factor.

			RH group		Total
			Positive	Negative	
Sex	F	Count	142	8	150
		% within Sex	94.7%	5.3%	100.0%
	M	Count	141	9	150
		% within Sex	94.0%	6.0%	100.0%
Total		Count	283	17	300
	% within Sex	94.3%	5.7%	100.0%	

Table No 2: Showing Distribution of Blood groups among Sex.

			Blood group				Total
			A	B	AB	O	
Sex	F	Count	26	47	11	66	150
		% within Sex	17.3%	31.3%	7.3%	44.0%	100.0%
	M	Count	28	60	11	51	150
		% within Sex	18.7%	40.0%	7.3%	34.0%	100.0%
Total		Count	54	107	22	117	300
	% within Sex	18.0%	35.7%	7.3%	39.0%	100.0%	

The 'O' group is the predominant blood group among all the subjects with 39%, followed by B-blood group (35.7%), then A-blood group (18.0%) and the least being the AB-group (7.3%).

The Females shows predominant blood group as O (44%), followed by B-Group (31.3%), then A-blood group (17.3%) and the least being AB-group (7.3%).

The B-blood group (40%) is the predominant blood group in males, followed by O-blood group (34%), then the A-blood group (18.7%) and the least being AB-blood group (Table No.2).

Fingerprint pattern analyses showed that, loops were the most common pattern in the study 1675 (55.83%), followed by whorls 1214(40.47%) while arches were the least type of finger prints in the study 111 (3.7%). (Table No. 3)

Table No 3: Showing Distribution of Finger Prints

	Frequency	Percentage
Loop	1675	55.83
Whorl	1214	40.47
Arch	111	3.7
Total	3000	100

The Loop Finger print was the predominant Finger print pattern in both the sexes, male with 852 (56.8%) and female with 823 (54.87%) prints. The whorl being the second largest group in the finger print pattern with males having 605 (40.33%) and females with 609 (40.6%) prints. The Arch finger print is being the least type of print in the study having 43 (2.87%) among males and 68 (4.53%) among females (Table No 4).

Table No 4: Showing Distribution of Finger Prints among Sex

Sex	Loop	Whorl	Arch	Total
Male	852(56.8)	605(40.33)	43(2.87)	1500(100)
Female	823(54.87)	609(40.6)	68(4.53)	1500(100)
Total	1675(55.83)	1214(40.2)	111(3.7)	3000(100)

In the present study, the loops showed high association with O blood group (38.80%), followed by B blood group (33.79%), A blood group (18.32%) and the least with AB blood group (9.07%). Similarly the whorls showed higher association with O blood group (39.70%), followed by B blood group (38.13%), A blood group (17.62%) and the least with AB blood group (4.53%) but Arches showed highest association with B blood group (36.93%) and followed by O blood group (34.23%), then being the A blood group(17.11%) and least with AB blood group (11.71%) (Table no. 5).

Table No 5: Showing correlation between Finger Prints and blood groups.

Blood Group	A	B	AB	O
Loop	307(18.32%)	566(33.79%)	152(9.07%)	650(38.80%)
Whorl	214(17.62%)	463(38.13%)	55 (4.53%)	482(39.70%)
Arch	19(17.11%)	41(36.93%)	13(11.71%)	38(34.23%)
Total	540(18%)	1070(35.67%)	220(7.33%)	1170(39%)

(p = 0.000108)

Discussion

The main objective of the present study was to ascertain if there was any association between fingerprint and blood group with respect to gender.

In the present study, inkless fingerprint pad was used for recording the fingerprint patterns, as it is easy to carry and once the fingerprint is obtained, leaves no residues on the fingers.

The present study reveals that there is an association between distribution of different fingerprint patterns, blood group and the gender.

Our study showed that the Blood group O is the predominant blood group followed by B, A and AB and the majority of the subjects were Rh Positive (94.3%) and only 5.7% were Rh negative, which is consistent with study done by Smitha Rani, Rastogi, Bharadwaja, and Radhika.[3, 4, 5 & 6] . The general distribution pattern of the primary fingerprint was of the same order in individuals with A, B, AB and O blood groups i.e high frequency of loops, moderate of whorls and low of arches. This is in accordance with the study conducted by Smitha Rani, Rastogi.P, Bharadwaja, Radhika, Desai B, Joshi S, and Kanchan T.[3,4, 5, 6, 7, 8 & 9]

Smitha Rani did a study of finger print pattern in different blood groups among Indian population at JSSMC, Mysore, which showed that incidence of loops and whorls are highest in O blood group and arches were more common with blood group B[3], which is in accordance with our study.

Prateek Rastogi did a study on finger print in relation with gender and blood group during 2010 on 200 medical students in KMC, Mangalore[4] which showed whorls are more common in blood group O which is in agreement with our study, while Loops and arches are predominantly seen in blood group A (not consistent with our study).

Bharadwaja et al conducted a study during 2000-2001 on 300 medical students with different ABO blood groups in Rajasthan which revealed that individuals with blood group A correlated with loops [5], which is in accordance with our study.

Desai B et al study carried out in Hubli- Dharwad of Karnataka showed that whorls were common in blood group O and arches in blood group B [7], which is in consistent with our study.

Joshi S et al study carried in Bhojia Dental College & Hospital, Baddi, Himachal Pradesh showed that the loops and whorls are predominant fingerprints in B blood group and arches are predominant in O blood group [8] which is in contrary to our study.

Conclusion

The following conclusions were drawn from the study

General distribution of fingerprint pattern in this study is noted to be in the same order as described in the literature. i.e. highest loops, moderate whorl, and least arch.

Majority of the subjects in the study were Rh positive.

Loop and Whorl finger print pattern showed significant association with O, B, A and AB in both the sexes.

Arch Finger print pattern showed its association with Blood Group B.

Females showed high predominance of Blood Group O.

Males showed high predominance of Blood Group B.

Fingerprints are already an established entity in the field of identification. Hence similar type of studies should be conducted on a larger group so as to increase the accuracy of prediction and to establish the individuality of a person.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Taken from IERB, SSIMS & RC, Davangere.

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DOI Number: 10.5958/0973-9130.2019.00098.7

Study on the Analysis and Synthesis of Designer Drugs, Piperazine

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Abstarct

Designer drugs, also termed as "legal drugs"[(1)] have evolved its availability to evade legal resolution. Earlier young users were the primary users but now with the changing trends these are consumed by a large part of the society[(2)]. They are the drugs with psychotropic effects which can easily be synthesized with other raw material to obtain synthetic compounds[(3)]. This research was done to analyses of theses designer drugs (piperazine was analyzed) using gas chromatography- mass spectrometry and gas chromatography- infrared deviation. In this analysis it was observed that these techniques provided the confirmatory data for the structural differentiation of the components and provided specific confirmation of each of the isomeric form of the derivative of the designer drug(isomeric piperazine) respectively[(4)].

Key words- *Designer drugs, legal drugs, Piperazine, analysis*

Introduction

Any chemical substances that have a capacity of altering the mechanism of human body are "Drugs". In today's era, drugs have become the most controversial word on the planet. As per the history drugs are the substances which were just used to treat a person medically but the modernization has made these drugs as the source of seduction in body. One of the kinds of drugs is known as designer drugs, these are the analogue of some prohibited drugs, designed to mimic the effect of original pharmaceutical drugs or simply the synthetic drugs made in the laboratory. Theses include marijuana, PCP, fentanyl, piperazine and many more. In the recent times piperazine is becoming an important drug have some forensic significance. It is a psychoactive drug which was earlier marketed as the 'natural' or 'herbal' drug. Most methods are optimized to accurately quantify the amount of drugs in forensic toxicology testing; challenges may arise during the postmortem redistribution, enzymatic reaction. Piperazine (1,4-hexohydropiperazine) is basically a heterocyclic organic compound which is further combined with caffeine and a wide range of binders and some vitamins to form a party pill. Piperazine are hygroscopic in nature with the antibiotic effects as earlier this drug was used in veterinary purposes .Some key members of this group which are widely used for non medical purposes may be TFMPP (1-[3-(trifluro-methyl) phenyl] piperazine), 1-(3-chlorophenyl) piperazine), BZP (benzylepiperazine), MDBP (1-(methylenedioxybenzyl)-piperazine), Mcpp(meta-chlorophenylpiperazine).

TFMPP is a recreational drug of piperazine having chemical formula C11H13F3N2 , behaves in the similar manner as phenethylamines. These drugs act as non selective serotonin receptor agonist, in addition to boosting synaptic serotonin levels by blocking serotonin reuptake. TFMPP is usually combined with BZP which can cause a range of side effects including dehydration, nausea, vomiting, toxic psychosis, muscle ache, anxiety, insomnia etc[(5)(6)].

BZP is again a recreational drug with stimulant properties which produces euphoria and cardiovascular effects.. Its chemical formula is C11H16N2. It also act as a non selective serotonin receptors agonist on a wide variety of serotonin receptors and causes mild hallucinations at high dose. It is legally available in

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certain countries and is said to a safe alternative of to some other illicit subsatances like methamphetamine and methylenedioxymethamphetamine (Ecstasy). The effects which are produced in an individual by the intake of BZP are more or less similar to those which are produced by amphetamine including decreased appetite, anxiety, blurred vision , increase in blood pressure and heart and respiration rate etc[7].

MDBP is reported to be the most common drug of abuse. It is often encountered as biological and forensic evidences. Its chemical formula is C12H16N2O2. It is one of the mild stimulant, and it does not produce euphoria, empathogenic or psychedelic effects. It is largely consumed by the youth of the society as the major party pill.

Mcpp is again a piperazine derivative with stimulant effects which have been used as an ingredient in party pills. Its chemical formula is C10H13CIN2. It not commonly desiered by the drugs user because of it unpleasant experiences. It lacks hallucinogenic effects but produces depressive, dyshoric and anxiogenic effects in an individual. It is also known to induse in humans and also used for the testing potential antimigraine medication[8].

Recent studies shows that these compounds can be separated using certain techniques, mainly GC-MS (gas chromatography- mass spectrometry) and GC-IRD (gas chromatography- infrared detection). GC-MS and GC-IRD are the combination of two powerful techniques commonly used in forensic laboratories, for the analysis of control substances it separates the chemical mixture of a material and identifies the components present[9].

Analysis By Advance Technology

GC-MS is the most commonly used which is used by the researchers for the identification of the forensic drugs. Piperazine's analysis is usually done by using 7890A gas chromatography along with 7683B auto injector further coupled with 7683B au. During the analysis, GC is being operated in splitless mode with helium with a flow rate of 0.7ml/ min and Column head pressure of 10 psi, and detector and transfer line were maintained at 250 and 280 degree respectively. MS was operated in EI mode (electron impact mode) having 70ev ionization voltage and temperature was at 230 degree centigrade.

Chromatographic separation was done using capillary column (30 m x 0.25mm i.d.) coated with 0.05 micrometer of 50% phenyl -50% methylpolysiloxane. The initial temperature was maintained at 70 degree for 1 minute , ramped up to 250 degree at the rate of 30 degree per minute, and was hold on the same for 15 minutes.

GC-IRD analysis was carried out by using Hewlett Packard 5890 series II gas chromatograph and a Hewlett Packard 7673 auto injector which was coupled with IRD II (infrared detector) for the analysis of the components of piperazine. The vapor phase infrared spectra were recorded in the range of 4000- 650 per cm with the resolution of 8 per cm and the scan rate was recorded as 1.5 scans per second. The IRD temperature and flow cell were maintained at 280 degree centigrade. GC was operated in the splitless mode with helium as the carrier gas having a flow rate of 0.7ml/ min, and the column pressure was 10psi. The capillary column (30m x 0.25mm) was coated with 0.50 micrometer of 50% of phenyl- 50% Rxi-50. The initial temperature of the study programmed was set at 100 degree for a minute and then was ramped up to 230^0 at the rate of 20^0 per minute and was further maintained on the same for 15 minutes[10].

Drugs and Reagents

The procedure for the synthesis of five isomeric benzylpiperazine involves the reductive amination of substituted benzylaldehyde and piperazine in the presence of sodium cynoborohydride. Isolation of basic gave the corresponding benzylpiperazine bases, which were converted into hydrochloride satls using gaseous HCl and was purified and recrystallized. The starting materials for the coumpound 1,2 and 3, was 4-epoxy benzeldehyde , 2,3-methylenedioxybenzeldehyde is the stating material of compound 4 and for compound 5 was 3,4- Methylenedioxybeneldehyde. These compounds are commercially available.

Derivation Procedure

Each perfluoroamide was prepared individually by dissolving approximately 0.3 mg (1.36×10^{-6} mol) of each amine hydrochloride salt in 50 µL of ethyl acetate, followed by addition of a large excess (250 µL) of the appropriate derivatizing agent (TFA, PFPA or HFBA), and the reaction mixtures were incubated in capped tubes at 70°C for 20 min. Following incubation, each

sample was evaporated to dryness under a stream of air at 55°C and reconstituted with 200 µL of ethyl acetate and 50 µL of pyridine. A portion of each final solution (50 µL) was diluted with HPLC-grade acetonitrile (200 µL) to give the working solution [11].

Conclusion and significance of fisibility in forensic concepts

Now days, new synthetic drugs are emerging that posses the biggest problem for the forensic investigator. These drugs are creating challenges for the scientist for their detection because they are made synthetically and their ingredients vary every time. Thus different new techniques and analytical methods are being applied for their analysis. These drugs are forms illegally and are circulated in the market having drastic effects on the life of people. These drugs interact with the body metabolism causing deadly effects. According to certain surveys made, Piperazine is such drug which has been involved in the drug deaths. Forensic experts are constantly trying to improve their interpretation of the data for aiding in investigation. As studied piperazine combined with other components becomes deadly to human body, therefore these researches done on the drugs helps in the analysis and separation of the various components of the drug.

Conflict of Interest – Nil.

Sourse of Funding – Self

Ethical Clearance – Not required as it a review article.

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DOI Number: 10.5958/0973-9130.2019.00099.9

Epidemiological Analysis of Ocular Injuries in a Tertiary Care Teaching Hospital in Coastal Karnataka

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Abstract

The aim of the study was to study the epidemiological pattern of ocular injuries in a tertiary care teaching hospital in coastal karmataka. Methods: The study was a retrospective analysis of patients with ocular injuries. Those who visited Kasturba Hospital, Ophthalmology Department between Jan 2010 – Dec 2016 were included : 262 patients (213 men and 49 women). The details of these patients were accessed from their case files in the Medical Records Department (MRD) of Kasturba Hospital. The present study showed that patients in the age group of 28-37 years formed the majority of those affected by ocular injuries. The number of males affected was higher than the number of females affected. The most common ocular injuries was other injuries of eye and orbit, followed by Ocular laceration and rupture with prolapse or loss of intraocular tissue. In the current study, the right eye was injured 44% of the time, the left eye 43% of the time and both eyes 13% of the time.

Keywords: *Ocular injury, epidemiological pattern, blunt trauma, eye injuries, open globe injury, closed globe injury.*

Introduction

Of the total body surface area, eyes represent only 0.1%.[1]Ocular trauma, which was once a "neglected disorder," has been highlighted recently as a cause of visual morbidity. [1]

The frequency of eye injuries in the first three decades of life is remarkably high and often results in a physical and psychological trauma and associated financial burden to the injured patient for the rest of their life. Therefore, it is very much essential to gain proper knowledge about causes of ocular trauma and their management and prevention.[2, 3]The incidence of ocular trauma has been found to gradually increase in elderly when compared to young adults. The situation is certainly worser in developing countries due to a general lack of access to preventive health care at all levels. [5,6]

The male to female ratio is around 4:1 worldwide with Open globe injury being the commonest type of injury. A significant number of studies on ocular injury have been conducted in the US as well as in other developed countries but the pattern of ocular injuries in developing countries is not known due to a lack of data[5]

The annual incidence rate of hospitalization for eye injuries per lakh population/year is 5–16% worldwide. Blindness resulting from ocular trauma has prevalence rates of 0.6%–0.8%.[2] A study from urban slums in Delhi noted a prevalence rate of 2.4% for ocular trauma resulting in blindness in 11% of injured eyes[4]. Andhra Pradesh and Tamil Nadu have found prevalence rates of ocular trauma of 2–10%.[2]Annually, over 2.5 million

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Americans suffer an eye injury, and globally more than half a million blinding injuries occur every year.The prevalence of ocular trauma in India was reported at 2.4%.[3] Worldwide, there are approximately 1.6 million people blind from eye injuries, 2.3 million bilaterally visually impaired, and 19 million with unilateral visual loss. [1]

The forty-seventh round of NSSO in 1991 noted a high prevalence of injury-related visual disability (35/1000 in rural and 32/1000 in urban areas). According to the 58th round of NSSO report, 2002, injury-related visual disability increased to 51/1000 population. [4]

Loss of vision in one or both eyes is so significant that it has been classified as 24% of whole person impairment and 85% of whole-person disability, respectively.[7]Worldwide eye injuries are responsible for about 1.6 million people being blind and a further 19 million suffering from monocular blindness.[8]Even though the socioeconomic burden of ocular injuries may be overestimated, the patients affected are usually afflicted with life style changes, lack of job opportunities and often permanent physical problems.[9]

Considering the importance of ocular trauma and its effect on eye and public health,[10] prevention of ocular injuries should form the basis of management for which collection of data is a must. Seeing the seriousness and enormity of ocular injuries, this study is undertaken to assess the financial burden associated with ocular injuries and to suggest recommendations to prevent ocular trauma.

Methodology

The study was a retrospective analysis of patients with ocular injuries who visited Kasturba Hospital, Manipal. This study was conducted for a period of 5 years between January 2010 to December 2016, which included patients above the age of 18 years who visited the Department of Ophthalmology in Kasturba Hospital. A total of 262 patients (213 men and 49 women) were considered for this study.

Details of patients like the pattern of eye injury with the ICD code, the side of eye injury, age and gender was obtained from their files situated in the MRD of Kasturba Hospital, Manipal.

The following outcomes were measured.

Age

Gender

Pattern of ocular injures

Injured eye

Data analysis and observations:

The objective was to study the epidemiological pattern of ocular injuries in patients presenting to the tertiary care teaching hospital.

To fulfill the objective, data on demographics i.e. age and gender, injured side (right, left or both) and pattern of ocular injuries was collected, collated and analyzed.

The total sample size was 262. This included all patients of ocular injuries that came to the tertiary care teaching hospital from January 2012 to December 2016.

All the data is presented in the form of frequencies and percentages.

Results

Gender

The total number of ocular injury patients that came to the hospital from Jan 2012 to Dec 2016 were 262, out of which 213 (81.3%) were males and 49 (18.7%) were females (fig 1). It is clearly seen that the burden of ocular injuries is much more in males than in females.

Table1. Gender

Gender	Frequency	Percentage
Male	213	81%
Female	49	19%
Total	262	100%

Age

The victims belonging to the age group of 28-37 years were affected the most.

1/3 of the ocular injuries were in the age group of 28-37 years.

2/3 of the ocular injuries were in the age group of

18-27 years and 38-47 years.

Frequency table for the affected age group.

Table 2. Age Pattern of ocular injuries

AGE (In years)	FREQUENCY (n=262)	PERCENTAGE
18-27	47	17.93%
28-37	69	26.33%
38-47	48	18.32%
48-57	39	14.88%
58-67	28	10.67%
68-77	28	10.67%
>80	3	1.2%
Total	262	100%

The most frequent pattern of ocular injury was found to be other injuries to the eye and orbit-67 (25.57%). The second most frequent pattern of ocular injuries was ocular laceration and rupture with prolapse or loss of intraocular tissue - 45 (17.2%), followed by other patterns of injury.

Table 3. Pattern of ocular injuries Injured side (Right, left or both)

Code	Pattern	Frequency	Percentage
S05.0	Injury of conjunctiva and corneal abrasion with mention of foreign body	18	6.9
S05.1	Contusion of eye ball and orbital tissues	40	15.27
S05.2	Ocular laceration and rupture with prolapse or loss of intraocular tissue	45	17.2
S05.3	Ocular laceration without prolapse or loss of intraocular tissue	29	11.06
S05.4	Penetrating wound of orbit with or without foreign body	06	2.3
S05.5	Penetrating wound of eye ball with foreign body	22	8.4
S05.6	Penetrating wound of eye ball without foreign body	10	3.80
S05.8	Other injuries of eye and orbit	67	25.57
S05.9	Injury of eye and orbit , part unspecified	25	9.5
	TOTAL	262	100

It was seen that the right eye was affected more than the left eye (44% for the the right eye, 43% for the left eye and 13% for both eyes).

Table 4. Side of injury

Injured Side	Frequency (n=262)	Percentage
Right	115	44%
Left	113	43%
Both	34	13%
Total	262	100%

Discussion

The present study showed that patients in the age group of 28-37 years formed the major group affected by the ocular injuries. More males were affected than females. The most common pattern of ocular injuries was other injuries of eye and orbit followed by Ocular laceration and rupture with prolapse or loss of intraocular tissue. In the current study, the right eye was injured 44% of the time, the left eye 43% of the time and both eyes 13% of the time.

Conclusion

Policies to prevent ocular injuries should be made and implemented in all areas of human work, primarily among blue collar workers and in the informal and unorganized sector. The concerned government departments must undertake community awareness programs on eye related injuries.

Ethical Clearance- Taken from Institutional ethics committee

Source of Funding- Self

Conflict of Interest - Nil

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DOI Number: 10.5958/0973-9130.2019.00100.2

Reliability of Length and width of Hip Bone and Transverse Diameter of Acetabulum in Gender Determination

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Abstract

Identification of the sex from the skeletal remains is the prime work of forensic experts. The present study is carried out to determine the sex of hip bone from the length of hip bone, width of hip bone, transverse diameter of acetabulum. One hundred adult hip bones of known sex (50 male and 50 female) available in the department of Forensic medicine and Department of Anatomy, M R Medical College and KBN Institute of medical sciences, Gulbarga are used for present study. Among all the three variables statistically analyzed, the most reliable parameter is length of hip bone, 28% of male and 8% of female hip bones that is, overall 18% of hip bones can be sorted out by this parameter alone. This parameter is found to be statistically significant.

Keywords: *Diameter of acetabulum, Identification point, Length of hip bone*

Introduction

Identification of sex of the deceased from skeletal remains is in practice since long ago, as it becomes a important expert evidence in the court of law. In medico legal cases forensic experts are often asked for their expert opinion regarding species, age, sex, race and stature and probable cause of death from skeletal remains.

In Medico-legal cases bones form important evidence in establishing identity of deceased. The determination of deceased sex is first step in skeletal analysis since estimation of age at death, race, and stature depends on sex of deceased.

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Observations and measurements suggesting age, sex and race of an individual skeleton or its remains are not only useful in anthropology and archeology but also essential for establishing personal identity in forensic medicine[1]. Hip bone is a large irregular bone consisting of three parts, ilium, pubis and ischium. It constitutes the major part of pelvis. The word hip bone is derived from Latin word *Os Coxae*[2]. The exact establishment of sex, in archeological and medico legal samples of bones, depends upon the bones sent for examination. If entire skeleton is sent for examination it becomes easy to identify sex and age of the individual. It becomes difficult to determine the sex of deceased, if few bones are available and it is still more difficult when a single bone or its fragments are available.

In forensic practice, the problem of identifying the human remains frequently involves identification of sex, which can be most certainly established from the pelvis or hip bone, though some doubt always remains. Complete accuracy has been claimed only when the rest of skeleton was available. Krogman[3] had given extensive review of literature on the sexing of skeletal remains in his textbook, 'The Human Skeleton in Forensic Medicine' as follows "*The sexing of unknown skeletal material depends upon relative completeness of*

the skeleton. Percentage of accuracy, for adult material, was about as follows entire skeleton 100% and by Pelvis alone 95%."

The hip bone alone can show sexual differentiating criteria since fetal life. Different workers have done sex differentiation studies of hip bone in different population, some of these are: Washburn in American Whites and Negroes[4], and in Bantu and Bushman[5], Hanna and Washburn in Eskimos[6], Davivongs in Australian Aborigines[7], Day and Wilmott in English population[8], Singh and Raju in Varanasi zone[9,10], Rajangam et al in population from Karnataka[11]. Results of these studies have shown wide range of variations in standards of morphological and morphometric sex differences. These variations occur because the skeletal growth is mostly influenced by factors like race, heredity, climate, environment, nutrition, etc., which are likely to change from region to region, hence, it is essential to carry out such studies in different regions. So, traditional method is not reliable in the study of bones. Other metrical methods are statistically significant but, many parameters show overlap between male and female values, considerable number of hip bones fall in the overlapping zone.

Material and Method

One hundred adult human hip bones of known sex available in the Department of Forensic Medicine & Toxicology and Department of Anatomy, M.R. Medical College & K.B.N. Institute of Medical Sciences, Gulbarga were used for the present study. Out of 100 hip bones, 50 are of males and 50 are of females. All the hip bones were dry, free of damage or deformity and were completely ossified.

Following instruments were used for the measurements of various parameters of hip bone:

Sliding Vernier caliper

Osteometric board

Sufficient care was taken to avoid manual error and all measurements were taken personally. From each hip bone following parameters were measured and indices were obtained in the manner described below:

Length of hip bone: It is the maximum distance between iliac crest and ischio-pubic ramus measured with the osteometric board.

Width of hip bone: It is the maximum distance between anterior superior iliac spine and posterior superior iliac spine of the iliac crest. It was measured with the osteometric board.

Transverse diameter of acetabulum: Maximum transverse diameter measured from marginal point of lunate articular surface to the opposite marginal point with sliding caliper.

As the first part of study all the values were tabulated and analysed statistically by routine statistical methods.

The values of range, mean, standard deviation, calculated range (mean±3SD), Demarking points and Identification points were obtained. For each parameters with male range of a – b and female range of c – d, values 'a' and 'd' were the identification points (I.P) for females and males respectively. Any hip parameter reading less than 'a' was regarded as female hip bone and greater than 'd' was regarded as male hip bone and in case where female range is more than male then 'b' and 'c' were identification points (I.P) for female and male respectively. Similarly Demarking Points (D.P) was calculated from calculated range i.e., Mean ± 3 S.D (a = minimum value in male range, b = maximum value in male range, c = minimum value in female range and d = maximum value in female range). Subsequently 't' test was applied to all of the 14 parameters.

Observations

One hundred hip bones (50 males and 50 females) were studied in the present study. In all the hip bones length and width of hip bone and transverse diameter of acetabulum measurements were measured. As the first part of study each parameter were analyzed statistically and mean, standard deviation, range, calculated range (mean±3 SD), demarking points (DP) and identification point (IP) were obtained. Percentage of the hip bones identified by demarking point, percentage of hip bones identified by identification point were calculated. Then 't' test was applied.

Comparative bar diagram of male and female values were drawn for each parameter respectively.

The mean length of hip bone in male is 202.46 mm ranging between 180-234 mm. The mean length of hip bone in female is 177.28 mm with the values ranging between 157-200 mm. The SD for male and female were 12.40 & 10.34 respectively. The range of mean ±

3 SD in males and females 165.27-239.69 mm & 146.25 – 208.31 mm respectively. Identification point for male is >200 mm & for female it is less than <180mm. The demarking point for males is >208.30 mm and for females it is <165 mm, and the percentage of hip bones identified by demarking point alone is 28% of male and 8% of female. 't' test was highly significant with P<0.001. (**Table-1**)

Table-1: Statistical analysis of the length of hip bone

Sl. No.	Particular	Male (mm)	Female (mm)
1.	Number of bones	50	50
2.	Range	180-234	157-200
3.	Mean	202.46	177.28
4.	Standard deviation (SD)	12.40	10.34
5.	Statistical Significance	Sig	Sig
6.	Identification Point	>200	<180
7.	Percentage of identified bones (by IP)	56%	72%
8.	Calculated range (mean±3SD)	165.27-239.65	146.25-208.31
9.	Demarking point	>208.30	<165
10.	Percentage beyond Demarking Point	26%	8%
11.	Standard Error	1.75	1.46

't' test=11.03; p<0.001 *Highly significant

The mean width of hip bone in male is 138.7 mm ranging between 123-158 mm. The mean width of hip bone in female is 136.3 mm with the values ranging between 118-146 mm. The S.D. for male and female are 10.18 & 7.49 respectively. The range of mean ± 3 S.D. in males and females is 108.17 – 169.30 mm & 113.28 – 158.78 mm respectively. Identification point for male is >146 mm & for female it is less than <123 mm. The demarking point for males is >158.78 mm and for females it is <108.17 mm, and the percentage of hip bones identified by demarking point alone is 0% for both male and female. 't' test was Insignificant with P>0.05. (**Table-2**)

Table-2: Statistical analysis of the width of hip bone

Sl. No.	Particular	Male (mm)	Female (mm)
1.	Number of bones	50	50
2.	Range	123-158	118-146
3.	Mean	138.7	136.3
4.	Standard deviation (SD)	10.18	7.49
5.	Statistical Significance	InSig	InSig
6.	Identification Point	>146	<123
7.	Percentage of identified bones	24	2%
8.	Calculated range (mean±3SD)	108.17 – 169.3	113.28 – 158.78
9.	Demarking point	>158.78	<108.17
10.	Percentage beyond Demarking Point	0%	0%
11.	Standard Error	1.44	1.06

t'test=1.34; p>0.05 *statistically Insignificant

The mean transverse diameter of acetabulum of the male hip bone is 51.6 mm ranging between 45-60 mm. The mean transverse diameter of acetabulum of female hip bone is 46.68 mm with the values ranging between 40-53 mm. The S.D. for male and female are 3.53 & 3.48 respectively. The range of mean ± 3 S.D. in males and females is 41-62.1 & 36.24-57.12 mm respectively. Identification point for male is more than 53 mm & for female it is less than 45 mm. The demarking point for males is >57.12 mm and for females it is <41 mm, and the percentage of hip bones identified by demarking point alone is 4% of male and 4% of female. 't' test is highly significant with P<0.001. (**Table-3**)

Table-3: Statistical analysis of the transverse diameter of acetabulum

Sl. No.	Particular	Male (mm)	Female (mm)
1.	Number of bones	50	50
2.	Range	45-60	40-53
3.	Mean	51.6	46.68
4.	Standard deviation (SD)	3.53	3.48
5.	Statistical Significance	Sig	Sig
6.	Identification Point	>53	<45
7.	Percentage of identified bones	32%	26%
8.	Calculated range (mean±3SD)	41-62.1	36.24-57.12
9.	Demarking point	>57.12	<41
10.	Percentage beyond Demarking Point	4%	4%
11.	Standard Error	0.5	0.49

't'test=7.02; p<0.001 *statistically highly significant

Table-4: Showing comparison of the Length of hipbone

Sl. No	Author	No. of Cases		Mean (mm)		Demarking Point (mm)	
		Male	Female	Male	Female	Male	Female
1	Davivongs[7]	99	96	197.65	181.96	>195	<178
2	Singh & Raju[9]	120	80	197.35	181.72	--	--
3	Bagade[12]	65	35	195.05	179.79	>196	<175
4	Gadare[13]	141	41	195.39	177.40	>208.96	<167.25
5	Rajangam et al[11]	60	45	202.5	185.8	>213.3	<178.2
6	Present study	50	50	202.46	177.28	>208.3	<165

Table-5: Showing comparison of the width of hip bone

Sr No	Author	No. of Cases		Mean (mm)		Demarking Point (mm)	
		Male	Female	Male	Female	Male	Female
1	Davivongs[7]	97	94	147.99	142.16	>161	<133
2	Singh & Raju[9]	120	80	143.34	137.36	--	--
3	Bagade[12]	65	35	140.87	132.32	>145	<126
4	Rajangam et al[11]	60	45	144.3	135	>158.4	<121.5
5	Gadare[13]	141	41	141.37	133.12	159.1	115.57
6	Present study	50	50	138.7	136.3	>158.78	<108.17

Table-6: Showing comparison of the transverse diameter of acetabulum

Sl. No.	Author	No. of Cases		Mean (mm)		Demarking Point (mm)	
		Male	Female	Male	Female	Male	Female
1	Davivongs[7]	95	89	50.75	45.53	>50	<45
2	Singh & Raju[9]	160	80	55.11	42.99	--	--
3	Bagade[12]	60	30	52.51	45.02	>51	<47
4	SSSN Rajasekhar[14]	121	85	50.8	52.7	>55.55	<39.03
5	Present study	50	50	51.6	46.68	>57.12	<41

Discussion

Length of hip bone:

The mean length of hip bone in male is 202.46 mm ranging between 180-234 mm. The mean length of hip bone in female is 177.28 mm with the values ranging between 157-200 mm. The SD for male and female were 12.40 & 10.34 respectively. The range of mean ± 3 SD in males and females 165.27-239.69 mm & 146.25 – 208.31 mm respectively. Identification point for male is >200 mm & for female it is less than <180mm. The demarking point for males is >208.30 mm and for females it is <165 mm, and the percentage of hip bones identified by demarking point alone is 28% of male and 8% of female. 't' test was highly significant with P<0.001.

Comparison of the length of hip bone with findings of other workers shows that in general male hip bones were longer than female hip bones. (Table-4)

Width of hip bone

The mean width of hip bone in male is 138.7 mm ranging between 123-158 mm. The mean width of hip bone in female is 136.3 mm with the values ranging between 118-146 mm. The S.D. for male and female are 10.18 & 7.49 respectively. The range of mean ± 3 S.D. in males and females is 108.17 – 169.30 mm & 113.28 – 158.78 mm respectively. Identification point for male is >146 mm & for female it is less than <123 mm. The demarking point for males is >158.78 mm and for females it is <108.17 mm, and the percentage of hip bones identified by demarking point alone is 0% of male and 0% of female. 't' test was Insignificant with P>0.05.

Comparison of the width of hip bone of the present study with the findings of other workers shows that in general male hip bones were broader than female hip bones. (Table-5)

Transverse Diameter of Acetabulum

The mean transverse diameter of acetabulum of the male hip bone is 51.6 mm ranging between 45-60 mm. The mean transverse diameter of acetabulum of female hip bone is 46.68 mm with the values ranging between 40-53 mm. The S.D. for male and female are 3.53 & 3.48 respectively. The range of mean ± 3 S.D. in males and females is 41-62.1 mm & 36.24-57.12 mm respectively. Identification point for male is more than 53 mm & for female it is less than 45 mm. The demarking point for males is >57.12 mm and for females it is <41 mm, and the percentage of hip bones identified by demarking point alone is 4% of male and 4% of female. 't' test is highly significant with P<0.001.

Comparison of transverse diameter of acetabulum of the present study with findings of previous workers. (Table-6)

Conclusion

Among all the three variables statistically analyzed, the most reliable parameter is length of hip bone, 28% of male hip bones and 8% of female hip bones i.e overall 18% hip bones can be sorted out by this parameter alone. This parameter is found to be statistically significant.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Taken from Institutional Ethical Committee

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DOI Number: 10.5958/0973-9130.2019.00101.4

Does Body Mass Index Influences the Method Opted for Suicide?

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Abstract

Background - In recent years many researches suggested that body mass index is inversely related to suicide. But only a limited literature explored the association of body mass index with method opted for suicide. The current research aims to find out the association between body mass index and method opted for suicide in Indian scenario. **Method -** Case-control study was conducted in the Department of Forensic Medicine and Toxicology, Gandhi Medical College, Bhopal. 70 hanging cases, 43 poisoning cases were compared with 50 road traffic accident postmortem study samples brought for medicolegal autopsy. Height and weight measured, body mass index calculated and categorised. Data were analysed using R version 3.3.3. **Conclusion -** The present study suggests death by hanging and by poisoning, the two most common methods of suicide in India, decreases with increase in BMI ($p < 0.01$). But, BMI cannot be used as a predictor of method opted for suicide, i.e., hanging or poisoning, in underweight, normal and overweight BMI categories ($p > 0.05$).

Keywords: *Body Mass Index, Suicide, Hanging, Poisoning, Road traffic accident.*

Introduction

Body Mass Index (BMI) is not a direct measure but, the most widely used method to gauge obesity. [1] The index, as an indicator of obesity or pomposity, cannot distinguish between heaviness due to adiposity, muscularity, or edema.[2] Nevertheless, the measurements can be made easily, quickly, and with a fair degree of accuracy.[3] Its advantages are widely exploited across disciplines ranging from international surveillance to individual patient assessment.

Suicide is the act of deliberately killing oneself.[4] It is described in International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) as Intentional self-harm (X60-X84). [5] Worldwide, in 2015, there was an estimated 8,00,000 suicide. [6] Suicide by intentional pesticide ingestion is among the most common methods of suicide globally. [7] In India, during the year 2015, more than one lakh persons (1,33,623) in the country lost their lives by committing suicide. Two most common means of suicide were hanging (45.6%) and consuming poison (27.9%). [8]

Most of the studies relating BMI to suicide suggested inverse relation between the two, i.e., suicide decreases with increase in BMI. Might BMI influence the choice of method used? Only a limited literature explored the association of BMI with method opted for suicide. The proposal of the current study was to examine the association of the body mass index with hanging and poisoning as the method opted for suicide in a postmortem study in Indian scenario.

Method

The case-control study was conducted in the Department of Forensic Medicine, Gandhi Medical College, Bhopal (M.P.) during the period September, 2014 to November, 2015. Study samples (N=163) were

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deceased brought by police for medicolegal autopsy. Cases were those who committed suicide by hanging (N=70) and poisoning (N=43) whereas controls (N=50) died in road traffic accident (RTA).

History of the incidence was obtained from inquest papers, hospital records and from available relatives. Death-to-postmortem interval was estimated from hospital records and inquest papers. In cases where the information differs between inquest papers and history by relatives, the time when the deceased was last seen alive was used as a proxy for time since death. Length (vortex-to-heel) and weight of the deceased were taken in supine position, after removing clothes and articles. Weight was measured on digital weighing scale with accuracy up to 0.020 kg. Deceased body length was taken by placing two vertical aluminium square tubes, one at head end and another at heel. The horizontal distance between the two aluminium tubes were measured using another metallic tube mounted with measuring tape (accuracy up to 0.01 meter). Weight and length were measured up to two decimal places. BMI was calculated. The International Classification of adult underweight, overweight and obesity according to BMI was used to categories the study samples. (Table 1).

Inclusion criterias were known cases of suicide by hanging and poisoning brought for medicolegal autopsy; both genders, male and female; and samples with age between 15 to 60 years. Whereas decomposed or mutilated bodies; duration of hospitalization more than 24 hours, death-to-postmortem interval more than 24 hours, clinical history of ascites, renal disease or cardiovascular disease and, in case of females, history of or postmortem finding of pregnancy were excluded from the study.

Statistical analysis were performed using R version 3.3.3 after removing the identification data. A two-tailed p-value <0.05 was considered statistically significant.

Results

In the study, there were 42.94% hanging cases (N = 70), 26.38% poisoning cases (N = 43) and 50 controls (RTA, 30.67%). No case or control in the obese (BMI $\geq$ 30 kg/m^2) category could be found during the study period. Among victims of suicide, 61.95% died by hanging and 38.05% died by ingestion of poison.

On sub-classifying study groups e.g., hanging, poisoning and controls, by BMI, majority of deaths were observed within normal BMI category. Among hanging and poisoning, the observed trend was underweight followed by overweight category. Reverse was true for controls.

Overall, deceased who died in RTA had a higher mean BMI (23.27 ± 2.58 kg/m^2) compared to those who had died of hanging (20.27 ± 2.39 kg/m^2) or poisoning (20.53 ± 3.07 kg/m^2). On sub-classifying study samples by BMI categories, hanging group had higher BMI compared to poisoning group, in underweight and in normal BMI category. Among overweights, poisoning group had higher BMI (26.53 ± 1.20 kg/m^2) compared to hanging group (26.31 ± 0.76 kg/m^2). (Figure 1)

Among hanging group, tendency to commit suicide decreases with increase in BMI (X^2 = 15.02, $p < 0.01$). Odds ratio, compared to underweight, were 0.16 and 0.04 in normal and overweight category respectively. The trend observed was similar for poisoning (X^2 = 8.01, $p < 0.01$), with odds ratio 0.11 and 0.09 for normal and overweight category compared to underweight.

Independent comparison of mean BMI score of hanging and of poisoning with RTA were significant ($p < 0.01$) in underweight and normal category, suggest that with lower BMI commitment of suicide increase either by hanging or poisoning. Whereas in overweights, neither hanging nor poisoning compared to control resulted in significant difference ($p > 0.05$). Comparison of mean BMI between two methods of suicide, i.e., hanging and poisoning, in underweight, normal, and overweight categories resulted non-significant ($p > 0.05$). This suggest no difference in method opted to commit suicide in underweight, normal and overweight categories.

Table 1: The International Classification of adult underweight, overweight and obesity according to BMI

Classification		BMI(kg/m²)	
		Principal cut-off points	Additional cut-off points
Underweight		<18.50	
	Severe thinness		<16.00
	Moderate thinness		16.00 - 16.99
	Mild thinness		17.00 - 18.49
Normal range		18.50 - 24.99	18.50 - 22.99
			23.00 - 24.99
Overweight		≥ 25.00	
	Pre-obese	25.00 - 29.99	25.00 - 27.49
			27.50 - 29.99
Obese		≥ 30.00	
	Obese class I	30.00 - 34.99	30.00 - 32.49
			32.50 - 34.99
	Obese class II	35.00 - 39.99	35.00 - 37.49
			37.50 - 39.99
	Obese class III	≥ 40.00	

Table 2: Distribution of study samples

BMI Category	Hanging			Poisoning			RTA*			Sum	
	N	Ncol%	Nrow%	N	Ncol%	Nrow%	N	Ncol%	Nrow%	N	Ncol%
Underweight	17	24.29	54.84	12	27.91	38.71	2	4.00	6.45	31	19.02
Normal	49	70.00	44.14	25	58.14	22.52	37	74.00	33.33	111	68.10
Overweight	4	5.71	19.05	6	13.95	28.57	11	22.00	52.38	21	12.88
Sum	70		42.95	43		26.38	50		30.67	163	
*RTA = Road traffic accident											

Table 3: Descriptive statistics of study samples

Groups	N	Mean ± SD (kg/m²)	Min	Max
Complete Sample	163	21.26 ± 2.95	15.47	28.23
Underweight	31	17.43 ± 0.78	15.47	18.35
Normal	111	21.29 ± 1.62	18.55	24.87
Overweight	21	26.75 ± 0.94	25.22	28.23
Hanging	70	20.27 ± 2.39	15.47	27.16
Poisoning	43	20.53 ± 3.07	16.03	28.23
RTA	50	23.27 ± 2.58	18.31	27.91
Underweight (Hanging)	17	17.43 ± 0.76	15.47	18.33
Underweight (Poisoning)	12	17.29 ± 0.80	16.03	18.35
Underweight (RTA)	2	18.32 ± 0.01	18.31	18.33
Normal (Hanging)	49	20.77 ± 1.36	18.55	23.45
Normal (Poisoning)	25	20.64 ± 1.27	18.58	23.61
Normal (RTA)	37	22.43 ± 1.59	19.20	24.87
Overweight (Hanging)	4	26.31 ± 0.76	25.33	27.16
Overweight (Poisoning)	6	26.53 ± 1.20	25.22	28.23
Overweight (RTA)	11	27.02 ± 0.83	25.29	27.91

Table 4: Analysis of linear trend by cause of death

Method	BMI (kg/m²) category	Case	Control	Odds Ratio	X^2	p-value
Hanging	<18.50	17	2	1.00	15.02	< 0.01
	18.50–24.99	49	37	0.16		
	25.00–29.99	4	11	0.04		
Poisoning	<18.50	12	2	1.00	8.01	< 0.01
	18.50–24.99	25	37	0.11		
	25.00–29.99	6	11	0.09		

Table 5: Comparison of means

Groups	t(df)= value	p-value	95%CI
Underweight (Hanging vs. RTA*)	t(16.09)= -4.82	< 0.01	-1.28, -0.50
Normal (Hanging vs. RTA*)	t(84)= -5.22	< 0.01	-2.29, -1.03
Overweight (Hanging vs. RTA*)	t(13)= -1.48	0.16	-1.74, 0.32
Underweight (Poisoning vs. RTA*)	t(11.04)= -4.48	< 0.01	-1.54, -0.53
Normal (Poisoning vs. RTA*)	t(60)= -4.71	< 0.01	-2.55, -1.03
Overweight (Poisoning vs. RTA*)	t(15)= -0.99	0.34	-1.54, 0.56
Underweight (Hanging vs. Poisoning)	t(27)= 0.48	0.64	-0.46, 0.74
Normal (Hanging vs. Poisoning)	t(72)= 0.4	0.69	-0.52, 0.78
Overweight (Hanging vs. Poisoning)	t(8)= -0.32	0.75	-1.79, 1.35
*RTA = Road traffic accident			

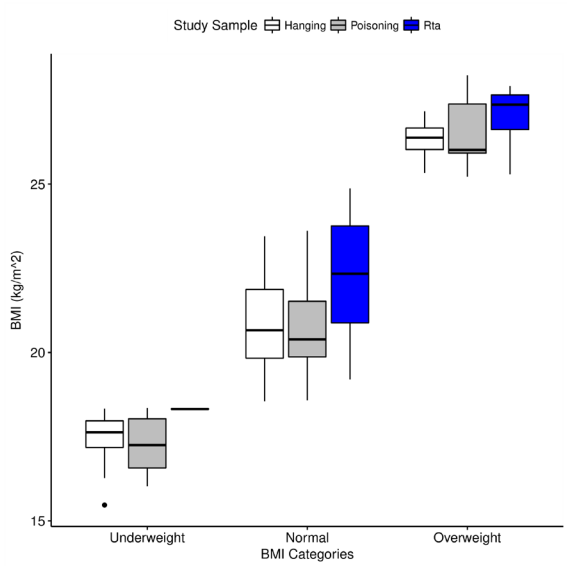

Figure 1: Mean BMI scores of study samples (Rta = Road traffic accident)

Discussion

This case-control study was conducted on 70 cases of hanging, 43 cases of poisoning and on 50 controls (RTA) postmortem samples to explore the association of BMI with specific methods opted for suicide.

Study samples belong to both genders and age-group from 15 to 60-years. Most of the researches were done in population >18 years. The present study included cases between 15 to 18 years, provided they fulfil selection criteria, keeping in with the finding of National crime record bureau (NCRB). According to NRCB, 7% of suicides occurred in the age group above 14 years and below 18 years. [8] On the other hand, due to possible presence of disease confounders, samples over age >60 years are excluded from the study.

The present study found hanging to be more common compared to poisoning as a method of committing suicide, this was consistent with the national data. [8] Only a few studies have addressed the association of BMI with the specific methods of suicide.

In the present study BMIs of both hanging and poisoning groups had lower BMI compared to controls. In contrast, postmortem South Australian retrospective study found BMIs were considerably lower in hangings

than in both the control group as well as in victims who died of alternative means of suicide (p <0.001). [9]

In an ecological study, in US, [10] the multivariable-adjusted correlation of obesity with non-firearm related suicide (r = -0.75; p <0.001) was found to be higher than with firearm related suicides (r = -0.53; p <0.001). Obesity rates were strongly correlated with lower rates of acts using firearms and hanging, two highly lethal methods, and almost completely uncorrelated with rates of acts using poisonings and other methods, which tend to be least lethal.

Findings of the present study differs from aforementioned researches addressing the method-specific suicides, which may be due to availability of the poison or firearm in the vicinity and knowledge of the lethality of method opted. Also, hanging (the method with high fatality) and poisoning require less effort in committing the act. The results were supported by Batty et al. that the strongest associations were those with methods that require greater physical effort and agility, e.g., hanging. [11] Ecological analyses again support fewer hangings with greater BMI, [10] and it was observed a somewhat stronger association of BMI with non-firearm–related than firearm-related suicide mortality among American men. [12] Cumulatively, these findings suggest that BMI may have its most salient role in making suicidal acts less frequently fatal.

Stringent inclusion and exclusion criterias were main strength of the study. This study has limitations too, most importantly single measurement of BMI and study cohort is a selected population of medico-legal cases referred by police for medicolegal autopsy. The present study also recommends for a prospective study with larger sample size, addressing confounders to know the mechanisms by which obesity may influence suicide risk and method opted for suicide.

Conclusion

The present study suggests death by hanging and by poisoning, the two most common methods of suicide in India, decreases with increase in BMI. BMI cannot be used as a predictor of method opted for suicide, i.e., hanging or poisoning, in underweight, normal and overweight BMI categories.

Ethical Clearance – Taken from Institutional Ethics Committee, Gandhi Medical College, Bhopal.

Source of Funding – Self.

Conflict of Interest – Nil.

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DOI Number: 10.5958/0973-9130.2019.00102.6

Road Traffic Accidents in India: Need for Urgent attention and Solutions to Ensure Road Safety

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Abstract

The present study aims to analyse the road accidents in India at National, state and inter-city levels. According to the recent available statistics, there is age and gender-wise variations in the proportion of road traffic accidents and deaths where males have a very high percentage share of fatalities (85%) when compared to females (15%). Tamil Nadu had the highest percentage share of accidents (14.9) and Uttar Pradesh had the highest percentage share of fatalities (12.8). Some of the possible solution to combat this raising trend of road traffic accidents are- awareness initiatives, maintenance of good data base, planning and designing for road safety, remedial action at high crash sites, design for pedestrians and cyclists and implementation of strict speed limits. Thus there is an urgent need to provide emphasis on road safety and curtail the worsening situation of road traffic accidents, injuries and deaths in India which is the need of the hour.

Keywords: *Road traffic accidents, fatalities, safety.*

Introduction

In India mortalities and morbidities resulting from Road Traffic Accidents (RTA) are a growing public health concern. There is one death every 4 minutes due to road traffic accident in India. Over 1.37 lakh people were killed in road accidents in 2013 alone which is more than the number of people killed in all our wars put together. 16 children die on Indian roads daily. 1214 road crashes occur every day in India. 377 people die every day, equivalent to a jumbo jet crashing every day.[1] Therefore have overtaken China and are leading in terms of most number of road traffic accident deaths in the world. India is facing a worsening situation in this respect whereas other developing countries have shown a general improvement in the condition with regards to road traffic accidents. It is estimated by some researchers that if the same situation continues, by 2027 India would witness a 100% raise in the road traffic accident deaths and by 2025 the total number of road traffic deaths is likely to cross 2.5 Lakhs.[2]

It is found that 3.7% loss of national GDP of India is incurred every year due to RTA's which is a huge economic loss.[3] There are lot of factors which contribute to this secular trend. Just like the epidemiological features of any disease will be depicted in terms of agent factors, host factors and environmental factors so also RTA's have to be addressed in terms of these factors. Factors responsible for these accidents might be diverse. Agent factors include careless, reckless driving by drivers. Host factors will include ignorance in following traffic rules, not wearing helmets, seat belts, overtaking vehicles due to urgency of reaching workplace in time, and violation of road rules by pedestrians. Environmental factors include bad roads, poorly laid traffic signals. It is also observed in many of the research studies that accidents showed a peak raise during monsoon season due to the fact that roads get highly deteriorated during rainy seasons which is something the authorities have to give due attention to. This calls for an urgent need to create awareness among general public regarding the aetiology of road traffic accidents and the simple ways and means to prevent it.[4] The present article was written with the aim to analyse the situation of road traffic accidents in

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India at International, National, state and city levels and suggest appropriate recommendations to improve the situation of road safety in the country.

Methods used for locating, selecting, extracting, and synthesizing data

In this analysis we have extracted the latest statistics that was available in authentic data sources like Open Government Data (OGD) Platform India which is hosted and maintained by National Informatics Centre (NIC), Ministry of Electronics & Information Technology, Government of India and also data from some experts who have published review articles in this subject matter.

Scenario of Road traffic accidents

Globally, millions of people are coping with the death or disability of family members from road traffic injury. It would be impossible to attach a value to each case of human sacrifice and suffering,add up the values and produce a figure that captures the global social cost of road crashes and injuries. Without appropriate action, by 2020, road traffic injuries are predicted to be the third leading contributor to the global burden of disease and injury in terms of Disability adjusted life years (DALY: Disability-adjusted life year. A health-gap measure that combines information on the number of years lost from premature death with the loss of health from disability)[5]. It was observed that in the year 1990 the diseases or injuries with the highest DALY were (in the descending order)- lower respiratory infections, lower respiratory infections, perinatal conditions, unipolar major depression, ischaemic heart disease, cerebrovascular disease, tuberculosis, measles, road traffic injuries& congenital abnormalities. But it is predicted that in the year 2020 the diseases or injuries with the highest DALY will be (in the descending order)- ischaemic heart disease, unipolar major depression, road traffic injuries, cerebrovascular disease, COPD, lower respiratory infections, tuberculosis, war, diarrhoeal diseases & HIV.

It is estimated that India has about 16.6 deaths per lakh population, which sums up to a huge number of 1.37 crore population which is very alarming[6]. Compared to many western countries India has a huge death rate attributable to road traffic accidents.

Table 1: Comparison of India's RTA deaths with other countries

Country	Reported number of road traffic deaths[a]	Modelled number of road traffic deaths (Point estimate)[b]	Estimated road traffic death rate per 100 000 population[b]
China	62,945	261,367	18.8
India	137,572	207,551	16.6
Germany	3,339	3,540	4.3
Japan	5,679	5,971	4.7
UK	1,770	1,827	2.9
USA	32,719	34,064	10.6

[a]Adjusted for 30-day definition of a road traffic death; [b]Modelled using negative binomial regression.

The statistics about Road traffic accidents in India will depict the secular trend[1].

Table 2: Trend of Road traffic accidents in India over the last few years

Year	Total no. of road traffic accidents	Total no. of deaths due to road traffic accidents
2000	391449	78911
2001	405637	80888
2002	407497	84674
2003	406726	85998
2004	429910	92618
2005	439255	94968
2006	460920	105749
2007	479216	114444
2008	484704	119860
2009	486384	125660
2010	499628	134513
2011	497686	142485
2012	490383	138258
2013	486476	137572
2014	489400	139671
2015	501423	146133
2016	480652	150785

Analysis of road traffic accidents in various states reveal that in some of the states there is a very high prevalence which contributes a major portion to the national statistics. It is been observed that most of the states in south India have a very high prevalence namely in Tamil Nadu, Karnataka, Kerala, Andhra Pradesh & Maharashtra. In northern part Madhya Pradesh & Uttar Pradesh have a high prevalence[1]. In states like Tamil Nadu & Uttar Pradesh there has been consistent increase in the number of road traffic deaths whereas in states like Gujrat and Andhra Pradesh there has been a decline.

Table 3: Number of persons killed in RTA in various states with high prevalence

States	Year 2005	Year 2010	Year 2014
Andhra Pradesh	46,613	53,928	29,931
Gujrat	34,901	32,449	22,493
Karnataka	54,061	61,774	56,831
Kerala	51,217	41,473	41,096
Madhya Pradesh	39,719	56,897	55,335
Maharashtra	40,838	46,985	40,455
Rajasthan	29,986	31,033	27,453
Tamil Nadu	62,006	75,445	77,725
Uttar Pradesh	12,883	20,113	22,337
All India	4,65,282	5,27,512	4,93,474

When we look into the statistics of the year 2016, the states with high prevalence of Road Traffic accident deaths are the same as previous years[7]. It was observed that Tamil Nadu had the highest percentage share of accidents (14.9) and thepercentage share of fatalities amounts to 11.4 %. The percentage share of accidents of Uttar Pradesh, Madhya Pradesh, Karnataka and Maharashtra were 7.4, 11.2, 9.2 & 8.3 respectively and the percentage share of fatalities of the above states were 12.8, 6.4, 7.4 & 8.6 respectively.

Intercity comparison of 2016 statistics showed that Chennai reported the highest number of Road Accidents – 7,486 followed by Delhi (7375), Bangalore (5323), Indore (5143), Kolkata (4104) & Mumbai (3379). Delhi reported the highest number of Road Accident Deaths – 1,591. Chennai reported the highest number of Persons Injured – 7,349.

RTA mortalitieshave increased more than 9 times, from 14,500 in 1970 to 137,400 in 2013. When we compare with the magnitude of 2003, mortalities and morbidities are higher by 53,000 and 87,000 in 2013, respectively. Mortalities have increased at a rate of 5% per year while the population of the country has increased only at the rate of 1.4% per year from 2003 to 2013. Subsequently, mortality risk, RTA deaths per 100,000 people, have raised in 2013from 7.9 in 2003 to 11.2[2].

Table 4: Age and gender wise comparison of RTA deaths between the year 2003 and 2013

Age group No. of fatalities (%)		Year 2003	Year 2013
		No. of fatalities (%)	
Up to 14 years		6534 (7.7)	7305 (5.3)
15-29 years		25223 (29.9)	42453 (30.9)
30-44 years		29156 (34.5)	47838 (34.8)
45-59 years		16674 (19.7)	28263 (20.6)
60 years and above		6843 (8.1)	11564 (8.4)
Gender	Male	71128 (84.2)	117055 (85.2)
	Female	13302 (15.8)	20368 (14.8)
Total		84430 (100)	137423 (100)

It was observed that when the deaths were categorized according to road users, riders motorized with 2 or 3 wheelers had the highest percentage of accidents (34), followed by drivers/passengers of heavy truck (13%), passengers of 4-wheeled cars and light vehicles (10%), drivers of 4 wheeled cars and light vehicles (7%), drivers/passengers of busses (7%), pedestrians (9%), cyclists (4%) and others constituted the rest.

According to the Ministry of Road transport and highways, it was observed that accidents were highest among the drivers of younger age group (18-35 years)[7]. Among the people in the age group of 18-25 years the total number of accidents were 1,15,053 which consisted of 30,661 fatal accidents. Similarly the total number of accidents and fatal accidents in the age group of 25-35 years were 1,31,142 and 37,252 respectively. The total accidents and the fatality figures in the age group of

35-45, 45-60 and 60 & above were 1,06,726 & 31,041; 62,746 & 17,184 and 16,492 & 4,505 respectively.

Discussion

An integrated approach involving close collaboration of many sectors is said to be the most effective way to reduce mortalities and morbidities. If we scrutinize the root cause for RTAs in India, it is observed that with increasing urbanisation and population explosion in India there has been a drastic raise in vehicle density in the cities leading to a significant raise in the road traffic accidents which has been showing a secular trend of raise.

Let us compare road traffic deaths with the number of deaths occurring due to malaria. World Health Organization estimates that India has 15 million cases of malaria with 19,500–20,000 deaths annually[8]. It is alarming to note that the deaths due to road traffic accidents in India are approximately ten times that of malaria deaths (1,50,785 in 2016).Some of the preventive measures that can be emphasized on are as follows

Awareness initiatives: Just like anti-tobacco campaign is being implemented similarly campaign against road traffic accidents can be implemented with slogans boards everywhere along the roads like- "Speed thrills, but kills", "a short cut can cut short your life". Speed limits have to be mentioned along the roads and people should be fined if they cross the speed limit. Heavy fines should be levied on all those people violating traffic rules and the amount collected should be used for the betterment of roads which is a model adopted by majority of the developed countries. Awareness can also be created among public through road shows, role plays in public, signature campaign etc. It also warrants the need to train common people regarding first aid management of road traffic victims so that precious life can be saved in the Golden hour.

Maintenance of a good database: It's crucial to maintain a good database of RTA mortalities and morbidities so that it will help in making effective policy decisions. Some of the ideas discussed by the Ministry of Road Transport and Highways are noteworthy[7]. Improving the Road accident data base will be an effective measure to know where exactly the fault lies. Road Accidents are multi-causal, but falls into three broad categories, viz., Human error, Road engineering defects, Vehicular defects. As there is a need to focus on vulnerable road users, especially pedestrians; a committee consisting of expert members from IITs, State Police etc. constituted by the Ministry to move closer towards an accurate, consistent and objective road accident database.

Planning and designing roads forsafety: The government should make it transparent to all the citizens of the country as to how much budget is sanctioned in the respective area, who is the contractor and how much money is utilized per kilometre of road construction. Local people should be given the rights to supervise road constructions in their respective areas and the right to complain concerned authorities if the constructors do not comply with the foretold guidelines.

Remedial action at high-risk crash sites: It's a known fact that throughout a road network road crashes are not evenly distributed. Along particular sections of road or scattered acrosswhole residential neighbourhoods they occur in clusters at single sites[9]. Experience may show that certain sites, sections or areas are hazardous and need improvement,even wherearea-wide impact assessment and road safety auditsare carried out.Adding skid-resistantsurfaces, improving lighting, providing centralrefuges or islands for pedestrians, adding signsor markings, improving junctions with signals orroundabouts and adding pedestrian bridges are some of the possibilities.

Design for pedestrians and cyclists: An ideal thing is that there should be networks of segregated or separate pedestrianand bicycle routes connecting to a public transport system[10]. With due emphasis laid to safe crossings at junctions, such a networkmight consist of sections of footpath or cyclepath separate from roads plus sections running alongside roads. If pedestrians arenot separated or segregated from motor vehicletraffic pedestrians have twice the risk of injury[11].

Implementation of strict speed limits: Those drivers who are exceeding speed limits can be caught with speed cameras or radar. It was found from a recent analysis of experience obtained from several countries that instrumentsthat automatically catch drivers reduced by 14% the roadtraffic deaths and serious injuries inflicted[12]. It was also found that due to enforcement by police officers, a 6% reduction in the RTA fatalities occurred. Research studies have confirmed that by publicizing the presence of speed cameras orradar a

significant improvement in the compliance to speed laws can be achieved and tit will substantially reduce the incidence of crash and injury[13-16].

Conclusion

Road safety has received inadequate attention at the central, state, and local government levels, despite the growing burden of RTA mortality and morbidity. Road traffic accidents does not come under any specific agency either at state or central government which is one of the main reasons why it has not got the due attention which is required. It is observed that different agencies, sectors and groups are involved in the responsibility of dealing with various aspects of problems including road worthiness test for vehicles, the design of road networks and roads, urban planning, the introduction and enforcement of road safety legislations, and post-crash medical care and there is no single agency or group that can be held responsible in particular. It is necessary that there should be one single minister or leader who has to coordinate the efforts and address all the issues pertaining to road safety holistically. Ensuring a change so that responsibility is clearly assigned, specific roles are allocated to specific agencies, and duplication is avoided is the need of the hour.

Ethical Clearance: obtained from Institutional ethics committee

Source of Funding: Nil

Conflict of Interest: Nil

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DOI Number: 10.5958/0973-9130.2019.00103.8

Epidemiological Profile of Fatal Blunt Abdominal Trauma 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 deaths with blunt abdominal trauma which were subjected to post-mortem examination in a tertiary care teaching hospital in Hyderabad, Telangana for a period of two years from June 2010 to May 2012. The epidemiological aspect included victim's age, gender, religion, geographical area, socio-economic status etc. The study revealed that among 150 cases in the study period, the most common cause of injury was road traffic accident (n=90;60%). Majority of the victims were aged between 21-30 years (n=48; 32%). Incidence was common in males (n=108; 72%). Blunt abdominal trauma was most common in Hindu religion (n=97; 64.67%). The major geographical area of distribution of the study population with blunt abdominal trauma was Urban (96; 64%). Majority cases occurred in lower socio-economic class (n=65; 43.33%), Cases were common in married individuals (n=95; 63.33%). Most commonest day of incidence was Saturday (n=44; 29.33%).

Keywords: *Blunt trauma, Abdominal injury, Fatal, Epidemiology, Autopsy cases.*

Introduction

Abdominal organs and viscera are quite vulnerable to trauma, unlike thoracic and cranial cavities which is well protected by rib cage and skull, there is no protection of abdomen by any bony cage.[1] According to World Health Organization (WHO), injuries kill more than five million people worldwide annually. They account for 9% of global mortality. Trauma due to road traffic accident and assault is a major issues causing morbidity and mortality in developing countries like India.[2] In India, according to National Crime Records Bureau (NCRB) during 2014, a total of 4,51,757 accidental deaths were reported.[3] WHO estimates that, by 2020, trauma will be the leading cause of years of productive life lost of the entire world population.[2] Traumas involve a wide spectrum ranging from a mild to severe injuries of several organs and systems. Trauma to abdominal viscera is an important source of bleeding and are pose special medical attention, since most cases present with practical difficulties in sufficient diagnosis and subsequent therapeutic approach, especially in presence of other associated lesions. This is because most cases of blunt abdominal trauma with bleeding in the peritoneal cavity or retroperitoneum manifests with few or no symptoms.[4,5] The known aetiology of blunt abdominal trauma includes road traffic accidents, assault, fall from height, industrial accidents, animal hits etc.[6] There are many factors which determine the prevalence of such fatalities, which is commonly reported in an particular age group, gender, socioeconomic status, geographic area etc. Further day of incidence also influence the existence of these fatalities. In this article, we aim to establish the epidemiological profile of deaths with blunt abdominal trauma.

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Material and Method

The present study is a prospective cohort study of

the cases of blunt injury abdomen which were subjected for post mortem examination at Gandhi hospital Mortuary, Secunderabad, Telangana during June 2010 to May 2012. The study constituted a total of 150 cases of deaths from blunt abdominal trauma. Preliminary information like age, sex, and other demographic and epidemiological details, brief facts of the cases and cause of injury was collected from the inquest report. All this information was collected on a proforma, and data prepared was analysed under discussed objectives.

Observation

The study revealed that among autopsies conducted on deceased with blunt abdominal trauma for a period of two years, the most common cause of injury was road traffic accident (n=90;60%) followed accidental fall from height (n=18; 12%) and homicide (n=12;8%). Industrial accidents contributed to 9 deaths (6%). The accidental fall from height included fall from trees, roof tops, and during walking particularly under the influence of alcohol. Accidental fall from bullock carts and being run over by the bullock cartwheel over the abdomen and bull gored injuries contributed 9 deaths (6%). (Table 1) The total cases of the study population of blunt abdominal trauma abdomen have been divided into six sub-groups i.e.0-10, 11-20, 21-30, 31-40, 41-50, 51-60 and above 51 years. The highest number of cases were recorded in the 21-30 years age group (n=48; 32%), followed by 41-50 years age group (n=24; 16%), and least cases (n=15; 10%) were seen in 0-10 age group. (Table 2) The majority of the fatal blunt abdominal injuries were noticed in males (n=108; 72%), and in female, it was noticed in 42 cases (28%). (Table 2)

Blunt abdominal trauma was most common in Hindu religion (n=97; 64.67%) followed by Muslim (n=28; 18.67%) and Christian (n=15; 10%), and status was 10 cases was unknown (6.67%). The major geographical area of distribution of the study population with blunt abdominal trauma was Urban (96; 64%), and 54 cases (36%) were from rural area. The distribution of study population according to socio-economic status revealed that majority cases occurred in lower class (n=65; 43.33%), followed by middle (n=55; 36.67%) and upper class (n=18; 12%), and status was not known in 12 cases (8%). Majority of cases were married (n=95; 63.33%), and 44 (29.33%) deceased were single, and status of 11 (7.33%) cases was not known. Most commonest day of incidence was Saturday (n=44; 29.33%) followed by Sunday (n=38; 25.33%) and least incidence was noted on Wednesday (n=12; 8.57%). (Fig. 1) This may be probably due to more incidence of road traffic accidents on weekends due consumption of alcohol. The identification status of 121 (80.66%) deceased was known.

Table 1: Distribution of study population based on cause of injury.

Cause of Injury	Male (n=108)	Female (n=42)	Total
Assault	12 (8%)	0	12 (8%)
Road Traffic Accidents	60 (40%)	30 (20%)	90 (60%)
Fall from Height	18 (12%)	12 (8%)	30 (20%)
Industrial	9 (6%)	0	9 (6%)
Others	9 (6%)	0	9 (6%)

Table 2: Distribution of study population based on age and sex.

Age Group	Male (n=108; 72%)	Female (n=42; 28%)	Total (n=150)
0-10 Years	9 (6%)	6 (4%)	15 (10%)
10-20 Years	15 (10%)	6 (4%)	21 (14%)
20-30 Years	39 (26%)	9 (6%)	48 (32%)
30-40 Years	15 (10%)	6 (4%)	21 (14%)
40-50 Years	15 (10%)	9 (6%)	24 (16%)
Above 50 Years	15 (10%)	6 (4%)	21 (14%)

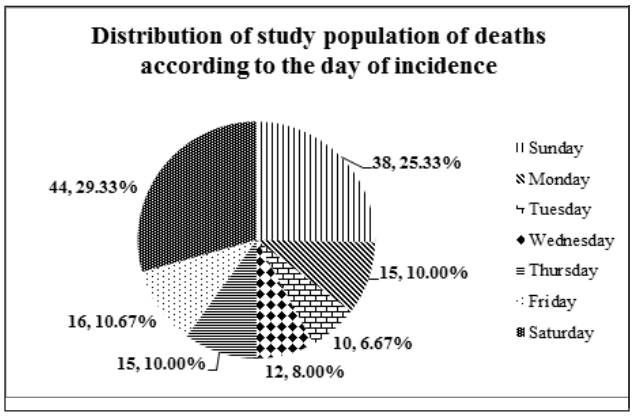

Fig. 1. Distribution of study population according to the day of incidence.

Discussion

The present study revealed that among autopsies conducted on deceased with blunt abdominal trauma for a period of two years, the major cause of injury was road traffic accident (n=90;60%). Shubhendu K et al study reported 64.7% deaths due to road traffic accident.[7] In Singh SP et al study of blunt abdominal trauma admitted in emergency medicine department, road traffic accident was the most common cause (60%).[8] A study of non-fatal blunt trauma in Pakistan conducted by Arif M et al revealed 84% cases injured by road traffic accident.[9] Gupta S et al described similar findings.[10] WHO mentions that 90% of the fatalities in the world on the roads occur in low- and middle-income countries. More than 1.25 million people die annually as a result of road traffic accidents.[11] According to NCRB data, 1,69,107 deaths resulted from road traffic accidents in India.[12]

In present study, the highest number of cases were reported in the 21-30 years age group (n=48; 32%), The age group 21-30 years being the most active and susceptible to more exposure would be the reason such fatalities. In study conducted in Brazil, Bordoni PH et al reported highest incidence common in the age group 18-29 years (34.41%),[13] and Arif M et al reported its common occurrence in age group 20-29 years (36%).[9] Such similarly was also seen in Singh SP et al[8] study (35%) and Gupta S et al[10] study. According to WHO, road traffic injuries are the leading cause of death among individuals aged from 15 to 29 years.[11] The maximum number of fatal blunt abdominal injuries were observed in males (n=108; 72%). Similar observation was also reported by Singh SP et al[8] (75%), Arif M et al[9] (92%) and Bordoni PH et al[13] (83.29%). This is probably because males are earning member of the family and predominantly being exposed to outside environment.

Blunt abdominal trauma was common in Hindu religion (n=97; 64.67%). This result is attributed to the fact that Hindu is the predominant religion in the region where the present study was conducted. The major geographical area of distribution with fatal blunt abdominal trauma was Urban (96; 64%), which is considerable as the study location belonged to Urban area. Fatalities were commonly reported in lower socio-economic class (n=65; 43.33%). Literature pertaining to association and the distribution of religion, geographical area and socio-economic status with fatal blunt abdominal trauma could not be established. Majority of cases were married (n=95; 63.33%). This finding negate with the study conducted by Bordoni PH et al where fatalities were less in married individuals (28.68%).[13] Study of fatal blunt injury abdomen in road traffic accidents by Kumar A et al revealed maximum married victims (67.3%).[14] Weekend, Saturday (29.33%) and Sunday (25.33%) were the common of incidence of fatalities. This may be probably due to more incidence of road traffic accidents due consumption of alcohol.

Conclusion

The study revealed that among 150 cases, the most common cause of injury was road traffic accident. Majority of the victims were aged 21-30 years and males. Incidence was common in weekends. Fatalities were commonly noticed in married individuals, urban area and low socio-economic status. As blunt abdominal trauma is common in road traffic accidents, this particular segment of susceptible population should be targeted with implementation of strict traffic rules. Further, the risk stratification and the study of nature of offending agent can assist the authorities in employing safety measures and better health care facilities on roads.

Funding

This article did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Declaration of Conflicting Interests: The authors declare that there is no conflict of interest.

Ethical Clearance: None required

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DOI Number: 10.5958/0973-9130.2019.00104.X

Quality of Life in Major Burn Patients in a Tertiary Care Teaching Hospital in South India

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Abstract

Aim: To assess the quality of life of major burn patients in a tertiary care teaching hospital.Materials and **Method:** A prospective approach was taken to identify patients who visited the department of plastic surgery for follow up from October 2017 to March 2018 after obtaining institutional ethical clearance. Details regarding social demographics, nature of the injury and the cause of injury were recorded in addition to administration of the questionnaire WHOQOL-BREF to assess the quality of life. Quality of life has four domains for assessment of physical, psychological, social and environmental aspects of burn survivors. **Results:** A total of 100 patients with burn injuries were identified (63 males, 37 females; mean age = 35.14 years). Nature of injury and cause of injury has no statistical significance over the quality of life. Quality of life was neither poor nor good among majority of 2nd-degree burn patients.

Keywords: *burns, quality of life, second degree burn*

Introduction

Burns are among the leading causes of disability-adjusted life-years (DALYs) lost in low-income and middle-income countries and globally females have moderately higher rates of death from burns compared to males according to the most recent data which is in contrast to the usual injury pattern, where rates of injury for the various injury mechanisms tend to be higher in males than females(1).Unsafe practice of cooking like open fire cooking or usage of unsafe cook-stoves or open flames used for lighting which can ignite loose clothing are the leading risks associated with females.

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Burn injuries are the most devastating injury, although most of the burn patients survives but ultimately results in numerous complications like limited range of mobility, hypertrophic scarring, motor dysfunctions and sensory disturbances, barriers to the activity of daily living, poor aesthetic appearance, psychological stress and social stigmas even when immediate management is administered.

It is very crucial to determine the factors which affect these outcomes in burn rehabilitation, as a result which will ultimately help to optimize the rehabilitation program(2). When compared to general population, quality of life in the early stages seems to be lower among burn survivors. Eventually quality of life and functional outcomes of burn survivors can be critically effected.

The objective of burn care is that the quality of the outcome must be worth the suffering of survival(3). Alteration in body images or appearance and cosmetically disfigurement are horrifying for the burn survivors. Also disquieting treatment procedure

and distressing nature of burn accidents induces psychopathological responses[4].Burn survivors are more effected mentally rather than physical impairment. Social issues incorporate challenges in sexual life and social interactions. Intervening factors for example low social support, abstaining from adapting styles and personality traits such as neuroticism and low extroversion adversely influence adjustment after burn injury[4]. Most of the burn victims belong to vulnerable group of the society. The suffering of burn survivors is further aggravated as the treatment requires prolonged hospitalization and multiple corrective plastic surgeries, leading to financial distress.

Methodology

This study included 100 patients (men and women) treated for burn injuries by Department of Plastic Surgery, Kasturba Medical College and hospital, Manipal, Karnataka during the period October 2017 to March 2018. Protocol approval was taken from the Institutional Ethics Committee, Kasturba Medical College, and Hospital, Manipal, Karnataka. Patients above the age of 18years can read and write English or Kannada, are willing to participate and who had sustained second degree or >second degree of burns were included in the study.

Permission was obtained from WHO, for using their standard questionnaire WHOQOL-BREF, for assessment of the quality of life. WHOQOL-BREF, questionnaire aims to assess the extent to which significant aspects of a person's life have been affected, rather than what symptoms and disabilities are present. The WHOQOL-BREF was developed by the WHOQOL Group, in 15 international field centers. It is a self-report questionnaire that contains 26 items. In this study, Kannada and English version were used. The questionnaire was administered to the patients who visited the department for follow-up. Verbal consent of the patients was taken before asking any question.

The collected data were numerically coded and analyzed using the SPSS Statistics software (version 16). The demographic information, nature of the injury and cause of injury of the participants were summarized using descriptive statistics. To compare the nature of injury with the domains, an independent samples t-test (or Man-Whitney U test) was used. To compare cause of injury with the domains, ANOVA (Kruskal-Wallis test) was used. The level of significance was set at .05 (two-tailed) and 95% confidence interval.

Results

Table no 1 shows Majority of the respondents belonged to the 40-49 age group (46%) with the least being 10% among 18-29 year olds. Male respondents were higher at 63% while female were 37%. Education status of most of the respondents were tertiary (60%) and illiterates being the least (10%).Occupation of respondents who were unemployed were higher (31%) while housewives (17%) being the least. Marital status of most of the respondents were single (47%) and married were (53%). Table 2 shows the most of the burn survivors (85%) were thermal burn patients and the least respondents were chemical burn patients (3%) and maximum of 33% respondents were injured by hot liquid spill and open fire with flames and 3% respondents were injured by acid spill Table no 3 shows mean scores of WHOQOL-BREF was on higher side for domain1 (QOL-PHY) 50.07±13.40 and lower side for domain4 (QOL-SR) 41.74±19.76. Table no 4 shows majority of respondents stated that the overall of quality of life was neither good nor bad 57%. Table no 4 shows Majority of respondents were neither satisfied nor dissatisfied with the health status 63%. Table no 5 shows there was no statistical significance between the nature of the injury and the QOL-PHY as determined by independent t-test ($t = 1.1$, $p = .25$) $p>0.05$. There was no statistical significant difference between the causes of burn injury and dom1b as determined by one-way ANOVA (F (4, 95) = .922, $p = .454$) $p>0.05$. Table no 6 shows there was no statistical significance

between the nature of injury and the dom2b (u=505, p=.956), dom3b (u=370, p=.894), dom4b (u=469.5, p=.657) as interpreted by the Mann-Whitney u test. There was no statistical significance between the cause of injury and the dom2b (χ^2=1.1, p=.893), dom2b (χ^2=4.1, p=.388), dom4b (χ^2=4.6, p=.321).

Table no 1 : Socio-Demographic characteristics of burn patients

Age: 18-29 30-39 40-49 50 and above	 10 (10%) 25 (25%) 46 (46%) 19(19%)
Gender: Male Female	 63 (63%) 37 (37%)
Education: None at all Primary school Secondary school Tertiary	 10 (10%) 15 (15%) 15 (15%) 60 (60%)
Occupation: Unemployed Semi-skilled Skilled Housewife	 31(31%) 29(29%) 23(23%) 17(17%)
Marital status: Single Married	 47 (47%) 53 (53%)

Table 2: Nature of burn injury and cause of burn injury among respondents:

Nature of burn	**Frequency**
Thermal burn	85(85%)
Electrical burn	12 (12%)
Chemical burn	3 (3%)
Total	100%
Causes of burn	
Stove accidents	19 (19%)
Electric current	12 (12%)
Hot liquid spill	33(33%)
Acid spill	3(3%)
Open fire with flames	33(33%)
Total	100%

Table no. 3 Descriptive statistics of quality of using WHOQOL-BREF

DOMAINS	**Mean**	**Std. Deviation**	**N**
QOL-PHY	50.0714	13.40138	100
QOL-PSYC	44.2167	16.08402	100
QOL-ENV	42.9217	21.66759	83
QOL-SR	41.7485	19.16888	100

Table no 4. The overall perception of quality of life and health satisfaction among burn survivors

Quality of life	**Frequency**
Very poor	1(1%)
Poor	27 (27%)
Neither poor nor good	57 (57%)
Good	14 (14%)
Very good	1(1%)
Total	**100%**
Satisfaction of health	Frequency
Very dissatisfied	1(1%)
Dissatisfied	5 (5%)
Neither satisfied nor dissatisfied	62 (62%)
Satisfied	30 (30%)
Very satisfied	2(2%)
Total	100%

Table no 5. Association of nature of injury and causes of injury with QOL-PHY

Nature of burn injury	**QOL-PHY**
Thermal burn Electrical burn **Independent t-test**	50.07±13.40 t-value (-1.1) df =95 p-value= (.25) sig≥.05 2-tailed
Causes of burn injury Stove accidents Electric current Hot liquid spill Acid Spill Open fire with flames **Anova**	 52.81±13.23 54.16±18.00 47.18±11.73 53.57±3.57 49.56±13.65 F(4,95)=.922 P value=.454 sig≥.05 2-tailed

Table no 6 Association of the nature of injury and cause of injury with QOL-PSY, QOL-ENV, and QOL-SR

	QOL-PSYC	QOL-ENV	QOL-SR
mean±s.d	44.21±16.08	42.92±21.66	41.74±19.16
Nature of burn injury (Mann-Whitney U Test)	U value=505 p value-=.956 sig≥.05 2-tailed	u value=370 p value=.894 sig≥.05 2-tailed	u value=469.5 p value=.657 sig≥.05 2-tailed
Causes of burn injury **Kruskal-Wallis test**	χ^2 =1.1 df=4 p value- .893 sig≥.05 2-tailed	χ^2=4.1 df=4 p value- .388 sig≥.05 2-tailed	χ^2=4.6 df=4 p value- .321 sig≥.05 2-tailed

Discussion

Quality of life was assessed using WHOQOL-BREF with the cut off points determined on basis of similar studies. In the present study males (67%) were predominantly affected by the burn injuries which is similar to the results found in a study conducted in China[2] with (76%) but females were predominantly affected by the burn injuries in another study conducted in India[4].

It has been observed in present study that thermal burn is most prominent nature of the burn injury accounts for 85%. A similar study conducted in different set up has the majority of cases 60% with thermal nature of burn[4]. Also, nature of burn injury and causes of burn injury has no significant impact on quality of life. In present study association of nature of injury and causes of injury have been checked with the quality of life were not found to be significant. While in another study

In the present study, the majority of respondents stated that quality of life was neither poor nor good (57%) and neither satisfied nor dissatisfied (63%), in the similar study using WHOQOL-BREF found to be significantly poor[5]. Another study using QOLS stated quality of life was poor in burn patients.

Conclusion

In this present study, nature of burn injury or the causes of burn injury has not been found significant with the quality of life which means the quality of life has the same impact on all types of burn. The eventual outcome of the burn survivors is related to individual physical characteristics of the patient, the severity of the burn injury, the time is taken to return back to work after treatment and quality of life. Quality of life among burn survivors always seems to be at the lower level but it can be enhanced with the help of strategies which creates awareness among general population regarding preventive measures through IEC as well as emphasizing more on rehabilitative measures. Educating the community on safer first aid practices, developing safer cooking appliances and promoting less inflammable fabrics to be worn at home can reduce the burn injuries up to certain extent along with bringing about regulations for these measures.

Limitations

Certain limitations are present in this study, though it was conducted using sound methodology. Inclusion criteria for small study setup for burn population. Less sample size as compared to similar studies done previously. Cross-sectional study including patients who were visiting the department for follow up. For better assessment in these patients longitudinal studies involving larger samples selected by systemic sampling method would be needed further.

Recommendations

A comprehensive rehabilitation programme is essential to decrease patient's post-traumatic effects and improve functional independence.[6]

It has to be the multidisciplinary team approach, which must begin at the time of injury and continues for months and years after the initial event and requires multidisciplinary efforts. It can be done in two phases i.e. the early phase of rehabilitation which includes critical care, anti-contracture positioning, splinting, stretching and early mobilization, encouragement for activities of daily life, and patient education. Another phase is the late phase of rehabilitation which includes the use of steroids, laser treatment, massage and moisturizing, pressure garment therapy, use of silicone and the social rehabilitation. However, the death and disability due to burn injury are preventable to a great scale if timely and appropriate management is done by trained personnel[7]

Skin bank is highly recommended. It is a facility where the skin is collected from the eligible deceased

donor and processed as per international protocols. Skin can be stored in the skin bank at 4-8 degree Celsius up to 5 years. The stored skin can be used for burns patients who have deep thermal burns, chemical burns, electrical burns, and radiation burns.

Implementation and evaluation of burn prevention program with help of IEC.

Ultimate goal of burn care should be "the quality of outcome must be worth the pain of survival".[8]

Ethical Clearance- Taken from Institutional ethics committee

Source of Funding- Self

Conflict of Interest - None

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DOI Number: 10.5958/0973-9130.2019.00105.1

Determination of Stature from Foot Length in Adults: A Regional Study in Chennai

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Abstract

Introduction: Stature estimation is important in medico-legal investigations and anthropological studies. Stature can be determined using the measurements of different body parts. Foot anthropometry is found to provide good predictive information about an individual's stature. The aim was to formulate regression equations from foot length for stature estimation of both sexes in Chennai region. **Material and Method:** In this cross sectional study, 619 subjects of both sexes with age ranging from 18 to 59 years of Chennai region were studied for stature and its relevance with that of foot length. Simple regression equations were derived by using two parameters – Right Foot Length (RFL) and Left Foot Length (LFL) - for estimation of stature of an individual for either sex separately. Pearson correlation coefficient (r) was calculated to assess the correlation of stature with foot length. **Findings:** In the present study, we found a significant ($p<0.01$) positive correlation between stature and foot length in both sexes. **Conclusion:** The present study gives statistically significant positive correlation between stature and foot length. Stature can be successfully and accurately determined in this regional population by applying these regression equations.

Keywords: *Stature, Foot length, Regression equations, Forensic anthropometry.*

Introduction

Stature estimation is an important parameter in medico-legal investigations and anthropological studies and in identification of unknown human skeletal remains in forensic examination.[1,2,3] Personal identification becomes difficult or impossible in cases of fires, explosions, advanced decomposition, mutilation, aircraft accidents, earthquakes, mass disasters and other terrorist activities.[2] Identification of individual by stature estimation was a great challenge to the forensic experts after the earthquake in Turkey in August 1999, the terror attack on the World Traders Centre in United States and the mass casualties reported during Tsunami in December 2005. Of the big four -age, sex, ethnicity and stature; stature is one of the most important elements in the identification of an individual.[4] The stature estimation is considered to be an important assessment in the identification of individual in forensic sciences.[1] Moreover, stature estimation plays an important role when height cannot be measured directly due to deformities such as kyphosis, scoliosis and missing legs.[5]

Prediction of the dimension of one body segment using another is common in modern sciences. [6] Many regional and international studies were done in the past for the estimation of stature and other aspects of identification from lengths of various bones and body parts. For instance, clavicle length,[7] forearm length,[8] phalangial length,[9] metacarpal bone length,[10] hand length,[11.12] and long bones such as femur and foot lengths,[12-21] are used in the estimation of stature. However, these studies clearly indicate that there is

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wide and distinct variation from country to country, region to region and place to place regarding the stature estimation. Therefore, our aim was to make simple regression equations from foot length for stature estimation of both sexes in Chennai region.

Materials and Method

The present study was conducted in the Institute of Forensic Medicine, Madras Medical College and in the Institute of Internal Medicine, Government General Hospital, Chennai, in the year of 2007 over a period of nine months from January to September. The study sample consisted of 619 healthy individuals comprising 311 males and 308 females in the age group of 18 to 59 years. This age group was selected based on the fact that all the centers of ossification in the foot, hand and long bones get completely fused around 18 years. Subjects with age above 60 years were excluded since stature and foot length significantly decline due to osteoporotic changes.

All the measurements were taken in well-lit room. The measurements were taken using standard anthropometric instruments in centimeter (cm.) to the nearest millimeter (mm.) accuracy according to the technique given in the manual of biological anthropology.[22] The study was approved by the Institutional Human Ethics Committee (IHEC) and an informed written consent in the regional language was obtained from each subject. Stature is the vertical distance between the highest point on the vertex and platform of stadiometer. The standing height method was chosen for measuring stature of each subject (Fig. 1and 2). Foot length is the straight distance directly from acropodian to pternion. It was measured using specially designed instrument more or less like an osteometric board of a miniature size. It consisted of a horizontal rectangular wooden platform with a fixed metal scale with calibration from 0 – 30 cm. to the nearest mm. accuracy (Fig. 3, 4 and 5).

Statistical analysis was performed in Systat version-12 and regression equations were derived with various combinations to reach the best estimate possible. Pearson correlation coefficient (r) was calculated to assess the correlation of stature with foot length. Independent sample *t*-test was applied to determine statistical significance of foot length and gender differences in height and foot length. *p*-values of less than 0.05 were considered significant.

To assess accuracy of prediction of stature by regression equations, standard error of estimate (SEE) and coefficient of determination (R2) were used. With the increase in value of SEE, accuracy of prediction of stature by regression formula decreases, while with the increase in value of R2, accuracy of prediction of stature by regression formula increases.

Results

Simple regression equations were derived by using the two parameters – RFL and LFL- for estimation of stature of an individual for either sex separately. Table 1 shows the sex distribution among the study subjects. They consisted of 311(50.2%) males and 308 (49.8%) females. Table 2 shows age group-wise distribution of study subjects. Both males and females were grouped together under five broad categories and no single age was omitted between 18 and 59 years. Table 3 shows mean, standard deviation and the range of the stature, RFL and LFL of the study subjects. The average stature for male adults was 167.5 cm. and ranged from 146.1 cm. to 190.0 cm. and for female adults it was 154.1 cm. and ranged from 139.6 cm. to 178.0 cm. The average RFL for males was found to be 25.3 cm. and ranged from 21.3 cm. to 30.4 cm. while for females it was 23.1 cm. and ranged from 19.6 cm. to 26.3 cm. The average LFL for males was found to be 25.4 cm. and ranged from 21.8 to 30.3 cm. while in females it was 23.1cm. and ranged from 19.6 cm. to 26.4 cm.

Table 4 shows Pearson correlation coefficient of the stature, RFL and LFL for males. The Pearson correlation coefficient of the stature, RFL and LFL for males were statistically significant and there was a positive correlation between stature and foot length. For example RFL increased proportionately while the stature increased and vice versa. This was true for left foot as well. Table 5 shows Pearson correlation coefficient of the stature, RFL and LFL for females. They were statistically significant and there was a positive correlation between stature and foot length. For example RFL increased proportionately while the stature increased and vice versa. This was true for left foot as well. Table 6 shows simple regression equations between the stature of male subjects and RFL and LFL**.** The stature of the male subjects was estimated by two different regression equations for right and left foot

respectively. Table 7 shows simple regression equations between the stature of female subjects and RFL and LFL**.** The stature of the female subjects was estimated by two different regression equations for right and left foot respectively.

Table 1: Sex distribution among the study subjects

Sex	Frequency	Percentage
Male	311	50.2
Female	308	49.8
Total	619	100.0

Table 2: Age group-wise distribution of the study subjects

Sl. No.	Age distribution	No. of cases	Percentage
1	Age from 18 – 20 years	134	21.6
2	Age from21 – 30 years	236	38.7
3	Age from31 – 40 years	137	22.1
4	Age from41 – 50 years	71	11.5
5	Age from51 – 59 years	38	6.1
Total		619	100.0

Table 3: Mean and SD and range of the stature, RFL and LFL of the study subjects

Selected variables in cm.	Male				Female				Comparison	
	Mean	S.D.	Range		Mean	S.D.	Range		*t* - value	*p* - value
			Min.	Max.			Min.	Max.		
Stature	167.455	7.213	146.1	190.0	154.106	6.389	139.6	178.0	24.364	<0.001
RFL	25.332	1.327	21.3	30.4	23.073	1.144	19.6	26.3	22.675	<0.001
LFL	25.410	1.299	21.8	30.3	23.091	1.127	19.6	26.4	23.711	<0.001

Table 4: Correlation co-efficient of stature, RFL and LFL for males

Variables	RFL in cm.	LFL in cm.	*p*-value
Stature in cm.	0.746	0.763	<0.01

Table 5: Correlation co-efficient of the stature, RFL and LFL for females

Variables	RFL in cm.	LFL in cm.	*p*-value
Stature in cm.	0.686	0.665	<0.01

Table 6: Simple regression equations from RFL and LFL in males

Independent Variables	Equations	SEE	R	R^2
RFL	S = 64.671 + 4.057 (RFL)	4.807	0.746	0.557
LFL	S = 59.766 + 4.238 (LFL)	4.667	0.763	0.583

Table 7: Simple regression equations from RFL and LFL in females

Independent Variables	Equations	SEE	R	R^2
RFL	65.654 + 3.834 (RFL)	4.653	0.686	0.471
LFL	67.101 + 3.768 (LFL)	4.779	0.665	0.442

Discussion

Stature determination can be done using measurements of different body parts. The foot measurements are highly reliable for determination of stature as foot length possesses a biological correlation with stature and foot measurement provides better predictive information about the stature of an individual.[19] Ossification and maturation occur in the foot earlier than the long bones and therefore stature could be more accurately determined especially in adolescence age from foot measurement as compared to that from long bones.[23,24] The present study found a significant ($p<0.01$) positive correlation between stature and foot length. That is the regression equations derived in the present study from the foot length for estimation of stature showed statistically significant results in both the sexes. The present study is in consistent with earlier studies.[1,19-21,23,25,26]

The findings of the present study indicate that there is a significant difference in stature and foot length between male and female study subjects. The males showed higher stature and foot length than the females. It is because in general the boys are having one to two years of extended growth period than the girls which results in longer and heavier bones, increase in stature and other dimensions of the body parts. The early maturity of girls could be due to early union of ossification centers in girls.[19,20,21] Formulation of separate regression equation is necessary for the specific region because variations in body dimensions are inherent among races and ethnic groups due to genetic, nutritional and environment factors.[12-14,25] Moreover, there is a significant difference in body dimensions found between male and female counterparts as evident in the present study and earlier studies. Therefore, the regression equations derived using foot length from the present study can be applied for stature determination of population in Chennai region.

Conclusion

Simple regression equations are derived from RFL and LFL to estimate the stature of both sexes. The present study gives statistically significant positive correlation between stature and foot length. Stature estimation can be more accurately calculated by applying these regression equations among population in Chennai region.

Conflicts of Interest: None

Funding: Self-funded

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DOI Number: 10.5958/0973-9130.2019.00106.3

Acute Methaemoglobinemia-Early Indicators of Prognosis-An Emergency Department based Study

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Abstract

Objective(s): to study the clinical manifestations, laboratory findings, complications and outcome of acute methemoglobinemia secondary to nitrobenzene poisoning.

Methodology: prospective observational study done in a tertiary care teaching hospital of central Karnataka for 3 years. All the cases were followed up till the discharge and results were formulated based on clinical features, duration of hospital stay and ventilator support, dose of methylene blue and outcome.

Results: total of 16 cases were admitted over a period of 3 years from June 2014-june 2017. Out 16 cases 15 were due to nitrobenzene ingestion and 1 case was dapsone induced methemoglobinemia. Among 16 cases 13 had favourable outcome and among the 3 patients died, hemodynamic and respiratory parameters were deranged at the time of presentation to ED.

Conclusion: In our study it is been evident that predictors of poor outcome based on initial clinical features were presenting blood pressure, percentage saturation ,ABG,Po2,sao2 and so2. Metabolic acidosis at presentation is a better predictor of outcome in a case of methemoglobinemia. The dose of methylene blue is completely dependent on clinical improvement of the patient, it does not have much of value in predicting mortality. As the duration of mechanical ventilation increases, the prognosis will be worsening.

Thus managing a case of methemoglobinemia in an emergency department needs high level of suspicion, with assessment of early clinical and vital parameters which could have a significant impact on outcome as mentioned above. Meticulous use of antidote along with correction of acidosis remains main stay of management. By using above mentioned clinical parameters ED physician can predict the mortality in case of methemoglobinemia.

Keywords: *methemoglobinemia, nitrobenzene, methylene blue, emergency department.*

Introduction

Acute poisoning with nitrobenzene causing significant methemoglobinaemia is rare but life threatening emergency. Early aggressive management of severe poisoning, strongly suspected on clinical grounds may change the outcome of a patient [1-2]. Its prompt recognition and treatment can avoid catastrophic complications. Nitrobenzene also known as nitrobenzol or oil of mirbane is used in dyes, paints, printing, lubricating oil and synthetic rubber [3]. In India, 20% nitrobenzene emulsion is widely used as pesticides. The lethal dose is reported to range from 1 to 10gm by different studies [3-5]. Nitrobenzene ingestion primarily induces methemoglobinemia. Many medically important drugs also causes methemoglobinemia [7-10]. In our we report cases of methemoglobinemia due to nitrobenzene and dapsone.

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Materials and Method

prospective observational study done in a tertiary care teaching hospital of central Karnataka for 3 years. All the cases presenting to ED with history of methemoglobinemia were followed up with clinical features, presenting vital signs and initial ABG characteristics. The dose of methylene blue was determined based on clinical and ABG parameters. As the co-oxymetry or blood level of methemoglobin was not available, In our cases Methylene blue was administered as 1.5 mg/kg initial dose and subsequent repeat dose was administered based on purely the clinical, ABG parameters as well as liver function test values (to rule out haemolysis). All the cases were followed up till the discharge or death. The results were formulated based on clinical features, duration of hospital stay and ventilator support, dose of methylene blue and outcome. Results analysed on the basis of initial presentation and arterial blood gas analysis to final outcome of the patient. Statistical analysis will be done based on mean, standard deviation, student T test and P value using appropriate statistical tool.

Results

Total of 16 cases were admitted over a period of 3 years from June 2014-june 2017. Out 16 cases 15 were due to nitrobenzene ingestion and 1 case was dapsone induced methemoglobinemia. Among 16 cases 13 had favourable outcome and among the 3 patients died, hemodynamic and respiratory parameters were deranged at the time of presentation to ED. Cyanosis was evident in all the cases presented to us.

Presence of cyanosis was not proven to be significant predictor of outcome as all the patient had cyanosis.

Table: 1. Clinical features and ABG parameters at presentation.

Variables	Favorable		Unfavorable	
	Mean	SD	Mean	SD
PULSE RATE	102.4	9.1	100.6	5.0
RESPIRATORY RATE	25.3	3.5	33.3	8.3
SBP	119.2	16.5	70.0	10.0
DBP	70.7	9.5	40.0	10.0
SPO2	83.2%	2.6%	66.0%	6.0%
SO2	93.7%	3.3%	78.2%	5.6%
PAO2	128.8%	38.0%	78.0%	8.0%
TOTAL DOSE OF METHYLENE BLUE(MG/KG)	2.7	0.7	2.6	0.5
ICU STAY(DAYS)	3.4	0.9	7.3	0.5
LENGTH OF HOSPITAL STAY(DAYS)	6.6	1.1	7.3	0.5

Statistical analysis on various clinical parameters at presentation to ED were assessed. Most patient presented with tachycardia and tachypnea. Mean pulse rate among patients with favourable outcome was 102.462±9.171 to that of unfavourable outcome was observed to be 100.667±5.033 with a p value of 0.659(>0.05) which is statistically not significant. Similarly respiratory rate at presentation was observed to be statistically insignificant p value 0.237.

Hypotension at the time of presentation was observed to be significant predictor of outcome in our study as among the 3 patients who had unfavourable outcome mean SBP of 70±10 and DBP of 40±10 mmhg. When compared with patients who had the favourable outcome p value was significant for SBP (0.001) and DBP (0.018) respectively.

Percentage saturation measured by pulse oxymetry at ED was proven to be statistically significant with mean saturation of 83.231 %(±2.651) among the

patient who had favourable outcome as compared to 66 %(±6%) among unfavourable outcome with p value of 0.033(which is <0.05).

Table: 2. Presence of cyanosis at presentation to ED.

CYANOSIS	OUTCOME		Total
	Favorable	Unfavorable	
Positive	13	3	16
	81.3%	18.8%	100.0%
Total	13	3	16
	81.3%	18.8%	100.0%

Initial arterial saturation of haemoglobin (SAO2) done in ED has been shown to be significant predictor of outcome in our study with mean SA02 among patients with favourable outcome being 93.798 %(±3.360%) and among unfavourable outcome with value of 78.2 %(±5.603%) p value was significant i.e. 0.032.

Partial pressure of oxygen (Po2) at presentation also has significant statistical impact on outcome of patient with methemoglobinemia. Mean Pao2 at presentation among favourable outcome was 128.84 %(±38%) to that of 78 %(±8%) among unfavourable outcome with p value of 0.001 which is statistically significant.

Total dose of methylene blue received by the patients in our study doesn't shown to be alter the prognosis as mean dose among favourable outcome was 2.769(±0.725)mg to that among unfavourable outcome being 2.667(±0.557)mg with p value of 0.806 which is statistically not significant.

Length of ICU stay was significantly more on patients who had unfavourable outcome and total days of hospital stay was same among both the group.

Metabolic acidosis was present in 10 cases of which 70% had favourable outcome and 30% had unfavourable outcome.

Table: 3 patients with acidosis at the time of presentation.

ACIDOSIS	OUTCOME		Total	p value
	Favorable	Unfavorable		
Positive	7	3	10	0.214
	70.0%	30.0%	100.0%	
Negative	6	0	6	
	100.0%	0.0%	100.0%	
Total	13	3	16	
	81.3%	18.8%	100.0%	

Out of the 13 patients who had favourable outcome only 2(26%) required mechanical ventilator support but all the three patient who had unfavourable outcome required mechanical ventilation.

Table: 4. Patient required mechanical ventilation.

MECHANICAL VENTILATION	OUTCOME		Total	p value
	Favorable	Unfavorable		
yes	2	3	5	0.018
	40.0%	60.0%	100.0%	
no	11	0	11	
	100.0%	0.0%	100.0%	
Total	13	3	16	
	81.3%	18.8%	100.0%	

Discussion

Methemoglobin is an altered state of hemoglobin in which the ferrous (Fe2+) irons of heme are oxidized to the ferric (Fe3+) state which has more affinity for oxygen which in turn hampers the delivery of oxygen to tissues.Thus Oxyhemoglobin dissociation curve shift to left.normally methemoglobin maintained at steady state i.e., in reduced form by various mechanisms in the body. Normally methemoglobin will be about 1% of total hemoglobin [1&2].

Various mechanism by which methemoglobin will be reduced state in the body includes

1. Cytochrome b5 reductase (b5R):95% of the reducing activity

2. Methemoglobin reductase: 4% of the reducing activity

3. Glutathione and ascorbic acid: 1%

The severity of methemoglobinemia depends on blood levels of methemoglobin. [1, 2, 8&9]

Diagnostic suspicion of methemoglobinemia is based on clinical findings. Generalized cyanosis out of proportion to respiratory status and normal PaO2 and doesn't improve with administration of O2. Constant pulse oximeter reading of 84-86% even with high flow 100% oxygen (An absorbance ratio (660nm/940nm) of 1.0 corresponds to an oxygen saturation of approx. 84-85%. When MetHb reaches 30% the light absorbance ratio reaches a plateau and the pulse oximeter reading becomes constant at 82-86% independent of actual MetHb levels). ABG: PaO2 normal →SaO2 normal (false normal). If there is a difference between the measured oxyhemoglobin of the pulse oximeter (spo2) and the calculated oxyhemoglobin of the ABG (Pao2), an abnormal Hemoglobin form may exist .The "oxygen saturation gap" >5%. Cooximetry is the diagnostic test of choice. It measures light absorbance at 4 different wavelength bands in whole blood (MetHb, COHb, oxyHb, deoxyHb) [7-10].

Treatment depending mainly on maintaining airway, breathing, circulation, haemodynamic stability and administration of antidote i.e., methylene blue. Methylene blue will be given as 1.5mg/kg body weight initial dose and followed with subsequent doses based on co-oxymetry, clinical improvement as well as improvement in ABG and saturation of arterial oxygen using pulse oxymetry.

Conclusion

In our study it is been evident that predictors of poor outcome based on initial clinical features were presenting blood pressure, percentage saturation ,ABG,Po2,sao2 and so2. Metabolic acidosis at presentation is a better predictor of outcome in a case of methemoglobinemia. Clinical finding such as heart rate, respiratory rate does not have any significant role in predicting the mortality. Cyanosis usually present in all cases as evident in our study and cannot be considered as prognostic marker. The dose of methylene blue is completely dependent on clinical improvement of the patient, it does not have much of value in predicting mortality. As the duration of mechanical ventilation increases, the prognosis will be worsening.

Thus managing a case of methemoglobinemia in an emergency department needs high suspicion, with assessment of early clinical and vital parameters which could have a significant impact on outcome as mentioned above. Immediately drawn ABG sample will aids in diagnosis as well as guides in early management. Meticulous use of antidote along with correction of acidosis remains main stay of management. By using above mentioned clinical parameters ED physician can predict the mortality in case of methemoglobinemia.

Limitations of study:

Rare case, limited knowledge regarding the poisoning in the literature.

Non availability of co-oximetry or blood methemoglobin level which has to be used as a guiding tool while giving methylene blue.

Small sample size, needs further multicentre studies to generalise to whole population.

Ethical Clearance- Yes.

Source of Funding- Self

Conflict of Interest - Nil

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DOI Number: 10.5958/0973-9130.2019.00107.5

Role of Vitreous Humor in Estimating Time Since Death

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Abstract

Background: Estimation of time since death is important for the investigation of crime. This study was done on about 200 medico legal autopsies at KIMS Hospital Bangalore. The information regarding time of death was gathered from hospital records. The data was collected and recorded on proforma and subjected to statistical analysis. **Results**: The ratio of male and female cases was 1.739:1. Around 42% were in the age group of 21-30 years. Majority of cases were from trauma (43%). The overall range of time since death was 0 to 72 hrs. The overall range of vitreous potassium ion concentration was 3.1 to 24 meq/L and maximum number of cases were in range between 6.1 to 12 meq/l (72%) followed by 3.1 to 6 meq/l (25%). **Conclusion**: In our present study, we have noticed linear rise of vitreous potassium concentration upto 57 hrs and positive correlation between vitreous potassium concentration and post-mortem interval.

Keywords: *Vitreous humor, Time since death, medicolegal autopsy, biochemistry, electrolyte, analysis.*

Introduction

The interval between death and the time of post-mortem examination is very important for investigation of crime. Time since death is important as it shows the track to reach the suspected person in criminal cases.[1] However, the longer the time interval between death and the examination of the body, the wider will be the limits of probability to fix the time of death. Routinely, post-mortem interval is estimated by using cooling of body, changes in eye, post-mortem staining, rigor mortis, decomposition changes, contents of stomach and bowels, contents of urinary bladder and circumstantial evidence, which determines the approximate time of death. Whereas, estimation of post-mortem interval using body fluids like blood, spinal fluid, aqueous humour and vitreous humour of eye show chemical changes immediately or shortly after death and also these changes has its own time factor or rate and progress in a fairly orderly fashion until the body disintegrates, thus helps in accurate estimation of time since death[2].

Although no single measurement gives a completely reliable estimate of the post-mortem interval, vitreous humour of eye is suitable to estimate post-mortem interval as it is relatively stable, less susceptible than other body fluids to rapid chemical changes and contamination, easily accessible and its composition is quite similar to that of aqueous fluid, cerebrospinal fluid and serum. The determinations of contents of vitreous humour includes the potassium, sodium, ascorbic acid, non – protein nitrogen, lactic acid, sodium and chloride[3] and magnesium, phosphate and bicarbonate[4] which is more valuable[5].

Thus the present study was conducted to determine a relationship between sodium and potassium levels of vitreous humour collected separately from each eye and to estimate the time since death.

Materials and Method

The study was carried out for a period of one year (1-1-2016 to 31-12-2016) at the department of forensic medicine and toxicology, in association with department of biochemistry, KIMS Hospital Bangalore after obtaining institutional ethical committee clearance. This study was done on 200 medico legal autopsies. The

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information regarding time of death was gathered from hospital records.

For the extraction of vitreous humour following procedure was done: The eyelid will be retracted with the help of self-retaining lid retractor. Vitreous fluid will be collected from posterior chamber of eye by needle aspiration through a puncture made 5-6mm away from limbus using a 10 ml sterile syringe, 20 gauze needle syringe and rubber stopper glass vial washed with deionized distilled water and dried in hot air oven will be used for sampling. Gelatins or water will be placed in posterior chamber for cosmetic purpose.

The sample will be immediately taken to department of biochemistry. So many methods are available for vitreous humor Biochemistry but here we have used Electrolyte Analyzer**.** Environmental temperature will be recorded at the time of collecting sample. All information about the deceased i.e. age, sex, cause of death, exact time of death, time of sampling and corresponding Na and K level will be fully recorded in proforma attached.

All the cases where the time of death was unknown or body in advanced stage of decomposition or due to any other reason the extracted sample becomes spoiled or case of ocular disorder or amount aspirated is less than 00.5ml will be excluded from the study. The data will be collected and recorded on proforma and subjected to statistical analysis.

Results

In the present study, 200 medico legal autopsies at KIMS hospital Bangalore were included.

Table 1: Distribution of cases according to age and gender

Sl.No	Age groups in year	Male	Female	Total	%
1	0 - 10	04	00	04	02.00
2	11 - 20	20	15	35	17.50
3	21 – 30	50	35	85	42.50
4	31 - 40	27	12	39	19.50
5	41 – 50	16	06	22	11.00
6	51 - 60	04	04	08	04.00
7	61 - 70	04	01	05	02.50
8	71 – 80	01	00	01	00.50
9	81- 90	01	00	01	00.50
Total		127	73	200	100.00

In the present study, 127 (63.5%) were males and 73 (36.5%) were females. The ratio of male and female cases was 1.739:1.

The minimum and maximum age of cases studied ranged from 8 years to 90 years respectively. Maximum number of cases was in age group 21 – 30 yrs (42.5%) of life followed by age group 31 – 40 yrs (19.5%) of life. This indicates that age group of 21 – 40 yrs contributes to majority of cases that is 124 cases (62%).

Table 2: Distribution of cases according to cause of death

Cause of Death	Trauma	Burn	Poisoning	Natural Death	Total
Male	70 (55.11%)	20 (15.74%)	34 (26.77%)	03 (2.36%)	127
Female	16 (21.91%)	33 (45.20%)	22 (30.13%)	02 (2.73%)	73
Total	86 (43.0%)	53 (26.50%)	56 (28.00%)	05 (02.50%)	200
% Cases	**43**	**26.50**	**28.00**	**2.5**	**100**

It is concluded from table no.2 that majority of cases were from trauma (43%) followed by poisoning (28.00%), burn (26.50%) and natural death (2.5%) respectively.

Males were more than female cases in term of cause of death except burn in which female cases were more than males.

Table 3: Distribution of cases according to time since death and cause of death

Time since death (hrs)	Causes of death				Total	%
	Trauma	Burn	Poisoning	Natural death		
0 – 1	02	00	00	00	02	**01.00**
1.1 – 3	11	07	01	00	19	**09.50**
3.1 – 6	17	10	12	00	39	**19.50**
6.1 – 12	25	14	17	03	59	**29.50**
12.1- 24	29	19	25	02	75	**37.50**
24.1 - 36	01	01	00	00	02	**01.00**
36.1 - 48	00	02	00	00	02	**01.00**
48.1 - 64	01	00	01	00	02	**01.00**
64.1 - 72	00	00	00	00	00	**00**
Total	**86**	**53**	**56**	**05**	**200**	**100.00**

The distribution patterns of various causes of death in relation to time since death are shown in table no.3. The overall range of time since death was 0 to 72 hrs of studied cases and maximum number of cases were in the range between 12.1 to 24 hrs (37.50%) followed by 6.1 to 12 hrs (29.50%) the 86.5% studied cases were in range of 3.1 to 24 hrs. None of the case was reported beyond 57 hrs of time since death.

Table 4: Distributions of cases according to vitreous Potassium (K^+) ion concentration and cause of death

Sl.No	Potassium (K^+) concentration (meq/L)	Trauma	Burn	Poisoning	Natural death	Total	%
1	0 – 1	00	00	00	00	00	**00**
2	1.1 – 3	00	00	00	00	00	**00**
3	3.1 – 6	25	12	13	00	50	**25.00**
4	6.1 – 12	60	38	42	04	144	**72.00**
5	12.1 - 24	01	02	01	01	06	**03.00**
Total		86	53	56	05	200	100.00

The overall range of vitreous potassium ion concentration was 3.1 to 24 meq/L and maximum number of cases were in range between 6.1 to 12 meq/L (72%) followed by 3.1 to 6 meq/L (25%).

Discussion

Establishing the post-mortem interval is one of the frustrating challenges faced by forensic experts, particularly when limited information about deceased is available. In the past and toady also estimation of post-mortem interval mainly relied on physical changes after death such as the degree of rigor mortis, post-mortem staining, cooling of body, changes in eye, decomposition changes, contents of stomach bowel and contents of urinary bladder.

The chemical tests to determine the post-mortem interval have been increased largely in the body immediately or shortly after death. These changes occur in various body fluids such as whole serum, spinal fluid, aqueous humour and vitreous humour. The vitreous humour is usually larger in volume, easily obtainable and is usually free from contamination. So vitreous humour is collected from dead bodies except the cases that fall under exclusion criteria, which are already mentioned under the heading of material and methods.

In this study, vitreous humour potassium (k^+) & sodium (Na^+) ion concentration were investigated to predict post-mortem interval. A total of 200 cases were studied during the period from 01-01-2016 to 31-12-2016.

A total of 400 samples of the vitreous humour from 200 dead bodies brought to KIMS hospital for medicolegal autopsy with known time of death were collected for measurement of potassium & sodium concentration, to find out the simple and accurate method of estimation of post-mortem interval.

In this study maximum numbers of cases studied were died to road traffic accident and males were more than females. Maximum numbers of cases were in the age group of 20-40 yrs and maximum number of cases fall in range of 12-24 hrs of time since death.

In this study, it was observed that there is considerable rise in the vitreous potassium level with increasing post-mortem interval. The rise in the vitreous potassium ion concentration varied from 3.85 to 16.70meq/l. This liner relationship of the increase in vitreous potassium (k^+) concentration with increase in post-mortem interval is both arithmetic and as well as logarithmic. So potassium (k^+) ion level in vitreous humour is one of the most accurate methods of estimating post-mortem interval.

This observation is supported by many workers included jaffe (1962), Sturner et al (1964)[6], Lie (1967), Blumenfield et al (1979)[7], Stephens RJ and Richard RG (1987)[8], Munoz Basus JI et al (2010)[9] and Ahi et al (2011)[10].This course of rise in potassium level in vitreous is due to the autolysis of the vascular choroids and retinal cells of the eye, which release substantial amount of potassium into vitreous humour. Lie (1967), Hughes (1965), coe (1969)[11] Adjutantis and coutselinis (1972) and Mckoy et al (1983) found that rise of vitreous

potassium concentration with post-mortem interval Is biphasic, in which the slope of the first few hours after death is steeper than for more prolonged times after death which was not observed in this study.

In our study, we have noticed linear rise of vitreous potassium concentration upto 57 hrs. We could not estimate potassium concentration beyond 57 hrs, as none of the case in our study was reported after 57 hrs of post-mortem interval.

On the basis of INDOSTAT software, we have derived following correlation

Coefficient of correlation: We found positive correlation between vitreous potassium concentration and post-mortem interval. The coefficient of correlation for potassium ion concentration in the vitreous humour is 0.831. This indicates that there is high degree of correlation between potassium concentration and post-mortem interval. The confidence limit is 7.6**.**

Coefficient of Regression: The value of coefficient of regression was 3.46 meg/L/hr. It means the rage of rise of vitreous potassium concentration was 0.29mg/L/hr.

Regression Equation: After calculating the coefficient of regression, the regression equation was derived. The post-mortem interval can be calculated by regression equation.

Post-mortem Interval = - 16.22+3.75xK^+. Where K^+ = Potassium ion concentration in vitreous confidence limit = 7.6.

Conclusion

In our present study, we have noticed linear rise of vitreous potassium concentration upto 57 hrs and positive correlation between vitreous potassium concentration and post-mortem interval.The ratio of male and female cases was 1.739:1. Around 42% were in the age group of 21-30 years. Majority of cases were from trauma (43%). The overall range of time since death was 0 to 72 hrs. The overall range of vitreous potassium ion concentration was 3.1 to 24 meq/L and maximum number of cases were in range between 6.1 to 12 meq/l (72%) followed by 3.1 to 6 meq/l (25%).

Ethical Committee Clearance: Obtained

Source of Funding: Self

Conflict of Interest: Nil

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DOI Number: 10.5958/0973-9130.2019.00108.7

Impact of Helfer Skin Tap Technique in Reduction of Pain During Vaccination among Infants- A Literature Review

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Abstract

Pain is an unpleasant sensation that can range from mild, localized discomfort to agony. It is too difficult to face pain of vaccinations in children.Helfer skin tapping technique is resulting to minimize the level of pain during intramuscular injections among children.

Objective- Primary objective behind this literature review is to find out effectiveness of helfer skin tap technique in reduction of level of pain among children.

Method- A systematic literature review was conducted. The literature includes last 8years' data. The literature reviewed was obtained through different database includes CINHAL (Cumulative index TO Nursing & Allied Health Literature), MEDLINE (Medical Literature Analysis & Retrieval System Online), PubMed, Science Direct, SpringerLink, ProQuest & Google scholar.

Result—Pain level of experimental group is less than control group. Helfer skin tap technique is effective to reducing the level of pain among infants who are undergone with pentavalent vaccination.

Conclusion—Helfer skin tap technique is helpful in minimizing the level of pain during vaccination among infants. All the nurses can perform Helfer skin tap technique in routine practices for reducing pain intensity.

Keywords- *Helfer skin tap technique, vaccination, pain, mechanical stimulation, intramuscular injection.*

Introduction

Pain is an unpleasant sensation which caused by strong stimuli which create severe pain.[1] It is an unpleasant sensory and emotional experience associated with actual or potential tissue damage. It is a feeling triggered in the nervous system. Pain may be sharp or dull. It may come and go, or it may be constant.[2]Vaccinations can be painful. Kids don't like them, and parents don't like seeing their children suffer.[3] Fear of needles is a common phobia for children.[4] Children have fear to the injections and because of that fear they are crying. All parents are continually striving to find the best way to respond those cries.[5] Vaccination is the most widely practiced percutaneous procedure. Each child is compulsorily exposed to this in his early childhood. The most common side effect of vaccination is pain.[6]In 1998, Ms Joanne Helfer made an attempt to alleviate pain due to intramuscular injection by developing,, "Helfer Skin Tapping technique" in which tapping of the skin over the injection site. The technique uses basic concepts of theory of pain; including the gate control theory.[7]Mechanical stimulation which is given by tapping, can diminishes the influence of small, pain-carrying fibers. It consists two basic points:

Muscle relaxation, which physically decreases the resistance to needle entry into the skin.

Diversion, by simultaneous tapping over the skin before the needle is inserted and removed. [8]

It was concluded that there is need to minimize the pain level of children while giving intramuscular

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injection or vaccine.

Material Methods and Findings

The study is headed mainly on minimize the pain during vaccination by providing Helfer skin tap technique among infants.The following electronic databases are searched: ProQuest, Embase, Pubmed, EBSCO, Scopus, the British Nursing Index and the Cumulative Index to Nursing & Allied Health Literature (CINHAL), e-journals and journal available in library.

Literature Review

A quasi experimental study was conducted on efficacy of Helfer skin tap technique on pain intensity as perceived by the patients receiving intramuscular injection at medical and surgical units of Main Mansoura University Hospital, by Amira AH. et al. at Egypt in year 2016. The data were collected by using purposive sampling technique. 100 patients of both sexes who correspond to inclusion criteria were taken. Each patient was administered repeated intramuscular injection at the gluteal muscle site. The level of pain is compared with two techniques, at the time of intramuscular injection administration through traditional technique and Helfer skin tapping technique. The tools used for data collection were socio-demographic characteristics and assess the level of pain by using Universal Pain Assessment Tool.The result shows that pain level of traditional technique was higher than pain level of Helfer skin tapping technique. Study concluded that Helfer skin tap technique was effective in minimize the pain level of patients.[9]

A quantitative study was conducted on effects of Helfer skin tapping and Z-Track techniques on pain intensity among hospitalized adult patients who are receiving intramuscular injection at Menoufia University Hospital in September, 2016. Quasi–experimental research design was used to conduct the study. 100 participants were randomly alternatively divided into two equal group of 50. Group I which will receive Helfer skin tap techniqueand group II which will receive Z-track technique and the samples fix with the inclusion criteria. Structured interview questionnaire and universal pain assessment tool were used to collect the data. Results reveals that Helfer skin tapping technique(HST) and Z track technique were help to reducing the level of pain while administration of intramuscular injection. The study was concluded that the responsibility of nurse is to minimize the pain while intramuscular injections by using Helfer skin tapping and Z-track techniques. So in future these kinds of studies definitely will be useful to the entire health care delivery system.[7]

A quantitative study was conducted at Kanchipuram on effectiveness of Helfer skin tap technique vs usual standard technique in reducing pain during intramuscular injection among adult patients in selected hospital of Kelambakkamin 2016.Quasi experimental research design was used to conduct the study. 60 samples (30 in experimental and control group) were selected by using simple random sampling technique. Structured questionnaire was used to collect the data. The result shows that, in experimental group 87% having mild pain, 10% having moderate pain and only 3% having severe pain. In control group 83% having moderate pain, 17% having severe pain. There was a significant association between the selected demographic variables and Heifer skin tap technique is effective in reducing pain than standard usual technique during intramuscular injection.[10]

A quantitative study conducted on effectiveness of rhythmic skin tap technique to minimize procedural pain during intramuscular injection among the patients admitted in the selected tertiary care hospital, Belgaum at Karnataka by medial surgical department of KLE university in July, 2014. True experimental post-test design was selected to conduct the study. 60 samples were taken by using non probability simple random sampling technique. The pain level was assessed by using visual analogue scale to determine the effectiveness of rhythmic skin tap technique. Descriptive and inferential statistics were used for data analysis. The result shows that pain was reduced among patients who all are receiving intramuscular injections in experimental group and skin tapping technique is effective during intramuscular injection. The study concluded that pain was reduced among patients after administration of rhythmic skin tapping technique. So, it proved as an effective treatment for reducing the pain.[11]

A quantitative study was conducted on assessing the effectiveness of Helfer skin tap technique on pain during intramuscular injection among neonates born in labour room of selected tertiary level hospital at UP in 2013. True experimental post test control design was selected to conduct the study. 100 new born babies were selected by using purposive and simple random

sampling techniques. Data were collected by Neonatal Infant Pain Scale. Collected data were analyzed by using descriptive and inferential statistics. The study result shows that 86 % of the neonates having mild pain, 14% were having severe pain during intramuscular injection in experimental group. 86 % of the neonates were having severe pain and 14% were having moderate pain during intramuscular injection by using routine technique. Thus, Helfer skin tapping technique is more effective on pain during intramuscular injections. The study concluded that Helfer skin technique is an effective way to minimize the pain during intramuscular injection. It should be compulsory step in intramuscular injection and thus agony of patients can be reduced. The standards for nursing care clearly supports a holistic care of our clients.[12]

A quantitative study was conducted on effectiveness of Helfer skin tap technique and routine technique on pain reduction among patients who are receiving intramuscular injection at government general hospital, Pondicherry in 2012.50 subjects were taken by using simple random sampling technique. 25 subjects were taken in experimental group who are receiving intramuscular injections by using Helfer skin tapping technique and 25 subjects in control group who all are receiving intramuscular injections by routine technique. Study result shows that the Helfer skin tap technique is effective in reducing pain level during intramuscular injection among patients at correlation of $p<0.05$ level. The study concluded that the intensity of pain is less when intra muscular injection is administered using Helfer skin tap technique. It works on the theoretical basis such as gate control theory. The technique can be adapted to the nursing education and to the nursing practice so that the quality can be ensured.[13]

A quantitative study was conducted to assess the effectiveness of skin tap technique in reducing pain response in January, 2012. 60 samples were selected by purposive sampling technique that is 30 each in experimental and control group. The resultreveals that the pain level was less in experimental group. 80% of infants in experimental group having mild pain and 16.66% of infants in control group having mild pain. There was association between the pain scores and selected variables. Study concluded that skin tap technique was proved effective to minimize the pain level during intramuscular injections.[14]

A quasi experimental study was conducted to assess the effect of Helfer Rhythmic skin tap technique on procedural pain among patients receiving intramuscular injection by Saleena S. et al. at orthopaedic wards of Govt. Medical College Kozhikode, Kerala in May, 2011. 82 patients admitted in orthopaedic wards, in the first post-operative day after orthopaedic surgery, who were receiving Inj. Voveran were selected by purposive sampling technique to Group I and II. Brief Pain Inventory were used to measure pre-procedure pain intensity and interference, Anxiety Scale were used to assess the pre-procedural anxiety, Numerical pain intensity scale and Visual Analogue scale were used to assess pain during intervention. SPSS- version 15 and descriptive, inferential statistics were used for data analysis.There is significant reduction in pain level of patients who are receiving intramuscular injection with Helfer rhythmic skin tapping technique, compared to that with conventional technique. There is no association between pain perception scores of patients receiving intramuscular injection with Helfer rhythmic skin tap technique and selected socio demographic variables. Study shows that Helfer rhythmic skin tap technique is effective in reducing pain perception during intramuscular injection. By this technique, routinely nurses can contribute to improve patient's comfort level by minimizing the interventional pain.[15]

Result

Over all literature reflect that helfer tap skin technique is very effective in reduction of pain sensation after intramuscular injection. It is easy, cheap and non invasive procedure, which help in reduction of pain level.

Conclusion

The study concluded that small children are very sensitive to pain. Cry is the first sign which we can observe when pain start. Helfer skin tape technique can be applied by any health personnel. It does not require any training. Apply this technique, before giving intramuscular injection. It is very effective method. It helps to reduce the severity and level of pain. It can be applied during vaccination like pentavalent, pneumococal and other injections.

Ethical Clearance- It is obtain from IEC-HR

Source of Funding- No funding

Conflict of Interest -Nil

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Socio Demographic Profile of Head Injury among Medico Legal Autopsies Conducted in a Rural Medical College

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Abstract

Incidence of injury cases are on rise year in urban as well as in rural population. The present work involved all autopsies referred from PRH or brought dead directly to P.M. Room, department of forensic medicine, rural Medical college, Loni during the years July 1997 to June 2000. A pre-tested structured proforma was used to obtain the information regarding the injuries. The observations thus made are presented in this paper.

Keywords: *Head Injury, Medicolegal autopsy, Road traffic accidents, cranio-cerebral injury, blunt trauma, sharp force.*

Introduction

A sharp increase in human and vehicular population, rapid urbanisation and industrialization has led to the increase in the incidence of accidents and injuries. India is undergoing major economic and demographic transition coupled with increasing urbanization and motorization. According to 2008 report of National Crime Record Bureau of India, 1,18,239 persons were killed in fatal road traffic accidents (RTA) and out of these, 23,552 (19.9%) were killed while riding on two wheelers.[1]

Cranio–cerebral injuries alone accounts for about one fourth of all deaths due to violence and 60% of all fatal road accidents result in head injuries.[2] A large variety of Cranio– cerebral injuries are sustained by persons in road traffic accidents, followed by the domestic and other accidents. Besides accidents, cases of cranio–cerebral injuries sustained in criminal violence are also on rise. All type of Cranio–cerebral injuries whether accidental, homicidal or suicidal are at times accompanied with consumption of alcohol and other drugs. Medico–legal problems associated with Cranio– cerebral injuries are complex especially in the terms of accidental, homicidal or suicidal. Interpretation of Cranio–cerebral injuries sustained by the impact of hard and blunt objects create major practical problems for many medico–legal experts because of the common defence plea of accidental cause.[3,4]

Most of the studies include the Cranio– cerebral injury cases are limited to urban areas only. The study of Cranio– cerebral injury cases, form medico–legal point of view, among rural population is still lacking. Hence, the present study is carried out in Pravara Rural Hospital attached to Rural Medical College, Loni.

Materials and Method

The present study was conducted in the department of forensic medicine, Rural Medical College, Loni after obtaining institutional ethical committee clearance. We included all the Protocol of the autopsies performed in Pravara Rural Hospital, Loni during the years July 1997 to June 2000. Pravara Rural Hospital is a teaching hospital attached to Rural Medical College (RMC), Loni. It is a 675 bedded hospital situated in a remote rural area of Dist. Ahmednagar in Maharashtra. The hospital provides out-patient and in-patient treatment to rural people from ninety one villages of Ahmednagar, Aurangabad and Nasik districts covering a total of 2.2 lakh population. This is well equipped hospital with

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all facilities as those are available in a level I Trauma Centre including C.T. Scan. Loni is a well-developed rural area with almost all higher educational facilities. Though the people in an around, Loni are mainly agricultural labourers and bidi workers belonging to the lower income group of population. The male to female ratio in the area drained to Pravara Rural Hospital is 1000:952. The rate of literacy is 52.32%.

The present work involved all autopsies referred from PRH or brought dead directly to Post mortem room. Cases of birth injury were not included in this study. Each injury cases have been studied in detail with the specific proforma, which is pre-tested structured and pilot tested. Mode of causation was identified in terms of accidents, assaults and homicide, and suicides. This was determined by examination of type, size, shape and direction of injury and as per the Inquest reports. It was also supported by patient's record and history by relatives. The photographs have been taken for proper assessment of mode of causation.

The studies were carried out among autopsies carried out at Department of forensic medicine and Toxicology. The present study is focused to interpret, analyse and make a separate Medico-legal evaluation of death due to cranio-cerebral injury.

Table 1: Age wise distribution of study subjects

Sr. No.	Age Group (years)	No. of Cases	% age of Total
1	<10	8	8.24
2	10 -20	11	11.34
3	20 -30	23	23.91
4	30 -40	15	15.46
5	40 -50	25	25.77
6	50 -60	8	8.24
7	60 -70	6	6.18
8	>70	1	1.03
	Total	**97**	**100**

The maximum number of cases were between 40 years to 50 years i.e. 25 cases and 21 years to 30 years i.e. 23 cases out of total 97 cases.

Table 2: Distribution of study subjects based on their gender

Sr .No.	Sex	No. of Cases	% of Total
1	Male	81	83.51
2	Female	16	16.49
	Total	97	100.00

Male death due to cranio-cerebral injury was 83.51% and female's death due to cranio-cerebral injury were 16.49%.

Table 3: Distribution of study subjects based on marital status

Sr. No.	Marital Status	July 1997-1998	July 1998- June 1999	June 1999 -2000	% OF Total
1	Married	35	26	10	73.19%
2	Unmarried	11	11	4	26.80%

Married dying due to cranio- cerebral injury were 71 were out of 97 i.e. 73.19% and unmarried dying due to cranio-cerebral injuries were 26 i.e.26.80%

Table 4: Distribution of study subjects based on their socio economic status

Sr. No.	Per capita monthly income in Rupees	1997-1998	1998-1999	1999-2000	Total %
1	Lower Class <2000	10	07	04	26.80%
2	Lower Middle 2000 – 4000	14	13	05	32.98%
3	Upper Middle 4001 – 6000	16	12	04	27.83%
4	Upper Class >6000	07	04	01	12.87%

Out of 97 cases 32 cases were from lower middle, 27 cases were from upper middle class, 26 were from lower class and lowest of all 12 cases were from upper class.

Maximum number of cases were from road traffic accident i.e. 85 out of 97 amounting to 87.62% due to fall there were 7 cases amounting to 7.21% and 2 cases of assault were found out of 97 i.e. 02.06%. Out of 97 cases occurred during the study period 51,549%. Head injury involved only vault 06.18, involved only Base 26.80%, with both vault and base 15.46% were cases without fracture of skull.

Discussion

Head injury constitutes one of the common medico-legal problems in living or dead persons. These medico-legal problems associated with head injuries are complex, especially in terms of accidental, homicidal or suicidal. Interpretation of most of these injury cases create practical problems because of common defence plea of accidental cause.

The present study was carried out at Pravara Rural Hospital attached to Rural Medical College, Loni 413 736, Dist. Ahmednagar in Maharashtra; with the main objective to access and evaluate the Medico-legal aspects of death due to cranio-cerebral injuries and to bring out any special feature of Medico-legal significance of injuries occurring in the rural population. The study has included 97 head injury cases resulted from vehicular accident, fall, assault and other.

In the present study, a total all 12675 cases were hospitalised due to all cases July 1997 to June 1998 out of these injuries were reported as cause of hospitalisation in 926 cases (7.309%) out of which deaths due to cranio-cerebral injury was 47 (0.3%). A total of 14427 cases were hospitalisation due to all cases in July 1995 to June 1999 out of these injuries were reported as cause of hospitalisation in 789 cases (05.43%) out of which deaths due to cranio cerebral injury was 47 (0.3%).

In the present study the number of total death due to all cases in Pravara Rural Hospital during the period from July 1997 to June 2000 were 1644 out of which total number of medico-legal post mortem were done in 593 cases (36.07%). The cranio-cerebral injury contributed 97 cases (16.27%) out of which there were 81 males (83.51%) and females were 16 (6.49%). The male to female ratio is 5.06:1. A report from NIMHANS (1994) analyzed a total at 32% cases of death due to head injury with a male to female ratio of 5:1.[5] This finding is consistent with the present study of 5.06:1. In the present study, total 97 cases of deaths due to head injuries were present out of 593 post mortems. Our findings are in general agreement with those of other workers in the field, who also reported maximum fatality in the age group 21-40 years[6,7,8,9]. In NCRB report of 2008, out of 23,552 RTA deaths, 20,420 (86.7%) were males and 3,132 (13.3%) were females[10].

Out of 593 deaths from July 1997 to June 2000, 97 (16.356) cases of death due to head injuries were observed, maximum due to RTA in 85 (87.63%) and fall contributed in 7 (07.26%) cases. The mortality of head injury cases remained 16.35% (97 total with maximum contribution of RTA). Among 97 cases, death due to RTA was in 87.62%. The findings were similar to other studies.[11]

LJ. Swannet al (1978) reported the mechanism of death due to head Injuries as RTA in 46 (21.50%) assaults and falls each in 69 (32.25%) and other in 30 (14.03%), this findings are not similar to that in the present study.The major difference being the more percentage of RTA fatalities in Rural area and less percentage of assaults (02.06%) and falls (07.20%).

The mechanism of road traffic accidents is summarized. Out of 85 cases maximum incidences (44.7%) involved motor vehicles like Jeep, car, Tempo vans, Bus and Trucks. Next were Pedestrians dashed by automobiles (23.52%) Motorcycle accidents in 18.82% and bicycle accidents in cases of 58% other road traffic accidents involved bullock carts and tractor.

The mechanism al Road traffic accidents cases in present study is similar to that of study done by peter Cameron, C.K. Vander Sluis, and C. Arcola. In the present study in incidence of motor vehicle accident is little less than the studies as other studies are mostly carried out in the cities and adjacent areas. Next involved groups were auto-Pedestrian and motor cycles crashes, bicycle crashes involved differences.

Conclusion

In the present study head injuries was more common among males, in the age group of 40-50 years and road traffic accidents contributed to head injuries in majority of the cases.

Conflict of Interest: No

Source of Funding: Self

Ethical Committee Clearance: Institutional ethical committee clearance obtained.

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DOI Number: 10.5958/0973-9130.2019.00110.5

Original Research Article

Analysis of Cranio-Cerebral Injuries in Fatal Road Traffic Accidents: A Prospective Autopsy Study

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Abstract

Road traffic accidents are a leading cause of death in all age groups in developed and developing countries. In India, deaths due to road traffic accidents are publicly glaring as road safety is professionally lacking. In order to study the magnitude of this problem, a three year prospective autopsy study was conducted at Topiwala national medical college, Mumbai between 1993 and 1996 with regard to Cranio-cerebral injuries in road traffic accidents, taking into consideration some salient parameters, and an attempt is made to suggest a set of preventive measures or multipronged strategies to minimize the frequency of road traffic accidents and deaths.

Keywords: *Cranio-cerebral Injury, Head Injury, Demography, Medicolegal Autopsy, Road traffic accidents, Blunt force, Road safety.*

Introduction

Every morning rises with news of some major road accidents in some part of country. The increasing population, increased vehicular traffic are greatly responsible for increase in road traffic accidents. It can be said that the occurrence of road traffic accidents has acquired the dimension of a man made epidemic.

It took from 1900 to 1952, half a century for drivers in United States of America to cause killing a million human beings. But by 1975,only 23 years later, they had killed a second million and by 1991 in just another 16 years they will; at current rate, have killed a third million [1].

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The number of persons killed in 1987 due to road traffic accidents in metropolitan cities like Bombay, Calcutta, Delhi, Nagpur and Pune count 536, 407, 285,130 and 277 respectively [2]. This human loss at such an alarming rate deserves highest priority.

Hence a three year prospective autopsy study was undertaken at TNMC Mumbai and an attempt is made here to affirm the factors responsible for road traffic accidents, to study the pattern and distribution of injuries in the deceased and to make some constructive suggestions to prevent the Road Traffic Accidents and therefore to reduce morbidity and mortality in day to day life. The observations thus made are represented in this paper by us.

Material and Method

The study material consisted of 809 medicolegal autopsies conducted in the department of forensic medicine and toxicology, Topiwala National medical college, Mumbai, Maharashtra during a period of 3 years (from June 1993 to June 1996). Of these, 49 cases were deaths due to cranio-cerebral injury sustained during road traffic accidents, which were studied prospectively

after obtaining clearance from the institutional ethical clearance committee.

Data for the study comprised of inquest reports and interviews from relatives and friends, of the victims. A detailed proforma for recording the particulars, history, and injury pattern was prepared. The information thus collected, was analyzed using appropriate statistical tools (namely Microsoft Excel 2007 and IBM SPSS V.20).

Observations and Results

During the study period, 809 cases were brought for Medicolegal postmortem examination, of which 49 (6%) cases were deaths due to cranio-cerebral injury (CCI) sustained during road traffic accidents (RTA).

Year wise analysis between June 1993 to June 1996 showed highest number of deaths due to head injury in the year 1994, where we encountered 18 cases (37%) [Table 1]. Maximum number of victims (43%) belonged to the age group ranging between 11-20 years [Table 3]. Observing sex wise death distribution, majority of the victims were found to be males (59%) [Table 2]. All cases of CCI's due to RTA were due to blunt force (100%). While considering the type of victims involved we observed that majority of the victims of RTA were Pedestrians (45%) [Table 4]. 90% of the CCI's due to RTA were associated with skull fractures, and majority of the cases showed involvement of only the vault with fissured fractures (67%) [Table 5], predominantly observed in the parieto-temporal region of the vault of the skull. All the cases were associated with intracranial haemorrhage, and the most frequently present intracranial haemorrhage was Subarachnoid Haemorrhage (41%), [Table 6].

Table 1: Year wise distribution of Cranio-Cerebral Injury (CCI) Cases in Road Traffic Accidents (RTA)

S.No.	Year	No. of Cases	Percentage (%)
1.	1993	10	20
2.	1994	18	37
3.	1995	15	31
4.	1996	06	12
	Total	49	100

Table 2: Sex Wise Distribution of CCI cases in RTA.

S.No	Sex	No. of Cases	Percentage (%)
1.	Male	29	59
2.	Female	20	41
	Total	49	100

Table 3: Age Wise distribution of CCI Cases in RTA

S.No	Age Group (Years)	No. of Cases	Percentage (%)
1.	0-10	2	4
2.	11-20	21	43
3.	21-30	11	22
4.	31-40	3	6
5.	41-50	5	10
6.	> 60	7	14
	Total	49	100

Table 4: Distribution of Type of Victims in RTA Cases encountered

S.No	Victim	No. of Cases	Percentage (%)
1.	Pedestrian	22	45
2.	Cyclist	2	4
3.	Motorcyclist	14	29
4.	Other Vehiclist	11	22
	Total	49	100

Table 5: Frequency of Skull Fractures in CCI cases in RTA

S.No	Type	No. of Cases	Percentage (%)
1.	Only Vault	33	67
2.	Only Base	5	10
3.	Both	6	12
4.	Neither	5	10
	Total	49	100

Table 6: Associated Intracranial Haemorrhage in RTA cases

S.No	Type	No. of Cases	Percentage (%)
1.	Extradural	4	8
2.	Subdural	13	27
3.	Subarachnoid	20	41
4.	Combined SDH and SAH	12	24
	Total	49	100

Discussion

In this section we compare our findings with studies made by researchers prior to our study period to arrive at an appropriate conclusion. In the present study, as observed, highest number of Cranio-cerebral injury (CCI) deaths were due to Road Traffic accidents (RTA) and this observation is consistent with the findings made by Aapte VV in 1972, and Gresham et al in 1986 [3, 4]. Death sex ratio was found to show male preponderance with a ratio of 2:1 and this finding is similar to the observation made by several researchers such as Wynder et al in 1981 and Weldon LB in 1986 [5,6].

In our study majority of the victims belonged to 11-20 years age group and this finding is also consistent with the observation made by Gresham, Maxwell and Austin [4,7,8]. However it did not correlate with the findings made by Waller J and Salgado et al [9, 10]. Further, this study showed that bulk of the victims due to RTA were pedestrians and this observation is similar to the one's made by Wynder et al, Mason J.K in 1978, Salgado et al in 1988 and Srivastava et al in 1989 [5,8,10,11]. We found that most of the cases were associated with skull fractures predominantly linear type around the parieto-temporal region and subarachnoid haemorrhage to be the most consistent intracranial haemorrhage in CCI's due to RTA, and this is consistent with the findings made by Aapte VV and Singh et al in 1996 [3, 12].

Conclusion

The age-old saying "Prevention is better than cure" holds good even in the case of Road Traffic Accidents. It is already mentioned before that the Road Traffic Accidents have assumed the proportion of man-made epidemic" and it is a tragic experience even today that in spite of recent advances in Traumatology, neurosurgery and over all medical management, many cases succumb to injuries sustained during Road Traffic Accidents. So by preventing Road Traffic Accidents, we will succeed in bringing down the mortality rate. Some suggested methods by us include a well-planned roadways, pedestrian walkways and safe pedestrian crossings. Further supplemented with designing two lane streets, good street lighting, and dynamic traffic controlling methods by road transport authorities.

Ethical Committee Clearance: Obtained

Source of Funding: Self

Conflict of Interest: Nil

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DOI Number: 10.5958/0973-9130.2019.00111.7

Socio-Etiological Aspects of Alleged Dowry Deaths – A Medicolegal Analysis

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Abstract

Violence against female was there since ancient times, which include dowry harassment and domestic violence. Dowry is the transfer of any kind or cash from bride's family to bridegroom or his family voluntarily, but as time passed, the voluntary element decreased and forcible element came up. The system of dowry is now commonly practiced in India, Bangladesh, Pakistan, Nepal etc. The idea of present study came from the light of increasing number of dowry deaths and low level of reporting in the society. The aim of the study was to sort out various socio-etiological factors of alleged dowry deaths in and around Puducherry. Out of 65 cases, mean age was 24 years and 56.91% cases occurred within three years of marriage. Most of the cases happened in a rural area (90.8%), in those who are living in a joint family (63.1%), and in low-income family (70.8%). Majority of them were housewives, studied up to high school standard (8th to 10th), and having one child. We observed that of most of them died to burns (73.84%), followed by poisoning (18.46%). Commonest manner of death was suicidal. Quarrel with spouse or in-laws were the most common reason or motive behind the death.

Keywords *: Dowry deaths, Female harassment,Suicides, Burns, Socio-etiological*

Introduction

Dowry is the transfer of any kind or cash from the bride's family to the bridegroom or his parents, and it practiced commonly in South Asian countries like India, Nepal, Pakistan, Bangladesh, etc. [1,2,3] In modern dowry system bridegroom's party is asking for huge amount of cash, jewelry or articles like vehicles and home appliances. Because of this unending dowry demand (cash/kind), the newly married wife has to suffer a lot of physical, mental and emotional harassment from the husband and in-laws. As a result of this, there may be suicides or even homicides - broadly termed as dowry death. Even after years of campaigning by voluntary organizations against the dowry, the number of dowry deaths and dowry harassments are on the rise, especially in India. According to National Crime Records Bureau (NCRB) statistics, in 2014 there were around 8,455 reported cases of dowry deaths and the number found to be 4.6% more than the previous year (8,083). Maximum percentage (29.2%) of such cases was from Uttar Pradesh, followed by Bihar (16.2%).[4]

But less number of studies has been done to identify the risk factors and various other parameters relating to such deaths, especially in India. In the state of Puducherry and Tamil Nadu also the situation is more or less similar. A thorough examination to the facts of the case has to be done in such cases and sometimes there is a chance to get biased to the version of the accused side. This study will give an idea and throw a light on the dowry-related deaths in and around Puducherry and can suggest some remedial measures for prevention of such deaths.

Material and Method

This is an epidemiological descriptive study. All

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deceased females within seven years of marriage during January 2014 to June 2015, reported in Department of Forensic Medicine, subject to inclusion and exclusion criteria were selected for the study.

Inclusion criteria

1. Autopsy on female deaths within seven years of marriage booked under section 176 Cr PC, 174(3) Cr PC, 174(1) Cr PC, and 304(B) IPC

Exclusion criteria

1. Autopsy on unidentified female bodies

2. Autopsy on decomposed female bodies

Age, duration of married life and number of children, time and place of occurrence, type of family, occupation, educational status and socio-economic status of victim, occupation of victim's husband, reason behind death, cause and manner of death were the parameters under study. A descriptive study was conducted to address the study objectives.

Ethics: The study was approved by Institute Ethics Committee.

Results

The total numbers of cases autopsied during the study period was 1254 cases of which 36.36% (n=456) cases constituted female deaths. But only 65 cases (5.18% of total autopsies) were alleged dowry death cases. The age groups in alleged dowry deaths came to our hospital were from 18 – 38 years of age, with a mean age of 24 years. We noticed that about 56.91% of such cases occurred within three years of marriage and 89.21% within five years of marriage. Most of the cases (90.8%) happened in a rural area as compared to the urban area (9.2%). Occupational status of victim and her husband is described in Table.1 and Table.2 respectively.

We observed from the study that about 63.1% of the cases occurred in those who are living in a joint family. Educational status of victims are shown in Fig. 1. None of them belong to illiterate or lower primary (</= 4) standard group, postgraduate, professional or technical education group. Majority of them had one child (43.1%) followed by two (29.2%) and no child (24.6%). 11 women out 65 were pregnant at the time of death. Most of the incidence happened during night time (6 pm – 6 am) ie. 65%. Socioeconomic status is described in fig. 2. In about one-third (33.8%) of the total cases the quarrel with spouse or in-laws were the reason or motive behind the death [Fig. 3]. In 29.2% of cases, there were definite dowry harassment and torture.

We observed that 73.84% of victims (48) died due to burns, followed by 18.46% due to poisoning. Only 3.08% of cases were due to hanging. Other causes include head injury, choking and Rheumatic Heart Disease (RHD) . The commonest manner of death was suicidal that account for 64.62% of cases, followed by accidental [Table.3]. In one case, it was the natural manner of death but she got torture from husband for dowry but died of RHD.

Table.1 – Occupation of victims in alleged dowry deaths

Serial No.	Occupation of victim	Number of cases	Percentage
1	Daily Laborer	7	10.8
2	Employed	4	6.2
3	House Wife	54	83.1
	Total	65	100.0

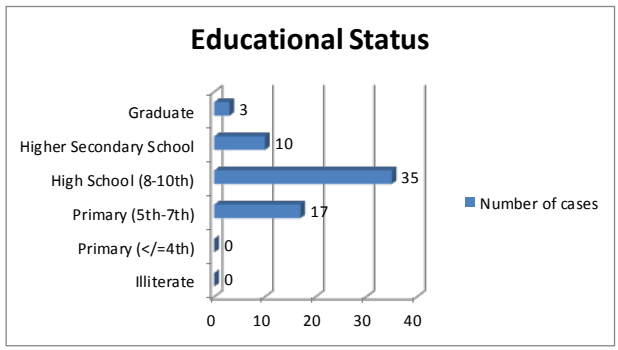

Fig. 1 – Educational status of the victim in alleged dowry deaths

Table. 2 – Occupation of victim's husbands in alleged dowry deaths

Serial No.	Occupation of victim's husband	Number of cases	Percentage (%)
1	Daily Laborer	43	66.2
2	Employed	7	10.8
3	Unemployed	3	4.6
4	Own Business	12	18.5
	Total	65	100.0

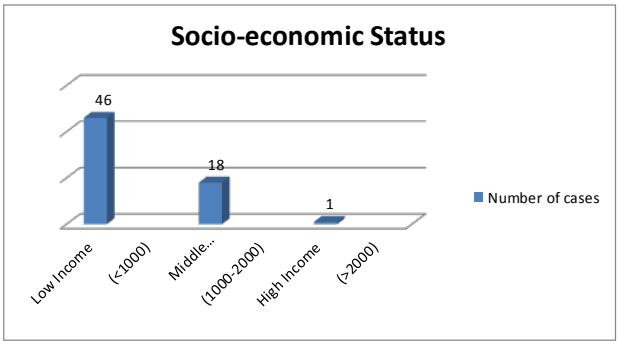

Fig. 2 – Socioeconomic status in alleged dowry deaths

Table. 3 – Cause and manner of death in alleged dowry deaths

Cause of death	Manner of death					
	Suicidal		Accidental		Total	
	No.	%	No.	%	No.	%
Burns	28	45.90	18	29.51	46	75.41
Poisoning	12	19.67	-	-	12	19.67
Hanging	2	3.28	-	-	2	3.28
Others	-	-	1	1.64	1	1.64
Total	42	68.85	19	31.15	61	100

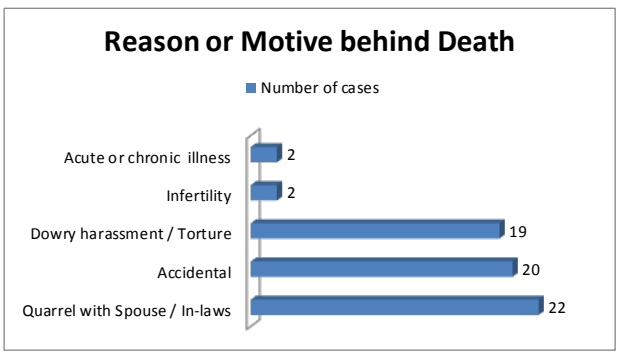

Fig. 3 – Reason / motive behind death in alleged dowry deaths

Discussion

The age of victims in 52.3% of women were between 22-25 years. Singh J et al. also found that 37 % of cases occurred in 22-25 years of age.[5] On further from the study, we can see that about 75.3% of cases were in 18-25 years age group, which was similar to the study by Radhika RH et al.[6] The dowry death cases being registered within seven years of marriage, the age may vary with a place to place as per the mean age of marriage and educational level of that place.

Women in 2-3 years of marriage constituted the single most vulnerable group from our study (26.15%). Arora P et al. and Srivastava AK et al. observed as 60 % of women died within three years of marriage.[7,8] As per Radhika RH et al., this was found to be increased to 73.3%.[6] This may be as a result of the silent suffering of women in first two years and at one point they will be agitated so much to commit suicide.

The time of occurence results were comparable with the studies by Mohanty S et al., Agnihotri A et al. and Nucchi UC et al.[9,10,11] However Shaha KK et al. observed as the majority of deaths occurred during the daytime.[12] With regard to place of occurrence, 59 out of 65 deaths happened in the rural area. Radhika RH et al. and Darji JA et al., also observed higher incidence in rural area.[6,13] But in our study this was very much high, may be due to less number of an urban living area as compared to other study populations.

The type of family results were comparable to the observations by Arora P et al., Mohanty S et al., Nuchhi UC et al., Tapse SP et al. and who noticed a high incidence of dowry deaths in a joint family.[7,9,11,14] But Kulshrestha P et al. found that about 52% of victims were from nuclear family.[15] Radhika RH et al. and Karukutla et al. also observed as high incidence in a nuclear family.[6,16] Low-income family (70.8%) was affected more in this study, followed by middle-income (27.7%). Nuchhi UC et al., Das RK et al. and Sinha US et al. also got results comparable to our findings.[11,17,18] But a study by Kulshrestha P et al. noted that middle-income family was affected more.[15]

Arora P et al. and Nuchhi UC et al. noted highest incidents in those who studied up to high school standard.[7,11] But according to Mohanty S et al., Darji JA et al. and Kulshrestha P et al. highest incidents were noted in illiterate women.[9,13,15] The majority of victims of the study were housewives (83.1%). Srivastava AK et al. and Sinha US et al. also noticed a dramatic number of incidents among housewives.[8,18] More mental stress among the housewives and the more tendencies for torture by husbands and in-laws over homemaker wives may be the probable reason for increased incidents. Nuchhi UC et al. observed that 37% of death took place

in women having an only female child.[11] But Mohanty S et al., Kulshrestha P et al., and Das RK et al. found that most of the incidents were seen in childless women.[9,15,17] Our finding was not comparable with other studies.

We observed that 33.8% events happened because of quarrel with spouse or in-laws. In 29.2% of cases, there were definite dowry harassment and torture. The reason for the quarrel with spouse or in-laws includes demanding money or things from her families, alcoholism of husbands and harsh behavior of husbands. Arora P et al. noticed as in 60% of the cases the reason behind such deaths were the dowry harassment, ill-treatment by in-laws, rash and negligent attitude, or extramarital affairs of husbands.[7] As per Srivastava AK et al. in 51% of suicide cases the reason was demand for dowry or ill-treatment by husbands and in-laws. Moreover, 58% of homicides were because of unsatisfied dowry demands.[8] Darji JA et al. also observed that in 27% of cases of suicide or homicide dowry was the motive.[13] A similar observation was made Mohanty et al. also.[9] All these studies were supporting our findings also.

Burns (73.84%) were the commonest cause of death in our study. Agnihotri A et al. also noticed a higher incidence of burns followed by poisoning.[10] Tapse SP et al., Kulshrestha P et al. and Sinha US et al. observed similar findings.[14,15,18] But Srivastava AK et al. and Karukutla N et al. stated in their study that, burns was the most common cause of death followed by hanging.[8,16] Radhika RH et al. findings were not consistent with our findings as she found hanging as most common cause of death, subsequently poisoning and burns.[6] The discrepancy in the observation with other studies may be due to poor availability of poisons and moreover in our study, more victims belonged to rural areas and constituted a major proportion of lower sections of the society. Also, thermal injuries were more common due to easy availability of inflammable materials.

From the history, inquest reports and postmortem examination we found that the commonest manner of death was suicidal followed by accidental cases. Studies of Radhika RH et al., Srivastava AK et al., Mohanty S et al., and Darji JA et al. were matching with our findings.[6,8,9,13] But Tapse SP et al. study showed that most of the cases were suicidal or homicidal.[14]Kulshrestha P et al. observed accidents as the most common cause of death[15]

Here we should give importance to the observation made by McCoid CH that the alleged "cooking accidents" may not true every time that can be homicide or suicide.[19] As there is no outside witnesses, low socioeconomic status, and low level of enquiry by the investigating officers this couldn't be verified in courts. Moreover, her relatives won't go for further legal proceedings as they won't get back their daughter and have to spend money to proceed which they don't have.

Conclusion

The study showed the magnitude of the dowry related issues and deaths in our society. Majority of the women subjected to this hard dowry harassment are not aware of their legal rights. The educational status of the victim and the income has got an inverse relation with the dowry harassment. Non-employment of the victim also produced such incidents.

This study warrants more exploration to understand many social, cultural and economic reasons behind this problem. The laxity in the involvement of the governmental or non-governmental organization in such dowry-related crimes is also contributed to their increased incidents. There are so many lacunae in the legal aspects of dowry deaths and torture. Sometimes the relatives of the victims will lodge the complaints about dowry death to get back the jewelry and the materials that had given to their daughters. Once they get the thing back or compromise the issues, they will not proceed further.

Recommendations

There are various steps which can reduce or avoid dowry related deaths in our society. Some important recommendations among them are as follows:

The principal solution to the dowry death problem is awareness that can be attained by conducting various awareness programmes.

Compulsory education to all female children should be provided and there should be added curriculum in schools for empowering and strengthening the women from the childhood itself.

Maintaining the gender equality at all stages of life

Premarital and post marital counseling for the couple can be done by establishing counseling centers

in rural or urban area.

Expensive and extravagant marriages should be discouraged. Also every marriage should be registered by a proper government agency in presence of anti-dowry officer.

The investigation of any unnatural death of newly married women should be done by a specifically allotted team including the police officer, the magistrate, doctors, and the forensic experts and there should be proper surveillance for such deaths.

Trial and enquiry of dowry related crimes should be done by special courts preferably with a female judge.

Finally, but not the least, preventing violence against women should start from women itself.

Funding : Nil

Conflicts of Interest: None.

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DOI Number: 10.5958/0973-9130.2019.00112.9

Research Ethics in Forensic Medicine – The Indian Scenario – Problems and Suggestions

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Abstract

Forensic Medicine deals with the application of forensic medical knowledge to the law and justice system. This knowledge, in turn, is dependent on information. Moreover, as in all data, it has to be accurate, reliable, reproducible and valid. The only means of ensuring this is research and experimentation. The administration of justice, therefore, depends on sound science. Unfortunately, research and experimentation in the realm of forensic medicine and toxicology are beset with problems. These problems range from areas as diverse as setting objectives for a study to correctly interpreting their results. However, the starting point is problems with research ethics. The Forensic research participant pool and resources are mainly the following: surviving victims of battery, sexual offences, accidents and others.; as well as fatalities due to any reason in medico-legal cases. When it comes to surviving victims, the guidelines though not established in India can be considered as on par with those involving at-risk and vulnerable populations in other studies, i.e. special care and consideration needs to be employed with dealing with these participants. However, the primary source of data for research will most likely always remain the cadaver in Forensic Medicine. However, real and valid concerns have arisen involving cadavers that if not addressed right now, threaten to derail progress made in inculcating a spirit of research in Forensic Medicine in India. Issues ranging from consent, toxicology research, and protocols to be followed in incidental findings, non-lethal pathologies need to be dealt with. This paper hopes to address and bring to light some of those problems and suggest ways to move ahead with the very least a roadmap.

Keywords: *Research ethics, Forensic Medicine, consent, toxicological research, research protocols*

Introduction

In India, the realm of ethics comes under the domain of Forensic Medicine. As such, the amount of literature about ethics in forensic medicine is substantial. However, when it comes to research ethics mainly involving Forensic participants the same does not hold true. The Forensic research participant pool and resources are primarily the following: surviving victims of battery, sexual offences, accidents and others.; as well as fatalities due to any reason in medico-legal cases. When it comes to surviving victims, the guidelines though not established in India can be considered as on par with those involving at-risk and vulnerable populations in other studies, i.e. special care and consideration needs to be employed with dealing with these participants. However, the primary source of data for research will most likely always remain the cadaver in Forensic Medicine.

It is has been established by the health professionals that the dead body or cadaver is a prime candidate for medical research. The reasons for this are varied and

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many. Some legitimate while others less so. Some aspects that led investigators to pursue cadaver research as an accessible source of material range from the perception that consent is not required for research on cadavers to the fact that every tissue of the body is usually available to the investigator. Another possible reason for the laid-back attitude of researchers towards post-mortem cases is the belief that since no harm is being done, and that too in a cadaver (unless gross mutilation takes place), the scope for objections is less. However, real and valid concerns have arisen, that if not addressed right now, threaten to derail progress made in inculcating a spirit of research in Forensic Medicine in India.

Issues in research ethics in Forensic Medicine may be discussed under the following headings:

Issues with consent

In general, consent has taken a back seat when it comes to research in Forensic Medicine. This becomes all the more alarming as, in India; it is the faculty of Forensic Medicine who teach all aspects of consent to undergraduates pursuing their medical M.B.B.S degree. Moreover, as research ethics is still not taught as a separate entity uniformly across the country, the responsibility to teach and practice what is taught becomes all the more significant.

However, what exactly are the main problems with consent? The first question that would then necessarily arise would be; is consent necessary when dealing with cadavers?

Sending of tissues or blood or any body tissue for examination does not require consent provided that it is being sent with the intention to ascertain facts regarding the cause of death. However, this is a slippery slope used by many researchers to justify all studies. A researcher may justify taking the heart and subjecting it to tests in brought dead cases and sudden death. However, is he justified in testing the heart in a road traffic accident? Here again due to the intricacies of the law, the role of the heart in contributing to the accident cannot be ruled out. Moreover, in suspected poisoning cases, it can be argued that changes in the heart might be correlated to the offending agent. This extended logic and reasoning can thus be applied to all cases. However, even though it is easy to justify any and all forensic tests this way, we must try to follow the scientific method in both spirit and not just the letter. It is commonly taught that even the dead have rights, the right to be treated with respect and not to have the body desecrated in any way. Treating the cadaver as an entity worthy of requiring consent to have anything done to or with it, is the primary step in developing a proper scientific protocol for forensic science research.

We thus suggest that it would be ideal to go about obtaining consent in all research studies as a standard protocol. The participant information sheet and consent form so produced will not only help in a proper documentation process but will also help to stand up to publisher scrutiny. The contents of these forms should include investigator details, the purpose of the study and should state that none of the published work will nor can be used to identify the participant. Unfortunately, there are real-world limitations in taking consent in all cases.

One of these problems is whom to ask for consent. In medico-legal cases, as it is the police and investigating authorities that have possession and custody of the body in its role of evidentiary material; it would appear that consent would have to be taken from them. However, no clear guidelines exist in this regard. Do the investigating authorities hold rights over the entire body or only aspects/parts that may lead to information necessary for the administration of justice? When during the inquest it becomes clear that only some part of the body is involved, who is the legal guardian then? We suggest that consent should be taken from both. During the actual conduct of an autopsy, as the body is the property of the law enforcement agencies, any sample taken should be done with their permission. Also since the samples or tissues so obtained will be tested and used AFTER the completion of medico-legal formalities, consent should be taken from the next of kin as they then become the legal heirs. We also suggest that cases in which specimens are taken from the body should be documented in the post-mortem report and also for what specific purpose. This documentation will lead to a decrease in allegations of "organ stealing" and "destruction of evidence" that are unfortunately a reality in medico-legal practice.

Special considerations when dealing with Forensic cadaver cases: No matter how well-intentioned the study and how well the consent forms and information sheets have been made, they still need to be explained to and signed by the next of kin. Unfortunately, here too problems arise. In some instances, it is not the immediate

family members who are present at the mortuary. Many a time it is the closest physically present family member or friend who will be responsible for transferring the body for the last rites after the completion of the autopsy. Here again, no clear guidelines are present to adhere to. However, looking at the concept of "local guardian" and "locally authorised" family member, it would be within the realms of acceptability to consider consent from such relatives and friends as valid. We, therefore, suggest that in such cases, consent still is taken but opportunity given to the grieving party to withdraw consent if the legal heirs object subsequently. Even in cases where the legal heirs are present, the sensitivities involved in taking consent from relatives who have just suffered a death in the family has to be considered. Emotions of anger on being asked consent for a research purpose are understandable. Furthermore, it is up to the investigator to handle the situation delicately. Investigators also have to consider if a grieving family member is in compos mentis to give valid consent. Again it can only be left on the judgement of the investigator as to whether to proceed or not. Considering the morality of taking consent from grieving family members is a philosophical discussion outside the purview of this paper. There are many studies and projects however that do not require removal of body fluids, tissues or any specimens. Anthropometry studies have long used cadavers as a source of knowledge. Keeping in mind the particular situation surrounding the family members, an acceptable practice may consist of forgoing consent in these cases provided no distortion of the body takes place.

Forensic Research and Toxicology

A significant proportion of deaths are poison-related in India. Hence it would seem that research into various poisons and their lethal effects could result in saving thousands of lives each year. Unfortunately, there are multiple hurdles in the way of valid, clinically significant research being done. Treatment of poisoning cases at the first contact point with primary care doctors revolves around identifying the clinical features even before the final poison has been confirmed. Treatment then proceeds based on what the doctor thinks the most likely poison consumed is. In centres where facilities are available, poison detection through poison detection labs will lead to the confirmation of the poison. However, there are accounts by clinicians of cases where there is a mismatch between clinical and laboratory diagnosis. Also in case of death of the patient of an unknown/ undetected poison, the clinician does not get to find out the poison as the specimens are then sent for chemical analysis through the forensic medicine department after conducting an autopsy. Therefore, research into better techniques for poison detection and treatment protocols is a vibrant area of study. Studies that have been conducted about poisons detected and in some instance their effects on individual organ systems. However, the realm of lethal doses of these poisons seems to be left to extrapolation from animal studies. This perhaps is one instance wherein animal studies will continue to play a role in research. However, the ethical problems of animal experimentation remain. Though it would be impossible to carry out toxin studies on humans, toxin concentration studies may still be pertinent in already poisoned cases. Estimation has to be done not only of the dose at the time of death but also back calculations for the amount at the time of consumption. This has implications as to the state of mind of the individual and also to differentiate between suicide and an accidental overdose. Only studies with significant patient numbers will lead to any significant finding.

Other issues

A significant source of research and publication material in post-mortem medico-legal cases comes from the so-called "incidental findings" that are revealed during an autopsy. In such cases in India, the practice has been to go ahead and publish results without getting consent for the same either from the family members or even police authorities. Here as it might be too traumatic to go and once again get consent from family members, it would be ethical practice to proceed provided anonymisation be taken care of.

Role of anonymisation: perhaps the most widely used reason used to justify the lack of importance given to consent is that hiding of personal identifiers and anonymisation of research entities ensures confidentiality and acceptance. This "blanket method" though accepted in some cases, still needs a better definition of its inclusions and exclusions. The only mentioned role of anonymisation is published research guidelines about cadavers is perhaps from "Guidelines on cadaver donor transplant" mentioned in the Ethical guidelines for biomedical research on human participants given by the Indian Council of medical research, 2006. It states "Remaining tissue and organs should be treated with

the respect due to a human body, and will not be used for any purpose to which explicit consent had not been given unless anonymised."[1]

Conclusion

Ethics in a research background is concerned mainly with undertaking investigatory activities in ways that respect each person's moral equality and associated rights.[2] In India, guidelines for Forensic research are still based on unspoken, unwritten and undocumented professional ethics codes. Ethical codes consist of series of foundational principles that are based on core values, and a set of clear, unambiguous standards or rules that reflect these core values.[3,4,5] But Lavin puts forth the assertion that professional ethical codes are inadequate to guide forensic and correctional research or practice and recommends that researchers familiarise themselves with ethical theory and concepts to enrich their ethical perception and decision making.[6] The blind copying of research guidelines from other disciplines and by extension their ethical foundations has its inherent risks and shortcomings. Ward and Syversen argued in their recent paper that ethical codes consist of sets of rules designed to address issues within a particular domain of practice, and ethical conflicts may emerge when ethical rules from different spheres clash.[7] The first step therefore in framing specific guidelines on research ethics in Forensic Medicine is to be aware of the specific problems inherent in forensic research. Ignorance may lead to researchers failing to act when they should, or dealing with difficulties that are noted in ethically unsuitable ways.[7] Similarly to the objectives mentioned by Ward and Willis, we aimed to provide some general suggestions and ideas of how to proceed in certain Forensic situations, rather than come with an unyielding set of answers to every imaginable problem.[8] The justification of these research ethics guidelines and their further development must proceed in a stepwise manner as mentioned by Ward and Svversen.[7] This process involves initially relying on rational reasoning and then in sequential stages appealing to the standards of ethical codes, and the principles underlying ethical codes (e.g., autonomy, beneficence, justice, and integrity), ethical concepts and theory, and finally, the concept of human dignity.[8] It is of the supreme importance that clear ethical guidelines are in place in India for Forensic research. Though this paper concerns itself mainly with cadaver research ethics, this is just the first step. As our research capabilities increase, we will undoubtedly face new challenges in the realms of forensic genetics, forensic anthropology and all the emerging forensic sciences. Unless we address these current issues, the Forensic fraternity may well fall further behind in our role of contributing to the progress of Forensic science and medicine.

Ethical Clearance: None required (review article)

Financial Funding: No funding used.

Conflict of Interest: None declared

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DOI Number: 10.5958/0973-9130.2019.00113.0

Comparison of Fingerprint Pattern, Face Shape and Gender in a Hospital Based Outpatient Population

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Abstract

Background: Gender and face shape classification from fingerprints is an important procedure in forensic anthropology in order to identify the gender of a criminal, their face shape type and narrow down the scope of suspects search. The use of fingerprint gives a likelihood probability value of the gender of a suspect. This study will show the data collection of fingerprint, face shape and gender in an outpatient population visiting a tertiary care dental hospital in Chennai.

Aim: To evaluate and determine the correlation between the fingerprint pattern with their face shape and gender among outpatient population.

Materials and Method: The study group comprised of 100 individuals from an outpatient population. The materials used are normal stamp ink and white bond paper. The data obtained will be analysed on the fingerprint pattern and its correlation to the face shape and gender.

Results: In males, the most dominant combination is between whorl type finger print and round face shapes which is 8% of total participants. In females, the most dominant combination is also whorl type finger print and round face shape which is 10% of total participants.

Conclusion: Narrowing of suspects in the criminal identification and reduction in the time consumed are advantages of this study. In anthropology, the skull remaining can be re-built by 3D imaging which will give their face shapes and the gender can be predicted.

Key words: *Comparison; Fingerprint; Face shape; Gender; Outpatient; Population*

Introduction

From the time of early people, the features of the hands have been an area of interest to describe possible future events. Over the years of scientific research, the hand has come to be recognized as a useful tool in the identification of a problem or its cause and other medical conditions.[1, 2] The term dermatoglyphics refers to the study of the naturally happening patterns of the surface of the hands and feet. It was first introduced by Cummins in 1926 and since then, this approach has been a topic of interest in varying scientific circles to figure out a plausible relationship between fingerprints and different medical conditions.[3, 4]

Considering today's conditions of increased importance of security and organization, identification and verification of an individual's identity has developed into a key technology.[5] The imperative need for reliable personal identification in computerized access control

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has resulted in the increased interest in the science of recording of information about the body. Fingerprints are one of the oldest recording technologies and have been accepted as key evidence in courts of law all over the world.[6]

Fingerprints are one of the most important biometric technologies and are considered as legal proof of court evidence of law all over the world.[7] Based on the varieties of the information available from the fingerprint researchers are able to process its identity along with gender, age and ethnicity.[8] In today's situation of increased importance of security and organization, identification and authentication methods have developed into a key technology. Such requirement for reliable personal identification in computerized access control has resulted in the increased biometrics interest.

A Fingerprint represent the epidermal ridges of the finger which consists of interleaved ridge pattern and unique valleys. The evolved fingertip ridges over the years allowed humans to grasp and grip objects. As other parts in the human body, fingerprint ridges and pattern form through a genetic combination or other environmental factors.[9] This uniqueness explained why even the fingerprint of identical twins is different. The fingerprint pattern concept being studied has been of significant use over time.

Human fingerprints have been discovered on a large number of archaeological artefacts and histological items throughout the centuries. Although these findings provide evidence to show that ancient people were aware of the individuality of fingerprints, it was not until the late sixteenth century that the modern scientific fingerprint technique was first started. During 1686, Marcello Malpighi, an anatomist from University of Bologna mentioned in his writings about the presence of ridges, spirals and loops in fingerprints.

Based on the information available from the fingerprint we can process its identity along with gender status, age and its family and cultural characteristics. Fingerprint is an impression of friction ridges, from the surface of the fingertip. Fingerprints have been used for personal identification for at least 50 years and more with much advancement in the technological aspects.10

Fingerprints have certain characteristic features which deem them as extremely valuable evidence in crime scene. The uniqueness of the fingerprints are:

1. A fingerprint is unique to a particular individual, and no two fingerprints possess exactly the same set of traits. [11]

2. Fingerprints do not change over the course of person's lifetime even after shallow injury to the fingers.

3. Fingerprint patterns can be classified, and those classifications are then used to narrow the range of suspects.

Fingerprint identification and classification has been studied in various researches papers, however very few studies have been undertaken to correlate the fingerprints with the gender type and face shape.

Acree used the ridge density, defined as the number of ridges in a certainspace; it was shown that the females have higher ridge density. Kralik showed that the males have higher ridge width, than females. Fingerprint ridge width is the distance between the centres of two valleys.[12] Two studies shows that the males have higher ridge count than the females. Female's finger prints are significantly having lower quality of lines or ridges width than male finger prints.[13] The appearance of white lines and scars in finger print images is very common in housewives.[14]

Therefore, this study is conducted to evaluate and determine the correlation between the fingerprint pattern with their face shape and gender among outpatient population.

Materials and Method

The present study comprised of 100 subjects of age range 17 - 70 years. Of the total subjects, 34 patients are male and 66 patients are females. The subjects were randomly selected for the purpose of this study. Subjects were selected from the outpatient departments of a tertiary dental care hospital in Chennai between September 2017 and December 2017. The finger prints of individuals with their gender and face shape were assessed.

The materials used for this study are normal stamp ink and white bond paper. Patients were asked to wash their hands with soap water and then the fingerprints were taken using normal stamp ink on an A4 white

paper by using ink and paper method which were studied for the pattern. The finger print configurations were categorized as arches (arch, tented arch), loops (left loop, right loop) and whorls.[15] [Figure 1] The face shape were categorised as diamond, triangular, round, heart, square and oval.[16] [Figure 2]. The data obtained will be analyzed on the fingerprint pattern and its correlation to the face shape and gender.

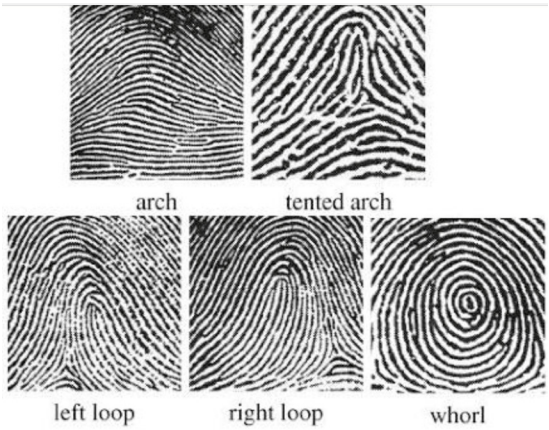

Figure 1: Type of finger prints.

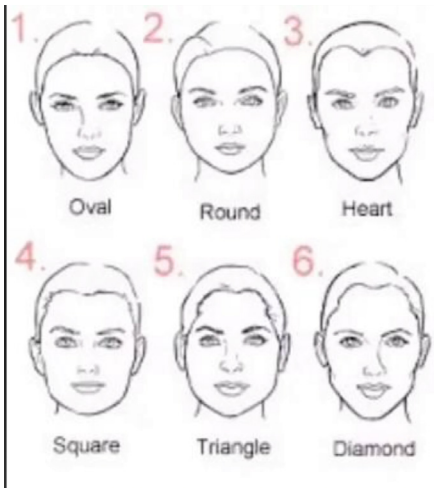

Figure 2: Type of face shapes.

Sample size of 100 is choose for this study with the expected reliability of the study is, r=0.80 and the test confidence of 80%. The method used to calculate the sample size is non-parametric binomial reliability demonstration test. 100 sample size is ideal for this study as indicated in this method.

All the raw data will be segregated based on the gender, different type of finger print and their face shape. The data will be analyzed based on the similarity of combination. Percentage from the segregation data will be presented in the table and graph.

Result

A total 100 participants in this study which consist of 34 males and 66 females, are further categorised into their type of fingerprints and face shapes.

Based on this study, the most dominant fingerprints type is whorl for both males and females. 52.9% of males having whorl type of fingerprint and 44% of females having the whorl type of fingerprint. In males, 17.7% having arch types fingerprints and another 20.5% having left loop fingerprints. However in females, arch and right loop are the next dominant type after whorl, which are 18.1% and 27.3% respectively. The least amount of fingerprint recorded in the data is tented arch type fingerprint, which was not recorded in men and only 4.6% of females having this type. The data of fingerprint type for both male and female are shown in Table 1 and Table 2.

Table 1: Percentage of finger prints type in males

Fingerprint	Percentage out of both gender (%)	Percentage out of Male only (%)
Arch	6	17.7
Tented Arch	0	0
Left Loop	7	20.5
Right Loop	3	8.9
Whorl	18	52.9
Total	34	100

Based on the face shape and gender in this study, the most dominant face shape recorded in males is round type face shape which is 41.2%. However, the least amount of face shape recorded are diamond type and heart type, which are 0% and 3% respectively. Meanwhile in females, the most dominant face shapes are diamond type, round type and oval types which are 25.7%, 24.2% and 18.2% respectively. Less number of square type face shape recorded for females which is only 7.7% only. The data of face shapes type for both male and female are shown in Table 3 and Table 4.

The combination between gender, finger prints and face shapes can be seen in the Table 1. In males, the most dominant combination is between whorl type finger print and round face shapes which is 8% of total participants having this. In females, the most dominant combination is also whorl type finger print and round face shapes which is 10% of total participants.

Table 2: Percentage of face shapes type in males

Face shape	Percentage out of both gender (%)	Percentage out of Male only (%)
Square	7	20.5
Oval	4	11.7
Round	14	41.2
Heart	1	3
Triangle	8	23.6
Diamond	0	0
Total	34	100

Table 3: Percentage of finger prints type in females

Fingerprint	Percentage out of both gender (%)	Percentage out of female only (%)
Arch	12	18.1
Tented Arch	3	4.6
Left Loop	4	6.0
Right Loop	18	27.3
Whorl	29	44.0
Total	66	100

Table 4: Percentage of face shape type in females

Face shape	Percentage out of both gender (%)	Percentage out of female only (%)
Square	5	7.7
Oval	12	18.2
Round	16	24.2
Heart	8	12.1
Triangle	8	12.1
Diamond	17	25.7
Total	66	100

Discussion

Fingerprint identification and classification has been studied in various research papers, however very few studies are done to correlate the fingerprints with the gender type and face shape. In this current study, 100 participants which were divided into 34 males and 66 females were examined and observations were done to identify their fingerprint and face shape type.

Based on this study, the most dominant fingerprints type is whorl for both males and females. 52.9% of males having whorl type of fingerprint and 44% of females having the whorl type of fingerprint. Based on the face shape and gender in this study, the most dominant face shape recorded in males is round type face shape which is 41.2%. However, the least amount of face shape recorded are diamond type and heart type, which are 0% and 3% respectively. In males, the most

dominant combination is between whorl type finger print and round face shapes which is 8% of total participants having this. In females, the most dominant combination is also whorl type finger print and round face shapes which is 10% of total participants

The most dominant fingerprint types is whorl in both males and females and the most dominant face shapes in males is round and diamond, round and oval for females. All the data was obtained from outpatient population visiting a multispecialty dental hospital in South India.

In a previous study, there are variation of fingerprint and face shape dominance based on their genetic make up and places of origin. The finger print type of 163 males and 184 females in the region of Murcia in Southeast Spain showed that females have a dominance of arches type fingerprint and whorl type was the least.[17]

In Nagaland, India, the Rengma Nagas tribes' finger prints were assessed in previous study. Finger prints of 207 adult individuals which consisted of 104 males and 103 females were recorded. The results reported that the most dominant types of finger prints were whorl patterns both in males (52.19%) and females (55.69%). The next dominant finger print types were loops (47.70% in males and 42.81% in females). [18]

Study conducted in Visakhapatnam district of Andra Pradesh by Reddy GG (1975) on finger prints of 235 males and 235 females reveal that loops are higher in females (57.58%) than in males (49.19%). Later, further study of all the tribes of Andhra Pradesh yields information of great value in disclosing the pattern distributions among these Dravidian or proto-Australoid tribal populations. [19]

In the current study correlating face shapes and gender, the most dominant face shape of male is round (41.2%), meanwhile for females are round (24.2%) and diamond (25.7%). There is lack of previous study showing the relationship between gender and the face shapes. In a previous study conducted among Turkish population, the face shape type was given for 3 different parameters based on facial indices, which are euryprosopic, mesoprosopic and leptoproposic. A study conducted on 173 Turkish in 2008, which was divided into 83 females and 90 females between 17 to 25 years. The result obtained shown that 59 subjects are euryprosopic, 49 subjects are mesoprosopic and 65 subjects are leptoproposic. This study shown that most adult Turkish females have euryprosopic faces, whereas the leptoprosopic face type was most common among adult Turkish males. From the overall evaluation, males having parameter of the fingerprint patter higher than females. [20]

Conclusion

Finger print type and face shapes and their association with the gender are very important for forensic purposes. Medico-legal, sex identification from the remaining dead bodies and criminal investigation are all related to finger print identification. From the finger print, the gender of the person to whom it belongs can be identified and the face shapes can be predicted. In anthropology, the skull remaining can be re-built by 3D imaging which will give their face shapes. Therefore, from the face shapes obtained from the 3D imaging, the gender can be predicted. Narrowing of suspects in the criminal identification and reduction in the time consumed are advantages of this study.

Ethical Clearance- All datas are taken from examination of outpatients of Saveetha Dental College and Hospital

Source of Funding- Saveetha Institute of Medical and Technical Sciences

Conflict of Interest - Nil

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DOI Number: 10.5958/0973-9130.2019.00114.2

Calcific Metamorphosis: An Insight

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Abstract

Trauma to the dental hard tissues often leads to clinical complications and the management appears as a challenge to the practitioner. The incidence of calcific metamorphosis is bound to be approximately 4 - 24%. Following calcific metamorphosis, attempt to negotiate canals and working through it to the full working length may lead to iatrogenic complications such as separated instrument, perforation etc. Calcific metamorphosis is distinguished by hard tissue deposition within the pulp space and the characteristic yellowish discoloration of the crown. Various practitioners proposed the treatment modalities for CM according to their experience and suggested that the treatment should be carried out with the earliest detection of CM or to wait and treat till the symptoms or radiographic signs of pulpal death are noticed.

Keywords: *Calcific metamorphosis, Calcification, Pulp canal obliteration, Pulp disease, Trauma*

Introduction

Practitioners in their clinical practice experience several complication and management challenges when treating patients with dental trauma. It affects both primary and permanent dentition as a result of trauma the teeth can have some common complications which include pulpal necrosis, surface inflammation or replacement resorption, internal resorption, invasive cervical resorption and calcific metamorphosis.[1]

The definition of calcific metamorphosis (CM) is has been varied among various authors. Some have proposed it to be a response of pulp to trauma which is detected with hard tissue deposition within the root canal.[2] It can also be entitled as pulp canal obliteration, calcific degeneration, dystrophic calcification, diffuse calcification, and dystrophic calcification.[3] Although the exact mechanism of CM remains unclear, but damage to the neurovascular supply of the pulp has been considered to be the reason for the same.[4] The diagnosis and treatment modalities for teeth with CM are always considered as a controversial issue.[5]

The need of making rational decisions for endodontic intervention by using operating microscope is at most important to localise the calcified canals if periapical lesion is present. Development of pathology is suspected in 1-16% of calcified tooth according to literature. If the tooth is calcified but there is no periapical pathology then available aesthetic treatment options such as veneers and bleaching can be recommended.[1]

Etiology and Incidence: Traumatic injuries at very young age is considered to be one of the reasons for calcific metamorphosis. CM can lead to complete or incomplete calcification of the pulp space which can be visualized radiographically and is more conspicuous in the anterior region of the mouth. The clinical scenario of CM could be described as a tooth with a darker hue than adjacent tooth as given by Patterson and Mitchell.[6] CM leads to change in colour of the tooth to dark yellow shade due to a tremendous reduction in translucency which can reasoned with the greater deposition of

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reparative/ tertiary dentin under the enamel. [7]

CM has been considered as a pathologic condition and the recommended treatment of choice would be either endodontic therapy or extraction of tooth. The involved pulp tissue undergoes total degeneration and acts as a nidus of infection and therefore appropriate treatment needs to be provided. Histologically, no evidence of pulpal pathology could be identified as a result of improper fixation of the pulpal tissue. The incidence of pulpal death in teeth exhibiting CM appear to have increased over a span of time, and routine pulp space therapies on teeth with CM was not justified.[8]

Radiographic Analysis

The radiological analysis of CM is described as total or incomplete root canal obliteration with intact lamina dura and PDL space. Periapical radiolucency and widening of periodontal ligament space may be noticed with or without any subjective signs and symptoms. In case of CM, there is no evidence stated that there is complete loss of pulpal tissue leading to obliteration, however some cases have reported with the presence of remnants of pulpal tissue leading to obliteration of canal space.[9-11] The radiographic interpretation of calcific metamorphosis or calcified canal reveals total blockage of the pulp space as a result of tertiary dentin deposition as shown in Fig 1. Cone beam computed tomography (CBCT) is considered to be an important tool for the confirmation of the calcific metamorphosis. When there is involvement of bone, there is loss of lamina dura with widening of periodontal ligament space.[12]

Mechanism Behind Hard Tissue Formation

The basic process behind Calcific Metamorphosis formation remains unclear and several theories have been laid down to explain the fact behind it. Torneck postulated that the reason behind hard tissue deposition in CM may be due to the proliferation of pre-existing odontoblasts or due to deprivation of regulatory mechanism.[9] Andreasen and Andreasen described CM could be presented as a reaction to the injury of the neurovascular bundle of the pulp, which when healed resulted in accelerated dentin deposition.[3] Calcific metamorphosis is described as the deposition of osteoid like tissue produced by the odontoblasts at the periphery of the pulp space or due to the stimulation of undifferentiated mesenchymal pulpal cells that undergo multiplication due to trauma. These cells undergo fusion to coalesce with one another, resulting in a radiographic appearance making the pulp space to be totally calcified.

Reparative odontoblasts in the absence of any epithelial influence can proliferate from dental pulp cells. During the developmental stage of the tooth, the undifferentiated ectomesenchymal cells of the dental papilla divides into two daughter cells. One daughter cell under the influence of epithelial cells undergoes differentiation into an odontoblast, while the second daughter cell persists as a sub-odontoblastic cell and is not exposed to the epithelial influence, when comes into contact with other influential factors, it differentiates into odontoblast- like cells and deposits dentin-like hard tissue.[8]

Based on the degree of the injury, deposition of reparative dentin or tertiary dentin takes place at particular sites. Higher the impact of injury, dentin deposition occurs at a faster rate than usual, as much as 3.5 μm in a single day. This eventually results in enhanced hard tissue deposition that entraps other cells of the pulp and gives the histological picture of osteodentin with an irregular tubular pattern. The cells constituting the hard tissue formation are originated from cell divisions in deeper layers of the pulp, and the type of cells that divide has not been established. They might be undifferentiated perivascular cells, pulpal fibroblasts, or cells formed from the odontoblast lineage but not exposed to the final epithelial influence.[13]

The cells that have been differentiated constituted a combination of various types of collagen like Type I, II, III, IV which helps in forming a matrix surface. The basis for positioning of cells is formed by the continuous deposition of fibronectin on predentin. These cells produce matrix which contain type I and II collagen. In the absence of phosphophoryn, the type I and II collagen accepts mineral.[14]

Management Guidelines

Anterior teeth are commonly affected in CM as they are subjected to trauma at a young age. Most teeth affected with CM exhibit a persisting narrow pulp canal space that cannot be easily detected in radiographs.[15,16]

To discover the exact position of the pulp chamber, the clinician mentally visualizes the position of orifice onto a radiograph of the calcified tooth. The 2D image of x-ray corresponds to the 3D morphology of the tooth

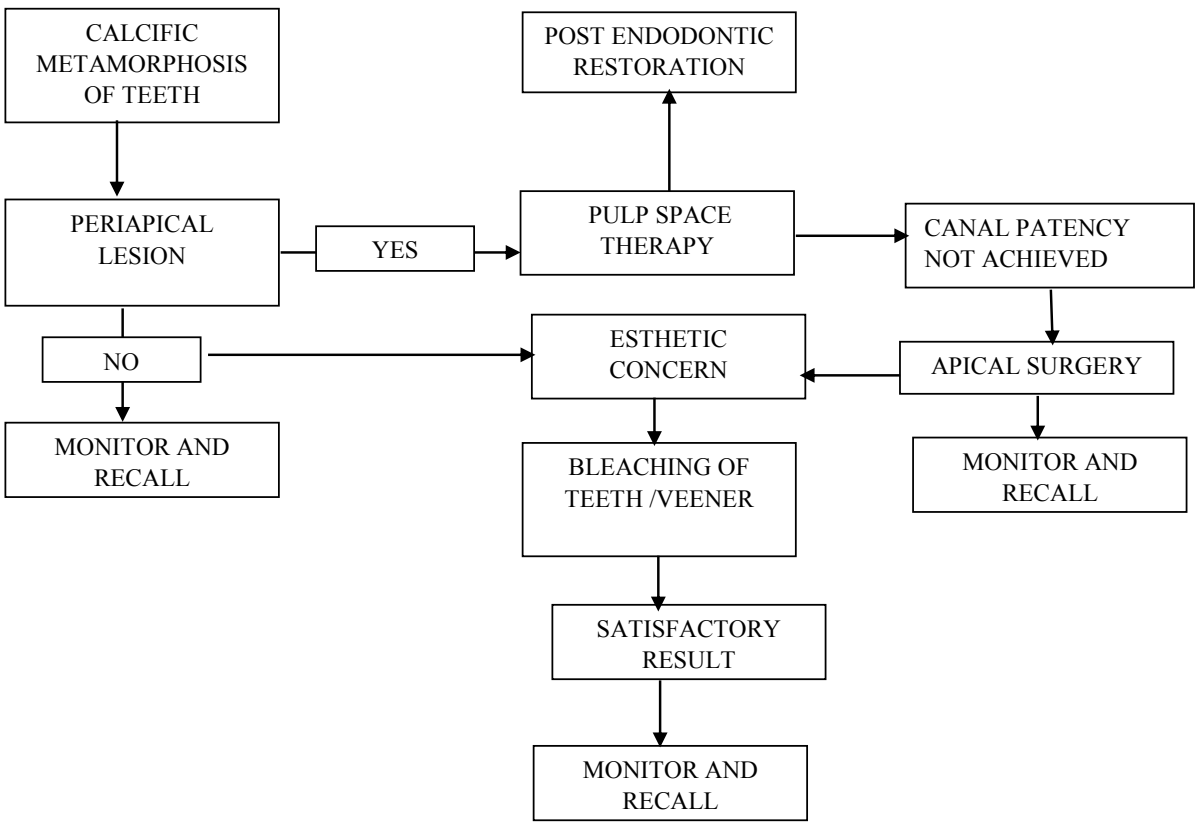
which may be not be reliable. As an adjunct, CBCT is mandatory.[17,18]

With an endodontic bur, the access opening is done by directing it toward the location of pulp space. A thorough knowledge of the location of pulp chamber, anatomy of the root canal, and the axial inclination of the roots is required to do the access opening of a calcified canal. Ideal preoperative radiographs are essential for visualization, bur penetration and orientation. Once the calcified orifice has been reached, the practitioner must be able to recognize it.

When the esthetic component is of prime concern, vital (external) bleaching technique can be considered as the prime option.[18] If the darkening of the tooth is caused by irregular reparative dentine formation, intentional endodontic therapy is carried out to aid in non-vital (internal) bleaching. An effective tool for the exploration of calcified canal is DG-16 endodontic explorer (Hu-Friedy, Chicago, IL). Other instruments like micro openers and debriders (Denstply, Maillefer, USA) are also used in probing for calcified canals. These instruments are designed such that the fingers need not be detached from the field of vision which increases operator efficiency when the canals are accessed under the microscope. The "crown down technique" is recommended technique for cleaning and shaping of the canal, together with copious irrigation using 2.5–5% sodium hypochlorite and ethylethylenediaminetetraacetic acid (EDTA).[19]

Fig 1: IOPAR revealing totally calcified canal with respect to 21 along with periapical lesion.

TREATMENT DECISION CHART FOR CALCIFIC METAMORPHOSIS



Conclusion

A great percentage (3.8% to 24%) of teeth undergone trauma develop some amount of calcification.[12] The ability to access the canal and removal of the deposited dentine decides the treatment outcome. Most of the research articles in the endodontic literature propose that endodontic intervention is not attempted unless periradicular pathosis is detected or the involved tooth becomes symptomatic. When the pulp tissue becomes necrotic and a periradicular radiolucency develops, surgical endodontic therapy has been proven to be successful in most of the cases. Veneer and bleaching forms an essential element of the aesthetic management of CM and must be performed.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Taken from Manipal College of Dental Sciences, Mangalore ethical committee.

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DOI Number: 10.5958/0973-9130.2019.00115.4

Influence of Varying Ferrule Heights and Configurations on the Fracture Resistance of Endodontically Treated Mandibular First Molars- An in Vitro Study

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Abstract

Purpose: To evaluate the influence of varying ferrule heights and configurations on the fracture resistance of endodontically treated teeth restored with custom cast post and cores and full metal crowns.

Method: Fifty extracted human mandibular first premolars were randomly divided into 5 groups: I, no root canal treatment (RCT), crown; II, no post and core, crown; III, 2-mm ferrule, cast post and core and crown; IV, non-uniform ferrule (2 mm buccal and lingual, 0.5 mm proximal), cast post and core and crown; and V, no ferrule, cast post and core and crown. Samples were subjected to a static load on the buccal cusp, 150° to the long axis of the tooth, and failure load was recorded. Statistical analysis was carried out with a 1-way analysis of variance and the Bonferroni pairwise comparison. The mode of fracture was noted by visual inspection.

Results: Absence of ferrule resulted in significantly lower fracture resistance (V: 308.27 +/- 75.567 N) as compared to all other groups. Group I: 714.69 +/- 89.37 N, and Group II: 656.90 +/- 133.15 N were significantly more resistant as compared to Group IV: 471.98 +/- 115.99 N ($p < 0.01$). However, there was no significant difference between non-uniform ferrule and the uniform 2-mm vertical ferrule.

Conclusion: The premolars with a ferrule were more fracture resistant as compared to the teeth with no ferrule preparation.

Keywords: *ferrule, endodontics, fracture resistance.*

Introduction

Less than ideal teeth may serve as abutments for fixed dental prosthesis (FDP). The aim in these situations is restoration to a form that protects the supporting units and reconstruction from overloading.[1] Endodontically treated teeth have lost a considerable amount of tooth structure and subsequently are at a higher risk for failure. Two factors influence the choice of restoration: the type of tooth, and the amount of remaining coronal tooth structure.[2] Loss of greater than 50% of the tooth structure usually would require a post and core foundation .[3,4] The purpose of a post is to provide retention for a core and strengthening the remaining tooth structure remains a problem.[5] It has been shown that coronal coverage significantly increases the stiffness of the remaining tooth.[6] A ferrule is a metal band or ring used to fit the root or crown of a tooth[2] It is thought to help bind the

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remaining tooth structure together, thus preventing root fracture during function.[1] The ferrule resists leveraged functional forces, wedging effect of tapered posts, and lateral forces exerted by the post during function.[7] Providing a ferrule ensures that the margin of the core and the crown are at different levels enhancing the resistance of the endodontically treated tooth[8,9] Isidor also found that ferrule length was more important than post length in increasing the fracture resistance to cyclic loading,[10] The configuration of the amount of remaining tooth structure is as important as the height. When the remaining axial wall is at the location where the load is applied, the arc of displacement of the complete crown places the remaining tooth structure under tension, buttressed against the post and core.[11] In addition a uniform 2mm ferrule preparation all around the tooth in all cases cannot be ensured. Tan studied the influence of a non-uniform ferrule as compared to a uniform one and found that even a non-uniform ferrule improved the fracture resistance of a tooth as compared to no ferrule preparation.[12] Further evidence still needs to be collected to clearly establish the role this non-uniform ferrule might play in reinforcing the tooth structure.

The purpose of this study was to evaluate the effect of varying ferrule configurations and heights on the fracture resistance of endodontically treated teeth restored with custom cast post and cores and full metal crowns under static loading.

Method

50 Mandibular first premolars caries free teeth with an average crown (8±1mm) and root (13±1mm) were collected for the study. These teeth were randomly divided into 5 groups with 10 samples in each group. Each group was subjected to different preparations:

Group 1: Control Group. Teeth restored with crowns without endodontics

Group 2: Endodontically treated and restored with crowns

Group 3: Endodontically treated, restored with cast post and core and crowns incorporating a 2mm ferrule

Group 4: Endodontically treated, restored with cast post and core and crowns incorporating a non uniform ferrule (2mm and 0.5mm)

Group 5: Endodontically treated, restored with cast post and core and crowns without a ferrule

Tooth preparation

The tooth preparation was done using diamond points to receive complete metal crown as per the recommended protocol with the help of a dental surveyor. [12, 13]

Teeth and the post space in Group 3,4 and 5 were prepared as per the suggested methodology ensuring apical seal of 4mm, core build up done, cast post fabricated and wax patterns were contoured and casted for crown fabrication and cemented as per manufacturer's instructions. (Fuji I; GC, USA). They were stored for 1 day in an environment of 100% humidity.

The samples were tested using a Universal testing machine (Model 3366). A load was applied at an angle of 150-degress to the long axis of the tooth using a custom made attachment.[13] The cross head applying the load moved at a speed of 2.5mm per minute. The load at which failure occurred and mode of failure was noted.

Statistical analysis was carried out using one-way Analysis of variance (ANOVA) using statistical package SPSS (version 13.0) Then pairwise comparison was carried out for all the groups using the Bonferroni test. The Weibull analysis was used to determine the group with the highest survival probability.

Results

Results are presented in Table 1-4

Table 1 – Failure load for all samples

Sample No	Group 1	Group 2	Group 3	Group 4	Group 5
1	903.77	576.13	469.92	480.82	266,91
2	790.52	704.32	672.51	345.29	340.52
3	716.15	869.31	438.19	595.58	345.97

Cont... **Table 1 – Failure load for all samples**

4	580.04	604.73	402.23	407.56	317.42
5	672.08	418.27	575.51	644.56	251.9
6	736.23	585.89	601.75	642.31	279.54
7	707.39	631.89	567.56	404.09	334.23
8	607.73	837.38	493.54	364.92	265.9
9	708.03	731.37	663.36	465.77	479.16
10	719.05	309.73	731.83	368.92	201.21

Table 2 – Inter-group comparison with ANOVA

Force	N	Mean	Std Deviation	95%Confidence Interval		ANOVA F	P value
				Lower bound	Upper Bound		
Group 1	10	714.6990	89.37503	650.7640	778.6340	22.660	.000 HS
Group 2	10	656.9020	133.15329	561.6499	752.1541		
Group 3	10	561.6400	109.10831	483.5886	639.6914		
Group 4	10	471.9820	115.98965	389.0080	554.9560		
Group 5	10	308.2760	75.56681	254.2188	362.3332		
Total	50	542.6998	177.30854	492.3093	593.0903		

Table 3 – Bonferroni Comparison between Multiple groups

Group (I)	Group (J)	Mean Difference (I-J)	Std Error	p	
Group1	Group 2	57.79700	47.65974	1.000	NS
	Group 3	153.05900	47.65974	.024	Sig
	Group 4	242.71700	47.65974	.000	HS
	Group 5	406.42300	47.65974	.000	HS
Group 2	Group 3	95.26200	47.65974	.517	NS
	Group 4	184.9200	47.65974	.003	HS
	Group 5	348.6260	47.65974	.000	HS
Group3	Group 4	89.65800	47.65974	.664	NS
	Group 5	253.36400	47.65974	.000	HS
Group4	Group 5	163.70600	47.65974	.013	sig

NS – not significant, Sig- Significant, HS- Highly significant

Table 4 – Modes of failure

	Number	Total samples	Percentage
Group 1,2			
Horizontal fracture	16	20	80
Oblique fracture	2		10
Crown fracture	2		10
Group 3,4,5			
Vertical fracture	28	30	93.33
Horizontal fracture	1		3.33
Decementation	1		3.33

Discussion

The results obtained in the study were found to be in agreement that post and core restorations reduce the strength of the tooth, and providing a ferrule would provide some reinforcement.

The Control group displayed mean failure loads of 714.69 N which was higher than the mean failure load of the other groups . This suggests that RCT treated teeth are more prone to fracture as compared to an intact vital tooth. The mean failure load for Group 2 (656.902 N) was higher than for Group 3 (561.64 N), 4 (471.982 N) and 5 (308.276 N).

These results are in agreement with the results obtained by Nagasiri et al,and Sorensen[14,15].

RCT teeth serving as fixed bear greater stresses in function than single crown abutments. leading to fracture of the teeth.[15]

Reinforcement with a dowel was thought mandatory in endodontically treated teeth used as abutments for fixed dental prosthesis.[16]

Nyman and Lindhe found that of all the abutments in fixed restorations that fractured, 75% were endodontically treated with posts.[17]

According to Sundh, only 53% of the abutments having a cast post-and-core to support the fixed partial denture unit were functional after 18 years as compared to the 65% survival of abutments as a whole. [18]

It is therefore essential to appropriately select the post system, material, and design. Prefabricated posts provide a good option because they save time and provide satisfactory results. Also some authors found prefabricated posts produced significantly less internal forces when compared to cast posts.[19]

However, if a canal requires extensive preparation, a well-adapted cast post and core restoration will be more retentive than a prefabricated post that does not match the canal shape.[20]

In clinical situations where there is insufficient ferrule length, even where margins are placed subgingivally, the clinician may consider surgical crown lengthening or orthodontic extrusion. This allows the distance between the crown margin and alveolar crest to be widened, and increases the potential ferrule length.[21]

Difference between Group 2 &3 was not significant possibly due to the reinforcement provided by the uniform 2mm ferrule. When a ferrule was provided, placement of a post did not significantly improve fracture resistance .[22, 23]

Groups 3, 4 and 5 were restored using custom posts and cores. The extensive loss of tooth structure prior to and during the restorative phase, increased stresses throughout the root and reduced remaining dentin thickness could have weakened the teeth in these groups. Between teeth restored with a crown only and those restored with post and core with no ferrule, or a non-uniform ferrule, the difference was highly significant.

Comparison between Group 3 and 4 showed the former had a higher mean failure load as compared to

group 4, though the results were not significant. This difference in failure load may be attributed to the difference in remaining coronal tooth structure. The greater surface area of dentin in uniform ferrule group provides stable foundation for better distribution and dissipation of forces. Tan et al suggested that when a uniform 2mm coronal dentin is maintained, the additional tooth structure forms a bevel over the tooth that may act as a modified or secondary ferrule.[12]

The Group 5 had a mean failure load that was significantly lower than all the remaining groups. This is due to the resistance provided by the limited amount of remaining tooth structure in the other groups. Similar results were obtained in other studies as well,[8, 12] Teeth with no ferrule were seen to survive very few fatigue cycles, as compared to 0.5mm and 1mm ferrule groups, which survived significantly more number of cycles in a study by Ma et al.[24]

Failures observed in this study were varied. 80% of the samples in the three groups that were restored with post and cores showed vertical root fracture. On the other hand, the teeth restored with only crowns (group 1 and 2), 80% showed root fracture within the cervical third of the root. Several studies have shown that custom cast post and core lead to catastrophic, non-restorable failure.[12, 25] which is what we observed in groups 3, 4 and 5. Modes of failure observed in this study do not represent failure as seen clinically. One reason for this could be that the periodontal ligament was not replicated in our models.

There are certain limitations of this study. In vitro studies are not representative of clinical situations with regard to the forces, amount and nature of load. Also, the sample size may have been insufficient. Further studies to compare fatigue testing and static loading, as well as comparing prefabricated dowels and direct cores with cast dowels and cores with different ferrule configurations is warranted.

Conclusion

Intact teeth were more fracture resistant RCT teeth

RCT teeth without ferrule were the least fracture resistant

There is no significant difference between fracture resistance of teeth with uniform or non uniform ferrule.

Conflict of Interest : Nil

Source of Funding : Self

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DOI Number: 10.5958/0973-9130.2019.00116.6

Assessment of Semen Bio Markers in Vaginal Swabs in Sexual Assaults

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Abstract

Introduction: Semen is considered a diagnostic fluid in forensic science which helps in diagnosis of sexual assault. The present study was conducted to determine semen biomarkers in vaginal fluid in suspected rate victims.

Materials & Method: The present study found 20 rape victim out of 94 women. In all, vaginal swabs were obtained. In this, Semen cytology (SC), prostate-specific antigen (PSA) and Y chromosome DNA was detected with polymerase chain reaction.

Results: Maximum victims were seen in age group 10-20 years (32) followed by 20-30 years (29), 30-40 years (28), 40-50 years (4) and >50 years (1). It was found that 20 cases were found to be positive of rape. Sensitivity of SC was found as 70%, PAS as 80% and PCR as 100%. Specificity of SC was 88%, PSA 92% and PCR as 96%. Table III shows various primers used in the study.

Conclusion: Semen biomarkers such as SC, PSA and Yc-DNA are widely used and accepted methods for detection of offense. They have high specificity and sensitivity rate.

Keywords: *Rape, Semen biomarkers, Semen cytology*

Introduction

There has been significant increase in rape incidents in world. The rate of rapes is showing that nowadays teenagers are more frequently involved in this act. This has opened the eyes of government as well as society. Forensic play an important role in identification of rapist and the victims. Semen is considered a diagnostic fluid in forensic science which helps in diagnosis of sexual assault.[1]

Medical examination of rape victims is of paramount importance. Semen identification near vagina is a positive indication of assault. Perpetrator's semen provides legal evidence for the criminal process. Careful gynaecological examination of rape victim and vaginal swabs to detect semen fluid is biological evidence that helps in solving the mystery.[2]

There are numerous biochemical techniques used in rape victims which comprised of sperm cytology (SC), detection of prostate-specific antigen (PSA) and acid phosphatase activity (APA). Sperm cytology (SC) is a confirmatory test.[3] PSA was introduced in year 1971 and is considered highly specific because even after 48 hours of intercourse there level is sufficient to be detected. Thus PSA detection represents a more specific marker. It is present in other tissues and body fluids in both men and women such as in blood, urine, and even breast milk. All biomarkers showed different stabilities in the vaginal fluid which could result in false negative and false positive findings. Apart from it, other useful biomarker is Y chromosome DNA (Yc-DNA) which is a genomic marker found only in males on sperm cells.[4,5]

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The present study was conducted to determine semen biomarkers in vaginal fluid in sexual assaults.

Materials & Method

The present study was conducted in the department of Forensic medicine & Gynaecology after obtaining approval from institutional ethical committee of Government Medical College, Kannauj, Up, India. It comprised of 94 women suspected of rape. All were informed regarding the study and written consent was obtained. Ethical clearance was obtained from institutional ethical committee.

General information such as name, age, gender etc. was recorded without revealing identity to anyone. PSA scores were assessed using immunochromatographic membrane test assay performed by One Step ABA card Imuno-Rapido PSA commercial kit as per to manufacturer's instructions.

SC test was performed with smear slide technic and Corin & Stockis coloration method. Slides were examined microscopically using 100X lens for the presence of spermatozoa and total number of sperms was scored. Presence of even 1 sperm was considered positive for the test.

Vaginal swabs were prepared with cotton swabs. It comprised of 80-100µL of the first swab wash, after tested by routine PSA and SC. All the samples were stored at -20°C.

Samples were also subjected to Proteinase K and SDS treatment followed by organic phenol/ chloroform extraction and ethanol precipitation. From each sample, DNA was extracted and suspended in 30 µl of LoTE buffer. The Y chromosome regions were amplified by polymerase chain reaction (PCR).

Male DNA and female DNA dilutions of 1:100 were used for the reaction. Contamination controls were represented by ultrapure water pipetted simultaneously with the test samples divided into laminar flow pipetting (pre-PCR control) and bench pipetting (DNA control). Following this, 6µL of PCR product were applied to a 7% polyacrylamide gel running at 240V for 60 - 90 minutes and stained with silver nitrate after amplification.

Statistical analysis

Results were subjected to statistical analysis using SPSS 21.0 version. Data was expressed as sensitivity and specificity. P value less than 0.05 was considered significant.

Results

Maximum victims were seen in age group 10-20 years (32) followed by 20-30 years (29), 30-40 years (28), 40-50 years (4) and >50 years (1) (Table I). It was found that 20 cases were found to be positive of rape. Table II shows sensitivity of SC as 70%, PAS as 80% and PCR as 100%. Specificity of SC was 88%, PSA 92% and PCR as 96%. Table III shows various primers used in the study.

Table I Age wise distribution of victims

Age group (years)	Number	Percentage
10-20	32	34
20-30	29	30.8
30-40	28	29.7
40-50	4	4.2
>50	1	1
Total	94	100

Table II Sensitivity and specificity of different methods

Technique	Positive samples	Sensitivity	Specificity
Sperm cytology (SC)	14	70	88
Prostate-specific antigen (PSA)	16	80	92
PCR	20	100	96

Table III Primers used to amplify fragments

Primer	Region	BP	Sequence
AMEL- Y	AMELOGENIN	100	F- 5' – CCCTGGGCTCTGTAAAGAATAGTG - 3' R- 5' – ATCAGAGCTTAAACTGGGAAGCTG -3'
DXYS96	Y STS	312	F – 5' - CACATTACTGGTGGGAGGAG - 3' R – 5' - CATCATCGCCCTACACTACC - 3'
DYS270	Y STS	216	F – 5' - TTCCATTTGATGTATTCCCG - 3' R – 5' - GATTGGACTGGAATGGAATG - 3'
SRY D&E	SRY	195	F – 5' - GGTAAGTGGCCTAGCTGGTG - 3' R – 5' - GCACAGAGAGAAATACCCGAA - 3'
SRY F&G	SRY	212	F – 5' - GTAACAAAGAATCTGGTAGA - 3' R – 5' – TTTCAGTGCAAAGGAAGGAA - 3'

Discussion

Semen biomarkers have been used for identification of victims since many years. Semen exposure could be diagnostic tool for sexual and reproductive acts. Various bio- markers such as PSA, Yc-DNA, semenogelin (Sg), sperm analysis, acid phosphatase, and testis-specific protein are widely used in rape victims. All have different sensitivities and specificities.[6]

PSA was used in the present study which indicated recent semen exposure in the past 24 hours, and then clearing by 48 hours. It is considered the "gold standard" biomarker. There are several assays to detect PSA such as the Abbott Architect's Total PSA quantitative assay and the Abacus ABA card assay.[7] The total PSA assay is a chemiluminescent immunoassay that yields quantitative results, with a readable range of 0 to 100 ng/mL. This assay was developed for prostate cancer detection in serum and the Architect platform is commercially available from Abbott. The Abacus One Step ABA card is a rapid qualitative or semi-quantitative assay with a lower limit of detection of 4 ng/mL. This assay was developed for semen exposure detection for use in forensic settings.[8]

Other useful method is PCR which detects Yc-DNA. Real-time polymerase chain reaction is used for detection of Y chromosome DNA. It can reliably detect semen starting at about 12 hours post exposure and then clearing by 1 to 2 weeks post exposure. While the assay offers a qualitative indication of the presence of Y chromosome DNA, it also yields quantitative results that have been shown to decrease with time since exposure. This assay is sensitive to five copies of Y chromosome for up to 14 days post exposure.[9]

In present study, we found that maximum suspected victims were seen in age group 10-20 years (32) followed by 20-30 years (29), 30-40 years (28), 40-50 years (4) and >50 years (1). Out of 94 suspected victims, 20 found to be rape positive.

Thurmen et al[10] in their study of assessment of the vaginal residence time of biomarkers of semen exposure, randomized healthy women to unprotected intercourse (n=17) versus vaginal inoculation with the male partner's semen in the clinic (n=16). Women were then further randomized to have vaginal swabs obtained at either 7 or 4 time points after semen exposure, up to 15 days post exposure, either obtained at home by the participant or in the clinic by the research nurse. Authors found that PSA and SRY were markers of recent semen exposure. TSPY4 was detectable in approximately 50% of participants at 15 days post exposure. Unprotected intercourse resulted in significantly higher concentrations of select biomarkers. Sampling frequency and home versus clinic sampling had no significant effect on biomarker concentrations.

Table II shows sensitivity of SC as 70%, PAS as 80% and PCR as 100%. Specificity of SC was 88%, PSA 92% and PCR as 96%. Table III shows various primers used in the study.

PCR strongly supports the use of DNA based tests in forensic rape case work, highlighting the importance of affordable and simple genetic testing in Police routine cases of sexual violence.[11] Sartori[12] in his study used

primers SRY D & E and AMEL Y for detecting portions of the Y chromosome in low representation mixtures was using which we recommend as additional tests In present study primer such as AMEL- Y, DXYS96, DYS270, SRY D&E and SRY F&G was used. Stange et al[13] in their study assessed male evidence detection rates using DNA Markers in suspected rape cases. They included 132 sexual abuse samples. Using five specific molecular markers for the Y chromosome, it was possible to identify 19 positive samples, which were negative for SC and PSA. Primers AMEL Y, SRY D&E and DYS270 showed high score rates, sensitivity, specificity and accuracy, suggesting that this new method presents good reliability and gives new perspectives for the sample screening process, providing more information about forensic samples involving sexual crimes.

Conclusion

Semen biomarkers such as SC, PSA and Yc-DNA are widely used and accepted methods for detection of offense. They have high specificity and sensitivity rate.

Conflict of Interest: NIL

Source of Funding: NIL

The present study was conducted in the department of Forensic medicine & Gynaecology after obtaining approval from institutional ethical committee of Government Medical College, Kannauj, Up, India.

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DOI Number: 10.5958/0973-9130.2019.00117.8

An Autopsy Study of Patho-Anatomic Findings and Inter- Related Conditions in Cases of Deaths Due to Compression of Neck

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Abstract

Introduction: Compression of neck due to hanging is common cause of death. The present study was conducted to determine patho-anatomic findings and inter- related conditions in autopsies.

Materials & Method: The present study was conducted on 134 deaths reported due to hanging in last 8 months. The site of ligature mark, causative factors, number of ligature mark, course and position of ligature mark on the neck, material used and the position of knot was recorded.

Results: Out of 134 cases, 70 were in males and 64 in females. Maximum cases were in age group 20-30 years. Most common causes for hanging was drug addiction seen in 35 and psychiatric illness in 30. The number of ligature marks was single in 90 (67.1%) and multiple in 44 (32.9%) cases. The type of material used was chunni in 24, bed sheet in 16, rope in 62, sari in10, pant/pajama in 8 and electric wire in 14 cases.

Conclusion: Compression of neck due to hanging is common cause of deaths. Authors found that most common causes for hanging was drug addiction and psychiatric illness.

Keywords: *Autopsy, Hanging, Neck*

Introduction

Human deaths due to compression of neck are common nowadays. Autopsy studies reveal asphyxia which results in lack of oxygen. Asphyxial deaths are common in forensic science. There is defective aeration of blood due to any cause leading to death.[1,2] The term has been translated from the original Greek word showing pulselessness/ absence of pulsation. Asphyxia results in death or sub-lethal injury due to mechanically induced cerebral hypoxia associated with the signs of impeded venous return.[3] It has been observed that pressure on the neck can affect the brain in either way or both ways at the same time resulting in infarction which can be ischemic or hyperemic.[4]

Hanging deaths are most prevalent deaths seen over the world. In India, there have been considerable numbers of deaths due to hanging. Hanging is a form of ligature strangulation in which the force applied to the neck is derived from the gravitational drag of the weight of the body. Hangings are mostly suicidal as opposed to accidental.[5] Reports of homicidal hangings are also present, but the rate is very less. Hanging may result from failures in life, disappointment, unemployment among youths and stress due to studies, bank loans or failure in love etc.[6,7]

Hanging is considered as a most commonly used method of suicide in World since time immemorial for

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its simplicity and efficacy in committing suicides. The commonly available objects and the presence of relative isolation that go with hanging make it a much adopted method of suicide. A furrow is the ligature mark on skin, usually localized above the larynx.[8] The present study was conducted to determine patho-anatomic findings and inter- related conditions in autopsies.

Materials & method

The present descriptive cross sectional study was conducted in the department of forensic medicine. It comprised of 134 deaths due to hanging in last 8 months. The ethical approval was obtained from institutional ethical committee for the study. All relatives or family members of victims were informed regarding the study and the consent was obtained.

Inclusion criteria comprised of asyphyxial deaths due to hanging or strangulation. Deaths occurring due to drowning or suffocation were excluded. Information pertaining to the victims such as name, age, gender etc. was recorded in case record. A careful clinical examination was performed in all victim bodies. The skull and chest were opened and contents were taken out to drain out the blood from the neck. Y-shaped incision was given in neck for thorough examination of the anterior neck organs. The site of ligature mark, causative factors, number of ligature mark, course and position of ligature mark on the neck, material used and the position of knot was recorded. The neck was dissected layer wise.

Statistical analysis

Results were tabulated and subjected to statistical analysis using social package for social science (SPSS) version 21.0. Data was subjected to Mann Whitney test and chi- square test between two variables. P value less than 0.05 was considered significant.

Results

Table 1, Graph I shows that out of 134 cases, 70 were in males and 64 in females. Age group 20-30 years had 41 cases, 30-40 had 32, 40-50 years had 27, 50-60 years had 22 and >60 years had 12 cases. The difference was significant (P< 0.05).

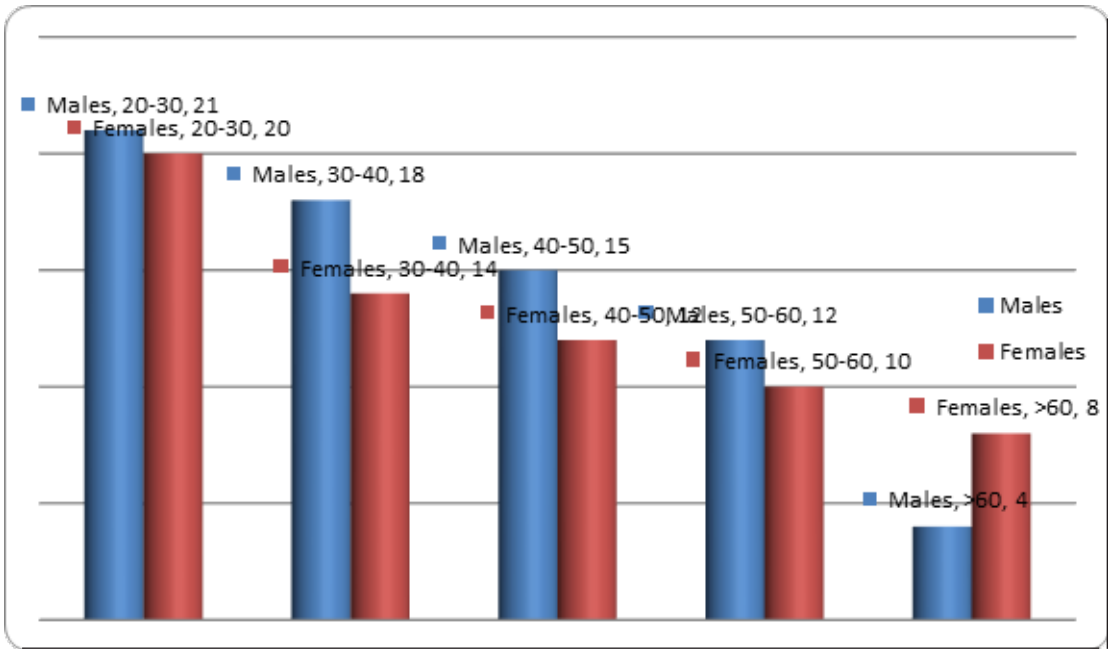
Table 2 shows that common causes for hanging was drug addiction seen in 35, domestic violence in 22, psychiatric illness in 30, poverty in 12, physical illness in 25 and dowry in 10. The difference was significant (P< 0.05).

Table 3 shows that common findings in victims was protrusion of tongue seen in 130, cyanosis of nail beds in 128, congestion of organs in 110, congestion of face in 112, dribbling of saliva in 56, urinary incontinence in 45 and seminal emission in 22. The difference was significant (P< 0.05).

Graph II shows that number of ligature marks was single in 90 (67.1%) and multiple in 44 (32.9%) cases. The difference was significant (P< 0.05). Graph III shows that position of ligature marks was above thyroid cartilage in 72 cases, over in 55 and below cartilage in 9 cases. The difference was significant (P< 0.05). Table 4 shows that type of material used was chunni in 24, bed sheet in 16, rope in 62, sari in10, pant/pajama in 8 and electric wire in 14 cases.

Table 1: Age & Gender wise distribution of cases

Age group (years)	Males	Females	Total	P value
20-30	21	20	41	0.01
30-40	18	14	32	
40-50	15	12	27	
50-60	12	10	22	
>60	4	8	12	
Total	70	64	134	



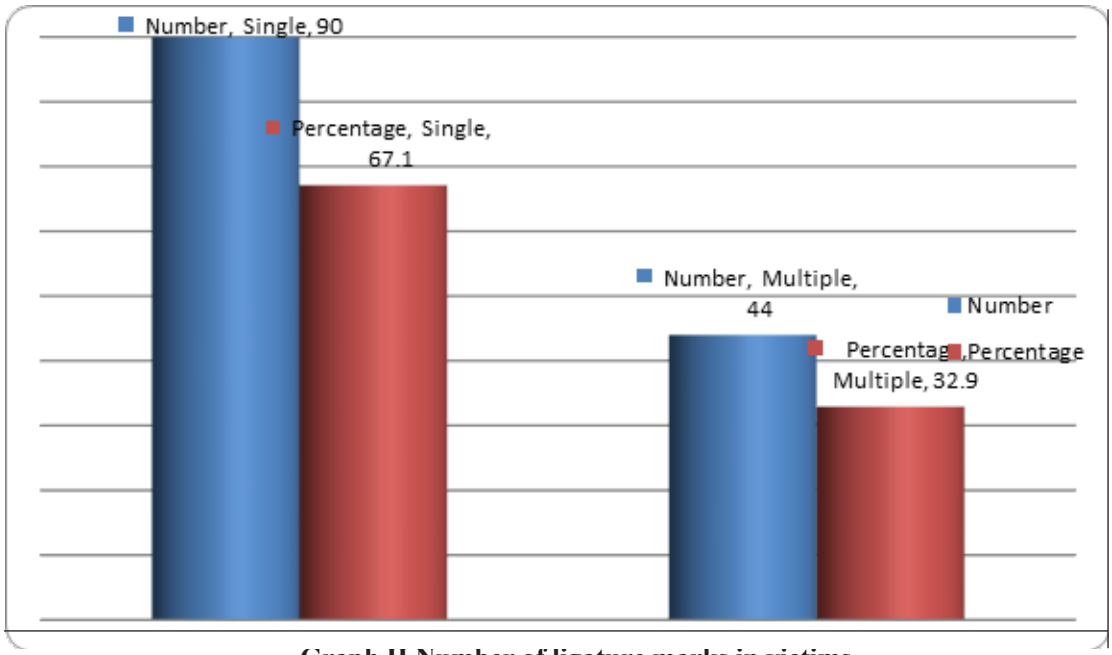
Graph I

Table 2: Causative factor of hanging

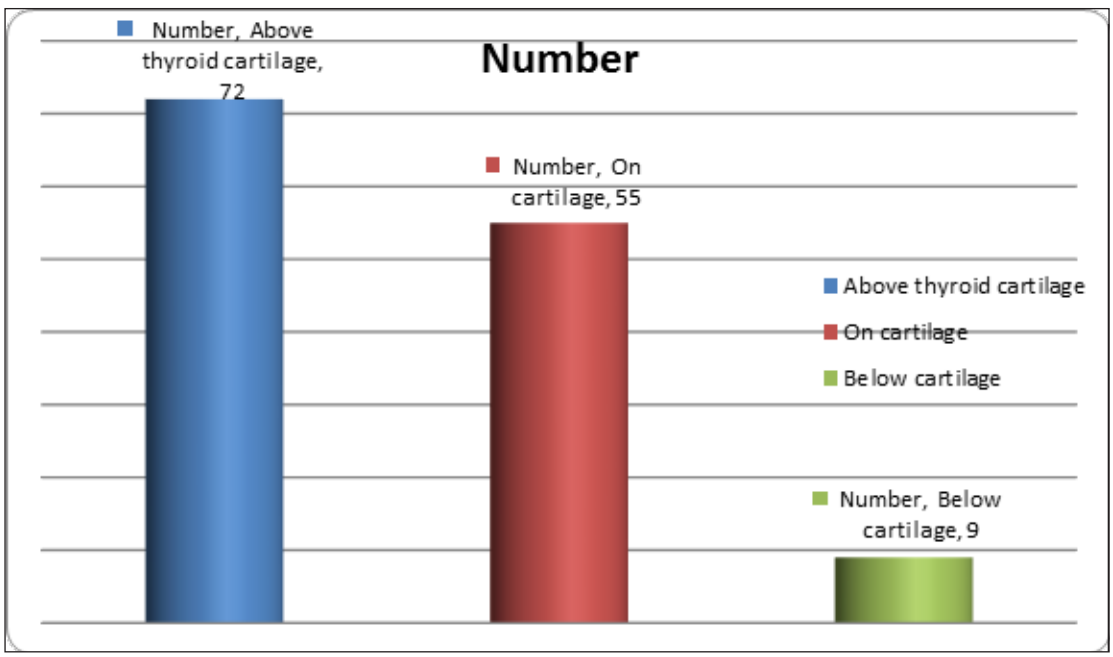
Cause	Number	P value
Drug addiction	35	0.01
Domestic violence	22	
Psychiatric illness	30	
Poverty	12	
Physical illness	25	
Dowry	10	
Total	134	

Table 3: Clinical findings in victims

Clinical features	Number	Percentage	P value
Seminal emission	22	16.4%	0.01
Protrusion of tongue	130	97%	
Urinary incontinence	45	33.5%	
Dribbling of saliva	56	41.7%	
Congestion of organs	110	82%	
Cyanosis of nail beds	128	95.5%	
Congestion of face	112	84%	



Graph II Number of ligature marks in victims



Graph III Position of ligature marks

Table 4: Type of ligature material

Material	Number	P value
Chunni	24	0.021
Bed sheet	16	
Rope	62	
Sari	10	
Pant/Pajama	8	
Electric wire	14	

Discussion

Hanging is considered common type of suicide. The commonly available objects and the presence of relative isolation that go with hanging make it a much adopted method of suicide. The relative dimensions of hanging and factors associated with it assume critical significance in order to differentiate it from other causes, which might have been used to cause death and hanging, is used as a camouflage, and also to help in differentiating it from either homicidal or accidental hanging.[9]

Anoxia refers to absence of oxygen. This term is further divided into three groups such as Anoxic anoxia such as prevention of oxygen from reaching the lungs, anemic anoxia such as inability of blood to carry sufficient oxygen to the tissues due to low hemoglobin content and stagnant anoxia such as lack of oxygenated blood transport to the tissues due to impaired circulation.[10] The present study was conducted to determine patho-anatomic findings and inter- related conditions in autopsies.

In present study, out of 134 cases, 70 were in males and 64 in females. Age group 20-30 years had 41 cases, 30-40 had 32, 40-50 years had 27, 50-60 years had 22 and >60 years had 12 cases. Rawat et al[11] conducted a study which included 101 hanging cases brought for autopsy. The most common victims were the married males in the age group of 21 to 30 years.

In present study common causes for hanging was drug addiction seen in 35, domestic violence in 22, psychiatric illness in 30, poverty in 12, physical illness in 25 and dowry in 10. Chand et al[12] in their study of postmortem findings of neck structures in cases of asphyxial deaths in 73 cases, the common cause of deaths was domestic violence in 65% and psychiatric illness in 35% cases.

Rahman et al[13] in their study of 312 deaths due to hanging, the mean age was 23.5 years and 46.8% of victims were seen in age group 21-30 years. Out of 312 cases, 55% (171) were female and 45% (141) were male. They found that 269 (87%) cases had ligature mark at neck, 132 (43%) cases had fracture of hyoid bone and 45 (15%) victims had the fracture of thyroid cartilages and none of the victims had found spinal cord injury. In 134 (43%) victims, ropes were used as ligature materials. In 70 (23%) cases, the reason of hanging was quarrel between husband and wife.

In present study, it was found that common findings in victims was protrusion of tongue, cyanosis of nail beds, congestion of organs, congestion of face, dribbling of saliva, urinary incontinence and seminal emission. Dribbling of saliva from the angle of the mouth is supposed to be sure sign of ante-mortem hanging, having taken place during life. It could be because of congestion and mechanical stimulation of the salivary glands consequent upon friction by ligature.

Pal et al[14] found that common features in victims were protrusion of tongue followed by dribbling of saliva and congestion of face. There were 68.85% males and 31.15% females. In 43.44%, rope was used as ligature material followed by chunni/dupatta in 40.16%. The nature of ligature material was soft in 52.45% cases while hard material was used in 47.54% cases. In 83.60% cases, there was complete suspension. Authors found that the position of knot was observed on left side of neck in 50% cases followed by right side of neck in 23.77% cases. The ligature mark was oblique shaped in 95.08% cases.

We observed that the number of ligature marks was single in 90 (67.1%) and multiple in 44 (32.9%) cases. It was found that position of ligature marks was above thyroid cartilage in 72 cases, over in 55 and below cartilage in 9 cases. Most commonly type of material used was rope in 62 cases followed by chunni in 24. Other material used was bed sheet, sari, pant/pajama and electric wire.

Ali et al[15] found that in 334 deaths of hanging, soft ligature was used as ligature in 53.46% cases; Rope being the most common one. Most cases showed slip knot with right side of neck being the most common place. In all cases, ligature mark was obliquely placed & in 91% it was lying above thyroid eminence. Hemorrhage in neck muscles under ligature mark was seen in 19% cases & fracture of hyoid bone was found in 3% cases. Rao[16] in their study assessed 264 cases of deaths due to hanging.

The limitation of the study is only hanging deaths were evaluated. The other cause of deaths could have been provided useful information.

Conclusion

Compression of neck due to hanging is common cause of deaths. Authors found that most common causes for hanging was drug addiction and psychiatric

illness. The number of ligature marks was single in 90 (67.1%) and multiple in 44 (32.9%) cases. The type of material used was chunni, bed sheet, rope, sari, pant/ pajama and electric wire.

Conflict of Interest: NIL

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DOI Number: 10.5958/0973-9130.2019.00118.X

A Study of Estimation of Stature from Forearm Length

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Abstract

Stature is a primary characteristic of identification of a person, even though it can be easily measured in living, but in cases of mass disasters, with dismembered bodies, stature estimation can be difficult. The present study was done including 200 medical students as subjects, to know co-relation between stature and forearm length. It was found that there is positive co-relation between forearm length and stature (r=0.83) and it is statistically significant. Regression equation was derived to estimate stature from forearm length which is Y=3.97X+63.67 for overall study population, while for only male subjects it was Y=2.66X+100.87 and for females it was Y=3.28X+78.53. This will be helpful to estimate stature from forearm length.

Keywords: *Stature, forearm length, identification, regression equation.*

Introduction

Identity of person is basic necessity in modern world with every person identified by different biometric criteria's like face, fingerprints, voice etc. but identity in dead must be relied on different identification features, like age, sex, stature, identification marks. Among them stature is primary characteristic of identification which can be determined with help of different anthropometric measurements of body. This in particular is helpful in cases of mutilated bodies in cases of homicide to conceal the criminal act or in accidents or mass disasters where bodies are usually dismembered and identity of that person becomes difficult. In these situations, stature being a basic feature can be estimated by using different regression equation developed by different studies using lengths of dismembered body parts, or by skeletal remains.

Many studies have been conducted to estimate stature from different parameters of body, like forearm length[1,2,3,4], hand length[5,6,7], foot length[8], knee length, etc. Since development of height is a very sensitive trait and it depends on a number of factors such as sex, age, race, body composition, social stratum and demographic location. The proportions of its particular components (extremities, trunk) also reveal great variability. For this reason, the application of the best formula to a particular population (or a group of individuals) is very difficult.[1]

In the present study we tried to estimate stature using forearm length, and make a regression equation particularly for the Kolhapur region.

Objectives:

1. To find co-relation between Forearm Length & stature of Individual (male & female)
2. To obtain regression formula to determine stature from forearm length.

Methodology

The study was carried out in D.Y. Patil Medical College where 200 students of both gender (100 male and 100 female) studying in MBBS were randomly selected with age limit between 18-24 yrs. Students who are healthy, without any pathological or skeletal deformities were included. The permission was taken from the Institutional research committee prior to study. Informed consent was taken from the participants. The measurements were taken at a fixed time to avoid

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diurnal variations in stature, and by same person to avoid interpersonal errors. The following parameters were taken.

Stature:

Height of the individual subject was measured (in centimeters) in standing erect anatomical position with bare foot on the baseboard of standard height measuring stand and Frankfurt's plane parallel to the ground. The measurement of height was taken in centimeters by bringing the projecting horizontal sliding bar to the vertex, and distance between the standing board and the sliding bar was noted. The measurements were repeated thrice and mean value was noted to avoid errors.

Forearm Length:

Forearm length was measured with the arm in flexed position by a standard measuring tape. Forearm length was measured from the tip of olecranon process to the point between radius and ulnar tuberosity.[2] Forearm Length of only left side was taken as per recommendation of the International agreement for paired measurements at Geneva (1912)[9], measurements were repeated thrice and mean value was noted to avoid errors.

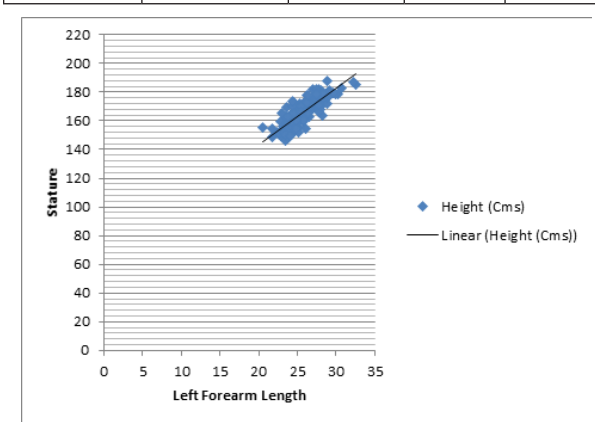
Results

It was found that mean height for overall study population was 165.73 with standard deviation of 9.47 and the mean left forearm length was 25.71 cm with standard deviation 1.99 as shown in table 1. There is positive correlation (r=0.83) between stature and left forearm length (Graph 1) and the regression equation was derived as Y=3.97X + 63.67 where Y is Stature and X is Left Forearm length; 3.97 being multiplication factor and 63.67 is constant. This equation would be helpful in estimating stature from forearm length if gender is not known.

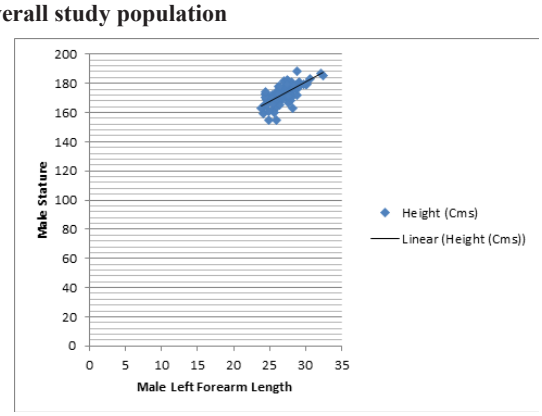
Among the male subjects the mean stature was 172.85 cm with standard deviation of 6.56 and mean left forearm length was 27.06 cm with standard deviation of 1.72, it was found there is positive correlation (r=0.69) between male stature and left forearm length (Graph 2). Regression equation was formulated as Y=2.66X+100.87. In female group, similar results were found with mean stature as 158.61 cm and standard deviation of 5.91, and mean left forearm length was 24.35 cm with standard deviation of 1.16. It was found that there is positive correlation (r=0.64) between the stature of female with their left forearm length (Graph 3). Regression equation for female group was formulated as Y=3.28X+78.54.

Table 1: Gender wise distribution of Stature and Forearm length

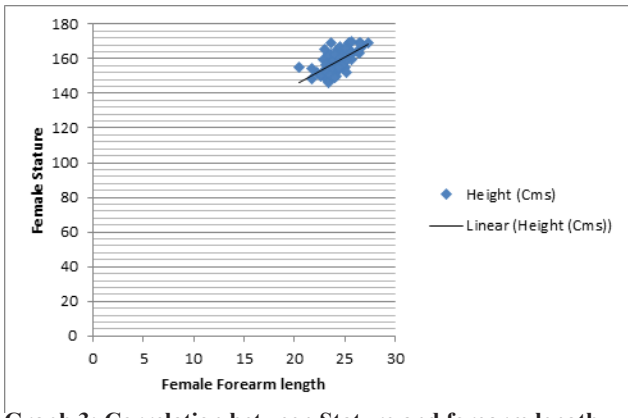
		Male	Female	Total
Stature (in cm)	Minimum	154.7	146.4	146.4
	Maximum	188	170	188
	Mean	172.85	158.61	165.73
	Standard deviation	6.56	5.91	9.47
Left Forearm length(in cm)	Minimum	23.8	20.5	20.5
	Maximum	32.5	27.4	32.5
	Mean	27.06	24.35	25.70
	Standard deviation	1.72	1.16	1.99



Graph 1: Correlation between Stature and forearm length in overall study population



Graph 2: Correlation between stature and forearm length among Males



Graph 3: Correlation between Stature and forearm length among Females

Discussion

Stature estimation is one of the basic identification features. In our study it was found that mean stature of females was comparatively less than males, which finding is similar to other studies conducted to estimate stature.[1-8] Similarly mean forearm length of females was also less than males as observed in other studies too. In Regression analysis there was positive correlation between forearm length and stature in both male (r=0.69) and female (r=0.64) which is coincident to the results of studies by Vaghefi SHE et al[2] and Choudhary et al.[5] When total study population is considered, correlation is positively significant, with r=0.83, which signifies it is more reliable in estimating stature than only male or female.

The regression equation for males was Y=2.66X+100.87, for females it was Y=3.28X+78.54, when both males and female data was combined regression equation was Y=3.97X+63.67, were Y is stature and X is the forearm length. Multiplication factor for male, female and total subjects were 2.66, 3.28 and 3.97 respectively, which differs from other studies[1-8] owing to the concept that stature differs from race, age, sex and region.

Conclusion

The study was conducted on 200 medical students, whose height and left forearm length was measured and analyzed statistically. There was positive co-relation between forearm length and stature (r=0.83). Regression equation thus obtained was Y=3.97X+63.67. Thus, this data is useful to determine stature from forearm length in this locality for identification of human individuals.

Conflict of Interest: None declared.

Source of Funding: Self-funded.

Ethical Clearance: Obtained from Institutional ethics committee.

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DOI Number: 10.5958/0973-9130.2019.00119.1

Comparative Study of Age Estimation by Cemental Annulations by Polarizing and Light Microscopic Methods Using Digital Method Adobe Photoshop 7 Version

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Abstract

Background: Cementum formed as continuous process throughout life consists of alternate light and dark bands known as incremental lines of Salter. Using different types of microscopy in forensic odontology, the number of these incremental lines is used to estimate the age of an individual. **Aim and Objectives:** To examine the correlation between age and tooth cemental annulations using light and polarizing microscopy with Adobe Photoshop Software 7 Version and to compare both the methods to ascertain the most reliable method of studying cementum. **Materials and Method:** A cross sectional descriptive, double blind study was conducted during the period of March 2016 to March 2017. 60 extracted monoradicular teeth from individuals in the age group of 20- 80 years (Females=42, Males =18) were randomly collected and longitudinal ground sections of the teeth were prepared, mounted and examined under light and polarizing microscope. Digital images were captured, magnified & cemental lines were counted using the Adobe Photoshop 7 Version by two anonymous oral pathologists who had no idea of the research study. Statistical analysis was done using SPSS 10 version. **Results:** There was a strong positive correlation between the estimated age and calculated age when light microscopy was used (r=0.725, p =0.00). The correlation was less with polarizing microscopy (r=0.697,p=0.00) and the cemental annulations were better appreciated and easily counted using the Adobe Photoshop Software 7 Version. **Conclusion:** Our findings suggest that Adobe Photoshop Software 7 Version provides better visibility of counting the cemental lines and therefore can estimate accurate age of an individual in forensic Odontology.

Keywords: *Tooth cemental annulations, Age estimation, Adobe photoshop 7 version, Polarizing microscopy, Light microscopy*

Introduction

Age estimation through dental parameters enacts an important step in human identification that is required for ethical, humanitarian and official records, in particular, the legal and criminal investigations [1,2] as well as support research in Archeology and Paleodemography. [1]These dental parameters include the hard tissues such as the enamel, dentin and cementum which are able to resist decay and degradation long after other tissues are lost. Thus, human dentition bestows the property of resistance, thereby making teeth as useful indicators for estimating age at the time of death.[2, 3] Various methods of age estimation are in practice, amongst which, the Gustafson's morphohistologic approach that includes six parameters, i.e. attrition, gingival recession, thickness of

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secondary dentin, cementum apposition, root resorption and root dentin translucency are most commonly used [4,5] Amongst these 6 parameters, various scientists, over the past few years, have used tooth cemental annulations as a reliable criteria to estimate age. [6]

Cementum is the calcified tissue that surrounds the dentine and is formed as a result of a continuous process throughout life. The cementum consists primarily of uncalcified dense bundles of collagen fibrils that later become mineralized by hydroxyapatite crystals, whose varying orientations may be responsible for the optical effect of alternating light and dark bands together forming one incremental band that represents one calendar year of the individual.[2,7] This technique of estimating age using the cemental lines is know as Cementochronology in anthropology and paleopathology.[8] The biological explanation for the alternating layers as proposed by Lieberman and Schroeder HE [9] stated that the dark lines are the stop phases of mineralization during the continuing growth of fibroblasts, leading to change in mineral crystal orientation. This pattern is visible under the microscope as incremental lines of Salter and constitutes a biological record that can be used to estimate the age of an individual. [2,10,11] These lines of Salter are studied using different microscopy such as polarizing microscopy, light microscopy and phase contrast microscopy. However, no studies in the past were conducted using the Adobe Photoshop software 7 version. Hence, the present study was conducted keeping this point in mind, to estimate age using tooth cemental annulations by two microscopic methods, light and polarizing microscopy with Adobe Photoshop software 7 version and to compare both the methods so as to ascertain the most reliable method of studying cementum.

Materials and Method

After obtaining the institutional ethical committee clearance from Krishna Institute of Medical Sciences, a cross sectional descriptive study was carried out in the Department of Oral Pathology & Microbiology during the period of March 2016 to March 2017. 60 monoradicular tooth specimens extracted for orthodontic purpose or full mouth extraction cases for prosthetic purpose, randomly collected from individuals of age group 20 -80 years (Females=42, Males =18) were included in the study. Teeth with carious lesions were excluded from the study samples. The tooth samples collected were stored in 10% formalin in camera roll bottles. The demographic details of the patient were recorded by the teaching staff and all the corresponding teeth were given code numbers, which were displayed on the bottles. This was carried out for the purpose of convenience so that during the time of sectioning the samples, the actual age of the subject remained unknown. Monoradicular teeth were included in the study design as the acellular cementum is regular and uniform in thickness. Longitudinal ground sections of about 0.25 mm thickness in the buccolingual plane were prepared and examined under light and polarizing microscope. In each section, the area at the junction of apical and middle third of root and the area where lines were easiest to count was selected for counting. Sections that showed readable cemental layers were captured with the digital camera in both light and polarizing microscope, images were transmitted from the microscope to a computer monitor, and counting was done with the help of Adobe photoshop 7 version software.

Adobe photoshop 7 version Software: On the right side of the Adobe Photoshop, there are different tools seen such as Select tool, Magnifier tool and Eyedropper tool. From all these, the Eyedropper tool is selected and right click on this tool gives the following options like Color sampler tool and Measure tool. Select the Measure tool and using this tool, a horizontal line is drawn by holding down the Shift key between the guides. If the Options Bar is not displayed, it can be activated by choosing Window Options. In this way, one guideline was placed on the entire width of the TCA running from dentinocemental junction to outer cemental surface using light microscopy in an area where the cemental lines rum approximately parallel to each other and the width designated as W on top of the software encircled in the figure 1a is noted as X. In the same way, the individual width wherein two adjacent dark lines were counted as one increment band using the light microscopy was noted as individual width and designated as Y as shown in figure 1b. The same images were then focused using polarizing microscopy and software was activated and lines drawn and noted as X & Y as shown in figure 2a and 2b. The Number of incremental lines n was calculated as dividing the total width by the individual width as follows: n = X/Y. By adding average age of eruption in years for each tooth, as was presented in Gray's anatomy, from the counted number of incremental lines, the chronological

age of the individual was obtained as E = n + t, where Estimated age (E) = number of incremental lines (n) + and eruption age of tooth= (t). The criteria and method of using the software was explained to two anonymous oral pathologist and they were asked to compare their readings with our readings. Hence, double blinding was done and the readings obtained were subjected to statistical analysis using the SPSS 10 version .

Results: Females (72.5%) outnumbered the males (27.5%) in the study. The actual age and estimated age of the individual based on both the light and polarizing microscopy using Adobe Photoshop 7 Version is shown in table 1. The Karl-Pearson correlation coefficient showed a fairly strong positive correlation between the estimated age and calculated age when light microscopy was used, while the correlation was less when polarizing microscopy is used (see table 2). The graphical representation of correlation between different forms of microscopy and actual age is shown in figure 3.

The inferences obtained were: the study specimens showed a high correlation between the TCA and actual age of the individual when light microscopy was used and the lower limit of the age range was taken for calculation and the variation range in age calculation corresponded to the age range of eruption of the tooth concerned.

Table 1:- Number of incremental lines (n) = X / Y.

E = n + t, where Estimated age (E) = number of incremental lines (n) + and eruption age of tooth= (t)

Tooth no	TCA As Seen In Adobe Photoshop CS5 Version E = n + t		Actual age	Estimated age
	Light microscopy	Polarizing microscopy		
11	2.22/0.6=3.7+7 = 10.7	2.0/0.5=4+7= 11	8	7
15	2.56/0.7=3.6+10= 13.6	2.45/0.5=4.9+10= 14.9	11	13
32	2.21/0.9= 2.4+7= 9.4	2.12/0.9= 2.3+7= 9.3	8	9
12	3.2/1.2=2.6+7= 9.7	3.1/1.1=2.8+7= 9.8	8	7
34	3.22/0.7=4.6+10= 14.6	4.22/0.8=5.2+10= 15.2	12	10
25	2.33/2.1= 1.1+10=11.1	2.6/2.0= 1.3+10=11.3	11	12
33	2.20/0.7= 3.1+7= 10.1	2.1/0.5= 4.2+7= 11.2	10	11
21	3.21/1.02=3.1+7= 10.1	3.11/1.2=5.7+7= 12.7	8	7

Table 2: Karl Pearson's correlation coefficient between different forms of microscopy and actual age

Correlation between different forms of microscopy	Pearson's correlation coefficient	P value
Light versus polarizing	0.952	0.000
Polarizing versus Actual age	0.697	0.000
Light versus Actual age	0.725	0.000

Correlation is significant at the 0.01 level (2-tailed).

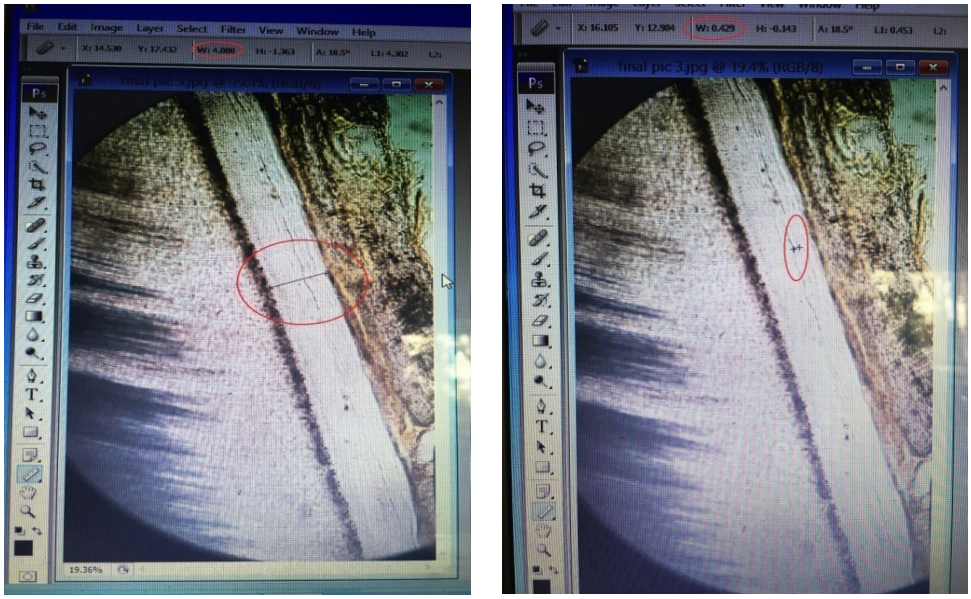

Figure 1a and 1b :- illustrates the entire width and the individual width of the TCA running from dentinocemental junction to outer cemental surface using light microscopy as seen in Adobe Photoshop Software

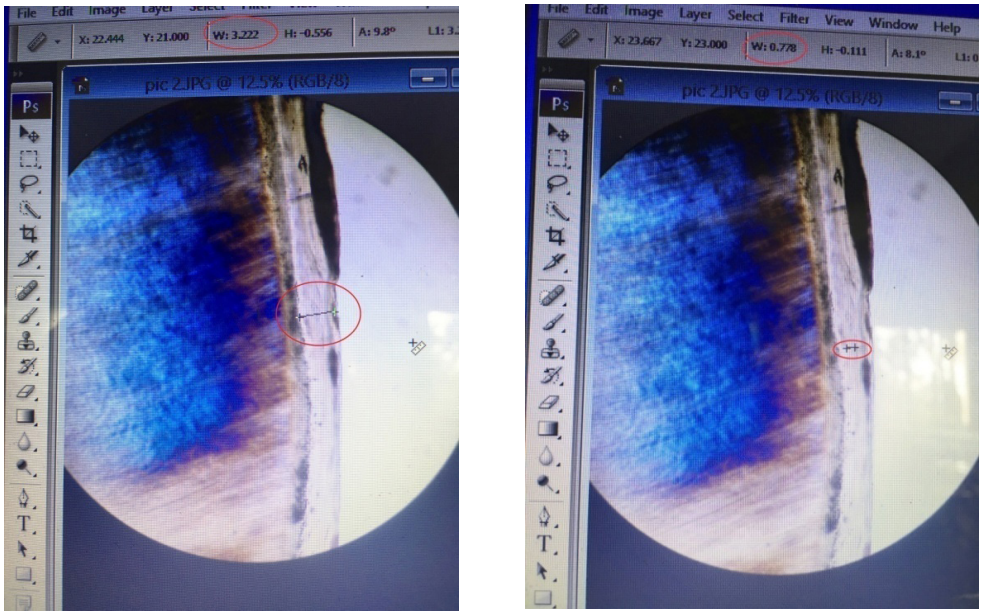

Figure 2a and 2b – illustrates the entire width and individual width of the TCA running from dentinocemental junction to outer cemental surface using polarizing microscopy as seen in Adobe Photoshop Software

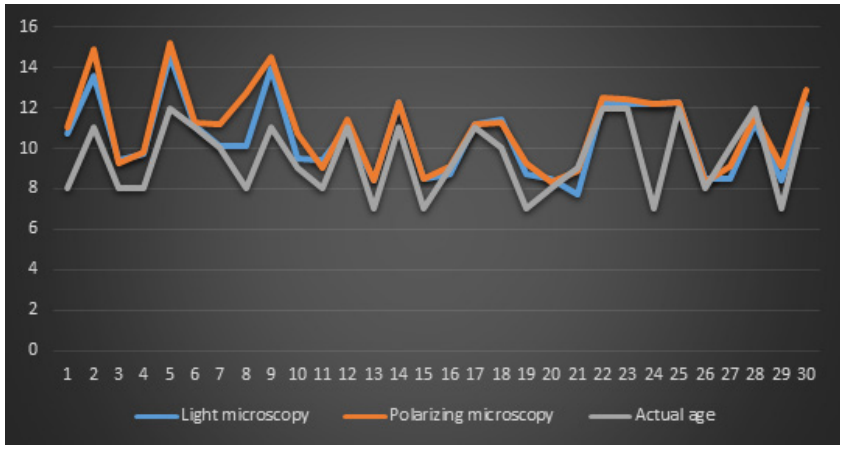

Figure 3: Correlation between different forms of microscopy and actual age

Discussion

Cementum is the calcified tissue that surrounds the root portion of dentin. It acts as an attachment apparatus for the periodontal fibres that link the tooth to the alveolar bone. In cementum formation, hypermineralized layers of extracellular matrix alternate with less-mineralized layers forming the light and dark bands [7] The dark lines have been referred to as incremental lines and the cementum between each two lines has been referred to as incremental bands. It was shown that each pair of lines corresponded to one calendar year of life and that it constituted a biological record that could be used to estimate the age of an individual. [4]

Accurate age estimations are critical to the proper estimation of individual age at death and are necessary for circumventing certain aspects of Forensic Odontology. Previous studies have evaluated the feasibility of using tooth cemental annulations for accurate age determination because of its position and unique location in the alveolar sockets. Studies by Zander and Hurzeler [11] stated that cementum is potentially a better age-estimating tissue because it is protected from the ravagement of dentin and enamel. Also cementum constitutes two unique zones called the acellular cementum that grows close to the cervical part of the root and the cellular cementum that mainly covers the apical part of the root. This growth is approximately linear and progressive throughout life. Linhart, Fog, Mosby and DeRicqules [12,13,14] suggested that this linear growth might be the result of regular apposition of cementum in bands similar to those bands exhibited by lower animal species. As published in all the previous studies, the Number of tooth cementum lines was used as the parameter to calculate the age of the individual. Moreover these studies were conducted using image analysis software or by manual counting. In our present study, the Width of the total cementum layer, rather than the number of incremental lines was selected as a parameter. This was then subjected to Adobe photoshop 7 version software as the accuracy of counting these lines was more clear. This study is one of its kind where the software was used. We also have found that cemental annulations were more clearly visible and easily countable under light microscope than polarizing microscope. Studies were done by various eminent scientists wherein different sections and different areas on the root surface were evaluated for the accuracy of counting the number of these lines. Charles *et al*. [15] systematically evaluated the distribution of lines in cementum of the middle third of root in different sections. Kagerer and Gruppe [16] applied a method called 'sequential analysis,' where they tried to find the 'most stable figure' or the 'most reliable number of layers.' They also counted lines in cementum of 70 µm thick unstained mineralized sections using phase-contrast microscopy. In our study, again the width and not the number, was measured in the middle third of the root for the following reasons: The thickness, width, and cellularity of the layers of cementum increases apically, thereby complicating the counting of annulations; the number of resorption areas also increases apically;the thinness of the cementum near the neck of the tooth inhibits scoring; and to minimize the influence of factors known to obscure annulations or produce variation in cementum, such as periodontal disease and hypercementosis due to local or systemic disease.

Studies by Pundhir S in 2009 was conducted and examined TCA using three different microscopic method (light, polarizing, phase contrast) and his results showed that phase contrast improves the accuracy of counting these lines. In the same academic year, I Kaur et al examined the correlation between age and the number of incremental lines in human dental cementum and using different microscopy and inferred that TCA were better appreciated in polarizing microscopy than brightfield microscopy. [9,17] In our present study we used two different microscopy i.e light and polarizing and our results showed that light microscopy using the Adobe photoshop software could easily appreciate the cemental lines.

Conclusion

Tooth cemental annulations counted from Adobe Photoshop software 7 version provides close estimate of actual age of individual in forensic studies. The choice of the method should be driven by the feasibility and ease to conduct the study with the software which is less expensive and techno savvy yielding quick results when compared to other softwares.

Source of Funding: Krishna institute of medical sciences

Conflict of Interest: Nil

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DOI Number: 10.5958/0973-9130.2019.00120.8

Pulp/Tooth Area Method: A Potential Statistical Tool for Age Estimation Using Digital Dental Radiographs

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Abstract

Background: Dental age estimation methods are one of the most advocated and widely accepted approaches in forensic anthropology. **Aim:** This is an analytical study to assess pulp/tooth area ratio of 2 maxillary and 2 mandibular monoradicular teeth and to correlate pulp/tooth area ratio with chronological age. **Methodology:** The study was performed on a sample of 480 Radiovisiographs (RVGs) of subjects having the age range from 15-54 years. Two radiographic measurements were done on each radiograph with the help of imaging software Adobe Photoshop, CS6. One is pulp area (PA) and another one is tooth area (TA). The ratio of pulp/tooth area (PA/TA) was calculated and tabulated in Microsoft excel sheet. Data was analyzed using statistical software. **Findings:** One way ANOVA was done to compare mean PA/TA ratio amongst all the selected teeth. The inter-group comparison of mean PA/TA ratio was done using the Post-hoc bonferroni test. Significant negative correlation of age with PA/TA ratio was reported for the over-all sample. The mean PA/TA was significantly more among maxillary 2nd premolar in comparison to maxillary canine. **Conclusion:** Present study is an attempt to correlate the chronological age with pulp/tooth area ratio using monoradicular teeth only. The study can be further carried out using monoradicular as well as multiradicular teeth on a larger sample size.

Keywords: *Forensic odontology, age estimation, statistical, digital dental radiographs, Radiovisiographs, Pulp/tooth area etc*

Background

Age estimation is one of the vital components of forensic odontology and is fundamental in setting up the personality of the individual. The precise age estimation with the assistance of dental remains is a very important parameter for identification. It is watched that teeth advancement isn't influenced by ailment, medications and endocrine status of the person like skeletal bones. That's why dental age estimation is considered to be more precise than skeletal age[1].

Teeth are composed of enamel, dentine, and cementum. These hard structures of teeth provide protection to the teeth from mechanical, physical impacts and safeguard the teeth for quite a while. This highlights the usage of teeth for the purpose of age estimation[2]. During the life cycle of teeth, it undergoes many formative and degenerative changes. Both the formative and degenerative changes in the tooth can be identified with sequential age[3]. Formative changes are teeth development, the degree of crown and root formation, root completion stages etc while degenerative changes are attrition, periodontal status, decomposition of secondary dentine root translucency, root resorption, change in cementum, color changes etc[4]. These changes can be assessed by any method such as morphological method, radiological method, biochemical method and histological method[5].

Teeth extraction is necessary for the execution of morphological, histological and biochemical

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methods. This makes these methods unethical for application, especially in living beings. Therefore, Radiological methods have become the need of the hour for age estimation[6]. Radiographic techniques offer a straightforward, ethically acceptable, cost-effective, brisk and non-obtrusive strategy for age estimation. These methods produce age estimation results with the high level of unwavering quality and relative effortlessness. Developmental changes, as well as regressive changes, can be related to chronological age[7]. Many degenerative changes in the tooth can be radiographically assessed. Pulpal changes are one of them. Dental pulp undergoes relapse in size with increasing age owing to secondary dentine deposition, the process that happens all through life and might be used as a parameter of age estimation[8]. Various types of radiographs can be used for age estimation in forensic dentistry.

The present study was conducted in Department of Genetics (Forensic Science), Maharshi Dayanand University, Rohtak with the aim to assess the dental age using RVGs and to compare the chronological age of the individual with dental age using Pulp area /Tooth area (PA/TA) ratio method.

Methodology

Sample Collection

The present study was performed to examine Pulp/ Tooth area ratio in a sample of digital radiographs dental radiographs. Type of digital dental radiographs collected for the present study were radiovisiographs (RVGs). The sample collection belongs to the Department of Oral Radiology, Medicine, and Diagnosis, Post graduate Institute of dental sciences (PGIDS), Rohtak and PDM Dental College and Research Institute, Bahadurgarh. The sample consists of 60 males 60 females of known age. Age of study subjects ranges from 15-54 years. Radiovisiographs of the study subjects fulfilling the inclusion and exclusion criteria were collected only after the written consent has been signed by them. The protocol of study was approved by the Institutional Human Ethical Committee (IHEC),MDU Rohtak.

Radiographic Measurements

Radiographic images were transported to imaging software Adobe Photoshop version CS6. Two radiographic measurements were done on each radiograph using magnetic lasso tool. One is the measurement of tooth area and another one is pulp area measurement. Both the measurements were done in millimeters. PA/TA ratio for each tooth was calculated after that. Data was tabulated and analysis was done using SPSS Version 21.

Statistical Analysis

The analysis was made for each gender and each tooth. To check intra- observer variability 20 radiographs were re-examined after an interval of 2- weeks. One way ANOVA was used to check the difference between the chronological age of males and females and to compare absolute accuracy between the genders. For inter teeth comparison Post-hoc bonferroni test was performed.

Findings

Strong negative correlation was found between chronological age Vs PA/TA ratios (figure 1). The comparison of mean PA/TA ratio was done between Mandibular canine, Mandibular first premolar, Maxillary canine and Maxillary 2nd premolar using the One-way ANOVA test.

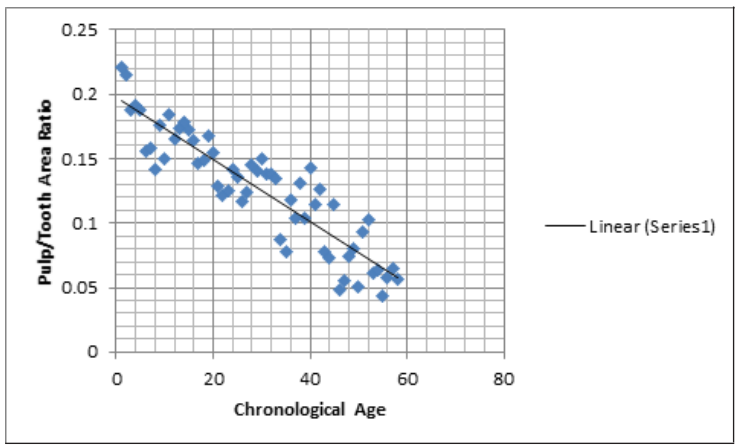

Figure 1: Showing scatter diagram of chronological age Vs Pulp/tooth area ratio

There was a significant difference in mean PA/TA ratio between Mandibular canine, Mandibular first premolar, Maxillary canine and Maxillary 2nd premolar. (Table 1)

Table 1: Showing One-way ANOVA test on the whole study sample

	PA/TA			
Teeth	**Mean**	**Std. Deviation**	**F-value**	**p-value**
Mandibular canine	0.124	0.045	4.202	0.006
Mandibular first premolar	0.133	0.042		
Maxillary canine	0.120	0.028		
Maxillary 2nd premolar	0.136	0.043		

*** Significant difference**

The inter-group comparison of mean PA/TA ratio was done using the Post-hoc bonferroni test. The mean PA/TA was significantly more among Maxillary 2nd premolar in comparison to Maxillary canine. (Table 2)

Table: 2 Showing Post-hoc bonferroni test for inter teeth comparison

		Mean Difference	**p-value**
Mandibular canine	Mandibular first premolar	-0.009	0.529
Mandibular canine	Maxillary canine	0.004	1.000
Mandibular canine	Maxillary 2nd premolar	-0.012	0.124
Mandibular first premolar	Mandibular canine	0.009	0.529
Mandibular first premolar	Maxillary canine	0.013	0.073
Mandibular first premolar	Maxillary 2nd premolar	-0.003	1.000
Maxillary canine	Mandibular canine	-0.004	1.000
Maxillary canine	Mandibular first premolar	-0.013	0.073
Maxillary canine	Maxillary 2nd premolar	-0.016	0.012*

*** Significant difference**

The comparison of mean PA/TA ratio was done between Mandibular canine, Mandibular first premolar, Maxillary canine and Maxillary 2nd premolar using the One-way ANOVA test amongst the male study subjects. There was a significant difference in mean PA/TA ratio between Mandibular canine, Mandibular first premolar, Maxillary canine and Maxillary 2nd premolar (Table 3).

Table 3: Showing One-way ANOVA test for male study subjects

	PA/TA			
Male	**Mean**	**Std. Deviation**	**F-value**	**p-value**
Mandibular canine	0.128	0.046	2.855	0.038*
Mandibular first premolar	0.134	0.046		
Maxillary canine	0.118	0.026		
Maxillary 2nd premolar	0.139	0.046		

* Significant difference

The inter-group comparison of mean PA/TA ratio was done using the Post-hoc bonferroni test. The mean PA/TA was significantly more among Maxillary 2nd premolar in comparison to Maxillary canine (Table 4).

Table 4: Showing Post-hoc bonferroni test for inter teeth comparison amongst the male study subjects

		Mean Difference	p-value
Mandibular canine	Mandibular first premolar	-0.007	1.000
Mandibular canine	Maxillary canine	0.009	1.000
Mandibular canine	Maxillary 2nd premolar	-0.011	0.861
Mandibular first premolar	Mandibular canine	0.007	1.000
Mandibular first premolar	Maxillary canine	0.016	0.165
Mandibular first premolar	Maxillary 2nd premolar	-0.004	1.000
Maxillary canine	Mandibular canine	-0.009	1.000
Maxillary canine	Mandibular first premolar	-0.016	0.165
Maxillary canine	Maxillary 2nd premolar	-0.021	0.042*

*** Significant difference**

The comparison of mean PA/TA ratio was done between Mandibular canine, Mandibular first premolar, maxillary canine and Maxillary 2nd premolar amongst the females using the One-way ANOVA test. There was no significant difference in mean PA/TA ratio between Mandibular canine, Mandibular first premolar, Maxillary canine and Maxillary 2nd premolar (Table 5).

Table 5: Showing One-way ANOVA test for female study subjects

	PA/TA			
Female	**Mean**	**Std. Deviation**	**F-value**	**p-value**
Mandibular canine	0.120	0.044	1.637	0.181
Mandibular first premolar	0.130	0.037		
Maxillary canine	0.122	0.029		
Maxillary 2nd premolar	0.133	0.040		

Non-significant difference

The inter-group comparison of mean PA/TA ratio was done using the Post-hoc bonferroni test. No significant difference could be found for the inter-group comparison of mean PA/TA ratio (Table 6).

Table 6: Showing Post-hoc bonferroni test for inter teeth comparison amongst the female study subjects

		Mean Difference	**p-value**
Mandibular canine	Mandibular first premolar	-0.010	0.842
Mandibular canine	Maxillary canine	-0.001	1.000
Mandibular canine	Maxillary 2nd premolar	-0.013	0.430
Mandibular first premolar	Mandibular canine	0.010	0.842
Mandibular first premolar	Maxillary canine	0.009	1.000

Cont... **Table 6: Showing Post-hoc bonferroni test for inter teeth comparison amongst the female study subjects**

Mandibular first premolar	Maxillary 2nd premolar	-0.002	1.000
Maxillary canine	Mandibular canine	0.001	1.000
Maxillary canine	Mandibular first premolar	-0.009	1.000
Maxillary canine	Maxillary 2nd premolar	-0.011	0.651

#Non-significant difference

The correlation of age was done with PA/TA ratio for the Over-all sample, Mandibular canine, Mandibular first premolar, Maxillary canine and Maxillary 2nd premolar using the Pearson Correlation test. There was a significantly negative correlation of age with PA/TA ratio for the Over-all sample, Mandibular canine, Mandibular first premolar, Maxillary canine and Maxillary 2nd premolar.

Discussion

Forensic Dentistry is a multifaceted sub-branch and includes the use of dentistry and law. Identification of an individual becomes significant in cases involving deaths in which body is too disfigured to recognize, such as in cases of high-velocity crashes, fires, explosions, blasts or decomposed/ skeletonized remains or cases involving living individuals, amnesia casualties, out cold casualties, casualties of deforming injury, destitute people, undocumented outsiders and so on[9,10]. C.E. Kells of New Orleans is credited for the primary down to earth and routine utilization of dental radiography in dentistry. In 1943, dental radiography was utilized for human distinguishing proof out of the blue[11,12].

Throughout the decades, different destructive and non-damaging strategies for age estimation including teeth have developed regularly being plainly visible, subjective and requesting ability. The damaging strategies included extraction of teeth and still were unequipped for assessing period of people more than 50 years old[13]. At that point, another approach accompanied the presentation of radiographic strategies and age could be assessed by estimating the deposition of secondary dentine which brought about decrease of pulp zone with time and age. It has corresponded with age and the outcomes acquired were not exact but rather very palatable. It had points of interest over different techniques as it was non-obtrusive and required less specialized ability[14].

The present study was conducted with the aim to correlate real age with the pulp/tooth area ratio on a sample of 480 RVGs. Paewinsky conducted a study using the pulp/tooth zone proportion of upper canines as a strategy for age estimation using orthopantomography[15]. Whenever pulp and tooth zones were estimated on digitized peri-apical pictures of canines, the concordance connection coefficient demonstrated that there were no noteworthy intra-observer contrasts that were similar to results of our study (Table 1, 2).

In our study, a significant difference has been found in mean PA/TA ratio of Mandibular canine, Mandibular first premolar, Maxillary canine and Maxillary 2nd premolar amongst the male study subjects as well as female subjects. This highlights the need for teeth-specific regression models (Table 3,4,5,6).

The outcomes of the study demonstrated the incredible precision of the pulp/tooth area proportion as a pointer of age estimation which is in accordance with the previous study conducted by Singaraju and Zaheer et al[16,17]. The information got by estimating pulp and tooth territories on radiovisiographic images of teeth was more precise and solid when contrasted with that got by orthopantomogram. With this basic and precise technique, the mistake of age estimation is much lower than that of most anthropological strategies.

Conclusion

Authors tried to correlate the pulp/tooth area ratio and chronological age of the study subjects. Maxillary 2nd Premolar was found to be a better indicator of age using this method. But this study was conducted on a small sample. A significant negative correlation was demonstrated between pulp/tooth area ratio and the chronological age of the study subjects. This highlights that pulp/tooth area ratio can be used as potential tool for age estimation. Present study includes only

monoradicular teeth, there is a scope for further research using multiradicular teeth as well and performing this study on the different type of dental radiographs simultaneously to achieve more accurate results.

Conflict of Interest: The author declares that there is no conflict of interest with regard to publication of this article. The institute and its department, from where the data for this study were collected, have been duly acknowledged in the methodology section.

Acknowledgments: The author is extremely thankful to the Dr. S. C Narula, Head & Prof., Department of Periodontics, PGIDS, Rohtak and Dr. Mandeep Singh Virdi, Principal, PDM Dental College and Research Institute, Bahadurgarh for allowing me for data collection. My sincere thanks to Dr. Cheena Singh, Assistant Professor, Department of Oral Medicine and Radiology, PDIGS, Rohtak for her assistance. We are deeply indebted to all the people who have participated in this by providing their RVGs for this study.

Funding: The financial support provided by UGC, New Delhi in the form of 'UGC-JRF Fellowship' (Letter No F.15-9 (JUNE 2014)/2014(NET), helped the author in preparation of this research article.

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DOI Number: 10.5958/0973-9130.2019.00121.X

MYTH- Woman is the Reason for Population Explosion: A Critical Study of PCPNDT Act to Findout the Truth of the Statement

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Abstract

Every law is enacted with a purpose and that purpose can be find out from the preamble of the Act. Even the Pre-Conception and Pre-Natal Diagnostic Techniques (PCPNDT) Act, 1994 was enacted with a purpose to control the female feticide. The preamble of the Act states that "An Act to provide for the prohibition of sex selection, before or after conception, and for regulation of prenatal diagnostic techniques for the purposes of detecting genetic abnormalities or metabolic disorders or chromosomal abnormalities or certain congenital malformations or sex-linked disorders and for the prevention of their misuse for sex determination leading to female feticide; and, for matters connected therewith or incidental thereto". Thus from here it is clear that this act can be used only for the detection of any kind of abnormalities in fetus but not for sex detection which may result in female feticide. Female feticide or sex selective abortion is the practice of elimination of the female fetus in the womb itself but before this the sex of the fetus has to be determined and it can be done by methods like amniocentesis, chorion villus biopsy, ultra-sonography. Once the sex of the fetus is determined, then it is aborted if it is found to be unwanted sex.

This Act was introduced to control the female feticide basically, but if go by the history of the abortion law in India, there we will find that MTP Act was introduced as a family planning method to control the population. It was later when due to female feticide issue and skewed sex ratio; Government enacted PCPNDT Act to control the skewed sex ratio by controlling the female feticide.

This paper will basically focus into two points- 1) Woman is not the reason for population explosion and 2) PCPNDT Act can help to control the population under certain conditions.

Keywords- *Chromosomes, Selective abortion, Abortion, Sperm sorting, PCPNDT*

Introduction

The Five year family planning program was introduced with an objective of "reducing birth rate to the extent necessary to stabilize the population at a level consistent with requirement of national economy."[1] According to Dr. Rodhinorton, "Family planning means activities of determining the time period between the birth of children and the number of required children for the couple themselves along with the health and family welfare"[2]. Thus, family planning is a method for population control. With this motive Medical Termination of Pregnancy Act was introduced to control the population. But it was found that even after the enactment of this law population problem remain the same. So Indian Government, in Six Five year Plan decided to take a further step to control the population. They set an objectives in Sixth Five year Plan stating that "22.63 The Working Group on Population Policy set up by the Planning Commission has recommended the adoption of the long-term demographic goal of reducing the net reproduction rate (NRR) to one by 1996 for the country as a whole and by 2001 in all the States from

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the present level of 1.67. The implications of this are as follows:—

i. The average size of the family would be reduced from 4.2 children to 2.3 children.

ii. The birth rate per thousand populations would be reduced from the level of 33 in 1978 to 21.

iii. The death rate per thousand populations would be reduced from about 14 in 1978 to 9 and the infant mortality rate would be reduced from 129 to 60 or less.

iv. As against 22 percent of the eligible couples protected with family planning at present 60 per cent would be protected.

iv. The population of India will be around 900 million by the turn of century and will stabilize at 1200 million by the year 2050 AD"[3].

The Net reproductive rate is usually defined as the rate of reproducers born per couple that is females who live to reproduce[4]. The same goal was set for 7th plan (1985- 190)[4]. To maintain the NRR of one, more than one son is acceptable but more than one girl is not acceptable. Many doctors were of the view that NRR of one can be achieved from female feticide[5]. By this only population will be stable by replacing mother with one daughter. Now interesting thing is that many well educated persons of our society thinks that woman are responsible for the growth of population. That is the reason NRR of one was asked to maintain. For Government less number of women means less population. Thus to achieve this target sex selective methods become important tool to check the fetus and if it is found to be female then it will be aborted under MTP Act.

Now here is the misconception, that woman is responsible for the population explosion and not the man.

Material and Method

This research is purely doctrinal in nature. Researchers have used both Primary and secondary sources available for this research like Gazettes of India, Acts, Books, Journals, and Newspaper etc.

Test of the MYTHS

Science has already discovered earlier that it's the male who is the reason for giving birth to a male or female child because of the chromosomes it carries. Actually man's sperm carries 22 chromosomes. It may be X- or Y-chromosome. A woman's egg contains 22 chromosomes plus an X-chromosome. The sperm that fertilizes the egg determines the baby's sex. If the sperm carries an X-chromosome the baby will be XX and will become a girl. If the sperm carries a Y-chromosome the baby will be XY, a boy[6].

Then, why a woman is held responsible for population explosion for giving birth to number of girl child. In fact it's the men who are responsible for every plight of the woman. Sex selective abortion or abortion is not at all good for the health of the woman. Even forcing woman to give birth to number of child for getting a male child or child of a choice is not only violation of the reproductive right but its hamper the health of the woman along with the child born from the pregnancy too.

After the 6th Family Plan, there was tremendous increase in the sex selective abortion for maintaining the NRR of one. It was the Indian Government who by various lucrative incentives, banners asked the couples to maintain the NRR of One resulting in female feticide.

Now question which arise here that why a woman is held responsible for the growth of the population alone? Actually both the male and female are responsible for growth of population. Rather I can say that it's the male who is responsible for the growth of the population and Government should not blame woman alone for it.

Sex selective abortion can be done for medical as well as for non medical reason. Medical reasons for determining the sex of the embryo is to avoid the X-linked disorders. For this Pre -implantation genetic diagnosis (PGD) can be used to prevent the birth of X-linked disorders.

Non-Medical reasons may be to maintain a balanced family or for the want of particular sex child. In all cases the Sex selective abortion is necessary.

It was the after the skewed sex ratio, PCPNDT Act was enacted and according to section 6 of the same "Determination of sex prohibited. - On and from the commencement of this Act,—

(a) no Genetic Counseling Centre or Genetic Laboratory or Genetic Clinic shall conduct or cause to be conducted in its Centre, Laboratory or Clinic, pre-natal diagnostic techniques including ultra sonography, for the purpose of determining the sex of a fetus;

(b) no person shall conduct or cause to be conducted any pre-natal diagnostic techniques including ultra sonography for the purpose of determining the sex of a fetus;

(c) no person shall, by whatever means, cause or allow to be caused selection of sex before or after conception.

Even though the PCPNDT Act, has banned any kind of use of techniques for sex selective abortion resulting in female feticide, for the protection of girl child, but still woman in India has to go through the number of pregnancy for giving birth to a particular sex child which can be prevented by the use of PGD which is considered to be the most effective way to get the desired sex child through IVF. Before conception also one can make a selection at the level of the sperm using sperm sorting. This technique is known as preconception sex selection, primary sex selection or sex pre-selection. Sperm Sorting is a new technique where the X and Y-sperm is separated by the use of centrifugation. "During centrifugation, controlled spinning causes particles in a sample to become sorted into layers according to density of those particles. Sorting separates the more dense X-sperm from the lighter Y-sperm. One half of the sperm normally produced by a healthy male will carry the Y-chromosome producing a male child, and the other half of the sperm will be the X-chromosome producing a female child. By altering the number of one chromosome or the other by separating the layers, one is increasing the chances of producing a child of a specific gender. During sperm sorting, the sperm cells are separated from the seminal fluid, the sperm are concentrated into healthy and motile sperm, abnormal sperm is filtered out, and finally the separation of the X and Y-sperm concentrates the sample to the desired gender. The remaining sample is more likely to result in a successful pregnancy and will increase the odds of the desired gender group. This technique is widely used and is a standard process in IVF and IUI procedures. After the sperm is sorted, the sample will be inseminated into the woman which is an in office technique. The most well-known method of sperm sorting is the Ericsson Method[7]".

PGD is almost 100% accurate and this procedure is more invasive, expensive, and controversial than sperm-sorting techniques and it is available in limited clinics.

One thing which is necessary to mentioned here that in PCPNDT Act, only for medical reasons sex selection is allowed. Here one thing which I would like to highlight is that sometimes when couples desperately want a child of particular sex and in such situation to protect the health of the woman for giving birth to number of children can be prevent only through the PGD or Pre conception selection under certain conditions, as it is the only way to save the country from over growing population as well as to protect the health of the woman without blaming her the cause of population explosion. Protection of woman health from number of pregnancy can also be a ground for medical reasons to have sex selective abortions.

It is also true that every law has some merit and demerit. We all know about the demerit of the PCPNDT Act, but the same Act can be used to control the population if it is used under certain conditions. Even for changing the mindset of the public first Government should change their thinking towards woman. Woman is not a reproductive machine whose task is only to follow the policy of the Government blindly or to follow the instruction of the husband for giving birth to child of a choice. When there is technique by which she can protect her health from giving birth to number of child without deteriorating her health in such situation she must have a right to get/seek permission under PCPNDT Act for preconception selection or PGD.

Sex Selective Abortion and Population Control

In one of the research done by the AIIMS,[8] where they have taken interview of 160 mothers and grandmothers. From that they found that 40% of them supported sex determination test on the ground that it will help in the population control by preventing the women for giving birth to number of girls for the want of male child.

Through sex selective abortion not only one can have a balanced family but it can help in the control of population too, which is major concern for all.

Sex selective abortion (SSA) and Gender Discrimination (GD) both this term are different. We generally get confused with these two terms. Cambridge Dictionary defines GD as "a situation in which someone is treated less well because of their sex, usually when a woman is treated less well than a man."[9] So, when someone hates a particular sex and because of this only want to go for sex selection then that will be social wrong and will be called as ***Gender Discrimination***. But for balancing one family if someone want to go for sex selection then it will be sex selective abortion and this will not amount to any wrong rather it help to control population as well as female feticide. According to Collins dictionary, Sex Selection means "the practice of attempting to control the sex of a baby in order to achieve a desired sex, through various scientific methods"[10].

For maintaining NRR of one, one should clear his or her concept that it talked about sex selective abortion and not of gender discrimination. Even Aristotle was also of the same view that when a family already had a number of desired children then what is the point of giving birth to number of same sex children.

For the benefit of the society and for the welfare of the woman, it's better to use PCPNDT Act for the control of population.

Even Family Balancing is the term for gender selection done for the purposes of achieving a more balanced representation of both genders in a family[11]. Population experts and researchers have argued that if barriers to free choice to determine size of the family are removed, the results will be smaller families and slower population growth to a rate that is more compatible with sustained and sustainable economic development[12]. Even G.Pennings in his paper "Ethics of sex selection for family balancing Family balancing as a morally acceptable application of sex selection"[13] has laid down certain proposed guidelines for sex selection are that: (i) it is not allowed for the first child; (ii) that it is not allowed when there is a gender balance in the family, although whether it should be permitted after the birth of the first child to prevent an imbalance in the family, or reserved for after the birth of the second child to correct any imbalance present, remains undecided, (iii) the sex selected can only be that of the less represented gender in the family; except when (iv) the prevention of the birth of a child of a certain sex is advisable on the basis of increased genetic risk[13].

By this, we can not only control the population but also the skewed sex ratio will get improved through it.

Conclusion and Suggestions

From this research what I found is that blaming woman for population explosion is absurd. Forcing her to give birth to number of child is violation of her reproductive right. If Government really want to maintain the NRR of One in that case Government should introduced the concept of balanced family in India. PCPNDT Act can help us to achieve this concept. In this way the health of the woman will be protected from number of abortion as well as from illegal sex selective abortion too. Sex selective abortion is not the only reason for the skewed sex ratio, but with the help of sex selective abortion and balanced family concept skewed sex ratio can be checked and improved.

When technology has given us a scope to control the population then we should use it for the betterment of the society.

Conflict of Interest: Pyali Chatterjee and Dr. Komal Vig declare that they have no conflict of interest**.**

Source of Funding: No funding for this research.

Ethical Approval: The study does not require the approval of Institutional Ethics Committee. As the study is the combination of socio-legal issue. No field study is done for this research.

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DOI Number: 10.5958/0973-9130.2019.00122.1

Metagenomics Shows Ubiquitous Nature of Red Complex Bacteria, Favoring New Classification of Periodontitis

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Abstract

Background: Classification of periodontal lesions has always been a difficult and dynamic issue, due to constant addition of knowledge that enriches our understanding of periodontal pathophysiology. With current evidence from metagenomics, it is necessary to find the association of oral microbiota to periodontal lesions.

Materials and Method: Current study is cross-sectional, and samples (subgingival plaque) were collected from 6 individuals classified in to 2 groups.,Viz. Aggressive periodontitis and Chronic periodontitis. The study excluded patients who underwent Antibiotic therapy within the past 3 months, Pregnant women, systemically unhealthy individuals, tobacco(in any form) user and alcoholics. Metagenomic analysis was conducted on subgingival plaque and results were tabulated with respect to red complex bacteria.

Results: It was observed that, red complex bacteria have not differed significantly between the chronic and aggressive periodontitis patients.

Conclusion: The new classification of periodontal lesions, 2017 is justified by classifying all microbial diseases in to one group as there is no evidence in metagenomics to separate them. But, the difference in clinical manifestation has to be further investigated to arrive at better treatment modalities.

Keywords: *Metagenomics, Red Complex, New classification*

Introduction

In the clinical scenario, aggressive periodontitis (AgP) manifests as rapid and severe periodontal destruction in young healthy individuals. AgP generally affects systemically healthy individuals below 30 years of age. Pathogenic bacteria are the primary etiology agents in the pathogenesis of periodontitis.

Hence, periodontal microbiology has always been a perplexing topic among the researchers and clinicians alike. Historically, these organisms have been classified in numerous ways to aid in understanding the etiology and treatment plan. With regard to etiology, predominant factors are microbial population and keystone pathogens among them. Traditionally they have been separated into various groups and complexes based on contemporary evidence.

This causative relation has been questioned at different times in the history, resulting in refinement of causal relations. In such scenarios, the studies done are not at global level, but only in specific ethnicity. By systematically reviewing the outcomes of such studies, the lacunae in the knowledge is being filled. Nevertheless, the lacuna has widened in the recent decade due to suspicion on non cultivable bacteria, present in the oral cavity. The 1989 workshop agreed on the classification based upon distinct clinical presentations, different ages of onset and rates of progression.[1] Hence they classified periodontitis as pre-pubertal, juvenile (localized and generalized), adult, and rapidly progressive.

During the 1993 European Workshop, classification was simplified, consisting of adult and early onset

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periodontitis.[2] In 1999 classification of periodontitis reached finer details and is being used till now.[3] Periodontitis was reclassified as chronic, aggressive (localized and generalized), necrotizing and as a manifestation of systemic disease. Recent classification of periodontal diseases is based upon better alignment with pathophysiology. Hence, it was classified as periodontitis, necrotising periodontitis and periodontitis as a manifestation of systemic diseases.

Though the causative association of initial classification was well proven and treatments done according to such classifications have been clinically effective. But when a classification is changed, organisation and categorization of the causative organisms is essential to provide proper care to the patient.

In this direction, current questions are as follows. Are specified group of bacteria influenced by certain other non-cultivable bacteria? If so, how are they functioning as sole keystone pathogens? What is the role of these bacteria in initiation and progression of periodontitis? Will introduction of certain species actually inhibit these pathogenic flora? In order to attempt answering these critical queries, It becomes essential to focus on the incidence and prevalence of these bacterial populations extensively, without elimination of non-cultivable flora.

Since studies till date have reported only on specific groups of bacteria, novel methods have to be used to judge the specific bacterial presence in the flora. In this connection, metagenomic analysis may throw light on the possible bacterial species association which might be uncultivable. Metagenomic analysis is applicable to assess the complexity and changes of the subgingival microbiota.

The current work focusses on the comparison of subgingival microbiota in chronic periodontitis and aggressive periodontitis individuals by metagenomic approach. By this means, it would become feasible to elucidate the direct link and association of bacterial species in the pathogenesis of generalized aggressive periodontitis and to evaluate and compare the role of microbiome and genetic factors among the three groups (aggressive, chronic and health).

Materials and Method

The study was approved by Human Ethics Committee of Bharath Institute of Higher Education and Research, Chennai. The study was conducted using the samples collected from outpatients of Sree Balaji Dental College and Hospital, Chennai, with informed consent. Current study is cross-sectional, and samples (subgingival plaque) were collected from 6 individuals classified in to 2 groups as follows:

Group I: Aggressive periodontitis

Group II: Chronic periodontitis

Inclusion criteria

Aggressive periodontitis patient:

Clinical finding with greater than 4mm of pocket depth, Radiographic findings with arc shaped bone loss in incisors and molar regions.

Chronic periodontitis patient:

Clinical findings with greater than 4mm of pocket depth

Exclusion Criteria

The study excluded patients who underwent Antibiotic therapy within the past 3 months, Pregnant women, systemically unhealthy individuals, tobacco(in any form) user and alcoholics.

Metagenomic analysis of subgingival plaque

The DNA was extracted from the subgingival plaque samples using DNeasy Blood and Tissue Kit (Qiagen, Germany). Quality and quantity of extracted DNA were assessed using Qubit 4.0 Fluorometer with standards. A PCR targeting *16S rRNA* gene was performed was performed with Mastercycler (Appllied Biosystems Veriti 96 Thermal cycler) with initial denaturation at 95°C for 3 min followed by 37 cycles at 95°C for 30 s, 55°C for 30 s and 72°C for 1 min, and with final extension at 72°C for 7 min. PCR amplicons were resolved along with DNA markers in 0.8% agarose with ethidium bromide (10 mg/mL) by gel electrophoresis for ~30min at 100 V and gel was analysed by Bio-glow UV Transilluminator). The resultant product size was 1500bp.

16S rRNA metagenome using next generation sequencing

PCR amplicons of 1500bp size were subjected to metagenomic sequencing Using 3rd Oxoford nano

pore technology (3rd generation) MINION Nano pore platform. Libraries were prepared with the 1D ligation sequencing kit (SQK-LSK108 - R9 version) and 1D Native Barcoding Kit (EXP-NBD103) using the Oxford Nanopore Technologies (ONT) sequencing protocol. Metagenome sequence data from the MinION R7.3 flow cells were analysed for phylogenetic assignment by submitting the sequences to MG-RAST pipeline (Argonne National Laboratory).

Results and Discussion

It has been evident from the clinical experience that the classification of periodontal diseases cannot be considered as permanent. Evolution of sciences pours in huge volumes of information every day. Classification of diseases must essentially serve two purposes, viz. Lead to better understanding of disease and should improve the outcome of the care. When a classification is modified, these must be conversely attended to.

When two are more distinctly classified clinical entities are merged together, it implies that the underlying disease process is the same or similar. If so, there should be a justification on the difference in clinical presentation. Hence, it becomes important to compare the etiopathogenesis of the clinical entities before and after the said classification.

Features predominating the various forms of aggressive periodontitis according to 1999 workshop are as follows: Patients are clinically healthy except for periodontitis, which is characterised by rapid attachment loss and bone destruction. It shows familial aggregation. Secondary features may include amounts of microbial deposits, inconsistent with the severity of periodontal tissue destruction and elevated proportions of Aggregatobacter actinomycetemcomitans. It is worthy to note that in some populations, Porphyromonas gingivalis was elevated. In addition age, gender and regional prediliction was also seen. circumpubertal onset in localized first molar / incisor presentation is common. In adults, it specifically occurs below 30 years of age. The destruction of periodontium was found to be episodic in nature. Further, AAP has recognised that it is not a singular entity but a group of disorders affecting the given demographic population.[4]

On the other hand, chronic periodontitis was described as predominantly occurring in adults, where the periodontal damage is proportional to accumulated plaque. It is heavily modified by local and systemic factors. It was defined as "An infectious disease resulting in inflammation within the supporting structures of teeth, progressive attachment and bone loss. It is characterized by pocket formation and / or gingival recession. It is recognized as the most frequent form of periodontitis. Its onset may be at any age but is most commonly detected in adults. The prevalence and severity of the disease increase with age. It may affect a variable number of teeth and has variable rates of progression"[5]

Hence, it is seen that it is not a microbe but the entire microbiome that causes a periodontal pathology. Hagishengallis et al., 2012 have reviewed on keystone pathogen hypothesis, which states "certain low-abundance microbial pathogens can orchestrate inflammatory disease by remodelling a normally benign microbiota into a dysbiotic one"[6]. In the previous century, studies revealed significant disparity in the periodontal microbiota in health and disease.[7] This change was taken to imply a causative relationship. The zeal to isolate specific pathogens has resulted in identification of a number of gram-negative anaerobic bacteria. Subsequent to identitifaction and isolation, they were classified as "red complex". They were not only frequently isolated together, but also are strongly associated with diseased sites in the mouth. When P.gingivalis was seen to possess sophisticated strategy to evert the immune system it became the keystone pathogen of the disease-provoking periodontal microbiota. It also obeyed the koch's postulates of association of a microbial agent to disease, when performed in mice. Also, specific removal of P. gingivalis from the periodontal biofilm had reversed the dysbiotic changes.[8]

Coming to the "AA" part of the issue, Hill (1965) has remarked on the causative relation and association of pathogen to disease.[9] He defined a condition called temporality, where a pathogen is associated with a disease, but not still confirmed to be a pathogen. If it is a pathogen its presence prior to destruction should be proven. But the experimental evidences are inconclusive.[10] Fine et al. Have technically argued that temporality can be used in support of an etiological role for A. actinomycetemcomitans in cases of localized aggressive periodontitis.[11] Frequently, increased levels of certain species can be a sequel to disease process/ progress. Detecting increased level of a flora after tissue destruction cannot support it as a putative pathogen. In other words, it need not initiate, but if present shift the

balance to an unfavourable clinical scenario. To support this view, perez chappiro et al., (2014) have identified 17 new pathogens associated with periodontitis.[12]

In a study by daSilva-Boghossian et al., (2011), Aa was found in over 50% of the sites, while the red complex was found only in about 35% of the sites of Aggressive and Chronic Periodontitis subjects respectively.[13] Diseased subjects displayed higher levels of the red complex than the healthy ones; they could demonstrate no differences between the two types of periodontitis. To add to the existing complications in etiology, it is seen that other bacteria can increase or decrease the virulence of bacteria under consideration.[14] That is, polymicrobial synergy is a well-established concept in periodontology.[15]

As early as 1980, Socransky et al., have remarked that uncultured bacteria could contribute to the periodontal pathogenesis.[16] They have listed some difficulties faced by microbiologists in the study of periodontal pathogens, highlighting difficulties in cultivation, complexity of the microbiota, different diseases diagnosed as being the same and the possibility of multiple diseases within a subject. Though none of the problems listed by them have been solved till date, a short list of pathogens have been formed and treatments are given to patients. Hence, even after a century of advanced investigations, we are still in the nascent phase of identifying the periodontal pathogens.[10]

In such a scenario, metagenomics has come as a boon to clarify the causative relationship. In current study, we have demonstrated that red complex bacteria have not differed significantly between the chronic and aggressive periodontitis patients. Table 1 shows the comparative picture of similarity in the bacterial profile between chronic and aggressive periodontitis patients. This is in line with recent, previous observations as shown above. Nevertheless, due to prohibitive nature of cost, the sample size has to be low. In future, such studies have to be conducted in a multicentric manner to arrive at a conclusion.

The recent "classification of periodontal diseases" has classified both the periodontites in the same group, which is showing the right light as far as causative association is concerned. But will the management strategy be merged according to this, is still a major question to be answered. Unless the comprehensive etiological relationship is proven be any credible technique such as metagenomics, it is difficult to alter the line of treatment in any major ways. **Conflict of interest:** none.

Ethical approval: Ethics committee approval obtained from Sree Balaji Dental college & Hospital (SBDCH/IEC/08/2017/5)

Funding: Self funded

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DOI Number: 10.5958/0973-9130.2019.00123.3

Prevalence and Pattern of Mandibular Third Molar Impaction among Patients Attending Private Dental Clinics in Chennai City- A Cross Sectional Survey

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Abstract

Background: The impaction of permanent teeth is a pathological situation in which a tooth cannot erupt into its normal functioning position without treatment. The impaction rate is higher for mandibular third molars when compared with other teeth. The cause of mandibular third molar impaction is said to be due to inadequate space between the distal of the second mandibular molar and the anterior border of the ascending ramus of the mandible. Impacted teeth may remain asymptomatic or may be associated with various pathologies such as caries, pericoronitis, and also root resorption of the adjacent tooth. The impaction of third molar is remaining a public health issue in adolescents. Hence, this study aimed to estimate the patterns and prevalence of mandibular third molar impaction.

Method: This is a cross sectional study done with 1580 patients. Participants information regarding age, gender, type of impaction and other related information were collected. OPGs were examined to determine the frequency of third molar impaction, and their levels of eruption and pattern. The degree of impaction was determined by the Winter's classification. SPSS was for statistical analysis.

Results: The overall prevalence of mandibular third molar impaction was 13 per cent. Mesioangular pattern is common in majority of the patients. The mean age of the population is 27 years. Prevalence of impaction was high in female than male.

Conclusions: Mandibular third molar impaction is still a major public health concern among young adolescents.

Key words: *Third molar impaction, mandible, prevalence*

Introduction

The mandibular third molars are the most frequently impacted teeth in humans followed by the maxillary third molars, maxillary canines and mandibular canines 1. Many research findings showed the prevalence of the third molar impaction ranges from 16.7% to 68.6% and with no sexual predilection being recorded 2. The factors causing the third molar impaction include crowding, ectopic position of the tooth germs, supernumerary teeth, genetic factors and soft tissue or bony lesions 3. Many theories have been proposed to explain the prevalence of the impacted mandibular third molar, and the majority discuss the relationship of jaw size to the tooth size which is suggested to result from the regional differences in dietary habits. The cause of mandibular third molar

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impaction is said to be due to inadequate space between the distal of the second mandibular molar and the anterior border of the ascending ramus of the mandible. Impacted teeth may remain asymptomatic or may be associated with various pathologies such as caries, pericoronitis, and also root resorption of the adjacent tooth. Several methods have been used to classify the impaction which is based on many factors such as i) level of impaction, ii) angulations of the third molar and iii) the relationship to the anterior border of the ramus of the mandible4. Impacted teeth are often associated with pericoronitis, incisor crowding, resorption of the adjacent tooth roots and temporo-mandibular third molar dysfunction. This study may assist orthodontists and maxillofacial surgeons in treatment planning of surgical procedures, viz. the early prediction, evaluation and possible treatment of impacted third molar teeth, as well as in future prevention of impaction with the use of gene therapy. It is important to determine the prevalence of the impacted third molar teeth in other regions of South Africa to verify whether the previously determined prevalence can be generalised or whether it varies by region or population. Therefore, this study estimated the pattern and prevalence of mandibular impaction of third molar tooth in private dental clinics of Chennai Metropolitan area.

Patients and Method

A cross sectional study was conducted to know the prevalence of third molar impaction. By Simple random sampling patients enrolled with the patients details of age, gender, location, type of impaction, presence of caries in the second molar, and different indication for extraction. The type of impaction was categorized using the Winter's classification of impacted mandibular third molars as Vertical, Horizontal, Mesio-Angular, Disto-Angular, Inverted, Bucco-version, Linguo-version,Transverse.

Statistical Analysis

The data were analyzed using the Statistical Packages for the Social Sciences (SPSS) version 21. Descriptive data were presented as frequencies and percentages and Continuous variables were expressed as mean and standard deviation. Statistical significance was set as $P < 0.05$.

Results

A total of 1580 patients were enrolled in this study from June 2017 to November 2018 and of these, 212 impacted mandibular third molars were surgically extracted and thus giving a prevalence rate of 13.41%. The prevalence is high in female (56%) than male(Table-1). The patients' ages ranged 18-40 years; the mean (SD) age was 28.5 (4.20) years. Right side impacted mandibular third molar was high in female. The number of impacted third molars varied from 1 to 4 impactions.

Table 1: Gender wise Prevalence of number of impacted third molar

No of Impaction	Male (n=93)			Female (n=119)			p-value
	Right	Left	Both	Right	Left	Both	
1	12	15	1	19	23	2	0.05
2	14	12	0	23	16	1	
3	12	11	0	19	9	0	
4	9	7	0	4	2	1	

p-value >0.05 considered as significant

Table 2: Demographic and clinical characteristics

Variables	Frequency	Percentage
Gender		
Male	93	44
Female	119	56
Angulation Type		
Mesioangular	98	46
Distoangular	56	26
Horizontal	23	11
Vertical	35	17
Mucosa Coverage		
Partial	156	74
Full	56	26
Second molar caries		
Yes	59	28
No	153	72
Surgical indications		
Recurrent pericoronitis	52	25
Apical periodontitis	10	4
Irreversible pulpitis	12	5
Caries	59	28

Prevalence of Mesioangular impaction was the most predominant impaction type (N = 98; 46%), followed by horizontal impaction (N = 56; 26%) [Table 2]. Mucosa coverage was partial in 156 cases (74%). About half of the impacted teeth were located on the left side (N = 51; 43.2%). There was bilateral location in 21 (17.8%) cases. Second molar dental caries was present in 59 (28%) cases. The most common indication for surgical extraction was recurrent pericoronitis (N = 52; 25%) followed by apical periodontitis (N = 10; 4%) [Table 2].

Discussion

Tooth impaction is a pathological condition in which a tooth is completely or partially unerupted and positioned against another tooth, bone or soft tissue, so that further eruption is unlikely to occur 5. Impaction also refers to the prevention of tooth eruption on its scheduled date, or the tooth is impacted if the time of its eruption has passed 6. In this study third molar impaction is high in female than male. These findings contradictory with7 , who concluded that mandibular third molar impaction is more prevalent in both males and females . Most of the researchers suggest that the females have a higher incidence of mandibular third molar impaction when compared to males 8,9. However, Chu et al. 10 defined an impacted tooth as one tooth that is obstructed along its path of eruption by an adjacent tooth, bone or soft tissue. The third molar tooth generally erupts between the ages of 18 – 24 years. But in this study the mean age of the patients are 27years. However, there is a high variation in the age of eruption 5. We excluded patients that were less than 19 years of age because human growth continues beyond this age 11. Schersten et al.12 suggested that the most suitable ages for studying the frequency of mandibular third molars and their impaction are between 20 and 25 years. In this study the gross prevalence of mandibular third molar impaction was around 13%. Other research had It has been shown that the prevalence of impacted teeth varies between regions. In the present study,the mesio-angulation pattern of impaction is most prevalent in both males and females while compare to other pattern. Many Studies using Winter's classification method often report higher rates of the Vertical position. Similar findings was obtained by Ramamurthy et al. In this study the most common angulation was mesioangular in the mandible.

Pandey et al13 ,Kumar et al14 study also agree that the mesioangular is a common molar impaction. But many international studies found vertical angulation is most common in mandibular third molar impaction. This study should help to determine whether teeth impaction is an emerging problem, or if it is due to simply to influences of the population's ethnic background.The incidence and prevalence of periodontitis increases with age irrespective of the presence or absence of the third molars, and thus a higher incidence of periodontitis has been observed among the older patients in relation to the impacted wisdom teeth.

Conclusion

Prevalence of mandibular third molar impaction was less in this group of population while compare to many other research. This study provides useful baseline data for part of Indian population for the prevalence and pattern of mandibular impaction in the Eritrean population. This present study when compared with other regional studies revealed that there was no universal pattern on the prevalence or patterns of impactions.

Conflict of Interest: None.

Ethical approval: Institution ethical committee approval obtained

Funding: Self funded

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DOI Number: 10.5958/0973-9130.2019.00124.5

Vaginal Evisceration: A Case Report and Review of the Literature

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Abstract

Vaginal evisceration occurs rarely due to a number of reasons. It is when the intestine protruding through the vaginal introitus can be observed following the disruption of the vagina. Herein, we presented a rare case of a 62-year-old female patient with vaginal evisceration occurred after a trauma (i.e., falling from a height). Vaginal evisceration requires prompt management strategies to preserve the intestinal viability. The patient referred to the Departments of Gynecology and General Surgery. Emergency surgery was not performed until the condition of the patient was stable. No complications were observed after surgery. The least invasive surgical procedure is recommended based on the condition of the patient for repositioning of the viable intestine into the abdominal cavity.

Keywords: *Vaginal evisceration, Trauma, Pelvic surgery*

Introduction

Vaginal evisceration is a rare complication associated with several factors, such as trauma, trauma during intercourse[1], iatrogenic injury, rape[2], the intrusion of foreign objects, and complications after surgery.[3] It usually occurs among postmenopausal women with genital atrophy, an enterocele, previous vaginal surgery, or hysterectomy.[4] Vaginal evisceration is characterized by partial or total separation of the vaginal cuff along with the protrusion of intra-abdominal contents, such as the small intestine.[5]

Patients with evisceration often report a sense of protruding mass from the vagina, abdominal pain, vaginal bleeding, or discharge.[6] In 1864, Hyernaux reported the first case of vaginal evisceration, which involved the disruption of the proximal vagina with the expulsion of intraperitoneal organs.[7] There have been fewer than 100 cases of vaginal evisceration reported until 2008.[8] Moreover, Ricotta et al. (2014), Thomopoulos et al. (2016), and Matsuhashi et al. (2017) reported 51, 7, and 1cases with vaginal evisceration, respectively.[9,10,11]

Vaginal evisceration is a gynecological emergency requiring immediate diagnosis and surgical intervention. The vaginal defect leads to the increasing rate of mortality and morbidity due to intestinal strangulation.[10] Surgical procedures, including abdominal, transvaginal, and combined abdominal-vaginal methods are regarded as the exclusive methods for the treatment of transvaginal evisceration. In addition, laparoscopic surgeries are also applied as alternatives to traditional methods.[11] The combined vaginal-abdominal and abdominal methods allow complete inspection of the abdominal cavity and apply a mesh for the repair and the prevention of relapses.[9]

Although vaginal evisceration occurs rarely, it is still a challenging problem facing gynecologists and general surgeons in Emergency Departments. Due to the high rates of morbidity among these patients, they need urgent and emergency medical intervention to ensure that the best care is provided.[12] Herein, we presented a patient with vaginal evisceration due to trauma (i.e., falling from a height).

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Case presentation

A 62-year-old female (G3P3L3, Gravida 3, Para 3) referred to the Department of Emergency Medicine with vaginal evisceration after trauma (Figure 1). The patient history and vital signs were obtained and she was found to have a history of diabetes. She was not given any hormone replacement therapy during her postmenopausal years. The woman had given birth three times, the last one was 30 years ago. The patient was taken to the Emergency Department after she fell from a height of 50 centimeters. The complications included vaginal lacerations, vaginal bleeding, the evisceration of the intestine through the vagina, and the transient loss of consciousness.

The patient referred to the Departments of General Surgery and Gynecologic Surgery. The broad-spectrum antibiotics were used and the intestine was preserved in a moist saline wrap. According to a gynecologic evaluation, the patient diagnosed with procidentia along with a rupture through posterior vaginal fornix. No prolonged and heavy bleeding was observed. Figure 2 demonstrates that the ovaries and fallopian tubes as well as the uterus are left intact.

The examination of the intestine by a general surgeon revealed no injuries to peristalsis and no signs of ischemia or incarceration. The intestines were replaced into the abdominal cavity through the vagina and the posterior vaginal wall was repaired. In addition, the gynecologist performed a vaginal hysterectomy followed by anterior and posterior colporrhaphy (Figure 3). The postoperative proceeded without complications and the patient was discharged from the hospital five days after surgery.

Figure 1: Vaginal evisceration after trauma

Figure 2: Vaginal evisceration after trauma showing the intact intestines, uterus, ovary, and fallopian tubes

Figure 3: View after surgical correction

Literature review

In the current study, we reported a case with vaginal evisceration after a trauma. In this review, the articles that evaluated females with vaginal evisceration were assessed through searching databases, such as PubMed, Science Direct, and Google Scholar. The search process was accomplished using the following keywords: "vaginal evisceration", "vaginal herniation", and "vaginal trauma/injury". All case reports or case series published in English up to 2018 were included in the study.

Kowalski et al. reported 60 cases of vaginal evisceration among whom 41 patients were

postmenopausal females. The results of the mentioned study showed that 73%, 63%, and 68% of the vaginal evisceration cases occurred among women with previous vaginal surgery, with enterocele, and postmenopausal females.[13]

In a study conducted by Partsinevelos et al., 51 cases of vaginal evisceration were observed among females after abdominal hysterectomy (47%) followed by vaginal hysterectomy (29.4%), and laparoscopic procedure (23.6%).

Moreover, Ricotta et al. demonstrated the higher incidence rates of vaginal evisceration after laparoscopic hysterectomy (42%) and vaginal hysterectomy (21%) in 2014.[9] Macintyre reported that 39% of women affected with vaginal evisceration after vaginal hysterectomy.[14] Table 1 presents vaginal evisceration due to various trauma followed by proper treatment strategies.

Table 1. A literature review of vaginal evisceration

Authors (years) References	Age	Kind of trauma	Number of birth given	Patient's medical history	Surgical procedure
Hall[15]	48	Sexual intercourse	None	Vaginal hysterectomy	Surgery and the vaginal repair
Avidor[16]	63	Water slide injury	Once	Vaginal hysterectomy and anterior colporrhaphy	Surgery and the vaginal repair
Lledó et al[17]	58	Falling during walking	NA*	Vaginal hysterectomy and transvaginal repair	Surgical sponges in the vagina
Nasr et al[18]	75	Sexual intercourse	NA	Abdominal hysterectomy and a total hip replacement	Laparotomy
Bozkurt et al[1]	73	Motor-vehicle accident	Twice	Pelvic surgery	Trans-vaginal hysterectomy
The case in this study	62	Falling from a height	Three times	Diabetes	Vaginal hysterectomy and colporrhaphy

*NA: Not Available

Discussion

In this study, 10 cases were reviewed with vaginal evisceration occurring due to trauma (n=5), a history of vaginal hysterectomy (n=3), abdominal hysterectomy (n=1), and pelvic surgery (n=1). However, the case in this study had no history of surgery. Vaginal evisceration is an extremely rare clinical condition that is most related to previous surgery. Croak et al. reported 10 out of 12 vaginal evisceration cases who had a history of surgery.[19] However, in older reviews, vaginal evisceration was more common (63%) after vaginal hysterectomy, compared to the other forms of hysterectomy.[20]

In a study performed by Thomopoulos et al., it is reported that laparoscopic and robotic hysterectomy was used for 50% of vaginal surgery.[10] Hur et al. demonstrated the increasing rate of laparoscopic and robotic hysterectomy from 0% to 0.7% between 2000 and 2006.[21] Furthermore, Nick et al. reported 3% of evisceration after robotic hysterectomy, compared to 0.29% and 0.12% of this complication after a total vaginal and abdominal hysterectomy, respectively.[22]

Risk factors reported for vaginal evisceration included vaginal atrophy, hysterectomy, concomitant enterocele, increased abdominal pressure, the presence of a foreign body, and sexual intercourse prior to complete wound healing.[12] Vaginal evisceration mainly occurs among postmenopausal women, and it is most often related to a history of vaginal surgery and pelvic floor dysfunction. In addition, hypoestrogenism, atrophy, and devascularization from previous surgery

play significant roles in the occurrence of vaginal evisceration.[14] In several studies, most common causes of vaginal evisceration were associated with postmenopausal years[23]; however, it may be observed among premenopausal women with complications due to delivery or sexual intercourse.[24]

According to the literature, few cases of vaginal evisceration have been reported among patients with or without a history of previous pelvic surgery.[1,15,16,17,18] Moreover, common causes of these rare cases include motor-vehicle accident, falling while walking, water-slide injury, and sexual intercourse.[1,15,16,17,18] Vaginal evisceration necessitates a surgical emergency for the preservation of intestinal viability. A complete history of the patient along with the physical examination must be obtained focusing on rigidity, abdominal guarding, distention, rebound tenderness, and hypoactive bowel sounds.[19]

In addition, a pelvic examination should be performed for vaginal lacerations and bleeding points. The viable intestine should be repositioned intraperitoneally using a moist sponge stick with the patient placed in the supine position.[21]

Nasr et al. described abdominal and laparoscopic methods. Vaginal repair relies on close surveillance of the recognized pelvic organ prolapse, the lack of intestinal incarceration, and prompt patient presentation.[18]

The surgical procedure includes several phases: 1) the protection of eviscerated abdominal contents, 2) the evaluation of the viability of the intestine and ischemic changes following resection, 3) the removal of the devitalized cervical tissue, cleaning and disinfection of contaminated surfaces, and 4) paravaginal defect repair using sutures with non-absorbable material or placing a non-absorbable polypropylene mesh.[3]

Furthermore, the repositioning of the viable intestine into the abdominal cavity and appropriate surgical repair are required for the treatment. The intestine preserved in a moist saline wrap and broad-spectrum antibiotics used to cover gastrointestinal and vaginal flora.[23]

Some authors believe that the best choice is to repair it in a surgical time, which implies a lower rate of infections leading to the reduction of the risk of second anesthesia and surgery.[22]

There is no standard surgical approach to vaginal evisceration repair. Some methods included laparoscopic surgery, combined vaginal-abdominal, and transvaginal. The present evidence does not suggest the superiority of one method over the other. The most effective surgical procedure depends on the condition of the patient, the intestine, and the ability to get the best visualization of the cuff dehiscence and the entire abdominal cavity.

Conclusion

In this case, vaginal evisceration occurred after trauma in a patient with no history of surgery; however, in most cases, this complication occurs among females with previous vaginal, abdominal, and pelvic surgeries. Minimally invasive approaches to vaginal evisceration are preferred to apply based on the patient's conditions.

Ethical Clearance: The manuscript reprted a case and just informed consent was taken from the patient

Source of Funding: This report is self-funded

Conflict of Interest: The authors declare that there is no conflict of interest regarding the publication of this article

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DOI Number: 10.5958/0973-9130.2019.00125.7

Do HIV-AIDS Programmes Require a Unique Quality Management System as a Public Management Tool for Optimal Success?

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Abstract

HIV-AIDS is a public health issue affecting global and local countries with men, women and children being affected. Significant changes have occurred in this field leading to more productive and healthier HIV positive individuals. This has been mainly through the development of in country, local, parastatal, NGO, NPO HIV-AIDS programmes dealing with aspects of HIV-AIDS wellness, treatment and care. Given the high disease burden that is placed on the multi-sectoral health systems, it becomes imperative to accurately monitor and evaluate these HIV-AIDS programmes to ensure alignment with financial, clinical and operational goals. Integral to this, is quality management systems for HIV-AIDS healthcare to ensure optimal treatment and patient outcomes. This paper will review the need for quality management systems for HIV-AIDS healthcare programmes and provide recommendations for smart practises.

Keywords: *HIV-AIDS, parastatal, NGO, NPO*

Background

HIV-AIDS is a significant health concern. In 2016, an estimated 36.7 million people were living with HIV [1.] This number of affected individuals is split within the HIV-AIDS paradigm of HIV treatment, prevention, wellness and care. There have been documented challenges in order to roll out free anti-retroviral therapy as prevention and treatment globally and within South Africa. South Africa has made good progress in meeting the Millennium Development goals of 90-90-90 targets, with 86% of people aware of their status[6.] South Africa the largest ART programme in the world. South Africa also offers HV prevention services including PrEP[5], which is now being made available to people at high risk of infection. In 2016, South Africa implemented the 'test and treat' approach with the WHO guideline change. This approach to care allows all HIV individuals to commence treatment irrespective of the CD4 and viral loads[4]. This implies a massive increase in patients at health care centres in order to accommodate this change in guideline and to get patients optimally managed. The volume of patients and service delivery raises a challenge in many aspects of programme management but more so in terms of quality of healthcare provision.

Quality management in HIV-AIDS programmes

Quality management efforts entail more effective HIV-AIDS service delivery with combination prevention modalities, access to HIV-AIDS treatment and care, harm reduction of HIV-AIDS stigma and discrimination together with HIV-AIDS education, awareness and advocacy. In the past decade, tremendous improvements have occurred in measuring and monitoring the quality of medical care globally. Despite these advances, problems with quality persist. Given the rapid rate at which HIV-AIDS programmes have developed globally and locally, and due to their rapid expansion, it is necessary to ensure quality management tools are in place to allow optimal healthcare and patient wellbeing.

Discussion

A retrospective data review was undertaken to ascertain the prevalence of quality management systems in healthcare globally and specifically in the arena of HIV-AIDS. The aim of this review was to assess available data on the prevalence of quality management systems in HIV-AIDS healthcare and identifies gaps and smart practices towards recommendations for comprehensive global HIV-AIDS standards development. Local and

global state, private, parastatal and non-governmental HIV-AIDS programmes were analyzed in terms of their clinical wellness and management protocols toward quality management systems.

Conclusion

It is imperative to note that not all health sectors have taken the challenge to implement quality management systems consistently. Some reasons for this include, implementation cost, dedicated personnel, set up, maintenance and documentation, lack of education and awareness and lack of skills set. To date selected private health companies have embarked on ISO accreditation of their facilities in a bid to improve service delivery. The same has not been echoed in the public sector. The parastatal sectors and non-governmental organizations utilize elements of global UNAIDS, PEPFAR and USAID documentation[2]. It is apparent that no standard for quality management of health systems exists for HIV-AIDS programmes, but an urgent need exists.

Recommendations

The need for a healthcare quality management system relevant to HIV-AIDS care is needed. Education and awareness activities governing quality management systems in HIV-AIDS healthcare should be encouraged among healthcare workers. Quality management systems certification should become necessary accreditation for all healthcare facilities including Hiv-AIDS programmes. Quality management systems in healthcare should form core curriculum in undergraduate and post graduate healthcare studies in order to grow future leaders in this field. A quality management system regulatory body should be developed locally and globally providing clinical governance to health facilities guiding best practices especially for HIV-AIDS programmes.

Conflict of Interest: NIL

Funding: Durban University of Technology as part of the primary author's doctoral thesis.

Ethics clearance: Durban University of Technology as part of the primary author's doctoral thesis.

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DOI Number: 10.5958/0973-9130.2019.00126.9

Non-communicable Diseases and HIV-AIDS: A Reason for an Integrated Approach for HIV-AIDS Programme Management

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Abstract

More than 7-million people are estimated to be living with HIV-AIDS in South Africa where the new infection rate is still on the increase[1]. In order to curtail this disease burden, South Africa has implemented the largest ARV programme in the world[8]. Now as HIV positive individuals live longer, more productive lives, the challenge has become on how to manage the double burden of non-communicable diseases and HIV-AIDS[7]. This paper reviews the current landscape of integrated care in HIV-AIDS/NCDs programmes and proposes smart practices toward optimal patient management.

Keywords: *HIV-AIDS, Integrated care, non-communicable diseases*

Background

A non-communicable disease, or NCD, is a medical condition or disease which by definition is non-infectious and non-transmissible between persons[5]. NCDs may be chronic diseases of long duration and slow progression, or they may result in more rapid death such as some types of sudden stroke They include heart disease, stroke, many cancers, asthma, diabetes, chronic kidney disease, osteoporosis, Alzheimer's disease, cataracts, and more. NCDs are distinguished only by their non-infectious cause, not necessarily by their duration. Risk factors such as a person's background, lifestyle and environment are known to increase the likelihood of certain non-communicable diseases[5]. They include age, sex, genetics, exposure to air pollution, and behaviours such as smoking, unhealthy diet and physical inactivity which can lead to hypertension and obesity, in turn leading to increased risk of many NCDs[5]. Most NCDs are considered preventable because they are caused by modifiable risk factors.

The WHO's World Health Report 2011 identified five important risk factors for non-communicable disease in the top ten leading risks to health[8]. These are raised blood pressure, raised cholesterol, tobacco use, alcohol consumption, and overweight. Other factors associated with higher risk of NCDs include a person's economic and social conditions, also known as the "social determinants of health[8]." It has been estimated that if the primary risk factors were eliminated, 80% of the cases of heart disease, stroke and type 2 diabetes and 40% of cancers could be prevented[8]. Interventions targeting the main risk factors could have a significant impact on reducing the burden of disease worldwide. Efforts focused on better diet and increased physical activity has been shown to control the prevalence of NCDs[8].

The understanding of the relationship between HIV and non-communicable diseases was complicated by the results of the SMART study, which had been designed to evaluate whether it might be possible to reduce the complications of ART, and preserve the drugs, by delaying treatment or taking people off of treatment when their CD4 cell counts were above 350[5].People living with HIV (N = 5472) (most of whom were taking ART whenever the study started) were randomized to continuous versus intermittent ART (not treating if the most recent CD4 cell count was above 350)[5].

Integrated care is a trend in health care reforms and new organizational arrangements focusing on more coordinated and integrated forms of care provision[2]. Integrated care may be seen as a response to the fragmented delivery of health and social services being an acknowledged problem in many health systems[4]. Distinction is also made between horizontal integration and vertical integration[4]. The integrated care literature distinguishes between different ways and degrees of

working together and three central terms in this respect are autonomy, co-ordination, and integration[6].

Discussion

A retrospective data review was undertaken to ascertain the prevalence of integrated care in healthcare globally and specifically in the arena of HIV-AIDS and NCDs. The aim of this review was to assess available data on the prevalence of integrated care in HIV-AIDS and NCDs healthcare and identifies gaps and smart practices towards recommendations for comprehensive global HIV-AIDS/NCDs standards development

Conclusion

A paucity of data exists in this relatively new arena of the double burden of HIV-AIDS management and NCDs. A benefit to management would be a combined approach through integrative care which will allow for a more streamlined approach resulting in fewer resources, better compliance and more efficient and effective patient outcomes.

Conflict of Interest: Nil

Funding: Durban University of Technology as part of the primary author's doctoral thesis.

Ethics Clearance: Durban University of Technology as part of the primary author's doctoral thesis.

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DOI Number: 10.5958/0973-9130.2019.00127.0

Post Traumatic Fibrous Dysplasia of Ribs at the Chest Tube Site (A Case Report)

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Abstract

Fibrous Dysplasia (FD) is a benign non-inherited and rare skeletal disorder that can affect any bone of human body. FD is caused by a mutation in *GNAS1* gene, but the mutation is not inherited from parents. While there are some reports of post-traumatic fibrous dysplasia, but the relationship between fibrous dysplasia and trauma or previous injury is unclear. Most of the time, fibrous dysplasia is diagnosed by accident in x-ray imaging. While there is much information on fibrous dysplasia, the main etiology is still unknown, however it seems to be linked to a gene mutation .A mutation in this gene affects differentiation and proliferation of cells. This benign fibro-osseous lesion is a result of disturbances of normal bone metabolism by a mutation of the alpha subunit of guanine nucleotide binding protein alpha stimulating. Here we report a case with two adjacent ribs involvement in a 25-year old man who admitted to our hospital with an acute right chest pain and swelling with history of major trauma in a motor vehicle accident 4 years ago with associated hemo-pneumothorax resulted in thoracostomy tube insertion and with subcutaneous mass was detected in the right chest wall which was located exactly at the thoracostomy tube insertion site.

Keywords: *Fibrous Dysplasia, Trauma, Chest Tube, GNAS1*

Introduction

Fibrous dysplasia (FD) is a benign non-inherited and rare skeletal disorder that affects any bone of human body.[1,2,3] Any part of the skeletal structure can be affected by FD, but the long bones, craniofacial bones and ribs are the most common affected sites.[2,4] In the process of FD development, the involved bone is replaced by fibrous tissue and abnormal immature woven bone.[2,3,5] Fibrous dysplasia generally is divided into 2 non-neoplastic types: I) It only affects a single bone as monostotic form II) It affects more than one bone or multiple bones as polyostotic form.[2,5] The monostotic form is more common and leads to most bone involvement while the polyostotic form is less common but with more severity.[3,6] It is evident that FD is caused by a mutation in a *GNAS1* gene which causes disturbances in the differentiation and proliferation of osteoblasts leading to development of fibrous tissue and abnormal immature woven bone instead of normal bone.[2,3,7,8,9,10] This mutation is not inherited from parents and it affects male and female similarly. Fibrous dysplasia can occur as a part of more complex disorders such as McCune_Albrigh syndrome, Masabraud syndrome and endocrine dysfunction.[1,2,3,11,12,13,14] Some of the patients with the fibrous dysplasia experience fewer or no symptoms.[3] Sever Fibrous dysplasia presents with bone pain, deformities, fractures, hormonal impairment and some other abnormalities such as early puberty, thyroid gland impairment, skin discoloration.[2,12] Most of the time, fibrous dysplasia is diagnosed by accident in x-ray imaging. CT, MRI, Bone scan are used for diagnosis and detection of abnormalities.[1,3,15] These diagnostic tools help to detect abnormalities related

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to FD, but the biopsy may be necessary to confirm the main diagnosis.[1] It seems that CT and X-Ray are the best ways for detecting fibrous dysplasia and the features of MRI are not helpful to distinguish fibrous dysplasia from other lesions.[6] X-ray imaging shows a dense structure like bone or a ground glass appearance.[6] There is no cure for fibrous dysplasia and treatment may include surgery which is often necessary to remove or fix or prevent bone abnormalities and the main focus is on the relieving probable signs and symptoms.

Case Presentation

A 25-year old man admitted to our hospital with an acute right chest pain and swelling. The pain has started 2 months ago. He had a history of major trauma in a motor vehicle accident 4 years ago with associated hemo-pneumothorax resulted in thoracostomy tube insertion. He did not have any history of any other problem before the trauma. In physical examination, a subcutaneous mass was detected in the right chest wall which was located exactly at the thoracostomy tube insertion site. Figure 1 and 2 represent CT scan and chest x-ray image view. CT scan showed a cystic bone lesion at the same location. The laboratory evaluations were of no significant problem. The physical examination showed no other finding. Some differential diagnosis based on clinical symptoms, history and imaging finding were: Ossifying Fibroma, Osteoma, Bone Cyst, Giant Cell Tumor or a malignancy of osseous origin.[16,17]

To narrow down the diagnoses, CT-guided biopsy was performed which was not diagnostic. Thereafter the patient was selected as a candidate for excisional biopsy at the site of the ribs. The pathology report of resected rib lesion indicated fibrous dysplasia. Microscopic findings showed a benign neoplastic tissue composed of narrow, carved and misshaped bony trabecular showing fish and Chinese letter configuration interspersed by fibroblastic and histiocytic stroma. Some osteoblasts-type giant cells were noted. No mitotic figures were identified (Figure 3 and 4). There was no post-operative complication after resection of the rib and lesion. The patient was discharged from hospital 4 days after surgery.

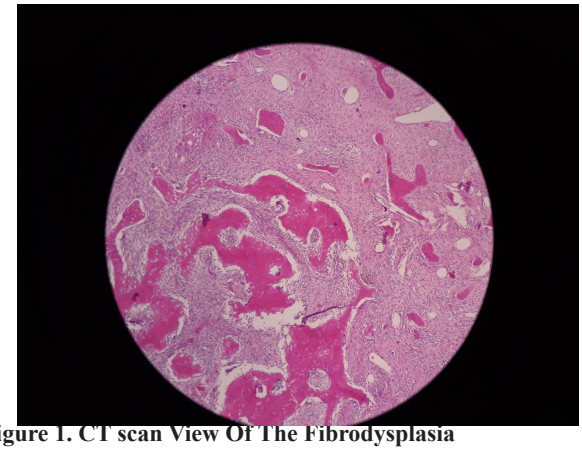

Figure 1. CT scan View Of The Fibrodysplasia

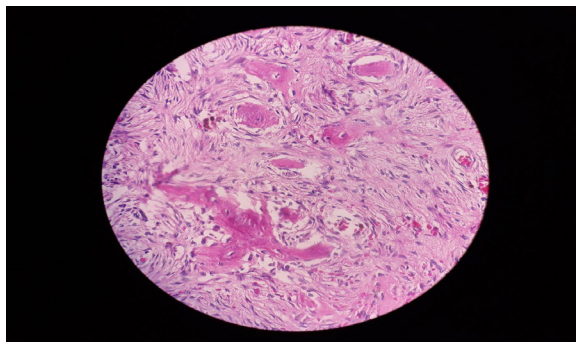

Figure 2. Cxr View Of The Fibrodysplasia

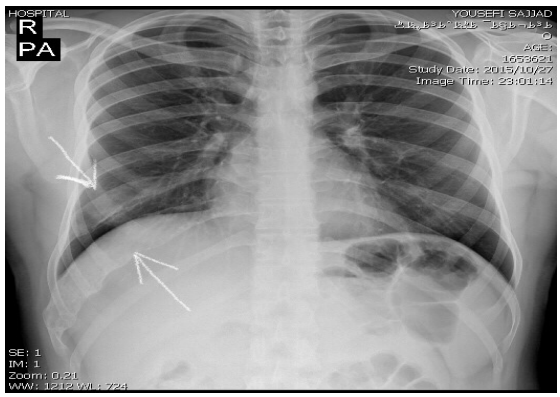

Figure 3. pathologic view of fibrodysplasia

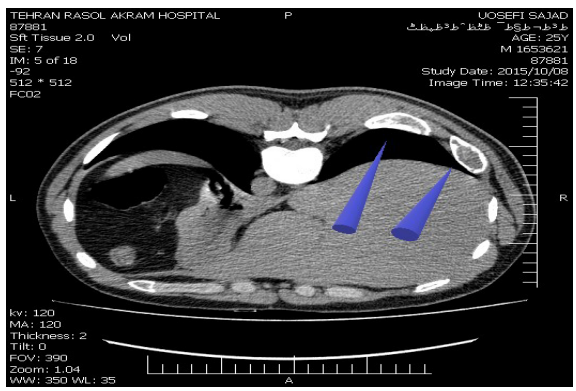

Figure 4. Pathologic View Of Fibrodysplasia

Discussion

Post-traumatic fibro-osseous lesion of rib was first reported by McCarthy et al.[18] in 1985 as a painless fibro-

osseous lesion of the rib resembling osteoid osteoma. These investigators described six patients with unusual benign lesions of the ribs discovered by bone scan. At that time, an association with previous injury was not clear, but subsequent reports have linked this entity to trauma. These lesions are mainly asymptomatic, and incidentally found as solitary hot spots on bone scans. They affect adults without gender predilection and there is usually a history of trauma.[11] Fibrous dysplasia includes about 1% of all primary bone lesions and 5 to 8% of benign osseous lesions.[7,10,19] Fibrous dysplasia can affect any bone, but in this case the fibrous dysplasia affected the ribs. Mortality rate of benign fibrous dysplasia is 0%.[2] In the presented case, the lesion grew slowly for 2 years after the trauma as a painful mass in the chest. The cystic mass was discovered at the ribs in the right side of the chest wall and it developed exactly at the chest tube site. The main diagnosis was made on biopsy. Therefore for diagnosis and treatment, biopsy and resection of the lesion under general anesthesia were done and cystic bony mass was completely removed with no recurrence at the first year after surgery. There was no additional extra-thoracic region with increased activation of osteoblasts in the patient.

While there is much information on fibrous dysplasia, the main etiology is still unknown, however it seems to be linked to a gene mutation .A mutation in this gene affects differentiation and proliferation of cells. This benign fibro-osseous lesion is a result of disturbances of normal bone metabolism by a mutation of the alpha subunit of guanine nucleotide binding protein alpha stimulating (*GNAS1*). This mutation leads to increased cAMP in the intracellular space and then differentiation of osteoblasts occurs in an unusual pathway.[8]

While there are some reports of post-traumatic fibrous dysplasia, but the relationship between fibrous dysplasia and trauma or previous injury is unclear. There are other reports of post-traumatic fibrous dysplasia and probable effects of trauma on development of FD lesions[1] and we also think the fibrous dysplasia of the presented patient can be related to the trauma. Fibrous dysplasia can be transformed to malignancy and potentially may cause malignant changes. This can occur in 0.5 % of monostotic type and 4% of McCune_ Albright syndrome.[20,21,22,23,24,25,26,27]

Funding: Authors have not used any funding to write this paper.

Declaration of conflicting interests: The authors declare that there is no conflict of interest regarding the publication of this article.

Ethic: Ethical clearance taken from ethical committee of Iran university of medical sciences.

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DOI Number: 10.5958/0973-9130.2019.00128.2

Study of the Antibiotics Use Patterns in Inpatients of Trauma Centers in Iran during 2014-2015

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Abstract

Introduction: The increasing prevalence of bacterial resistance in antibiotics has globally become an issue in recent years, and there is a correlation between wrong use of antibiotics and the microbial resistance. Since the pattern of use for antibiotics has considerable significance among all forms of medicine consumption, the present paper aims to study the pattern of use for antibiotics in Shahid Bahonar Hospital in Kerman.

Materials and Method: The present research is a descriptive cross-sectional study conducted in Shahid Bahonar Hospital in Kerman, a hospital affiliated to Kerman University of Medical Sciences; the studied sample is all patients with 15 years of age and above who were admitted to the mentioned hospital during 2014 and 2015 and took antibiotic medicines during their hospitalization period. The statistical analysis of the data was performed by SPSS 18.

Results: The present research determined that 69% of the studied patients were using antibiotics during their treatment period at the hospital; moreover, during this 2-year time span, the antibiotics with highest consumption amounts were as follows: Cefazolin, Clindamycin, Meropenem, and Vancomycin.

Conclusion: Based on the research results, it was found that, on average, 20 to 40 % of the drug costs of the patients goes to antibiotics; this finding was in line with the previous researches. Also, some hospital departments had a higher antibiotics use, which is due, presumably, to lack of proper administration and/or to prolonged hospitalization period.

Keywords: *Pattern of use, Hospital, Drug daily dose, Antibiotic resistance.*

Introduction

The increasing prevalence of bacterial resistance to antibiotics has become a serious problem all over the world [1, 2]. In fact, there is a clear relationship between misuse of antibiotics and bacterial resistance [3, 4]. The overuse of antibiotics, as well as lack of close observations for infection control indices are the two main factors causing the increase in antimicrobial resistances [1,5,6]. Previous studies show that antibiotics have been prescribed inappropriately in 50% of the cases [5, 7]. In addition, it was clarified, in a similar study, that most of the cases in which antibiotics were prescribed for kids and/or prescribed by general practitioners were unnecessary [8]. The total amount of an antibiotic which is overused in a specific geographical area during a specific period can be one of the main reasons behind resistance against that antibiotic [3,9]. Among the potential problems caused by overuse of antibiotics, one can mention the antibacterial resistance, the increase in the burden of chronic diseases, the increase in the cost of healthcare services, and the prevalence of antibiotics side effects [10].

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Several methods have been proposed for measuring the consumption of antibiotics [11,12]. The WHO has recommended the Defined Daily Dose (DDD) as a standard scale for measuring the average maintenance dose per day for a drug (e.g. antibiotics) used for its main indication in adults [11,12]. Knowledge about patterns of the prescribed prescriptions is an important tool in rational medications [13]. Previous studies show much variety in the pattern of use for antibiotics in different countries [14,15].

In a study conducted by Behboodi during 1996-98 in educational hospitals of Rasht City, northern Iran, on patients who had undergone surgery, he found out that using antibiotics in surgeries was often inappropriate, excessive, and disordered; he, moreover, discussed the need for review and reform in trainings manuals about using such drugs [16]. In another study by Hajebi et al, they concluded that using antibiotics for a few days before surgeries, especially for elective surgeries for prevention, could be considered as an example of irrational usage of antibiotics [17]. Khoshdel and Panahandeh also conclude, in their research, that the pattern of use for antibiotics in is not compatible with the standard pattern and the approved treatment protocol. Therefore, they deem it necessary to take the required measures about rational use of antibiotics [18].

Since the pattern of use for antibiotics is more important than for other drugs, the present paper attempts to study the pattern of use for antibiotics in Shahid Bahonar university hospital in Kerman as the main trauma center in Southeastern Iran.

Method

This research was of descriptive/cross-sectional type was conducted in Shahid Bahonar hospital affiliated with the Medical Sciences University of Kerman; as the main trauma center of Southeastern Iran, this hospital includes 9 wards and 345 beds. The studied cases included all patients over 15 years of age who were admitted in this hospital during 2014-15 and have taken antibiotics during treatment. Data for the studied patients were obtained from the hospital information system.

In this study, it was tried to separately present the data of different wards at the hospital, including orthopedics, oncology, emergency monitoring, urology, general surgery, oral and maxillofacial surgery, neurosurgery, internal medicine, and critical care. Medicines consumption rate was measured based on the daily dose, as well as the admitted patients' consumption rate by means of daily dose scale for number of beds measured using Equation 1 [19].

Eq. (1)

Microsoft Excel was applied for studying the data extracted from the HIS. In addition, SPSS v.18 was used for statistical analysis. The *t*-test was used in order to compare the average consumption of antibiotics based on DID during 2014-15 in different wards of the hospital. P-values less than 0.05 were considered as significant difference.

Results

The age and gender distribution of the admitted patients medicated by antibiotics, are shown in Table 1.

Table 1. The age and gender distribution of the admitted patients medicated by antibiotics

Patients charact-eristics	**Total No. of admitted patients**		**No. of patients medicated by antibiotics**		**Percentage of patients medicated by antibiotics**	
Age	2014	2015	**2014**	**2015**	**2014**	**2015**
<18	2985	2725	1865	1802	62.5%	65.5%
18-40	9669	9423	7025	6806	72.7%	72.2%
41-60	4194	4482	2832	3054	67.5%	68.1%
>60	2658	3168	1736	2088	65.3%	66%
Gender	-	-	-	-	-	-
Male	14033	14058	9877	9951	70.4%	70.8%
Female	5473	5767	3581	3799	65.4%	65.9%
Total	19506	19825	13458	13750	69%	69.4%

The average duration of hospitalization for the patients in 2014 and in 2015 was 7.2 and 7.4 days respectively and the patients, on average, took 2.1 and 2.2 antibiotics per prescription respectively (Table 2).The 10 most used antibiotics during these two years are shown in Table 3.

Table 2. Additional information about the patients medicated by antibiotics

Parameter	N=27208(Total No. in 2014-15) Mean(SD)	
	2014	2015
Age (year)	35.6(19.1)	37.3(19.8)
Gender (male-female)	9877-3581	9951-3799
Average hospitalization period (day)	7.2(4.1)	7.4(4.2)
Average no. of antibiotics per prescription	2.1(1.9)	2.2(2.1)
Total no. of patients medicated by antibiotics	13458	13750

Pattern of use for antibiotics in different wards based on DID are shown in table 4.

Table 3. Pattern of use for the 10 most prescribed antibiotics based on number

No. (%)		Antibiotic	Class
2015	2014		
77101(23.11)	90579(31.53)	**Cefazolin**	**Betalactams**
18966(5.69)	19062(6.64)	**Ceftriaxone**	
18779(5.62)	13991(4.87)	**Ceftazidime**	
5844(1.75)	10872(3.78)	**Imipenem**	
20562(6.16)	21453(7.47)	**Metronidazole**	Nitroimidazoles
39791(11.93)	23490(8.18)	**Meropenem**	Carbapenems
19617(5.88)	15100(5.26)	**Amikacin**	Aminoglycosides
52103(15.62)	38615(13.44)	**Clindamycin**	Lincosamide
17819(5.34)	14975(5.21)	**Ciprofloxacin**	Quinolones
62996(18.88)	39153(13.63)	**Vancomycin**	Glycopeptide
333578	287290	**-**	**Total**

In 2015, in emergency ward, the average dose of antibiotics based on daily dose per bed decreased significantly in comparison to 2014 while it increased significantly in the other two wards, i.e. the ICU and orthopedics wards(Table 5).

Table 4. pattern of use for antibiotics in different wards based on DID

Urology		Emergency		Orthopedics		General surgery		ATC code	Antibiotic
2015	2014	2015	2014	2015	2014	2015	2014		
33.3	50.3	7.6	41.5	100	95	52.4	57.4	**J01DB04**	**Cefazolin**
30.9	25	1.1	5	2.7	2.4	37.1	43.3	J01DD04	**Ceftriaxone**
17.7	13.2	3	3.6	3.2	2.8	2.6	1.4	J01DD02	Ceftazidime
0.5	1.3	3.1	6.3	2.8	1.7	2.9	3.5	**J01DH51**	**Imipenem**

Cont... **Table 4. pattern of use for antibiotics in different wards based on DID**

1.9	1.8	0.3	13.2	1.5	0.7	19.2	31.8	P01AB01	Metronidazole
3.5	2	2.2	9	5	2.5	15.8	6.1	J01DH02	**Meropenem**
9.7	6.3	0.1	1.1	10.6	7.8	2.1	4.1	J01GB06	Amikacin
0.9	0.8	0.3	3.8	3.9	3.2	15.3	18.8	J01FF01	**Clindamycin**
3.4	1.6	0.1	0.4	1.8	1.3	3.4	2.7	J01MA02	Ciprofloxacin
0.8	1.2	2.7	11.7	18.4	7.4	6.9	4.1	J01XA01	**Vancomycin**
10.3	10.4	2.2	9.6	15	12.5	16.8	17.1	-	**Average**

The 10 most used antibiotics based on DDD and price are shown in table 6.

Table 5. Differences among the 10 most used antibiotics based on DID during 2014-2015 in different wards

p-value	Degree of freedom (DOF)	t-value	Error value	SD	Mean difference	Wards
0.85	9	-0.19	1.43	4.55	-0.28	**General surgery**
0.04	9	2.38	1.05	3.33	2.51	**Orthopedics**
0.04	9	-2.3	3.2	10.1	-7.41	**Emergency**
0.96	9	-0.45	2	6.34	-0.09	**Urology**
0.61	9	0.54	3.31	10.49	1.78	**Oncology**
0.33	9	1.01	1.84	5.85	1.88	**Neurosurgery**
0.07	9	2.01	1.32	4.16	2.65	**Oral and maxillofacial surgery**
0.02	9	2.73	4	12.62	10.94	**ICU**
0.8	9	0.25	2	6.32	0.51	**Internal medicine**

Table 6. The 10 most used antibiotics based on DDD and price

Drug	**DDD (gram)**		**Price (I.R. Rial)**	
	2014	2015	2014	2015
Cefazolin	82946	75160	13694	17916
Ceftriaxone	18478	18450	14883	22860
Ceftazidime	21381	24566	24200	37110
Imipenem	5436	2922	370000	420000
Metronidazole	9200	8550	14770	19380
Meropenem	21986	36286	196138	285596
Amikacin	7247	9531	21603	38237
Clindamycin	11046	15080	27333	39013

Cont... **Table 6. The 10 most used antibiotics based on DDD and price**

Ciprofloxacin	3582	4063	65000	75234
Vancomycin	20781	31710	60000	79148
Total	202110	226318	-	-

Discussion and Conclusion

About 69% and 69.4% of all patients admitted during 2014 and 2015 took antibiotics respectively. In a similar research conducted in India, researchers reported that 92% of the admitted patients were medicated by antibiotics [20]. On the other hand, another study conducted in Turkey shows that only 30% of the admitted patients were medicated by antibiotics [21]. Such inconsistent findings show different nature of antibiotics prescribing in different areas. Moreover, the present research showed that the average number of antibiotic per prescription was 2.1 and 2.2 in 2014 and 2015 respectively, which is in line with the study conducted previously in Italy [22]. The present study also indicated that the most common antibiotic for prescription is of beta-lactam type (31%) which is in line with the results of previous studies in this field [22, 23]. Based on daily dose per bed, Cefazolin, Meropenem, and Vancomycin were the most used antibiotics during 2014 and 2015. Since the study location was also the trauma center in addition to another study conducted in this field, the mentioned antibiotics were found to be used vastly for post-surgery infections [24]. The results are compatible with previous studies. Also, the present study showed that there is a significant difference between the three wards of orthopedics, ICU, and emergency regarding using the antibiotics during the two consecutive years. As perceived from the results, the process of prescribing antibiotic in emergency ward was decreasing in 2015 compared to 2014, which is probably due to implementation of the national reorganization project for emergencies by the Ministry of Health and Medical Education in late 2014, by which the country emergencies were required to determine the patients' situation for 6 hours maximally. The increase in antibiotics prescription in orthopedics ward was due to the fact that the studied hospital is the center of trauma in Kerman province, and that the orthopedic patients are inseparable part of accidents and, therefore, lack of appropriate organization for patients in this ward causes nosocomial infections that leads to overuse of antibiotics.

On the other hand, patients in ICU at this hospital are suffering from multiple traumas, which prolong the patients' length of stay in the ward. Therefore, this finding is also compatible with those of the previous study reporting that the infection risk for those with long-term stay in hospital is high [25].

According to the studies in this paper, the antibiotics cost approximately included 32% and 38% of the patients' medication costs in 2014 and 2015 respectively, which is compatible with the results of previous studies [26]. Considering the results and the increase in antibiotics price (Table 6), the increase in prescribing the antibiotics may impose higher costs to the patients.

One of the power points of this research is high volume of patients' data studied within two years. In addition, all wards of the hospital were included in the study, which can be considered as another powerpoint. Since there was not access to the prescriber physicians, the process of antibiotics prescription by physicians was not studied, which can be regarded as one of the limitations of this study. Another limitation was lack of considering the patients' disease type and disease intensity based on diagnosis, which can play an important role in the accuracy of the results.

For further studies, it is recommended to conduct a research for studying the medication mistakes related to overuse, abuse, or misuse of antibiotics, in order to determine how much of antibiotics prescription results in medication mistakes and what impact it will have on patients care and their safety.

Conflict of Interests: Nil.

Ethical Considerations: 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.

Source of Funding: None.

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DOI Number: 10.5958/0973-9130.2019.00129.4

Effective Factors on Outbreaks of Food and Water Borne Diseases in Iran: A Trend Analysis

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Abstract

Introduction: Waterborne and foodborne diseases are a major global public health concern. This study was conducted to identify affecting factors on waterborne and food borne outbreaks and analyzing its trend in Iran.

Materials and Method: A descriptive cross-sectional study was carried out using waterborne and foodborne disease national surveillance system data from 2015-2016, which have been reported by all provincial health centers to the Center for Communicable Disease Control of the ministry of health. Collected data were analyzed using SPSS version 16 software.

Results: a total of 5, 500 water and food borne outbreaks reported in Iran. Analyzed data showed that the outbreak rate was 4.14/100000 in 2015 to 2.7/100000 population in 2016 in Iran. According to laboratory results, the most frequent microbial pathogens which were sources of outbreaks included Escherichia Coli, Shigella, Entamoeba Histolytica, Salmonella, Hepatitis A virus and Vibrio NAG (Non Agglutinating Groups). The highest frequency of outbreak occurred in rural areas (56.1%). The most commonly reported symptoms were abdominal pain, vomiting and diarrhea. Qazvin, Zanjan and Kermanshah were three provinces that reported more outbreaks than nationally outbreak incidence rate during 2015 -2016.

Discussion and Conclusion: trend analysis of reported Waterborne and foodborne diseases in Iran showed a seasonal pattern, particularly increased in autumn. Occurrence of this outbreaks in many provinces with higher incidence need to root cause analysis and interventions subsequently. These interventions should be carried out both at the level of health policy-makers to set appropriate, evidence-based priorities in the area of water and food safety and at the community level. Using syndromic surveillance data for outbreak detection, active case-finding, timely diagnosis, accurate treatment, patients monitoring along with public health education are highly recommended. Rational use and prescription of drugs inhibits antibiotic resistance and can reduce the cost of therapeutic of these diseases.

Keywords: *Foodborne diseases, Outbreak, Surveillance system, Water borne diseases.*

Introduction

Water and foodborne diseases are one of the most important public health problems, Which cause a significant number of mortality in people every year[1]. The outbreak of waterborne and foodborne diseases imposes enormous social and economic burden on health systems, So the safety and security of food and water is important[2]. Foodborne or waterborne diseases are caused by consuming contaminated foods or beverages. A food or water outbreak is an incident in which two or more persons experience a similar illness after ingestion or drinking of a common food or water source with the same clinical symptoms, and epidemiologic analysis implicates the food or water as the source of the illness. Foodborne diseases have been an issue for all societies since the beginning of humanity. The types, severity and impacts of these illnesses have changed through the ages and are still diverse across regions, countries and communities.

Waterborne disease is a global burden which is estimated to cause more than 2.2 million deaths pear year [4, 5]. About 1.4 millions of these deaths are children [4]. It is suggested that waterborne diseases have an economic cost associated of 12 billion dollars annually in the World [6].

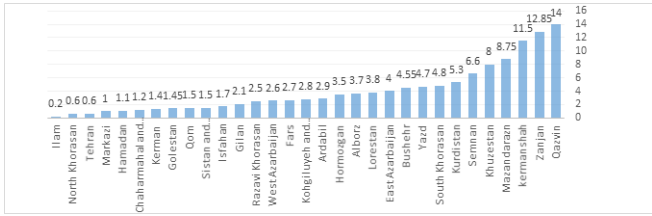
Monitoring and trend analysis of the outbreaks of waterborne and foodborne disease are necessary to prevent and control of them. This study was conducted to identify affecting factors on water and food borne outbreaks and analyzing its trend in Iran.

Materials and Method

This descriptive cross-sectional study was carried out using waterborne and foodborne disease national surveillance system data from 2015-2016, which have been reported by all provincial health centers to the Center for Communicable Disease Control of the ministry of health. The data of waterborne and foodborne diseases' outbreaks were extracted from reports of surveillance system related to Center of Disease Control of the Ministry of Health in Iran. The data collected for each outbreak include the date of outbreak, the place of outbreak, the number of inpatient and outpatients, the agent of disease, age, gender, disease symptoms, outcomes of the disease (death or recovery), type of food consumed, type of sample used for testing, reference laboratory approval, treatment, period of outbreak, population at risk and transmission route. The validity and reliability of data collection tools has been confirmed through previous studies. The data collected for this study was approved by surveillance system related to CDC of Ministry of Health in Iran. The country's guide to the foodborne disease surveillance system was announced in 2006 by Ministry of Health to all provinces. Data were analyzed by using descriptive and analytical statistics with SPSS software(version 16). descriptive statistics used to percentage of frequency and the Chi-square test used to show the distribution of the outbreak variables relationship between outbreak and other variables.

Results

A total of 5, 500 water and food borne outbreaks reported in Iran. Analyzed data showed that the outbreak rate was 4.14/100000 in 2015 to 2.7/100000 population in 2016 in Iran.



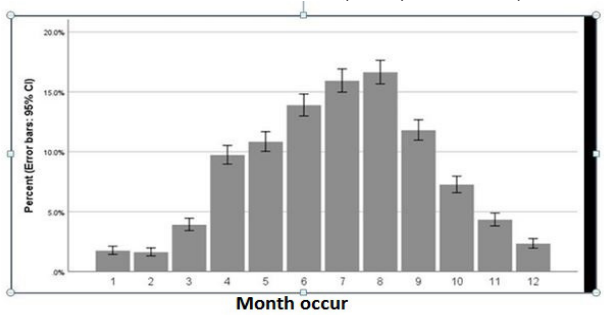
Graph 1. Incidence rate of foodborne disease outbreaks by provinces in Iran/100000

Qazvin, Zanjan, Kermanshah and Mazendaran were three provinces that reported more outbreaks than nationally outbreak incidence rate during 2015 -2016.

Incidence of foodborne disease outbreaks by provinces were shown in graph 1.the most frequent microbial pathogens which were sources of outbreaks included Escherichia Coli, Shigella, Entamoeba Histolytica, Salmonella, Hepatitis A virus and Vibrio NAG. The most frequent pathogen outbreak was reported by clinical diagnosis without testing of microbial pathogen included Staphylococcus Toxin, Rotaviruses, Hepatitis A virus, Adenovirus and non-microbial factors included heavy metals, chemical pesticides and alcohol.

The highest frequency of outbreak occurred in rural areas (56.1%) and urban areas (43.9%). There is a statistically significant relationship between the incidence rate of outbreaks of water and foodborne diseases and the regions of the country (P<0/0001).

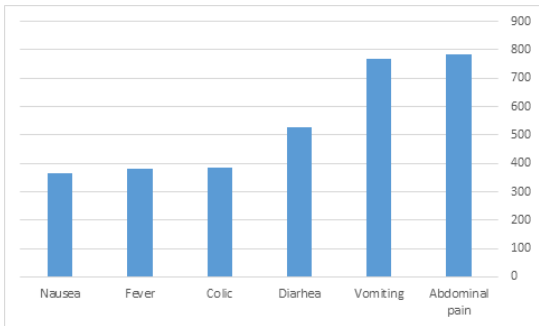
The most frequent of the outbreaks occurred from late summer to early winter(Graph 2). There is a statistically significant relationship between the incidence rate of outbreaks of water and foodborne diseases and the months of the year (P<0/0001).



Graph 2. Frequency of outbreaks by months of the year

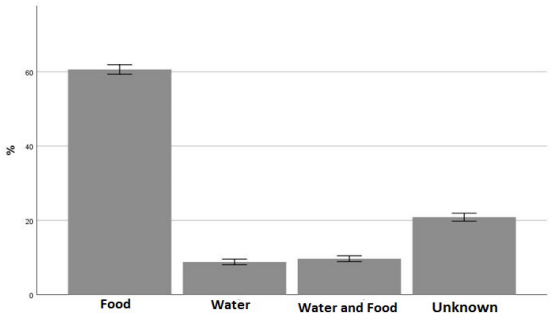
60.3% of the outbreaks occurred in 2015 and 39.7% of them occurred in 2016. The incidence rate of outbreak in the year 2016 was approximately 1.5 times lower compared to 2015. During the 5500 cases of outbreaks, 1173924 people were at risk, 2911 people were ill, 528 people were hospitalize and 4 people died.

The most common reported clinical symptoms were abdominal pain, vomiting and diarrhea(Graph 3).



Graph 3. Incidence of clinical symptoms

The most common way of pathogens transmission were rreported through the food (60.6%), 9% of the cases were transmitted through the water, and the others (31%) did not indicate the way of transmission(Graph 4).



Graph 4. Frequency of transmition route in the patients

Among 4083 cases of water samples that has been tested just 3293 (80%) samples were reported positive microbial contamination. The most_prevalent microbial contamination in water was related to the Coliform, Escherichia Coli, Vibrio NAG, Rotavirus and Adenoviruses. 13.8% of the water samples cases showed the amount of Chlorine residual in water consumption was zero and in 26.4% of the cases, amount of Chlorine residual in water consumption was reported between 0.5 and 0.8 mg / liter (Table 1).

Table 1. The amount of residual Chlorine in water (mg / liter)

mg / liter	Frequency (Percent)
0	757(13.8)
0-0.5	1044 (19)
0.5-0.8	1452(26.4)
0.8-1	414 (7.5)
Not Measure	320 (5/8)

3833 human samples tested, only 3497 cases(90%) of the samples were positive for microbial pathogens. 640 food samples tested, only 499 cases (78%) were positive for microbial pathogens.

Discussion

With the expansion of laboratories and identification equipment, the number of outbreaks increases but this is not necessarily due to the worsening of the health status of the community. It actually provides more accurate information about the health status of the community [7]. For example, in a country like Nigeria with 170 million population, only 90,000 cases of water and foodborne diseases are reported per year, while in a developed country with 24 million population, such as Australia, 5,200,000 cases of these diseases are registered per year. Which in fact represents an effective monitoring system in developed countries [8].

Water and foodborne disease are as a global problem which is estimated more than 2.2 million mortality per year and more people to become ill, including diarrhea, digestive and systemic diseases [9]. About 1,4 million cases (63%) of these mortality About 1,4 million cases (63%) of these deaths are attributable to children due to the weakness of the immune system and the lack of familiarity with health issues, they are usually more affected by this diseases. It is estimated that the burden of these diseases is about $ 12 billion in the world annually [8]. Between 2007 and 2009,, 134 outbreaks of water and foodborne diseases were reported in the United States that 64% of outbreaks were caused by parasites, 21% by bacteria and 4.8% by viruses. The leading etiologic pathogen was Cryptosporidium, Escherichia Coli, Shigella sonnei Pseudomonas and Legionella [10].

Between 2015 and 2016, a total 5,500 outbreaks of water and foodborne diseases were registered in Iran. In this study, 5500 outbreaks of water and foodborne diseases the leading etiologic pathogens were Escherichia Coli, Schigella, Entamoeba Histolytica, Hepatitis A virus and Salmonella.

Outbreak of water and foodborne diseases happened in European Union countries especially Germany in 2011 with Escherichia coli with the origin of raw fruits, vegetables and beans sprouts was one of the most important foodborne outbreaks [10].

in the United States, The most common pathogens of Foodborne diseases outbreak were Salmonella (50%), Escherichia Coli (33%) and Shigella (17%)[11,12].

The main symptoms of disease in these outbreaks were gastrointestinal symptoms, which included Abdominal pain, Vomiting, Diarrhea, Fever, Colic, and Nausea. Abdominal pain, Diarrhea and Vomiting was identified as the most common symptom of poisoning or foodborne infections in Australia[13].

Masoumi Asl et al. 38% of the outbreaks were in urban areas and 62% in rural areas (our study was 43.9% in urban areas and 56.1% in rural areas) and the highest seasons of outbreak occurred in summer (our study in autumn) [14].

In this study, the main way of Transmission of diseases was reported through contaminated food. 60.6% of all cases were due to the use of contaminated food. 9% of the cases were infected through contaminated water, and in 20% of cases, was not identified the way of transmission. The most frequent of outbreaks occurred in the late summer to early winter. However, the rate of outbreaks has decreased in 2016 compared with 2015. The most common clinical diagnosis of diseases included Staphylococcal Toxin poisoning, Rotavirus Diarrhea, Chemical Toxicity and Hepatitis A virus, although in many cases, The pathogen was not detected.

The results of this survey showed that 56.1% of the outbreaks were in rural areas and 43.9% in urban areas. Which will double the necessary attention to rural areas. Although one of the reasons for this figure in rural areas is probably a more accurate registration system in rural areas than urban areas.

Growth and survival of foodborne pathogens is associated with several environmental factors such as temperature, pH, water availability, climate change, and natural disasters [15]. inadequate water purification, such as inadequate surface water filtration or inadequate groundwater disinfection, can lead to outbreak of waterborne disease. Between 2001 and 2002, the cause of 14% of the outbreaks of water borne diseases were due to inadequate water purification [16].

About 780 million people do not have access to safe drinking water, and about 2.5 billion people do not have access to proper water treatment systems in the world. It is estimated that 2.3% of all deaths around the world are due to unsafe water caused by poor sanitation and hygiene. According to the WHO, the improvement of drinking water quality could reduce by almost 4% the global burden of the disease. Despite the significant decline in outbreaks of waterborne diseases since the 1900s, the global burden of these diseases is still significant [17]. In addition, the number of these outbreak is less than actual ones[18].

The amount of residual chlorine in the water after half an hour contact time is 0.5 to 0.8 mg / liter in the normal conditions at the end of the water transfer network. Regarding PH and emergencies situation, epidemic of intestinal diseases and natural disasters is 1mg / liter [18]. In our study, the residual chlorine in water was less than 0.5mg / liter in approximately 33% of cases and it was in the range of 0.5 to 0.8mg / liter in 26.4% of cases. This indicates that the amount of residual chlorine should be carefully monitored in water to ensure complete disinfection of pathogenic agents in the water. The most commonly pathogens detected in water specimens were Escherichia Coli, Coliform, Vibrio NAG , Adenoviruses and Rotaviruses[19].

Conclusion

Trend analysis showed the incidence of Water and foodborne diseases occurred in all seasons, especially in autumn. Occurrence of this outbreaks are indicated that the provinces with higher incidence may need to interventions. This interventions should be carried out both at the community level and health surveillance system. Active case-finding, timely diagnosis, accurate treatment, patients monitoring are highly recommended. Rational use and prescription of drugs inhibits antibiotic resistance and can reduce the cost of therapeutic of these diseases.

It is recommended that, while monitoring and controlling health at the supply level, the importance and training of the basic principles of prevention and surveillance system of foodborne diseases for producers, providers and consumers of food will be informed through various public communication channels. Considering the high incidence of water and foodborne outbreaks, preparedness, sensitivity and the importance of these diseases is one of the priorities in Iran.

Acknowledgments: The authors would like to appreciate Dr. Mohammad Mehdi Gouya and Dr. Babak Eshrati for their collaboration in this article.

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.

Source of Funding: None.

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DOI Number: 10.5958/0973-9130.2019.00130.0

Impact of Health Services Quality upon Clients' Personal Growth and Positive Relations with Others at Outpatient Consultancy Clinics of Al Sadder Teaching Hospital in Al Amara City

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Abstract

The aim of the study is to identify the impact of health services quality upon client's personal growth and positive relations with others at outpatient consultancy clinics of Al Sadder teaching hospital. A descriptive analytic study design was carried out at outpatient consultancy clinics of Al Sadder Teaching Hospital from march 14th to June 12th 2018. Non – probability (purposive) sample of 200 clients who were coming to the Outpatient Consultancy Clinics were selected. Assessment of the health services quality through the SERVQUAL scale consists of 22 items, and assessment of client's personal growth (7 items) and positive relations with others(7 items) through Ryff's scale; and then identification the impact of health services quality upon client's personal growth and positive relations with others. Reliability of instrument was determined through the use of Alpha (Cronbach) approach and the instrument validity was determined through a panel of experts. The findings of the present study revealed that there are significant differences found in the level of client's personal growth and positive relations with others (Ryff's Scale) with regard to health services quality dimensions (Tangibility, Reliability, Responsiveness, Safety and Assurance, and Empathy**).**

Keyword: *Impact; Health services quality; Clients; personal growth; positive relations with others; Outpatient; Consultancy clinics.*

Introduction

Health services quality have defined by Institute of Medicine (IOM) as the level in which health services for individuals, families and communities increase the probability of desirable health outcomes and are harmonious with present professional knowledge [1]. The definition of services quality is differentiated according to quality conductors and codes of the standards, these indicators are not necessary in terms of the a thing that may happen or be the case or conceptual association for these indicators. Health services quality means "the applicable of medical science and health technology in a way that increases its outcomes to health without increasing the mistakes or risks [2]. Health service quality defined as "the providing of health care that overtakes client expectations, fulfill and perfect the optimal possible clinical services outcomes with the available resources [3]. The quality of the health services which is provided by a health professionals can be measured and evaluated by its outcomes, the performance of the care providers, and by interpersonal relationships. Client perceptions of health care quality often affected by their interaction with the health providers. Some researchers reported that specific client sociodemographic and clinical characteristics, such as gender, age, education level, health status and the severity of diseases, are associated with clients' satisfaction scores toward health services quality [4]. Service quality is a significant stimulator of clients' satisfaction and behavioral

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determination. Many quantitative researches have been showing that service quality is an indicator of client satisfaction [5]. Satisfaction means supplying rights and good services that create specific degree of perceived value for the client, so the client is remaining attached positively with the institution [6], also, satisfaction defined as client's positive attitude toward provided services, whereas, client become dissatisfaction and have negative attitudes due to insufficient services that create specific degree of perceived value for the client [7]. Highly client satisfaction means that the actual services performance are higher than their expectations, which leads to improve wellbeing of the client, when the actual services performance are lesser than expectation the clients are dissatisfied, and negative response may be occurring [8]. Personal growth means that individuals seek to realize their full potential and recognize that the self is constantly developing; positive relations with others when individuals experience pleasurable feelings With Others, and these defined as a dynamic processes or system characterized by constant change, activity, or progress, determined by evaluation of the functional or conditional relationships among the individuals, conditions of their life and their environment, explaining the wellbeing involved the prediction and control of both behavior and environment and the interaction between the element, feature, or factor that is liable to vary or change which identified and known by the individual, such as conditional factors, constructional situation and the human being or an individual [9].

Materials and Method

A descriptive analytic study design was carried out at outpatient consultancy clinics of al sadder teaching hospital from march 14th to June 12th 2018. Before the data collection, permissions were obtained to conduct the study. Non – probability (purposive) sample of 200 clients who were coming to the Outpatient Consultancy Clinics. These clients were selected according to the following criteria: Both sexes of clients (Males and Females); Clients who were coming to Outpatient Consultancy Clinics; Clients who were at the age 18 years and older. For the purpose of the present study a questionnaire was designed and developed by the researchers which consists of three parts: The first part of the questionnaire concerned with determination of the sociodemographic characteristics of the sample which including: gender, age, marital status, educational level, occupational status, and residence. The second part of the questionnaire for assessing health services quality using SERVQUAL model which consists of 22 items of statements that measure client's expectations and perceptions of service performance; and these statements are loaded into 5 dimensions of service quality including reliability, responsiveness, assurance, empathy and tangibility, and the third part is adopted on a global scales designed by experts to determine clients' personal growth (7 items) and positive relations with others (7 items) using Ryff's scale. Reliability of instrument was determined through the use of Alpha Cronbach approach (r=0.862) for SERVQUAL scale, and the instrument validity was determined through a panel of (17) experts. In order to achieve the early stated objectives, the data of the study were analyzed through the use of Statistical Package of social sciences (SPSS) version 20 through statistical approach that includes: frequency, percentage, Mean of score, standard deviation, and Pearson Coefficient.

Results and Discusion

The results revealed that the majority of the samples (73.5%) were living in urban areas; (64%) were males; (28.5%) at age 58 years and above; (67.5%) are married; (32%) have secondary school; and 30% of them were government employee. The results indicated that the total mean of score of health services qualityare 2.01, which indicate that health services quality were at moderate level. also, shows that average mean of Tangibility dimension which consists of 5 items (1, 2, 3, 4, 5) are 2.02 which indicate that Tangibility dimension at moderate level; Average mean of Reliability dimension which consists of 5 items (6, 7, 8, 9, 10) are 1.62 which indicate that Reliability dimension at poor level; Average mean of Responsiveness dimension which consists of 4 items (11, 12, 13, 14) are 2.07 which indicate that Responsiveness dimension at moderate level; Average mean of Safety and Assurance) dimension which consists of 4 items (15, 16, 17, 18) are 1.98 which indicate that Safety and Assurance dimension at moderate level; Average mean of Empathy dimension which consists of 4 items (19, 20, 21, 22) are 2.36 which indicate that Empathy dimension at good level. These findings indicate that Empathy dimension at first level of health services quality, then Responsiveness dimension at second level of health services quality, then Tangibility

dimension at third level of health services quality, then Safety and Assurance dimension at fourth level of health services quality, and Reliability dimension at fifth level of health services quality. The findings indicate that the average mean for Personal Growth dimension = 3.65, that means that the clients have high level of personal growth (the dimension of psychological wellbeing). The results indicate that the average mean for Positive Relations with others dimension = 3.17, this means that the clients have moderate level of positive relations with others (the dimension of psychological wellbeing). The results reveal that there are significant relationship between Personal growth and health services quality dimensions at p≤ 0.01 level, that means there are a significant impact of health services quality upon clients' Personal growth. The findings reveal that there are significant relationship between Positive relation with others and health services quality dimensions at p≤ 0.01 level, that means there are an impact of health services quality upon clients' Positive relation with others. The present study indicates that the majority (73.5%) of the clients were living in urban areas, 64% are males, the highest percentage of the study sample 28.5% were at age over 58 years, More than half of the current study clients 67.5% are married, 32% have secondary school, and 30% of them were government employee. The results of health services quality indicate that it was at moderate level. The highest level of health services quality (good) were for empathy dimension (mean = 2.36), whereas the lowest level of health services quality (poor) were reliability dimension (mean = 1.62), another dimensions; Tangibility (mean = 2.02), Responsiveness (mean = 2.07), and Safety and Assurance (mean = 1.98) and all of them have moderate level. These results was supported by the study of Safa (2010) who reported that the five main dimensions of health services quality according to respondents' view are sequenced as follows: (Empathy) at first degree, then (Tangibility) at second degree, then (Responsiveness) at third degree, then (Safety and Assurance) at fourth degree, and (Reliability) at last degree. Concerning the relationship of personal growth and positive relations with others with health services quality, the findings reveal that there are a significant relationship between personal growth and health services quality dimensions at p≤ 0.01 level; the relationship between Positive relation with others and health services quality dimensions at p≤ 0.01 level, that means there are an impact of health services quality upon clients' Personal growth and Positive relation with others. These findings are similar to the study of Belaid, (2015) who indicated that there was a significant relationship between overall service quality and life satisfaction of Bechar hospital. The researchers recommend that the hospital administration should give more attention for clients' needs, educational programs and training courses for staff members who work at outpatient consultancy clinics on how to handle with the clients and their families to help them overcome the psychological distress and improve their psychological status, and hospital administration is recommended to assess clients' satisfactions toward health services quality be developing a complete system in the hospital, thus improve the health services quality and overall clients' satisfaction and then improving personal growth and positive relations with others.

Table 1: Distribution of the clients by their sociodemographic characteristics

No.	Variables	(n=200)	F	%
1	Residence	Urban	147	73.5
		Rural	53	26.5
		Total	200	100.0
2	Gender	Male	128	64.0
		Female	72	36.0
		Total	200	100.0

Cont... **Table 1: Distribution of the clients by their sociodemographic characteristics**

3	Age (year)	18-27	24	12.0
		28-37	36	18.0
		38-47	38	19.0
		48-57	45	22.5
		58 and above	57	28.5
		Total	200	100.0
4	Marital status	Single	34	17.0
		Married	135	67.5
		Widowed	23	11.5
		Divorced	8	4.0
		Total	200	100.0
5	Level of education	Can't read and write	18	9.0
		Read and write	34	17.0
		Primary school	52	26.0
		Secondary school	64	32.0
		Higher education	32	16.0
		Total	200	100.0
6	Occupation	Government employee	60	30.0
		Privet work	45	22.5
		Retired	29	14.5
		Housewife	38	19.0
		Un employee	28	14.0
		Total	200	100.0

Table (2): The level of Health Services Quality

Dimensions of (SERVQUAL) Scale	**Good**		**Moderate**		**Poor**				
	F	**%**	**F**	**%**	**F**	**%**	**M.S**	**S.D**	**Level**
1	115	57.5	62	31.0	23	11.5	2.46	0.69	Good
2	34	17.0	41	20.5	125	62.5	1.54	0.76	poor
3	72	36.0	61	30.5	67	33.5	2.02	0.83	Moderate
4	74	37.0	62	31.0	64	32.0	2.05	0.83	Moderate
5	70	35.0	75	37.5	55	27.5	2.07	0.78	Moderate
Average mean (Tangibility)							2.02		Moderate
6	127	63.5	36	18.0	37	18.5	2.42	0.78	Good
7	26	13.0	33	16.5	141	70.5	1.42	0.71	Poor
8	40	20.0	35	17.5	125	62.5	1.52	0.80	Poor

Cont... **Table (2): The level of Health Services Quality**

9	24	12.0	32	16.0	144	72.0	1.40	0.69	Poor
10	33	16.5	49	24.5	118	59.0	1.57	0.75	Poor
Average mean (Reliability)							1.62		poor
11	66	33.0	78	39.0	56	28	2.05	0.78	Moderate
12	35	17.5	40	20.0	125	62.5	1.55	0.77	Poor
13	126	63.0	47	23.5	27	13.5	2.49	0.72	Good
14	93	46.5	57	28.5	50	25.0	2.21	0.81	Moderate
Average mean (Responsiveness)							2.07		Moderate
15	79	39.5	65	32.5	56	28.0	2.11	0.81	Moderate
16	76	38.0	73	36.5	51	25.5	2.12	0.78	Moderate
17	63	31.5	76	38.0	61	30.5	2.01	0.78	Moderate
18	50	25.0	38	19.0	112	56.0	1.69	0.84	Moderate
Average mean (Safety and Assurance)							1.98		Moderate
19	93	46.5	52	26.0	55	27.5	2.24	0.84	Moderate
20	116	58.0	52	26.0	32	16.0	2.42	0.75	Good
21	124	62.0	41	20.5	35	17.5	2.48	0.77	Good
22	107	53.5	45	22.5	48	24.0	2.32	0.83	Moderate
Average mean (Empathy)							2.36		Good

Table 3: The level of Personal Growth dimension (Ryff's Scale):

Items	**Strongly Disagree 1**		**Disagree 2**		**Not sure 3**		**Agree 4**		**Strongly Agree 5**		**M.S**	**SD**	**Level**
	F	**%**	**F**	**%**	**F**	**%**	**F**	**%**	**F**	**%**			
1	29	14.5	63	31.5	65	32.5	36	18.0	7	3.5	2.64	1.10	Low
2	6	3.0	11	5.5	57	28.5	91	45.5	35	17.5	3.54	1.10	Moderate
3	9	4.5	14	7.0	49	24.5	80	40.0	48	24.0	3.96	1.18	High
4	10	5.0	28	14.0	31	15.5	77	38.5	54	27.0	3.68	0.91	High
5	4	2.0	18	9.0	20	10.0	116	58.0	42	21	3.88	0.94	High
6	6	3.0	10	5.0	26	13.0	111	55.5	47	23.5	3.92	0.89	High
7	4	2.0	15	7.5	28	14.0	102	51.0	51	25.5	3.91	1.00	High
Average mean for Personal Growth dimension											3.65	High	

Table 4: The level of Positive relations with others (Ryff's Scale):

Items	Strongly Disagree 1		Disagree 2		Not sure 3		Agree 4		Strongly Agree 5		M.S	SD	Level
	F	%	F	%	F	%	F	%	F	%			
1	21	10.5	46	23.0	59	29.5	63	31.5	11	5.5	2.98	1.09	Moderate
2	12	6.0	42	21.0	48	24.0	62	31.0	36	18.0	3.34	1.17	Moderate
3	15	7.5	35	17.5	53	26.5	71	35.5	26	13.0	3.29	1.12	Moderate
4	21	10.5	88	44.0	62	31.0	22	11.0	7	3.5	2.53	0.94	Low
5	15	7.5	31	15.5	48	24.0	79	39.5	27	13.5	3.36	1.12	Moderate
6	19	9.5	29	14.5	38	19.0	73	36.5	41	20.5	3.44	1.23	Moderate
7	20	10.0	37	18.5	43	21.5	63	31.5	37	18.5	3.30	1.24	Moderate
Average mean for Positive Relations with others dimension											3.17	Moderate	

Table 5: The relationship of personal growth with health services quality:

Correlations			
		Health services quality	Personal growth
Health services quality	Pearson Correlation	1	.237**
	Sig. (2-tailed)		.001
	N	200	200
Personal growth	Pearson Correlation	.237**	1
	Sig. (2-tailed)	.001	
	N	200	200

Table 6: Correlation of positive relations with others with regard to health services quality:

Correlations			
		Health services quality	Positive relations with others
Health services quality	Pearson Correlation	1	.255**
	Sig. (2-tailed)		.000
	N	200	200
Positive relation with others	Pearson Correlation	.255**	1
	Sig. (2-tailed)	.000	
	N	200	200

Conclusion

The current study concluded that the health services quality were at moderate level according to SERVQUAL scale; Tangibility, Responsiveness, and Safety and Assurance dimensions have moderate level of health services quality, empathy dimension have good level of health services quality, whereas, reliability dimension have poor level of health services quality, the present study also concluded that health services quality dimensions have a significant impact upon the level of personal growth and positive relations with others.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the High Institute of Health Vocational, Ministry of Health, Iraq and all experiments were carried out in accordance with approved guidelines.

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DOI Number: 10.5958/0973-9130.2019.00131.2

Quality of Life for adult Clients Who Undergone Bone Marrow Transplantation at the Specialized Bone Marrow Transplantation Center in Baghdad City : A Cross Sectional Study

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Abstract

Evaluating the quality of life for adult clients who undergone bone marrow transplantation at the specialized bone marrow transplantation center in Baghdad City. A cross sectional design is carried out through the current study from 4th of March 2018 to 10th of November 2018. The study is conducted on adult clients who are visiting specialized bone marrow transplantation center in Baghdad city. A purposive sample " non probability " of (30) teenager (21) male (9) female and who are undergone bone marrow transplantation, six month after operation, with non-Hodgkin Lymphoma (NHL), Hodgkin Lymphoma (HL) and Multiple Myeloma (MM). The pilot study was conducted to determine the questionnaire reliability through the use of split-half techniques and the computation of Cronbach alpha correlation coefficient. The content validity of the instrument was established through penal of (18) experts. Data were analyzed by application of descriptive and inferential statistical methods. The results show poor quality of life (QOL) for adult clients after bone marrow transplantation (BMT). And the results show a significant relationship between adult clients' age and their (QOL). And no significant relationship between gender, marital status and socio – economic status and their (QOL).

Keyword: *Quality of life, Bone marrow transplantation.*

Introduction

Cancer is the second leading reason of death worldwide, and is accountable for an estimated (9.6) million deaths in (2018). Globally, about (1) in (6) deaths is because of cancer. Doctor Hippocrates (460-370 BC) first used the word cancer. Cancer is not a new disease, it has found in clay manuscripts in ancient Egypt that describe cancer and before that found bone of human with bone cancer [1, 2]. The 20th century, developed new methods for cancer treatment by surgery with radiation and/chemotherapy. The growth in knowledge has led to progress in cancer early detection, prevention and treatment .Currently cancer research is advancing on many fronts [3]. (BMT) is a curative format for selected patients with hematologic malignancies, hematologic disorders, and solid tumors. (BMT) is frequently used for treatment of many malignant diseases, such as , (Leukemia and lymphoma Multiple, Myeloma, Hodgkin lymphoma , and Non-Hodgkin lymphoma [4]. Bone marrow is the spongy liquid tissue in the center of some bones. It has a rich supply of stem cells, and its main job is to create blood cells that circulate in body. The bones of the pelvis (hip) have the most marrow and contain large numbers of stem cells. For this reason, cells from the pelvic bone are used most often for a bone marrow transplant. Enough marrow must be removed to collect a large number of healthy stem cells [5, 6]. The basis for (BMT) is that all blood cells and immune cells arise from stem cells in marrow. At the turn of the 20th century, scientists began to formulate the idea that a small number of cells in the marrow might be responsible for the development of all blood cells. They

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began to refer to them as "stem cells." The scientific exploration of marrow transplantation as a form of treatment began at the end of World War II [7]. Patients with cancer disease such, as Hodgkin's, non-Hodgkin's, multiple myeloma, leukemia or lymphoma and does not respond to therapy, may be given radiation and / or very intensive chemotherapy therapy as treatment, which requires bone marrow transplantation (BMT), this requires a long time to stay in hospital and This can affect the patient's (QOL) [8,9]. Therefore evaluation (QOL) is important to find out any changes that have occurred to the patients after (BMT) and any changes have the potential to effect on (QOL), the improve their (QOL) should be a constant concern [10, 11]. Despite the psychological and physical burden experienced by patients undergoing (BMT), studies of interventions to improve their (QoL) and reduce their distress are limited [12 , 13].

Methodology

A cross sectional design is carried out through the current study from 4th of March 2018 to 10th of November 2018. The study is conducted on adult clients who are visiting specialized bone marrow transplantation center in Baghdad city. A purposive sample " non probability " of (30) teenager (21) male (9) female and who are undergone bone marrow transplantation, six month after operation, with non-Hodgkin Lymphoma (NHL), Hodgkin Lymphoma (HL) and Multiple Myeloma (MM). An instrument is developed out The World Health Organization quality of life, spirituality, religiousness and personal beliefs (WHOQOL-SRPB), as well as, Functional Assessment of Cancer Therapy-Bone Marrow Transplant (FACT-BMT) (Version 4) the instrument is consists of two parts. Firs part was socio-demographic characteristic include (age, gender, level of education, marital status and socioeconomic status). The second part contain six domains (Physical, Psychological, Level of independence, Social relationship, Environment, Spirituality / religion / personal beliefs). The pilot study was conducted to determine the questionnaire reliability through the use of split-half techniques and the computation of Cronbach alpha correlation coefficient. The content validity of the instrument was established through penal of (15) experts. Data were analyzed by application of descriptive and inferential statistical methods. The pilot study was conducted to determine the questionnaire reliability through the use of split-half techniques and the computation of Cronbach alpha correlation coefficient. The content validity of the instrument was established through penal of (18) experts. The data were collected by utilization of the study instrument (English version), through the interview with each clients who have bone marrow transplantation, since six month ago, the interview was in specialized bone marrow transplantation center. Each interview took approximately (25) minutes. Data were analyzed through the use of SPSS (Statistical Process for Social Sciences) version (25), the through following approaches, descriptive statistical such as (frequency, percent) and inferential analysis approach (Multiple Linear Regressions)

Results and Discusion

Analysis of such characteristics indicates that most of adult clients is (25-37) years old (40%) of each age groups**.** Regarding their gender of adult clients most of adult clients of male (70%)**.** Relative to their marital status, most adult clients are married and they are accounted for (80%) of the whole subjects. Concerning their socioeconomic status, the most adult clients with low and moderate (40%). Results of this table depict overall evaluation indicates that most of the clients have poor (QOL)(53.3%), regarding to physical domain for adult clients reveals most adult clients have poor level (QOL) (46.7%), with respect to psychological domain presents poor level of (QOL) (50.0%), independence domain shown fair (QOL) (70.0%), Social relationship domain presented poor level (QOL) (60%), related environmental domain the majority of them reported poor (QOL) (76.7%) and Spirituality domain accounted good (QOL) (43.3%). Table 4 show that there is a significant difference between adult clients regard to their (QOL). The result of this table show that there is a significant differences between early and middle adult clients, high a significant differences between early and late adult clients and high a significant differences between middle and late adult clients regarding their (QOL). This table presents there is high significant relationship between of adult clients' age and their (QOL), and no significant relationship between gender, marital status and Socio -Economic Status and their quality of life.

Part I. Socio-Demographic Characteristics

The data analysis has shown characteristics indicates

that most of adult clients is (25-37) years old. Regarding their gender of adult clients most of adult clients of male**.** Relative to their marital status, most adult clients are married. Concerning their socioeconomic status, the most adult clients with low and moderate (Table 1).

Part II. Overall Evaluation for the Quality of Life for Adult Clients Who Undergone Bone Marrow Transplantation

Overall evaluation presents that most of the adult clients have poor (QOL) for those who undergone (BMT) (Table 2). This result can be caused the (BMT) as complex procedure and affects different aspects of clients; physical, psychological, social relationship and spiritual ones and the restoration of their (QOL) take long time, hospitalization for a long period create social and psychological problems. Findings of the current study are supported by Braamse and others (2010) have mentioned that (BMT) is considered as one of the processes that causes decrease in (QOL) before and after transplantation[14]. Another study by Sun and others (2011) indicate that one in five clients post (BMT) has poor depression and psychological outcomes[15].

Part III. Comparative Differences between Adult Clients' Quality of Life

With respect to the comparative differences between adult clients post (BMT) relative their (QOL), Table (3) detects that there is a significant difference between adult clients with their (QOL). This finding can be resulted due to that most of adult clients usually have responsibility with their families and multiple changes consequence of aging that produce multiple health problems. Findings of the existing study are supported by Chiodi and others (2000) who state that clients older than (25) years have significantly poorer (QOL) compared with clients (≤25) years old post (BMT) [16].

Part IV. Comparative Difference between Early, Middle and Late Adult Clients' Quality of Life

Comparative differences between early, middle and late of adult clients after (BMT) in table (4) reveal significant differences between early and middle adult clients, high a significant differences between early and late adult clients and a significant difference between middle and late adults clients. This finding can be interpreted in a way that due to aging and health problems like hypertension and diabetic can cause poor (QOL). This finding of the current study has disagreed with that of the study by El-Jawahri and others (2014) who report the older clients have good (QOL) compared to younger and middle-aged clients despite a high degree of functional and physical limitations [17].

Part V. Relationship between Adults' Socio-demographic Characteristic and Quality of Life

The relationship between adult clients post (BMT) and their socio demographic characteristic relative their (QOL) is presented in table (5). The result of the recent study shows that there is only high significant relationship between age of adults and their (QOL). This result can be interpreted in such way that increase in physical weakness because of aging and increase of chronic diseases may result into poor (QOL). Findings of the present study are inconsistent with that of a study by Janicsák and others (2013) who report that of the socio-demographic characteristics, only gender and unemployment, have affected (QOL) [18].

Table (1). Disribution of Socio-Demographic Characteristics for adults Who Undergone Bone Marrow Transplantation (n=30)

List	Socio-Demographic Charactersitics	Frequency	Percent
1	Age (Years) (25-37) (38-50) (51-64)	 12 10 8	 40.0% 33.3% 26.7%
	Total	30	100%
2	Gender Male Female	 21 9	 70% 30%

Cont... **Table (1). Disribution of Socio-Demographic Characteristics for adults Who Undergone Bone Marrow Transplantation (n=30)**

	Total	30	100%
3	Marital Status Single Married widowed Divorced Separated	 2 24 1 1 2	 6.7% 80% 3.3% 3.3% 6.7%
	Total	30	100%
4	Socioeconomic Status Low (21-51.3) Moderate (51.4-81.7) High (81.8-112)	 12 12 6	 40% 40% 20%
	Total	30	100

Table (2). Evaluation Domins the Quality of Life for Adult Clients Who Undergone Bone Marrow Transplantation (n=30)

Domains	**Poor**		**Fair**		**Good**		**Evaluation**
	F	**%**	**F**	**%**	**F**	**%**	
physical domain	14	46.7%	13	43.3%	3	10.0%	Poor
Psychological domain	15	50.0%	9	30.0%	6	20.0%	Poor
Independence Domain	4	13.3%	21	70.0%	5	16.7%	Fair
Social Relationship Domain	18	60.0%	9	30.0%	3	10.0%	Poor
Environmental Domain	23	76.7%	3	10.0%	4	13.3%	Poor
Spirituality / religion / personal beliefs domain	10	33.3%	7	23.3%	13	43.3%	Good
Overall	16	53.3%	12	40.0%	2	6.7%	Poor

Table (3). Comparative Differences between adult Clients Who Undergone Bone Marrow Transplantation Relative to Their Quality of Life (n=30)

age groups	**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**	**S. C.**
Teenagers Between Groups	3437.200	18	190.956	4.411	.008	S
Within Groups	476.167	11	43.288			
Total	3913.367	29				

Table (4). Comparative Difference between Early, Middle and Late adult Clients Who Undergone Bone Marrow Transplantation Relative to Their Quality of Life (n=30)

Groups	M(SD)			Post Hoc using LSD		
	Early	Middle	Late	Early vs middle	Early vs late	Middle vs late
adults	91.83(5.30)	70.91 (7.62)	64.58 (3.14)	.012	.000	.012

Table (5): Multiple Linear Regressions for the Relationship between adult Clients with Bone Marrow Transplantation Socio-demographic Characteristics and Their Quality of Life (n=30)

Teenage	Unstandardized Coefficients		Standardized Coefficients	T	Sig	S. C.
	B	Std. Error	Beta			
Age	-4.164	.859	-.749	4.254	.000	HS
Gender	-4.258	5.950	-.114	-.716	.485	NS
Marital Status	-4.233	9.789	-.068	-.432	.671	NS
Socio -Economic Status	-.045	.028	-.299	-1.580	.134	NS

Conclusion

The results show poor quality of life (QOL) for adult clients after bone marrow transplantation(BMT). And the results show a significant relationship between adult clients' age and their (QOL). And no significant relationship between gender, marital status and socio – economic status and their (QOL).

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Community Health Nursing Department, College of Nursing, University of Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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DOI Number: 10.5958/0973-9130.2019.00132.4

Synthesis of Some New Aryl Thiobarbituric Acid Derivatives as Antibacterial and Antifungal Agents

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Abstract

We report the synthesis of some aryl thiourea derivatives (1and 2) produced through the reaction of aniline derivatives with CS_2 in absolute ethanol . These derivatives were condensed with dimethylmalonate or azo derivatives using THF as solvent to obtain thiobarbituric acid derivatives (3 and 4 , 11-16) . The later compounds (3and4) were reacted with different aldehydes to produce a new series of thiobarbituric derivatives (5-10) . The species thus synthesized were characterized using different analytical techniques such as IR and ^{1}HNMR spectroscopies . The activity of the prepared compounds against the growth of certain kind of bacteria such as *E.coli , Sepidermidis , Klebseilla , S.aureus* and *Condida* fungi have been investigated, which revealed that all these compounds show good antibacterial and antifungal activity .

Keywords: *aryl thiourea; antibacterial ; thiobarbituric acid; antifungal.*

Introduction

Much of the literature related to thiobarbituric acid derivatives show the importance of these compounds in the pharmaceutical industry. So it is unsurprising that the derivatives of thiobarbituric acid are considered to be of great medicinal importance, in particular as antimicrobial antitubercular agents, antioxidant [4] , herbicides[2] and radio protecter [4] as well as, compounds which include thiobarbiturate unit which are used as sirtuin inhibitors [6] .We are interested in the preparation of analogues of thiobarbituic acid derivatives. Several studies have described the preparation of substituted thiobarbituric acid . Shaaban *et al* [7]. and Xue *et al*[8]. Reported the synthesis of other thiobarbituric acid derivatives . Kandhavelu *et al* reported the preparation of such compounds via the azo coupling reaction of diazonium salts with thiobarbituric acid under NaOAc or NaOH conditions [9].

Materials and Method

All reagents used in this work were commercially available and used without further purification. The purity of the prepared materials was tested via thin layer chromatography using benzene : methanol(5:1). The melting point of each was also measured using open capillary tubes, which were uncorrected. To characterize the derivatives, FTIR spectra were recorded on a Shimadzu model FTIR-8400, whilst ^{1}H NMR spectra were recorded in DMSO-d_6 on aVarian-Mercury 300 MH_Z spectrometer, on which the relevant reaction were also followed .

Synthesis of thiourea derivatives(1-2) .

A mixture of aniline derivatives (0.215 mol) and carbon disulphide (0.329 mol) in absolute ethanol (40 mL) was refluxed until the reaction mixture solidified, which took about 12 hrs. The separated product was filtered and washed with aqueous (1:1) dilute hydrochloric acid to remove any unreacted aniline derivatives, followed by a final wash with cold ethanol[10-11]. A mixture of thiourea derivatives (0.01 mol) in THF(100 ml) as a solvent was refluxed with dimethyl malonate (0.01 mol) for 10 hrs . The reaction products thus obtained, which separated on cooling were filtered and washed with ethanol , and finally recrystallized from THF[12] .

General procedure for synthesis of thiobarbituric derivatives(3,4,11-16)

A mixture of thiourea or azo derivatives (0.01 mol) in THF (75 ml) was refluxed with dimethyl malonate (0.01 mol) for 10-12 hrs . The product which separated on cooling , filtered and washed with alcohol , and

recrystallized from THF .

Synthesis of derivatives (5-10)

A mix of thiobarbituric derivatives(3,4) (0.01 mol) with different aldehydes (0.01 mol) was prepared in ethanol (25 ml) containing a small amount of piperidine as catalyst (4 drops) and refluxed for 4 hrs. The reaction mixture was allowed to cool, and then the precipitated solid was filtered off , dried , and recrystallized from DMF to give compound (5-10).

Results and Discusion

The chemical structures of thiobarbituric acid derivatives were determined via ^{1}HNMR (table 2) and FTIR spectroscopies (table 3) .All spectra recorded were accord with our expectations from the literature.. The physical properties of the synthesized derivatives are summarized in table 1 .Compounds(1 and 2)were prepared from aniline derivatives and CS_2 with ehanol as the solvent . The IR spectra of these compounds , show the appearance of bands at (3205-3213 , (3009-3014) , (1527-1591) , 819 , and 727 cm^{-1} which were assigned to υ(NH), υ(C-H$_{ar}$) , υ(C=C) , υ(C-Br) and υ(C-Cl) vibrational modes, respectively . The ^{1}HNMR spectra measured in DMSO-d$_6$ revealed a multiplet at 7.1-7.6 ppm resulting from the aromatic protons ,and a singlet at 9.8 ppm for the (NH) proton . In addition , the reaction between compounds (1and 2) and the dimethylmalonate or azo derivatives with THF as the solvent led to the formation of derivatives (3, 4 and 11-16) .The IR spectrum of compound(3) shows the appearance of (C=O) vibrational band at 1651 cm^{-1} ,a (C=C) band at(1512- 1597) cm^{-1} , (C-H$_{ar}$) at 3009 cm^{-1}, and (C-H$_{al}$)at 2906 cm^{-1} . The ^{1}HNMR spectrum of compound (3) showed a singlet at 2.9 ppm (assigned to CH_2) ,and a multiplet at 7.4-8.6 ppm assigned to the aromatic protons .The IR spectra of compound (16) , also revealed the appearance of bands at (1688 and 1665) cm^{-1} , 3086 cm^{-1} , and (1573 and 1519) cm^{-1} which were assigned to υ(C=O) , υ(C-H$_{ar}$) and υ(C=C) , respectively . As reported in table 2 , the ^{1}HNMR spectrum of compound(16) showed singlet at (2.3 and 3.1)ppm (CH_3) , a singlet at 3.5 ppm(CH) , and a multiplet at (6.9-7.6) ppm aromatic protons . Finally , compounds (5-10) were synthesized by the reaction of compounds(3 and 4) with various aldehydes in ethanol as the solvent. The spectroscopic data recorded for compound(6) showed the appearance of various band at 1649 cm^{-1} , 3051 cm^{-1} , and (1512 and1585) cm^{-1} which were assigned to the υ(C=O) , υ(C-H$_{ar}$) , and (C=C) vibrations, respectively. The ^{1}HNMR spectrum recorded for compound (6) showed a singlet at 9.1 ppm (=CH) , and a multiplet at 7.6-8.1 ppm aromatic protons [15].

Antibacterial and antifungal activity .

The antibacterial and antifungal activities of the synthesized compounds were studied. Consequently , the inhibition zones were measured in mm as shown in (table 4). The results of antibacterial screening revealed that compounds (5-16) showed activity against *E.coli* , *Klebseilla* , *S.epidermidis* and *S.aureus* showed exception of compound [8]. Furthermore , compounds (5-16) showed antifungal activity against *Condida* fungi, in this instance with the exception of compound [7] .

Table (1): Physical properties of prepared compounds

NO.	formula	Yield%	m.p	M.wt
1	$C_{13}H_{10}Br_2N_2S$	73	158-161	386.1
2	$C_{13}H_{10}Cl_2N_2S$	82	213-217	297.2
3	$C_{16}H_{10}Br_2N_2O_2S$	66	185-189	453.8
4	$C_{16}H_{10}Cl_2N_2O_2S$	78	190-195	365.2
5	$C_{23}H_{13}Cl_2N_3O_4S$	68	260-263	498.3
6	$C_{23}H_{13}Br_2ClN_2O_2S$	80	277-279	576.6
7	$C_{23}H_{13}Br_3N_2O_2S$	55	223-227	621.1
8	$C_{23}H_{13}Br_2N_3O_4S$	52	177-180	587.2
9	$C_{23}H_{13}BrCl_2N_2O_2S$	62	155-157	532.2
10	$C_{23}H_{13}Cl_3N_2O_2S$	67	250-255	487.7
11	$C_{22}H_{13}Br_2N_5O_4S$	75	168-169	603.2
12	$C_{22}H_{14}Br_2N_4O_3S$	63	189-192	574.2
13	$C_{27}H_{20}Br_2N_6O_3S$	53	220-223	668.3
14	$C_{22}H_{13}Cl_2N_5O_4S$	68	199-203	514.3
15	$C_{22}H_{14}Cl_2N_4O_3S$	55	180-183	485.3
16	$C_{27}H_{20}Cl_2N_6O_3S$	68	250-255	579.4

Table (2): FTIR spectra of the synthesized compounds

NO.	υ (N-H)	υ (C=O)	υ $(C-H)_{ar}$	υ (C=C)	υ others
1	3205	-	3009	1591,1527	819(C-Br)
2	3213	-	3014	1591,1533	727(C-Cl)
3	-	1651	3009	1597,1512	2906$(C-H)_{al}$, 815(C-Br)
4	-	1685	3012	1593,1533	2955$(C-H)_{al}$, 727(C-Cl)
5	-	1680	3017	1597,1508	740(C-Cl),1417(NO_2)
6	-	1649	3051	1585,1512	823(C-Br) , 748(C-Cl)
7	-	1716	3024	1583,1529	819(C-Br)
8	-	1687	3049	1573 , 1502	820(C-Br),1430(NO_2)
9	-	1670	3055	1581,1539	825(C-Br) , 754(C-Cl)
10	-	1680	3036	1585,1531	746(C-Cl)
11	-	1695	3061	1589,1531	820(C-Br),1437(NO_2),1485(N=N)
12	-	1716	3066	1591,1533	821(C-Br),3475(OH),1498(N=N)
13	-	1689,1651	3022	1591,1510	2962($C-H_{al}$), 839(C-Br)
14	-	1687	3078	1591,1533	725(C-Cl),1398(NO_2),1487(N=N)
15	-	1677	3074	1591,1564	719(C-Cl),4330(OH),1489(N=N)
16	-	1688,1665	3086	1573,1519	2955($C-H_{al}$), 727(C-Cl)

Table (3): Proton NMR signals of the some synthesized compounds in DMSO-d_6

NO.	δ ppm
1	9.8(2H , s , NH) , 7.1-7.6 (8H , m , H aromatic)
2	9.8 (2H , s , NH) , 7.2-7.4 (8H , m , H aromatic)
3	2.9 (2H , s , CH_2) , 7.4-8.6 (8H , m , H aromatic)
5	8.7 (1H , s , =CH) , 7.3-8.4 (12H , m , H aromatic)
6	9.1 (1H , s , =CH) , 7.6-8.1 (12H , m , H aromatic)
7	9.3(1H , s , =CH) , 7.2-8.3 (12H , m , H aromatic)
8	8.9(1H , s , =CH) , 7.5-8.7 (12H , m , H aromatic)
9	8.6(1H , s , =CH) , 7.3-7.6 (12H , m , H aromatic)
12	5.9(1H , s , OH) , 3.9 (1H , s , CH) , 6.7-8.5 (12H , m , H aromatic)
13	2.7(3H , s , CH_3), 3.2(3H , s , CH_3) , 3.7 (1H , s , CH) , 6.3-8.1 (^{13H} , m , H aromatic)
14	3.5 (1H , s , CH) , 6.9-8.2 (12H , m , H aromatic)
15	5.7(1H , s , OH) , 3.3 (1H , s , CH) , 6.9-8.2 (12H , m , H aromatic)
16	2.3(3H , s , CH_3) , 3.1(3H , s , CH_3) , 3.5(1H , s , CH) , 6.9-7.6(13H , m , H aromatic)

Table (4): Antibacterial and antifungal activity data of the compounds (5-16)

NO.	Zone of inhibition of samples(mm) in :											
	5	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
E.coli	15	17	13	-	22	21	18	11	12	10	9	13
Klebseilla	17	18	12	-	15	20	16	14	11	12	11	15
S.epidermidis	21	14	15	11	14	17	11	13	14	13	15	16
S.aureus	18	15	-	-	11	16	10	15	13	11	16	11
Condida fungi	10	11	-	9	8	10	11	13	12	8	13	9

Conclusion

The species thus synthesized were characterized using different analytical techniques such as IR and ^{1}HNMR spectroscopies . The activity of the prepared compounds against the growth of certain kind of bacteria such as *E.coli , Sepidermidis , Klebseilla , S.aureus* and *Condida* fungi have been investigated, which revealed that all these compounds show good antibacterial and antifungal activity

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Chemistry, College of Science, Mustansiriyah University, Baghdad-Iraq and all experiments were carried out in accordance with approved guidelines.

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DOI Number: 10.5958/0973-9130.2019.00133.6

Congenital Heart Disease Pattern in Salah-Al-Deen Governorate –Iraq

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Abstract

The aims of study to evaluate the relation between occurrence of the CHDs and history of consanguinity. This observational cross-sectional hospital based study involved (171) patients attend to the pediatrics clinic at Salah Aldeen General hospital, was done during the period from 1st April-30th September 2017. The cases were categorized according to types of cardiac malformation, age of diagnosis, sex distribution, associated consanguinity as first cousin, second cousin and no relation. Among 171 patients of congenital heart disease, 91(53.3%) of patients were females and 80(46.7%)of patients were males. The study showed that most patients attending hospital were at age 1-5year 81(47%), while those below 1month were the least number15 (9%). The most cases were underweight 99 (57%), and the most common sign was heart murmur161 (94.2%) followed by cough and fever51(29.8%). Sixty seven percent of cases had abnormal chest X-ray and 31% of abnormal chest X-ray had cardiac abnormality which include cardiomegaly, abnormal shape of the heart, abnormal position of the heart.

Keywords: *Congenital Heart Disease, Salah-Al-Deen governorate, Iraq*

Introduction

Congenital heart defect (CHD) some of the more prevalent malformation among live birth and remained the leading cause of the death from congenital malformation [1]. CHD occur in 0.8-1% of live birth, the incidence is higher in still birth (3-4%), spontaneous abortion (10-25%) and premature infants (2%) excluding patent ductus arteriosus. It has a wide spectrum of severity in infants, about 2-3/1000 newborn infants will be symptomatic with heart disease in first year of life. CHD causes the death of thousands of children in developing countries [1]. About 30%-40% of patient with CHD are symptomatic in the first year of life, while the diagnosis can be established in 60% of patient by the first month of age [2].

Methodology

The study has been conducted in Pediatrics Department in Salah-Aldeen General hospital in Tikrit city in which all cases with CHD were included during the study period. The total number of cases 171, who come to the hospital with signs and symptoms suggesting of CHD. Demographic character, duration of study as well as inclusion and exclusion criteria played an important role in determining the size of study sample. This is cross sectional hospital-based selective study to know the occurrence of CHD and to find out the relation of parental consanguinity as a risk factor for CHD studies from 1st April- 30th September 2017. Each patient exposed to full history and physical and specific Cardiac examination. Echocardiography examination was conducted using M-mode, two-dimensional and color, pulse and continuous wave Doppler. These patients range at age from zero to 15 years which was classified into 4group as follows: Newborn, Infant, Preschool children. Patient with abnormal heart sound that discovered accidently. School children (>6year) Patients excluded from our study those with isolated cardiac arrhythmias, patent ductus arteriosus in premature newborn, mitral valve prolapse and patent foramen ovale.

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Results and Discusion

Total No. of cases were 171 patients, their gender composed of 91females (53.2%) and 80 males (46.8%). Most of the cases were VSD, 65 (38%), followed by ASD 30 cases(17%) and the most common types of cyanotic CHDs were TOF 24 cases(14%), followed by TGA 10 cases(5.8%), and the least CHDs were TAPVR, Truncus arteriosus, DORV, pulmonary atresia and partial AV canal as shown in table(1). Regarding age distribution of CHD in 171 children was as follows, most patients attending hospital were at age of 1-5 yr, 81 patients (47%), followed by age range in 5-15yr, 41 patients (24%), 1-12 months 34 (20%) patients while those below one month were the least number 15 patients (9%). Regarding sex distribution of CHDs, the study showed that CHD was slightly more in females 91(53.2%) than in males 80 (46.8%), also showed that the most common CHD in females was VSD, while the least CHDs were COA, TAPVR, Partial AV canal and regarding males, also VSD was the common CHDs. Regarding signs and symptoms of CHDs, The most common feature was heart murmur, 161 cases(94.2%), followed by cough and fever 51cases (29.8%), and the least signs were cyanotic spell 2 cases (1.2%), palpitation 2 cases (1.2%) and shock 2 cases(1.2%), as shown in table (3-5). Most of the cases of CHDs were underweight(99 of cases (57.9%) and 72 of cases(42.1%) had normal body weight), in ASD, 18 patients (10.5%) had normal body weight in compare to 12 patients (7%) were under body weight. In patients with TOF, 14 patients(8.2%) had normal body weight and 10 patients (5.8%) were under body weight as in table (3). Most cases of CHD from Tikrit city 79 patients (46.2%), followed by those from Beiji 26 patients (15.2%), Shurka 22(12.9%), Aldor 14 (8.2%), Samarra 12 (7%) and the least cases from Balad one patient (0.6%) from other areas 17 (9.9%). The most common chromosomal abnormality (among 20 case) which associated with CHDs was Down syndrome 14 cases (70%) followed by Turner syndrome 4cases(20%), and 2 cases (10%) had Edward syndrome. Chest X-ray may provide information about the cardiac size, shape of the heart and pulmonary blood flow(plethoric & olegmic), the study showed 52 patients (31%) had cardiac abnormality on CXR including cardiomegaly, boot shape, dextrocardia , whereas plethoric lung was present in 34 patients (20%), olegmic lung was present in 28 (16%) of patients and normal CXR findings in 57 (33%) of patients as in table [5]. Only 65 patients (38%) born from related parents have CHDs, while 106 (62%) patients born from negative consanguineous families. In related to cyanotic and acyanotic groups, the study showed no significant difference was found in relation to consanguinity between cyanotic and acyanotic group of CHD. In relation to first and second cousin, CHDs in babies born from second cousin parents were more than babies born by first cousin parents in compare to non-related parents. Positive family history of acyanotic CH present in 50/129 (38.8%) and the family history from the first cousin 14 (28%) in comparison to history from the second cousin 36 (72%). The negative family history of acyanotic CHD was 79 (61.2%). Positive family history of cyanotic CH present in 15 (35.7%) and the family history from the first cousin 5 (33.3%) in comparison to history from the second cousin 10 (66.7%). The negative family history of acyanotic CHD was 27 (64.3%). Regarding effect of consanguinity on subtypes of CHD, in VSD,41 paients (63%) of nonrelated parents, whereas 24patients(37%) of related parents, while in ASD, 14patients(46.7%) of no relation, whereas 16patients(53.3%) of related parents. In TOF,17patients(70.8%) of no relation, whereas 7patients(29.2%) of positive consanguinity. The study showed no significant effect of consanguinity in production of CHDs as shown in table (6).

Distribution of cases according to family history of CHD. Regarding family history, 63 patients (37%) had positive family history and 108 patients (63%) had negative family history, 47 patients (74.6%) with CHD were found to be with family history of CHD rather than from the father and mother side. Fourteen patients (22.2%) had positive family history from brother and sister side. Two patients (3.2%) had had positive family history from the mother side. Regarding ECG Finding, most patients 108 (63%) had abnormal ECG, 49 patients (29%) had LAD, 31 patients (18%) had RAD, 16patients (9.3%) had BVH, and 12 patients had RBBB, While 63(37%) had normal ECG. During our study , the most recorded CHD subtypes were VSD (38%), ASD (17.5%), TOF (14%), PDA (7%), and TGA (5.8%) malformation. This is in different to what has found in Oman (2000) (3), Subramanyan et al recorded lower rate for VSD (24.9%), ASD (14.4%), and high rate for PDA(10.3%), while in Lebanon higher rate recorded for VSD (62%), ASD (62%), and TOF(39%) [4], and Yunis et al, recorded the similar to our study which shows high rate for VSD (26.6%), followed by ASD(13.3%), but TGA(10.4%)

not TOF CHD subtypes, while in Iran, the study done by Bagher Nikar [6], showed that ASD more than VSD. The difference may be due to severity of defects or could be due to racial or genetic factor in different population or sample size [7]. The least number of CHD was reported below one month of life, while the most cases between 1-5 years, similar results which obtained in Pakistan [8], and in Bangladesh [9], and this is may be due to absence of neonatal examination and early discharge to home. This study shows that CHD is slightly prevailed in females. The male : female ratio was 1: 1.14, a finding which is compatible to the pattern of the sex distribution of CHD in most of the world. In Poland, CHDs more common in males children than females with male: female ratio (1.5:1), While CHDs in Denmark, where the females more prevalent than males with male: female ratio (0.9:1) [10,11]. In our study, VSD, ASD and PDA are associated with female predominance, while in TOF, male predominance was seen and this is consistent with a study in Jordon [12]. In this study, most of the cases were underweight, similar to other studies like Kreiger I. Forchielli ML, pittmanJG demonstrate similar result [13-15]. Growth retardation causes in CHD are multifactorial [13,14], inadequate caloric intake and increased energy requirement which is caused by increased metabolism (13). Consanguinity increase the incidence of CHD due to expression of deleterious recessive genes causing such abnormalities. Regarding consanguinity, 38% of study cases (male16.5% and female 21.5%) were from positive consanguineous families and this may be explained by cultural habits of consanguineous marriage. This study results was lower than the what found in Saudi Arabia, rate of consanguinity was 56%. In current study, effect of consanguinity was higher in the second cousins than the first cousins related parents. and this was differ from study in Lebanon where first cousins related parents more than second cousins [5]. There was no significant difference found in relation to consanguinity between cyanotic and acyanotic groups of CHD and this was consistent with an Iraqi study, but it was differ from that reported in Iceland, who showed the family history was only 18.4%. High ratio in this study may be due to cultural habits of relative marriage [19]. Most cases from Tikrit city (46.2%) and the least cases were from Balad, probable reason for this may be no referral system. In our study , the most common signs and symptoms were murmur 161 (94.2%), followed by cough and fever 51 (29.8%), dyspnea 44 (25.7%), and these were consistent with other studies done by Pelech AN and Poddar B in India [21]. This may be due to coming of patient later to hospital in advance stage, neglected patient and poor follow up. Our study showed that ECG was abnormal in 63% of cases. Other studies showed nearly the same result by Crow RS.

Table 1. Types and distribution of CHD among the study cases.

Type of malformation	No. of cases	Percentage of total
VSD	65	38%
ASD	30	17.5%
TOF	24	14%
PDA	12	7%
TGA	10	5.8%
PS	8	4.7%
AVSD	4	2.3%
COA	3	1.5%
As	4	2.3%
Dextrocardia with	3	1.5%
TGA	2	1.2%
Pulmonary atresia	2	1.2%
TAPVR	2	1.2%
DORV	1	0.9%
Partial AV canal	1	0.9%
Truncusarteriosus	1	0.9%
Total	171	100%

Table 2. Distribution of congenital heart disease according to sex.

Type of malformation	Sex		M/F Ratio
	Male	Female	
VSD	27	38	1:1.4
TOF	14	10	1.4:1
ASD	9	21	1:2.3
TGA	6	4	1.5:1
PDA	4	8	1:2
PS	5	3	1.6:1
COA	2	1	2:1
AVSD	2	2	1:1
AS	4	0	4:0
Dextrocardia with	1	2	1:2
TGA	2	0	2:0
Pulmonary atresia	1	1	1:1
TAPVR	2	0	2:0
DORV	1	0	1:0
Truncusarteriosus	0	1	0:1
Partial AV canal			
Total	80	91	1:1.14

Table (3) Effect of congenital heart disease on growth. .

Type of malformation	Under weight	Percentage %	Normal weight	Percentage %
VSD	42	24.5%	23	13.5%
TOF	10	5.8%	14	8.2%
ASD	12	7%	18	10.5%
PDA	9	5.3%	3	1.7%
TGA	6	3.5%	4	2.3%
PS	5	2.9%	3	1.7%
AS	2	1.2%	2	1.2%
COA	2	1.2%	1	0.6%
AVSD	3	1.7%	1	0.6%
Dextrocardia with TGA	2	1.2%	1	0.6%
Pulmonary atresia	2	1.2%	0	0%
TAPVR	2	1.2%	0	0%
DORV	1	0.6%	1	0.6%
Partial AV canal	0	0%	1	0.6%
Truncusarteriosus	1	0.6%	0	0%
Total	99	57.9%	72	42.1%

Table (4) Clinical features of congenital heart disease.

Clinical features	No. of cases	Percentage
Murmur	161	94.2%
Cough&Fever	51	29.8%
Dyspnea&Fatigue	44	25.7%
Cyanosis	32	18.7%
FTT	22	12.7%
Increased sweating	12	7%
Found on ER	8	4.8%
Squatting	4	2.3%
Papitation	2	1.2%
Shock	2	1.2%
Cyanotic spells	2	1.2%

Table (5) chest X-ray finding of congenital heart disease.

Type of malformation	Chest X-ray finding			CHD
	Abnormal		Normal	
	Cardiac abnormalities	Pulmonary abnormalities		
VSD	14	24	27	65
ASD	5	11	14	30
TOF	12	8	4	24
PDA	5	4	3	12
PS	2	4	2	8
TGA	5	2	3	10
COA	1	-	2	3
AVSD	1	3	-	4
AS	3	-	1	4
Dextrocardia with TGA	3	-	-	3
Pulmonary atresia	-	2	-	2
TAPVR	-	2	-	2
DORV	-	2	-	2
Truncusarteriosus	1	-	-	1
Partial AV canal	-	-	1	1
Total	52	62	57	171

Table (6) Degree of consanguinity in relation to CHD .subtypes.

CHD subtype	No.	Degree of consanguinity					No relation
			First cousin		Second cousin		
		No.	%	No.	%	No.	%
VSD	65	9	14%	15	23%	41	63%
ASD	30	5	16.6%	11	36.7%	14	46.7%
TOF	24	2	8.4%	5	20.8%	17	70.8%
PDA	12	1	8.4%	4	33.3%	7	58.3%
TGA	10	1	10%	3	30%	6	60%
PS	8	-		3	37.5%	5	62.5%
AVSD	4	-		1	25%	3	75%
AS	4	-		1	25%	3	75%
COA	3	-		1	33.3%	2	66.7%
Dextrocardia with TGA	3	-		1	33.3%	2	66.7%
TAPVR	2	-		-		2	100%
DORV	2	-		1	50%	1	50%
Pulmonary atresia	2	-		-		2	100%
Truncusarteriosus	1	-		1	100%	-	
Partial AV canal	1	-		-		1	100%

Conclusion

The most common CHDs was VSD 65(38%) followed by ASD30(17.5%) in acyanotic patients, while in cyanotic patients, the most common was TOF24(14%).The consanguinity rate was positive only in 38% of studied cases, and therefore, no significant effect of consanguinity in production of CHDs. while the family history rate was positive in 37%.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Tikrit Medical College, Iraq and all experiments were carried out in accordance with approved guidelines.

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DOI Number: 10.5958/0973-9130.2019.00134.8

Head CT Scans for Young Patients and Compliance with NICE Guidelines: A Retrospective Audit Ali Riyad Saleim

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Abstract

Although compute tomography (CT) scans have valuable medical benefits, their increased usage with low diagnostic yield in AL-HUSSIN EDUCATIONAL HOSPITAL in Iraq has raised concerns about the risk of contracting cancer. This study aims to investigate the proportion of justified and unjustified CT scans performed on young people aged under 35, according to NICE guidelines. Medical records for all computed tomography brain scans performed on young people aged under 35 during the period 1 April 2014 to 1 December 2014 at AL-HUSSIN EDUCATIONAL HOSPITAL were reviewed. NICE guidelines were retrospectively applied by two reviewers in order to identify the proportion of justified and unjustified head CT scans. Kappa test was employed to measure the agreement between the reviewers. Chi-square test was then used to compare the number of unjustified scans from the emergency and non-emergency department. Of the 287 head CT scans, 183 (64%) scans were justified and 104(36%) scans were unjustified according to the NICE guidelines. There was fair to substantial agreement between the reviewers (k= 8.99). The number of unjustified scans from the emergency department was greater than the number of unjustified scans from non-emergency department. This difference was significant (chi-square statistic = 7.959; p=0.005).

Key words: *Compute tomography, justification.*

Introduction

Compute tomography (CT) is a useful diagnostic technology to the extent that it has revolutionised radiology and medicine [1].Consequently, the use of CT imaging techniques has become extensive in numerous nations worldwide. Although CT scans have significant medical benefits, CT techniques expose patients to significant levels of radiation when compared to traditional radiography [2]. People under 35 are at greater risk of developing cancer from radiation, mainly due to the fact that they have increased radiosensitivity and longer lifespans after exposure [3]. However, this has not prevented physicians, often acting as a referrers, from requesting and overusing radiological procedures for patients with this demographic [4]. Sierzenski et al. explained that the excessive use of the CT imaging technique might comprise scans that have questionable indications and so they should, as a consequence , be eliminated [5]. Furthermore, numerous studies across the world have been conducted to explore physicians' knowledge of radiation dosages and the risks arising from CT scans [6,7]. Overall, these studies have drawn the conclusion that physicians possess limited knowledge about radiation exposure involved typical radiology processes and the adverse effect of ionising radiation upon the patients. The national institute for health and clinical excellence (NICE) guidelines provides a framework for selecting patients for head CT scan. Therefore, the aim of the present study is to determine whether previous CT examinations done at AHEH on patients under the age of 35 years were justified using NICE as a gold standard.

Material and Method

The institutional review board had approved this study without the need for informed consent. A retrospective audit was conducted on 287 patients who received head CT scan following a request from the ED and non-ED made between 1 April 2014 and 1 December

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2014. Inclusion criteria consisted of all cranial CT scans that was carried out on subjects who were below35 years. This age range was selected in view of the similar previous studies undertaken by Oikarinen et al. (2009) and Brenner et al. (2001) which argued that the lifetime risk of radiation-induced cancer mortality was greater in younger individuals [4,8]. Exclusion criteria comprised requests made by consultants from private clinics and this is because the history provided was inadequate for justifying the scans requests. Demographic data, referring departmen name and indications of the examination were collected manually from each patient's notes. When the information was felt to be inadequate, completeness of the history was ensured by checking information from patient's files. Each request form was carefully and thoroughly reviewed by two reviewers (the researcher and an experienced radiologic technologist). The NICE guidelines were used as the standards of care. The study ensured that the radiologic technologist reviewer was blind to the research details to prevent the occurrence of bias. Furthermore, the two reviewers were independent to avoid potential bias from the study design as much as possible (9). These data were used to assess patients who satisfied the criteria to qualify for a head CT scan according the NICE guidelines.

Statistical analysis

The information were structured in a statistical file and then analyzed using the SPSS software, version 20.0, for windows. For Statistical analysis, Kappa Test was employed to measure the agreement between the reviewers. Moreover, Chi-square test was used to compare the number of unjustified scans from the emergency department versus the number of unjustified scans from non-emergency department. Statistically significance was defined as a p value less than 0.05.

Results and Discusion

Table1: shows the variance, in quantitative measure, between observer 1 and observer 2 following the application of the NICE guidelines. In this instance, the value (0) denotes the scans that were unjustified and the value (1) denotes the scans that were justified. It is evident that the first observer reported 125 unjustified cases from a total of 287. The second observer concurred with the first; however, there was one additional case identified as unjustified by the second observer. Conversely, only one patient appeared unjustified according to the first observer, but justified according to the second. The Cohen-Kappa was conducted to measure the inter-rater agreement between the two observers. The present research's kappa value was recorded at 0.98, which is indicative of a substantial degree of agreement; this is illustrated in Table 5 and is based on the provided scale. Table 3: shows that the number of unjustified scans from the emergency department was greater than the number of unjustified scans from non-emergency department. This difference was significant (chi-square statistic = 7.959; p=0.005). To avoid controversy and make the most efficient use of radiological procedures, many institutions have established guidelines such as those of the NICE. We conducted this study in the largest hospital of our region that has adopted the NICE guidelines by policy. In a previously published study [4], 77% of the CT examinations of the lumbar spine, 37% of the abdomen, 36% of head, and 3% of the cervical spine were deemed unjustified by authors. One important finding of the present study is that a significant number of head scans were proven to be unjustified based on the hospital's own criteria: 104 scans (36%) in total. This indicates that 36% of the scans resulted in exposure to unnecessary ionising radiation. Furthermore, our study also reveals that significantly more unjustified requests for CT scans came from doctors working in emergency admissions than from other sources (table 3). This is in agreement with published study indicated that 97% of emergency doctors admit to ordering unnecessary advanced radiology tests [10]. These deficits can be explained by the fact that most of the emergency requests were referred by a clinician and often without the input of radiologists. In particular, they may be unaware of the radiation dose exposure in CT imaging. According to one multinational survey conducted in 28 countries, physicians lack awareness of the last radiosensitive age [11]. Therefore, we believe that an effort to practice ALARA principle should be more focused on CT requests from came from doctors working in emergency admissions than from other sources. The present research's kappa value was recorded at 0.98, which is indicative of a substantial degree of agreement. Therefore, there is a need to educate ED physicians. There are a few limitations to this study including its retrospective design. However, a retrospective design was appropriate to study the application of the NICE in a real-life setting. The study is also limited to one institute; naturally a multicentre study would yield a more confident measure of the applicability of the NICE.

Table 1: Inter-rater agreement chart

Researcher1 * Researcher2 Cross tabulation					
0 1			Researcher2		Total
Researcher1	0	Count	125	1	126
		% within Researcher1	99.2%	0.8%	100.0%
		% within Researcher2	99.2%	0.6%	43.9%
	1	Count	1	160	161
		% within Researcher1	0.6%	99.4%	100.0%
		% within Researcher2	0.8%	99.4%	56.1%
Total % within Researcher1 % within Researcher2		Count	126	161	287
		43.9%	56.1%	100.0%	
		100.0%	100.0%	100.0%	

Table 2. Kappa statistic depicting the Symmetric Measures Symmetric Measures Value

		Value	Asymp. Std. Errora	Approx. Tb	Approx. Sig.
Measure of Agreement	Kappa	.9 86	.010	16.701	.000
N of Valid Cases		287			

Table 3: Emergency versus Non-Emergency Referrals

	Justified	unjustified
emergency	128	89
Non-emergency	55	15

Conclusion

The adherence to NICE guidelines was not optimal. While the majority were appropriate, an unacceptably large minority of scans were not. In addition, many of these scans would have been contra-indicated had the hospital's own policy regarding the appropriate justification of head scans been properly adhered to. More efforts are required to ensure a more judicious application of CT scans in medical practice. Furthermore, clear recommendations regarding justification principle are required along with radiation awareness (in referring physicians) and improved communication between radiologists and referring physicians.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Southern technical university, Iraq and all experiments were carried out in accordance with approved guidelines.

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DOI Number: 10.5958/0973-9130.2019.00135.X

Histological & Physiological Alternations in the Aorta & Heart in Relation with Cholesterol Diet in Male Albino Rat

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Abstract

The aim of this work was to examine the microscopically alterations in the heart architecture & of albino rat & physiological aspects of lipid profile in relation with cholesterol diet. Ten male of albino rats were subdivided into two groups (n=5): group 1 was given 1 ml of normal saline & considered as control group(G1), while the second group treated with enriched -cholesterol nutriment once at a dosage of 1.5 mg / k g body weight extent to 8 weeks & considered as treated group(G2) . The tissues of hearts & aortic were obtained & stained with H & E stain. Blood samples were withdrawn after starvation of the animals at night after the end of the experiment to study the following parameters: measurement the intensification of (T C), (T A G), (H D L), (L D L) & (V L D L). Result showed the presence of a significant increase ($p < 0 . 0 5$) in the concentrations of TC, TAG, LDL, VLDL & significant decrease ($p < 0 .0 5$) in the concentrations of HDL in processed group (G2).

Key words: *cholesterol, histology, physiology, heart, aorta.*

Introduction

Cardiovascular diseases (CVD) are a word that refer to a group of diseases with a public set of risk elements & that outcome from coronary artery disease particularly coronary heart disease, stroke & peripheral arterial disease. It also covers other circumstances such as vascular dementia, chronic kidney disease, cardiac arrhythmias, type 2 diabetes, unexpected cardiac death & heart failure. These circumstances frequently share communal risk elements or hold a important impact on C V D death [1] The Cardiovascular disease poses a serious threat to human life, & 17.9 million individuals died from cardiovascular disease in 2015, which rose by 12.5% since 2005 [2]. Epidemiological studies have conducted on the correlation between total cholesterol (TC) with increased cardiovascular risk. Cholesterol is differs from fat, it is similar to the waxy material . The liver make cholesterol & move it to other body parts for the reproduction of cell secretions & included within cells membranes. While cholesterol is devolved in the blood, it is presented as low-density lipoproteins (L D L), sometimes named as the " bad cholesterol ". In spite of L D L is essential in controlled amount (L D L delivers cholesterol to different portions of body), a high level of L D L cholesterol may alteration risk of a heart attack [5,6]. High-cholesterol nutriment is considered as an essential cause in the evolution of cardiac diseases since it leads to sophistication of hyper-lipidemia, atherosclerosis, & ischemic heart disease [7]. Atherosclerosis is a common form of cardiovascular diseases , small aggregations of cholesterol & other materials (like a small tumors) form in the wall of artery & then to blood flow. This leads to decrease supplying of oxygen for the cardiac muscle, which result in chest pain (angina), usually after excitement or exercise. Plaques of cholesterol weak the cardiac muscle until caused heart failure, that occur through the heart attack [8,9] Hyperlipidemia is best-known as primary risk factor for atherosclerosis. The abnormality bend in serum T C , T G & L D L - C levels are among the parameters of atherosclerosis development, otherwise elevation serum H D L - C is better-known to protect against the evaluation of atherosclerosis. Oxidative stress role is a chief role in the process of endothelial damage & atherosclerosis. ROS can oxygenate & modify L D L - C to form oxidized

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L D L - C , directing to the assembling cholesterol in phagocytes & to the formation of foam cells, bolstering the evolving of atherosclerosis [10]. Heart in rats fed on enriched-cholesterol diet demonstrated to focal necrosis of myocytes associated with leucocyte cells infiltration & congestion myocardial blood vessels while in aorta showed vacuolation of tunica media & characteristic anisotropic granules [11]. The dietary cholesterol cased an increase in body weight after a 3 month treatment. In the hypercholesterolemia rats reported a evidential alteration in the total cholesterol, L D L - cholesterol & triglycerides ratio , & an important decrease in H D L - cholesterol [9,12].

The composition of Dietary fat can development of obesity due to the specific roles of some fatty acids that have variety of metabolic activities, which can change lipid oxidation & deposition average , leading to variation in body weight &/or composition [13]

Materials and Method

Experimental routine were authorized by the veterinary collage of Karbala University. Ten male rats with age surrounded between 12-16 weeks with weight (200-300) gm were obtained from the house of laboratory animals at Biotechnology Research Center of collage. The animals were subdivided into two groups (five rats /group), the first group was given 1 ml of normal saline & considered as control group (G1), while the second group treated with high-fat diet once at a dose of 1.5mg/kg body weight & considered as treated group (G2). Blood samples were withdrawn after starvation of the animals at night, after the end of 8 weeks, when 5 ml of blood was withdrawn from the heart. The blood was then placed in clean plastic tubes, especially the non- containment of anticoagulants. At a speed of 3000 cycles / minute for 15 minutes to measure some of the following parameters: concentration of total cholesterol (T C), triglyceride (T A G), high density lipoprotein (H D L), low density lipoprotein (L D L) & very low density lipoprotein (V L D L). The concentration of cholesterol was measured according to method (14), the determination of the concentration of HDL was done by enzymatic method [15]. While LDL was measured according to the Friedewald equation. VLDL concentration can be calculated by dividing the value of TAG by 5

Statistical analysis

These study was analyzed with using the A N O V A test , the variables shown as +/- S D & a value of (P < 0 . 0 5) was considered as significant , the statistical analysis was done by using of the (S P S S Ver.19) .

Results and Discusion

To evaluate the histological structures of the heart & the upper part of a o r t a, heamatoxylin-eosin

(Figures 1, 2 & 3) staining were applied.

Histology of the cardiac tissue:

Control rats group, the cardiac muscle layer is striated & arranged in a linear pattern that branches & anatomizes in a specific model giving the appearance of a sheet. The cardiac muscle fibers are joined together by intercalated discs. They contain acidophilic cytoplasm with oval nuclei located in the center. The cardiac muscle fibers are separated by mild coating of conct. Tissue with well clear myocardial blood vessels. (Fig.1). Cholesterol-fed rats were identified with heart tissue damage as increased myofibrillar loss, congestion of blood vessels, vacuolation, & aggregation of lipids (Fig.2)

Histology of the aortic tissue

Aorta of normal control group of rats illustrated normal histological architecture & normal aorta thickness. The normal main artery was organized with a smooth intima, containing of endothelial cells, with normal contour & normal endothelial corrugation of the intima (Fig.3). There was no indication of inflammatory cell infiltration into the sub - endothelial layer. Moreover, there were no adipocytes in the adventitia. The T. media covered an abundant amount of elastic fibers, between which were a large number of smooth muscle cells with a noticeable nuclei. Normal quantity of collagen fibers & connec.tissues are showed in the tunica adventitia of the aortic wall of normal rats. Most of the medial smooth muscle cells of the tunica media focused on horizontally to the aortic lumen (Fig.3). In contrast, the aorta of cholesterol-fed group rat (Fig.4) illustrated: multifocal collapse, necrosis, disorientation of smooth muscle cells & unequal wall of the aorta with increased of wall width, damage of normal corrugation & intermittent endothelium in the tunica intima & hemorrhage in peri-vascular tissue (T. adventitia) with a vacuolated in the

cells of the tunica media (Fig.4), accumulation of adipose tissue in the tunica adventitia , minor rise in the thickness of aorta wall, & partially stenosis in the lumen of the artery (Fig.4).

Measurement of Serum lipid profile

The Result of Table 1 showed the presence of a major escalation ($p < 0.05$) in the concentrations of T C , TAG , L D L , & V L D L ; & significant decrease ($p < 0.05$) in the concentrations of H D L in treated group (G 2) compared with the control group (G1). With the high levels of morbidity & mortality rates, cardiovascular diseases (CVDs) represented the most important death cause, globally. According to the WHO report, approximately 17.5 M. people, which equals to 31 % of entirely losses, died from CVDs in 2012. [6] Epidemiological studies identified attitude LDL cholesterol levels, even the lack of extra risk factors might improve the progression of CVD (11).However, there is evidence about the alterations of fatty acid & histological abnormalities of heart & aorta tissues after feeding with high cholesterol diet. Many studies showed that feeding of 2% cholesterol for 8 weeks might be associated with changed free fatty acid, proteins related to lipid metabolism, in parallel to histological alterations. The feeding of rats with high cholesterol-fed displayed considerably increased in serum cholesterol levels compared to controls. Recent studies have classified the progression of cardiomyopathy into four classes on the basis of pathology. While class I is characterized by cardiomyocyte alterations, class II contains fibrotic remodeling, class III exhibits fibrosis & cardiomyocyte damage, & class IV consists the accumulation of non-collagenous material or inflammatory response with or without cardiomyocyte alterations (26) . Our histological results from the cholesterol-fed group indicated the loss of myofibrils, without effecting fibrosis, which suggests the presence of cardiomyopathy with class I characteristics.

Table 1: The Effect of high fat- diet on serum lipid profile in male albino rat.

parameters groups	TC	HDL	TAG	LDL	VLDL
Control Group (G1)	42.50± 0.17	21.86± 0.21	45.10± 0.13	29.11± 0.15	9.01± 0.02
Rats treated with 1.5 mg/kg of cholesterol (G2)	149.10± 2.15	11.94± 0.30	112.20± 0.30	124.16± 2.19	22.83± 0.42

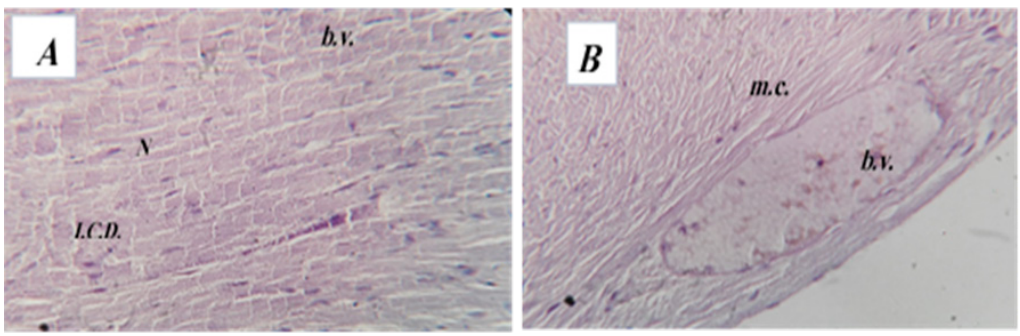

Fig.1 (A & B): Light photomicrograph of histological section through the heart, illustrated the normal architecture of heart tissue in control group of experimental animals. H & E, 40x, 10x respectively, b.v : blood vessel, N: nucleus ,I.C.D.: intercalated disck ,m.c.: myocardium

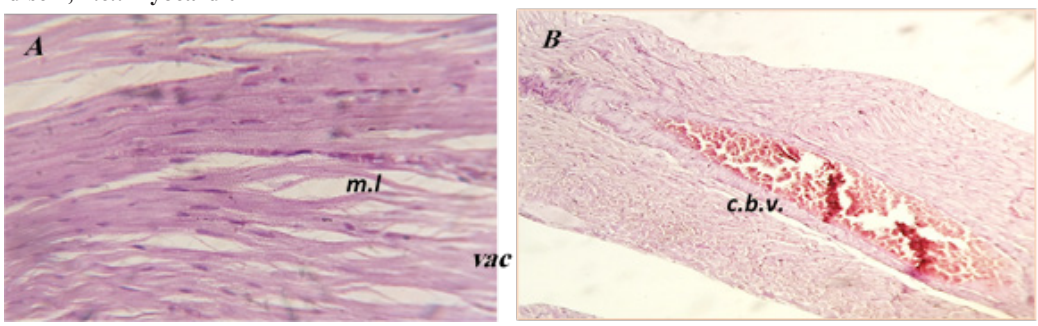

Fig. 2: Light photomicrograph of histological section through the heart, illustrated the histopathy alteration in architecture of heart tissue in Cholesterol-fed group of experimental animals. M.l.: myofibrillar loss , vac : vacuoles, c.b.v : congested blood vessels H & E, 40x,10x..

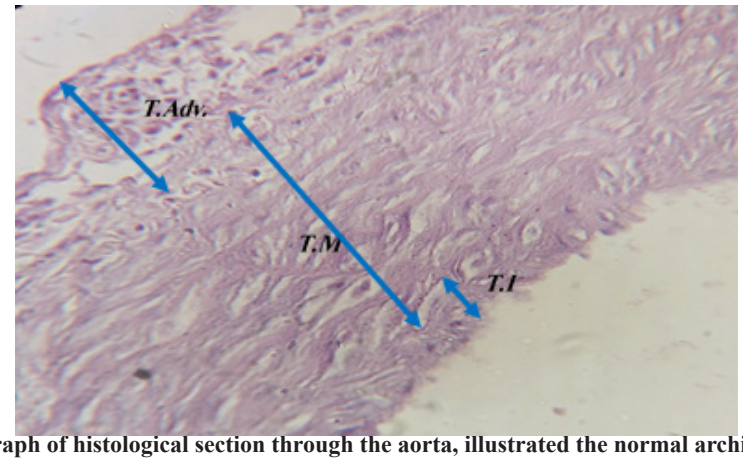

Fig 3. : Light photomicrograph of histological section through the aorta, illustrated the normal architecture of elastic artery in control group of experimental animals. T. I.: Tunica intima, T. M.: tunica media, T.Adv.: tunica adventitia H & E, 10

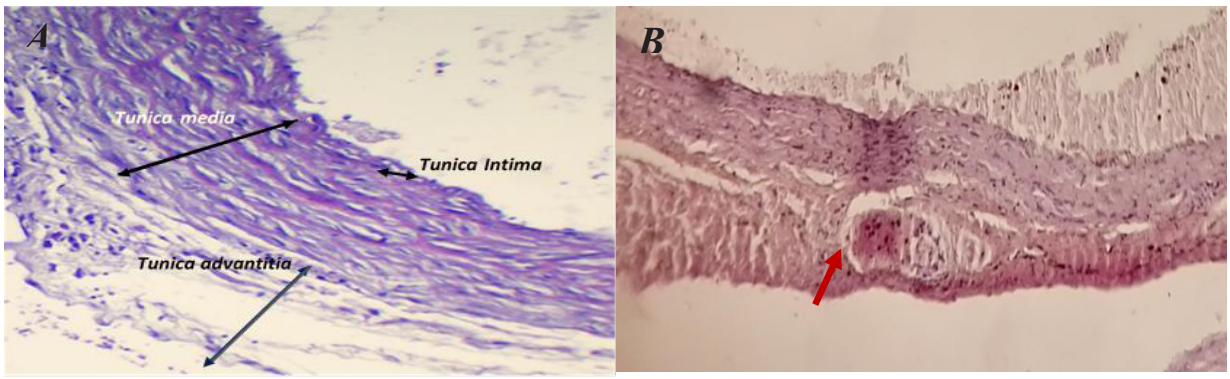

Fig.4: Light photomicrograph of histological section through the aorta, illustrated the histopathy alteration in architecture of elastic artery in Cholesterol-fed group of experimental animal's .row: hemorrhage H & E, 10x.

Conclusion

this study presents a comprehensive data of the alterations in fatty acids, oxysterols, & SR composition & their implication with histological modifications of the heart tissue in cholesterol-fed rats [25]. Future studies are also required to identify the biological association of the identified changes in the lipid profile, as well as the effect of blood flow Underst&ing but also lead the development of further theories & strategies of therapy in the field of heart diseases that mediated by hypercholesterolemia. In the study that performed by Fi9 Borai & his collagenous: the cholesterol - enriched diet for 8-weeks resulted in a dramatic surge in serum entire cholesterol (81.83%), total lipids (63.74%), & triacylglycerol's (176.30%). Concerning lipoproteins & AI, it was oblivious that, circulating serum HDL-C level (the good cholesterol) was significantly diminished (85.74%) in the HC- rats, whereas atherogenic lipoproteins; LDL-C (the bad cholesterol) & VLDL-C levels were significantly raised as compared to normal control group with percentages amounting to 323.86%, 175.21%, & 2671.1%, respectively . The elevation of lipid profile factors had been displayed to stay a key risk factor for coronary heart diseases [21]. These results run in parallel with [24]. The elevation of L D L – C in hyper-cholesterolemic rats could be main feature of LDL receptors down regulation by cholesterol & saturated f. a. that found in the diet Consistently, several studies indicated that, deposition of L D L - C leading to arteries stenosis even in typical lipid profile characters.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Veterinary Medicine, Kerbala University, Iraq and all experiments were carried out in accordance with approved guidelines.

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DOI Number: 10.5958/0973-9130.2019.00136.1

Polyvinyl Alcohol (PVA)-Rhodam B (Excellent Medicinal Applications as Biocompatibility and Biodegradable): Study the Optical Properties

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Abstract

The study includes the recording of the spectrum of absorbance and transmittance for blend solutions for polyvinyl alcohol (PVA) with Rhodamine and calculating the a absorption coefficient and other optical constants. The samples have been prepared in different weight concentrations (0,2,4, 6 wt.%) (PVA- RB) the values of absorbence, absorption coefficient and refractive Index values for pure and doped polymer are increasing with increasing of the concentration ratio of RB. The results show that decreasing in transmittance with concentration the values of reflectance are increases with increasing concentrator before and after the doping, the results showed decreasing energy gap with increasing ratio of doping.

Keywords: *Poly(vinyl alcohol), nano thin film, Rhodamine B,Spin Coating.*

Introduction

Main physical features of poly vinyl alcohol (P.V.A) $[CH_2 CH (OH)]_n$ is water soluble, semi crystalline, nontoxic, biocompatible, eco-friendly , better film and fiber forming, good mechanical properties, excellent chemical resistance and biodegradable. The physical features of it produced by the polymerization of vinyl acetate to polyvinyl acetate (PVAC) and then hydrolysis to obtain of PVA. Poly vinyl alcohol (PVA) is a hydrophilic polymer which is serving special in application in medicine due to excellent biocompatibility and biodegradable. Finally, important property of (PVA) is semicrystalline nature which is the existence of both amorphous and crystalline areas causing interfacial effects which increases the physical features. So, these unique characterizes of poly vinyl alcohol make it used in most commonly synthetic polymers [1,2]. Poly vinyl alcohol(P.V.A) is commonly used in cosmetic, adhesive, food, paper, medicine, and packaging industries. The chief functional uses of poly vinyl alcohol involve filtration, optics, and catalysis. Several of the important properties of PVA are the result of its major cohesive energy because of polarity from group of hydroxyl that produce intra molecular of hydrogen bonding. But, the same features that provide PVA with unique performance and hydrophobicity make it susceptible to plasticization in humid environments [2]. In addition to; the degree of swelling or rubbery in water or biological fluids is high [3]. Polyvinyl alcohol has glass transition temperature Tg=85C° and melting point temperature Tm = 230ºC and density is of 1.3(g/cm3) .Figure (1) shows structure of polyvinyl alcohol (P.V.A). Rhodamine B $C_{28} H_{31} ClN_2 O_3$ dye belongs to the xanthine family. It is one of the most commonly used in various spectroscopic Studies [4]. They cover the wavelength region from 500-700nm and are generally very efficient [5]. Xanthene dyes are those containing the xanthylium as chromophore with amino or hydroxy groups meta to the oxygen as the usual auxochromes. Rhodamines are commercially the most important aminoxanthenes. The organic dye laser has found many applications in scientific research because of its unusual flexibility [6].There are large amount of data about laser dyes from many authors, Douglas Magde and co-workers studied fluorescence quantum yields and their relation to lifetimes of Rhodamine (6G) and fluorescence in nine solvent [7].

Experimental Part

The materials used in the search

a . Poly Vinyl Alcohol (PVA).

b. Dye Rhodamine B
d. distilled water.

c. Slides of glass.

Prepare polymer

The polyvinyl alcohol polymer was prepared by dissolving the polyvinyl alcohol powder.(0.5)in the distilled water (30) ml. The Rhodamine B was then added with different weight ratios (2 ,4 and 6) g to polyvinyl alcohol solution and mixed with the magnetic vibrator to obtain a homogeneous solution and prepared in a film form using the Spin Coatin method.

Prepare thin films

Thin films were prepared by deposition of material on pieces of glass after clean samples, and be a sedimentation process using a spin coating method.

Optical measurements

The absorbance and transmittance for solutions were measured by using instrument measuring the spectrum, made by (Shemadzo) company, Japan, type (Double-Beam Spectrophotometer (UV-1800)) where the range of wavelengths is (300-1100) nm. A computer programmer make scanned for all wavelengths and gave the value of wavelength that occurs in it a greatest absorption.

Theoretical calculations

Absorbance) A)

Absorbance defined as the ratio between absorbed light intensity (I_T) by material and the incident intensity of light (I_o) [8].

$$A = \log \frac{I_o}{I_T} \qquad (1)$$

The optical absorbance coefficient (σ_{opt})of solution and film is given by the equation:

$$\alpha_{opt} = 2.303A/d \qquad (2)$$

where (d) represent a thickness of sample.

The ratio (I / I_o) called (Transmittance), (T_r) connected with absorbance by equation:

$$T_r = e^{-2.303A} \qquad (3)$$

Refractive Index (n)

The refractive index can be given by the equation:

$$n = \frac{c}{\acute{\imath}} \qquad (4)$$

where defined as a ratio between the speed of light in a vacuum (c), to the speed of light in a medium (ν) .

The values of refractive index were measured practically then applied in equation depending on the reflectance and the extinction coefficient (K_n) as shown in the following equations [11].

Then, refractive index will be:

$$n = \left[\left(\frac{1+R}{1-R}\right)^2 - (k_o^2 + 1)\right]^{\frac{1}{2}} + \frac{1+R}{1-R} \qquad (5)$$

Reflectance (R)

The reflectance can be represented depending on the value of refractive index by the equation:

$$R = \frac{(n-1)^2 + k^2}{(n+1)^2 + k^2} \qquad (6)$$

Reflectance also can be obtained from absorption and transmission spectrum in accordance to the law of conservation of energy by the relation:

$$R + T + A = 1 \qquad (7)$$

when light radiation passes from one medium into another having a different index of refraction, some of the light is scattered at the interface between the two media even if both are transparent. Since the index of refraction of air is very nearly unity. Thus, higher index of refraction of the solid, greater is the reflectivity. For typical silicate glasses, the reflectivity is approximately (0.05). Just as the index of refraction of a solid depends on the wavelength of the incident light, so the reflectivity varies with wavelength. Reflection losses for lenses and other optical instruments are minimized significantly by coating the reflecting surface with very thin layers of dielectric materials such as magnesium fluoride (MgF_2)[11].

Extinction Coefficient (k)

Extinction coefficient (k) given by following equation:

$$k = \alpha_{op} \lambda / 4\pi \qquad (8)$$

where (λ) is the wavelength of incident photon.

The extinction coefficient represents the amount of attenuation of an electromagnetic wave that is traveling in a material, where it values depend on the density of free electrons in the material and also on the structure nature:

$$n^* = n - ik \quad (9)$$

where: n, the real part of refractive index. n*: complex refractive index which depends on the material type, crystal structure (particle size), crystal defects and stress in the crystal.

Electronic Transitions

The optical data were analyzed from the classical relation for near optical absorption in semiconductor [14]

$$\alpha = A[(hf - E_g)^r / hf] \quad (10)$$

where (f) is the frequency, (h) is plank constant and r is (1/2,3/2,2,3) for transition (direct allowed, direct forbidden, indirect allowed and indirect forbidden, respectively). A is a constant and E_g is defined as the optical energy band gap between the valence band (V.B) and the conduction band (C.B). The type of transition depends on the absorption coefficient value when α value is larger than ($10^4 cm^{-1}$) the transition called (direct transition) where electron moves from V.B to C.B with the same wave vector (k) and momentum are conserved . while,indirect transition occurs when the value of absorption coefficient is less than ($10^4 .cm^{-1}$) [10], where the electrons transferred from V.B to C.B at the same wave vector (k) .The momentum and energy must be conserved with phonon assistant [11].

Results and Discusion

Absorbance Spectrum

Absorbance measurements of(pva) before and after doping, were plotted as a function of wavelength, as shown in figure (3 A). This figure shows that the absorbance of pure polymer and its additives are increasing with the increase of the concentrations of Rhodamine B dye. Figure (3 A) represent the relation between the absorbance with wavelengths for pure pva and doped for different ratio of doping. We can note from this figure, the values of absorbance increase when concentration increase, because the absorbance is directly proportional with concentration according to the Lambert-Beer law, this is because the addition led to increase the values of concentration in same volume, then increase the number of particles that absorb the energy of incident light according to the Lambert-Beer law, this is agreement with [15].

Transmittance (T)

From figure (3 B), the transmittance spectrum exhibits an opposite behavior of absorbance behavior. Where, the transmittance decreases with increasing of doping ratio, also the value of Transmittance increasing with the increasing of the wavelengths. This confirms that the spectrum of the absorption and the transmittance depends on the energy of the incident photon [16]. The figure shows that the refractive index values of pure and doping polymer are increasing with the increase of the concentrations of doping ratio.

Refractive Index

The colculated values of refractive index of (pva) before and after doping (are shown in figures .4 (A ,B).

Absorption Coefficients

The values of α for all thin films are found to be greater than 104 cm-1 in the visible region , which means that the films have a direct optical energy gap The variation of the absorption coefficient (α) of (pva) films is shown in Figures 5 (A, B)) as a function of wavelength.

Direct energy gap

The optical band gap determined from the plot of $(\alpha h_v)^2$ versus photon energy is shown in figure (6 A,B).

Extinction Coefficient

The calculated values of extinction coefficient (k) of (PVA) before and after doping are shown in figures (11,12).

Table (1) optical parameters of pva: Rhodamine B. λ = 220 nm

pva: Rhodamine B sample	α ×10⁴ (cm⁻¹)	Eg(eV)	n	k
0	0.5658	5.7	1.4131	0.097
0.02	16.906	4.6	1.4529	0.284
0.04	25.33	3.8	1.511	0.4255
0.06	27	3.2	1.5411	0.5111

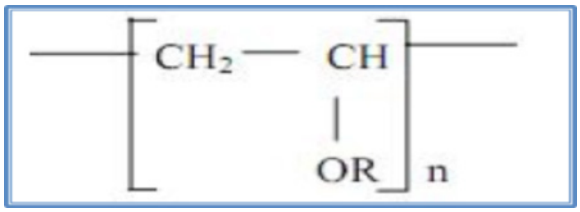


Fig. (1) structure of polyvinyl alcohol.

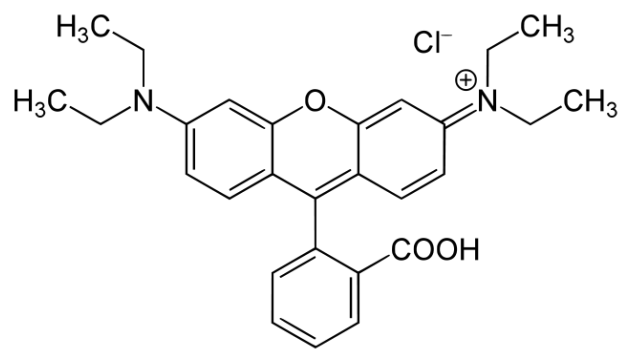
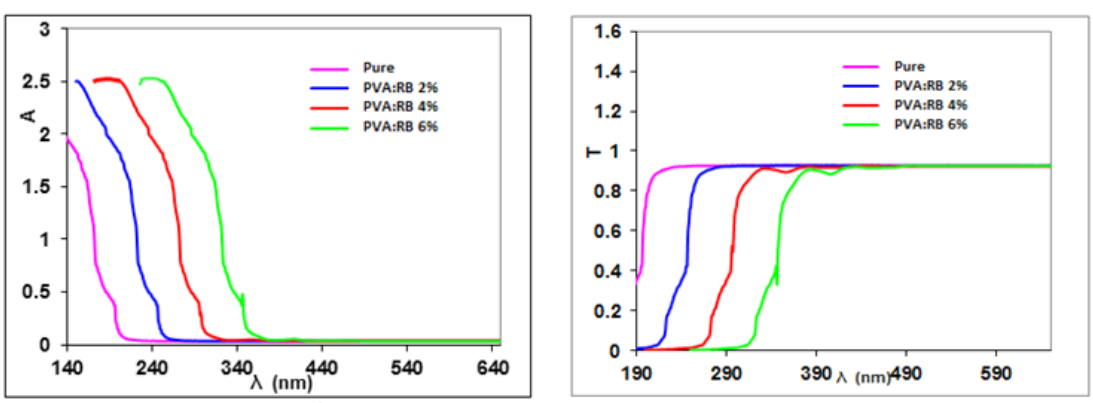


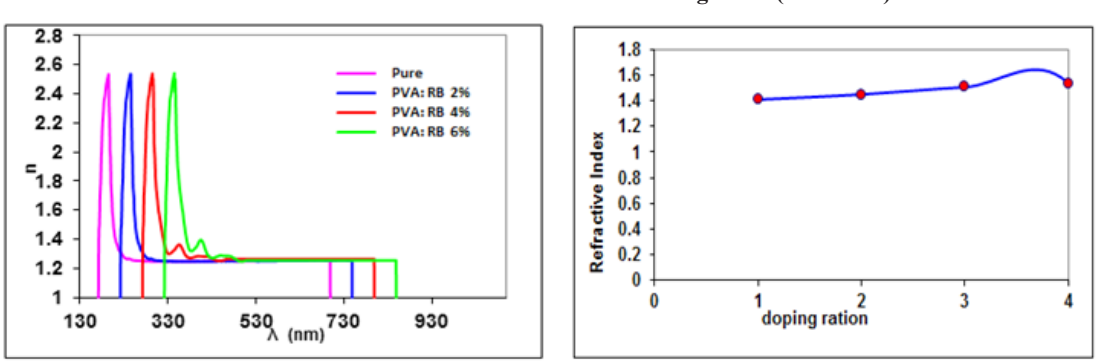
Fig. (2) structure of Rhodamine B



A B

Fig(3) A- Absorbance as a function of wavelengths for(PVA: RB).

B- Transmittance as a function of wavelengths for(PVA: RB).



A B

Fig.(4) A- Refractive index as a function of wavelengths for (PVA: RB).

B -Refractive index as a function of doping ratio

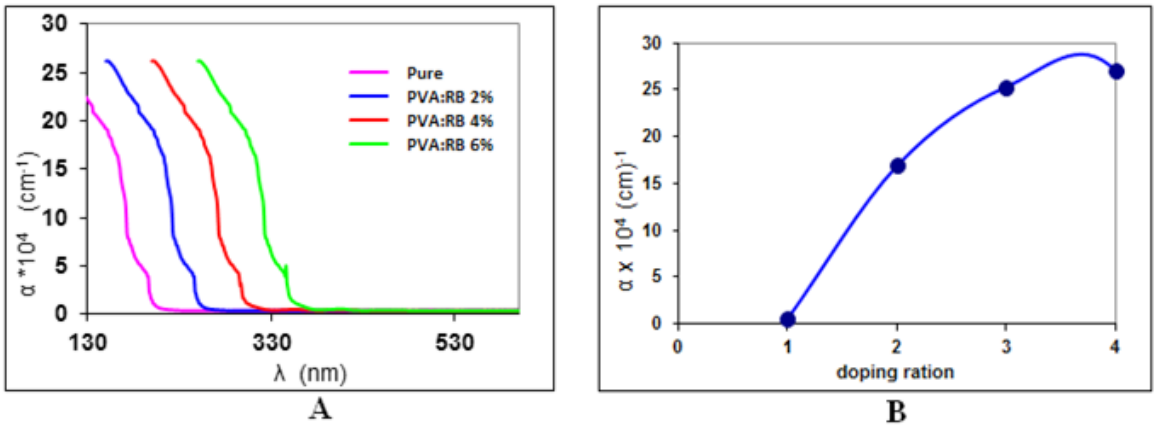


Fig. (5) A- Absorption Coefficients as a function of wavelength for (PVA: RB).

B- Absorption Coefficients (α) as a function of doping ratio

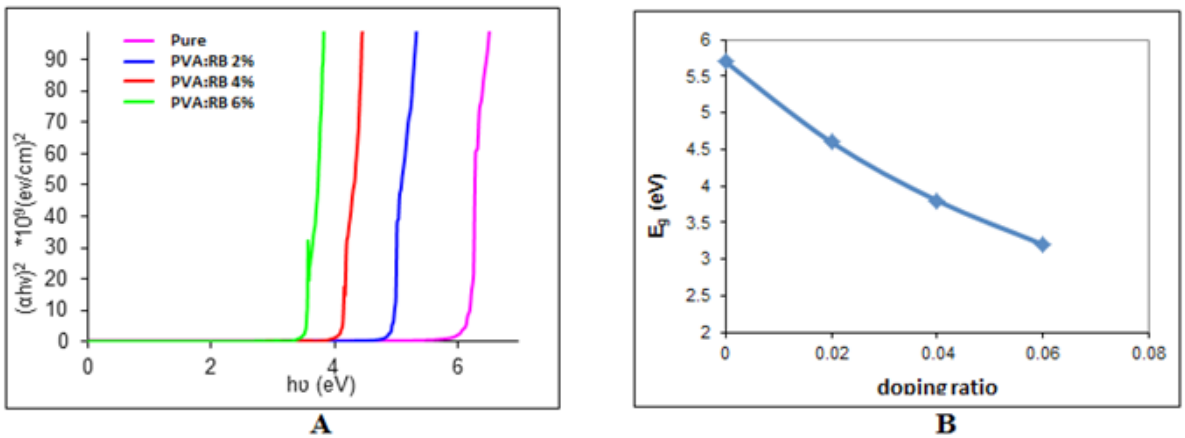


Fig.(6) A- Relation between $(\alpha h_{\nu})^2$ versus photon energy

B- Relation between E_g and doping ratio

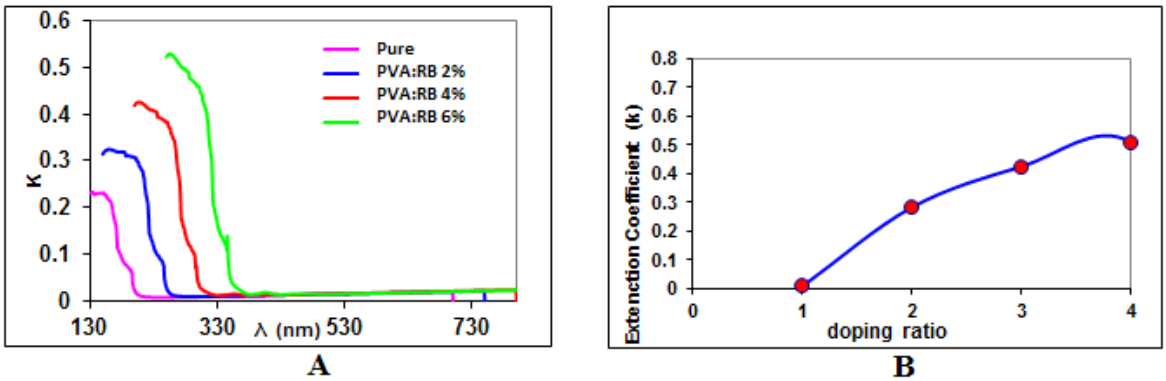


Fig. (7) A- Extinction coefficients as a function of wavelength for (PVA: RB).

B- Extinction coefficients (k) as a function of doping ratio.

Conclusion

The summarized results from this work are the following spin coating technique is a good technique in the preparation of thin films. It is found through a study that these polymers cossess random installation. is found through the study that these polymers appear a continuous change in the optical properties as a result of adding (Rhodamine B) to the polymer. The addition of Rhodamine B to (pva) led to the improvement optical properties. And get a lower energy gap. We have also found that increasing absorbency increases the amount of deflection.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Physics, College of Science, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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DOI Number: 10.5958/0973-9130.2019.00137.3

Assessment of Knowledge Regarding First aid among Primary School Teachers

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Abstract

This study aims to explore the primary school teachers' knowledge toward first aid at primary school. A cross-sectional descriptive research was conducted at the primary school to identify knowledge of primary school teachers toward first aid in Kerbala city- South-Central of Iraq during the period from November 2018 to December 2018 on a sample of 200 teachers. Out of 200 teachers, majority (83 %) of the total sample were females while 17 % were males, (76%) were between (30-49) years old, (90%) of study sample did not participate in any training program. and, majority (85%) of teachers they have acquired knowledge through T.V or Net. About half of primary school teachers' did have low level of knowledge concerning first aid, most of the primary school teachers not participant in any training program about first aid , and difference in gender has effect on their knowledge.

Keywords: *Knowledge, first aid, primary school, and teachers.*

Introduction

First aid is the help given to any individual enduring a sudden ailment or damage[1]. The rationality of first aid: it's help to survival and recuperation from ailment and damage in the pre-doctor's facility setting, are expeditious and viable support of the body's essential capacities: aviation route, breathing, course, and draining control [2]. First aid is for the most part performed by the layman, with numerous individuals prepared in giving essential levels of medical aid, and others willing to do as such from procured information. What's more, there are numerous circumstances which may require medical aid, and numerous nations have enactment, direction, or direction which determines a base level of emergency treatment arrangement in specific conditions. This can incorporate particular preparing or gear to be accessible in the working environment[3]. It for the most part comprises of arrangement of straightforward, now and then lifesaving, therapeutic procedures, which an person, either with or without formal therapeutic foundation can be prepared to perform with negligible gear. To begin with help applies to a wide run of therapeutic circumstances and comprises both of particular information and aptitudes[4]. The foremost common cause of passing among children from age 7-14 is injury and mishaps. The guess of any wounds ensuing to mishaps generally depends on the administration which is provided to the casualty within to begin with minutes quickly taking after the occurrence. This reflects the major importance of the first-aid given to the casualty which may be life-saving in some cases [5]. Since children at the age of primary school areliable for mischances and need information and great judgment when crises happen or evensimpler rates. Preparing instructors how to deal with mishaps is of self-evident significance since a few basic steps to begin with help can avoid perilous results which are caused by not acting or acting wrongly [4]. In primary school the basis for to begin with help is, All children have the right to feel secure and well, and know that they will be gone to with due care when in require to begin with help [6]. In this manner, each head master must have satisfactory and fitting gear and offices for giving first aid within the work environment. In schools

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this incorporates obligation for the head educator and instructors, non-teaching staff, and understudies [7,8]. The information of first aid, when legitimately connected, can bridge the hole between brief or changeless damage, quick recuperation, or long-term incapacity [9]. All staff within the schools must be instructed standard safety measures. These arrangements are composed into the crisis arrange. Individuals of the athletic staff such as coaches and physical education instructors have to be up to date on crisis wellbeing strategies. In case they are not, the school nurture will instruct them approximately the approaches and give a implies to audit first-aid methods among them on a standard premise [10]. A essential information and understanding of to begin with help can be important for both instructors and understudies to be able to supply crisis care within the occasion of an mischance, conceivably sparing lives and minimizing damage in school settings [11].

Methodology

A cross-sectional descriptive research was conducted at the primary school in Kerbala city in Iraq, during the period from November 2018 to December 2018 on a randomly sample of 200 teachers to assess the primary school teachers' knowledge toward first aid. Based on review of relevant literature [5,16], a self-administered questionnaire was designed by the researchers. The study instrument was consisted of two part: Demographic data which include teachers' gender, age, teaching subject, years of practice, training related course, and source of information; and primary school teachers' knowledge which comprised of 15 multiple choice questions. The items concerning primary school teachers' knowledge were measured on each multiple choice question consists of (4) alternative responses, and only one of these alternative responses was considered a correct response. To achieve the purpose of the present study, the responses of knowledge questionnaire were scored as (2) for correct responses and (1) for incorrect responses. The cut of point was (1.5) which was calculated as 1+2 / 2 = 1.5 . RS = cut of point / no. of scoring *100 , 1.5/2*100=75. The low limit relative sufficiency (RS) for acceptance primary school teachers' knowledge score was (75). Assessment of primary school teachers' knowledge was based on relative sufficiency score. Relative sufficiency score for knowledge items below 75 was considered as poor, 75 to 87.5 considered as moderate and 87.6 to 100 considered as high.

Data Analysis

Data analysis included descriptive, and inferential statistics was performed by using the Statistical Package for the Social Sciences for Windows (SPSS,version 20)

Administrative Arrangement

Official permission was arranged from Ministry of Education - Directorate of Education of Kerbala for the purpose of conducting this study.

Results and Discusion

Table (1) shows that 83 % of the total sample were females while 17 % were males. Most of the teacher (76%) were between (30-49) years old. Concerning teaching subject, this table shows that the (35.5%) were Arabic and Islamic, (16%) were mathematics, (12%) were English, (11%) were general, (10.5%) were social, (6.5%) were science, (6%) were artistic, and (2%) were sport. Also, this table depicts that the most (79%) of the study sample had 10-29 years' of practice. Concerning training related course this table shows that the majority (90%) of study sample did not participate in any training program. Relative to the source of knowledge, majority (85%) of teachers have acquired information through T.V or Net. Table (2) shows the majority of participants (90.5%) of subjects answered question concerning the care that the child should be taken when he is exposed to foreign body in eye - correctly. So, (80%) of subjects answered question concerning the care that the child should be taken when he is exposed to an epileptic seizure-correctly. (79.5%) of participants answered question concerning the first aid for cases of suffocation (gout) during the meal - correctly. (79%) of subjects answered question concerning the care that the child should be taken when he is exposed to pelvis fracture - correctly. (67%) of participants answered question concerning the first aid for cases of loss of consciousness -correctly. (62.5%) of subjects answered question concerning the care that the child should be taken when he is exposed to poisoning - correctly. (62%) of subjects answered question concerning the care that the child should be taken when he is exposed to epistaxis - correctly. While, (93%) of teachers answered question concerning the first aid when a wound occurs in the arm of a student and he begins to bleed severely-incorrectly. (89.5%) of teachers answered question concerning the contains of first aid bag - incorrectly. (72%) of participants answered question concerning

the first aid for cases when somebody is exposed to trauma -incorrectly. Figure 1 shows that the (2%) of primary school teachers had high level of knowledge, (48%) had moderate level of knowledge, and (50%) had low level of knowledge. Table 3 displays that there is a high significant association between primary school teachers' knowledge and their gender, and no significant association between primary school teachers' knowledge and their other demographic characteristics that presented in this table at P≤ 0.05. Quick to begin with first aid treatment may offer assistance decrease morbidity and mortality. Medical caretakers and specialists are not display in schools in Iraq. Because incite administration of to begin with help may minimize damage horribleness and mortality, instructors must be capable in essential to begin with help abilities [4]. Also , teachers are dependable for checking their pupils. They must make beyond any doubt they feel comfortable and secure interior the four dividers of their school. The current study, shows that 83 % of the teachers were females. These findings agree with the study directed by Shobha et. al., (2014) in India, to assess knowledge and practice of teachers about first aid among children, who showed that the majority (94%) of the primary school teachers were female [13]. Other results of this study illustrates that majority (90%) of study sample did not participate in any training program in first aid that related to the source of knowledge, majority (85%) of primary school teachers had acquired knowledge through T.V or Net. These findings compatible with the study conducted in KAS by AL-Samghan et. al., (2015), to assess primary school teachers' knowledge about first-aid, who showed that the 71.7% of primary school teachers not had previous training in first aid , and 86% of teachers reported that the source of their information was media and internet [5]. The present study findings show that the large percentage of teachers were answered correctly about; question domains related dealing with a foreign object enters the eye and mouth that may be caused swallowed problem and asphyxiating of a student during the meal or playing. Question concerning the care that the child should be taken when he is exposed to an epileptic seizure, and question concerning the first aid when a student is exposed to an fracture (table 2). These problems are common problems, prompting teachers to seek information about them via the internet and television. Due to the study which was conducted by Ayanniyi et. al., (2009), to report the patter of ocular trauma among school pupils in Nigeria. The ocular trauma was found among (0.8%) of pupils, Other lesions included eyelid bruises (0.14%), Physical trauma in school and home (27.30%), fighting (18.20%), home accident (9.10%), and couching (9.10%) occurred in unattended [14]. Also other study was done in Kirkuk/Iraq by Salah (2010), to assess the emergency accident among primary school pupils and type of managements, mentioned the distribution of accident types and location among primary school pupils were seizures 3.2% , shorting of breathing 7%, choking 1.2% , and hematoma 5% [11]. Concerning the first aid for cases of loss of consciousness (67%) of participants answered question - correctly. (62.5%) of subjects answered question concerning the care that the child should be taken when he is exposed to poisoning- correctly. These findings agree with the study conducted by AL-Samghan et. al., (2015), that showed that the 68.4% of participants knew correctly how to manage loss of consciousness. While, disagree with the other results of same study, that showed that the only 26.2% of participants knew correctly how to deal correctly with cases of poisoning [5]. Through the more than half (62%) of subjects answered question concerning the care that the child should be taken when he is exposed to epistaxis - correctly. This finding agree with other study revealed that most (56.6) of teachers had accurate knowledge about the first-aid of epistaxis [14]. While, it is inconsistent with the study conducted by Baser et al.,(2007) in Turkey, to evaluate primary school teachers knowledge and attitudes concerning first aid, who stated that only 11.3% of the respondents knew the correct first aid management of epistaxis [15]. Also in question two concerning the contains of first aid bag about three third (89.5%) of teachers answered question concerning the contains of first aid bag - incorrectly. (72%) of participants answered question concerning the first aid for cases when student is exposed to trauma -incorrectly. And (61.5%) of teachers answered question regarding the general information about fist aid -incorrectly. These findings disagree with the study conducted by Al-Tameemi and Khudair (2016), who showed that the primary school teachers had good level of knowledge toward general information about first aid[16].

Table (1) Distribution of the Primary School Teachers by their Demographic Characteristics (N.200).

List	Items		Frequency	Percent
	Gender	Male	34	17.0
		Female	166	83.0
	Age	20 _ 29	7	3.5
		30 _39	67	33.5
		40 - 49	85	42.5
		50 - 59	38	19.0
		60 years and more	3	1.5
	Teaching subject	Mathematics	33	16.5
		English	24	12.0
		science	13	6.5
		Social	21	10.5
		Arabic and Islamic	71	35.5
		Sport	4	2.0
		Artistic	12	6.0
		General	22	11.0
	Years of practice	1 - 9 years	20	10.0
		10 - 19 years	94	47.0
		20 - 29 years	65	32.5
		30 - 39 years	21	10.5
	Training related course	Yes	20	10
		No	180	90
	Source of information	Educational course	18	9.0
		T.V or Net	170	85.0
		Books	12	6.0

Table 2 : Primary School Teachers' Answer Concerning First Aid (N=200).

First aid domain	Correct Answer	
	Frequency	Percentage (%)
General information about fist aid	77	38.5
first aid bag contains	21	10.5
Bleeding		
Wound	14	7.0
Epistaxis	124	62.0
Foreign body		
Eye	181	90.5
Swallowed and asphyxiating	159	79.5
Trauma	56	28.0
Fracture	105.6	52.8
Neck and Skull	106	53.0

Cont... **Table 2 : Primary School Teachers' Answer Concerning First Aid (N=200).**

Pelvis	158	79.0
Loss of consciousness	134	67.0
Epileptic seizure	160	80.0
Electric shock	63	31.5
Poisoning	125	62.5
Sun strike	59	29.5

Table 3: Association Between Primary School Teachers' Knowledge toward First Aid and Their Demographic Characteristics (n=200).

List	Items Low		Knowledge			X^2
			Moderate	High		
	Age	20 - 29	3	4	0	X^2 = 10.430 d.f.= 8 p-value = 0.236
		30 - 39	24	42	1	
		40 - 49	51	33	1	
		50 - 59	21	16	1	
		60 years and More	1	2	0	
	Gender	Male	8	23	3	X^2 = 23.484 d.f.= 2 p-value = 0.000
		Female	92	74	0	
	Teaching Subject	Mathematics	11	22	0	X^2 = 20.432 d.f.= 16 p-value = 0. 201
		English	13	10	1	
		science	9	4	0	
		Social	9	11	1	
		Arabic and Islamic	32	38	1	
		Sport	1	3	0	
		Artistic	8	4	0	
		General	17	5	0	
	Years of Practice	1 - 9 years	8	11	1	X^2 = 5.034 d.f.= 6 p-value = 0. 539
		10 - 19 years	43	50	1	
		20 - 29 years	37	27	1	
		30 - 39 years	12	9	0	
	Training related course	Yes	12	8	0	X^2 = 1.109 d.f.= 2 p-value = 0. 574
		No	88	89	3	
	Source of Knowledge	Educational course	7	10	1	X^2 = 3.486 d.f.= 4 p-value = 0. 480
		T.V or Net	88	80	2	
		Books	5	7	0	

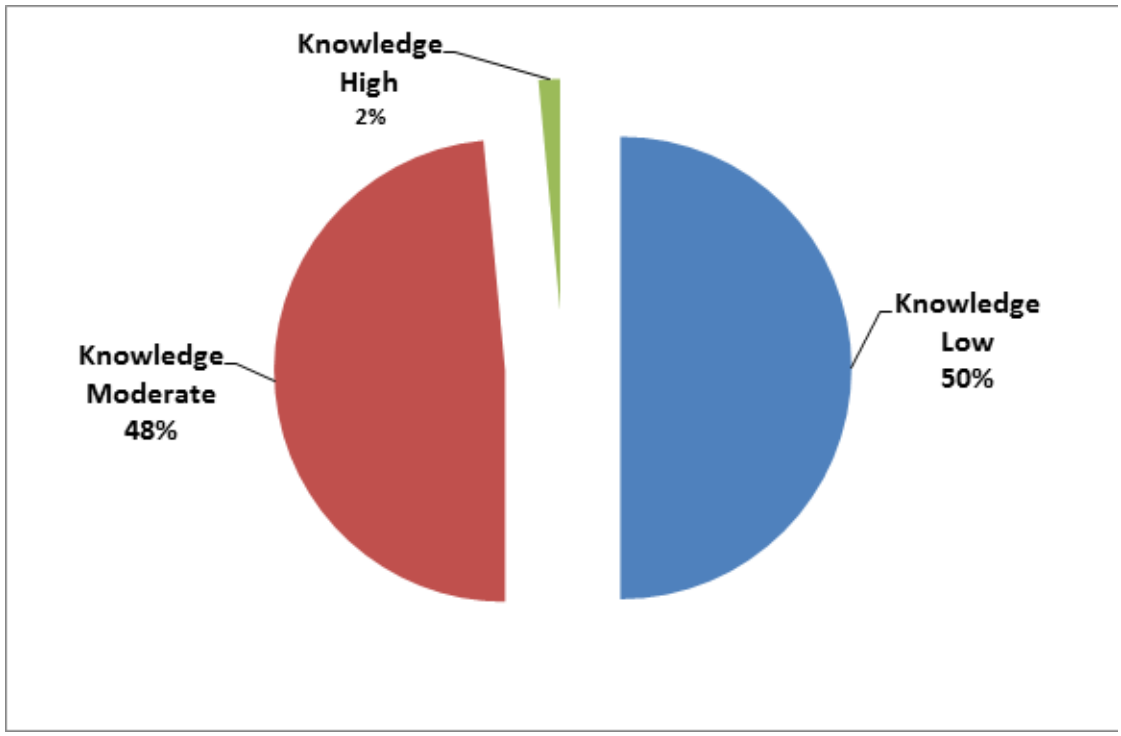

Figure (1): Pie Chart for the Total Knowledge of Primary School Teachers about First Aid According to Their Scores.

Conclusion

About half of primary school teachers' have low level of knowledge concerning first aid, most of the primary school teachers not participant in any training program about first aid, and difference in gender has effect on their knowledge.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Family and Community Health Nursing Department / College of Nursing/ University of Kerbala, Kerbala City, Iraq and all experiments were carried out in accordance with approved guidelines.

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DOI Number: 10.5958/0973-9130.2019.00138.5

Caregivers Knowledge about Psychosocial Problems of Epileptic Patients in AL-Diwanyia Governorate

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Abstract

Epilepsy is one of the most common serious chronic neurological disease, individuals with epilepsy have psychological and social problems. Objective: The aim of this study is to assessment knowledge of caregivers about psychosocial problems of epilepsy. A descriptive study carried out from 3th June to 16th Sep. 2018. conducted at the specialized neurological center in Al- Dewanyia teaching hospital. on caregiver's of patients with epilepsy who were attending this center. A purposive (non- probability) sample of (56) caregiver's. the data was collected through the use of unstructured interview by using questionnaire, this consist of three major parts: Part I : covering letters to obtain the agreements of caregivers to participate in the present study Part II: Demographic information:(Socio-demographic characteristics. this part consists of (10) items about caregivers and (4) items about patients, Part III: include three domains: 1- Questions about epilepsy, 2- Psychological problems , 3- Social problems. the total items of the instrument are (50) items. The findings of the present study indicate that the most of caregivers have poor knowledge (95%). There is no significant difference between the age groups of the caregivers and their knowledge towards psychosocial problems of epilepsy at $p \leq 0.05$.

***Keywords**: Epilepsy, Psychosocial problems, Caregivers.*

Introduction

Epilepsy is one of the most common serious chronic neurological disease in childhood that effects all individuals at any age the incidence usually much higher rate in children and adolescent [1]. People with epilepsy can be more possible than other people to occurrence of affecting, psychological, behavioral disorder and sever social problems. It is enduring tendency by the neurologic, cognitive, psychological and social consequences [2]. Many studies reveals that individuals with epilepsy have psychological and social problems related to their disease and affect their quality of life as well as they lives in psychological and social difficulties than other people with another chronic disorders (asthma, cardiac diseases and diabetes) this problems among individuals with epilepsy has been studied in our country[3]. Psychiatric co-morbidities are frequently encountered in patients with epilepsy, these psychiatric disorders are common in both in pediatric and adolescents population. Prevalence of Anxiety disorders among patients with epilepsy are twice more common than population without epilepsy also suicide has been more reported in patients with epilepsy in comparison to healthy general population[3]. Caregiver of children with epilepsy face profound caregiver challenges because they must dealing with seizures and its associated physical , psychological and social problems such as limitations in activities, stigma, social isolation and decrease quality of life for the clients with epilepsy[4]. Caregivers have an important role in the physical and emotional health of the patients with epilepsy. Often the caregiver is a relatives member or a person who has a closely personal association with the patients. Sometimes the role of the caregiver is to provides the essential connection between the patients and health care professionals. A caregiver's role involves knowledge, patience, and compassion (Edmonton Epilepsy Association, 2011).

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Methodology

A descriptive study carried out from 3th June to 16th Sep. 2018. The study was conducted on caregivers of patients with epilepsy to assess their knowledge about psychosocial problems for their patients, the study is conducted at the specialized neurological center in Al- Dewanyia teaching hospital. on caregivers of patients with epilepsy who were attending this center with their patients to receive medication. a purposive (non- probability) sample of (56) caregivers. all the participants had fill a consent in order to participate in the study, the data was collected from the participants through the use of unstructured interview, meeting them were Saturday and Tuesday each week by using questionnaire, this consist of three major parts:

Part I : covering letters to obtain the agreements of caregivers to participate in the present study

Part II: Demographic information**:(** Socio-demographic characteristics. this part consists of (10) items about caregivers and (4) items about patients**,**

Part III: include three domains**:**

1-Questions about epilepsy**,**

2-Psychological problems **,**

3-Social problems**.**

The total items of the instrument are (50) items for measures the knowledge of caregiver's about psychosocial problems of patients with epilepsy. total score is 50 if all the items are correct and take zero (0) if all the items are incorrect. cut of point is 25, level of knowledge is divided into the following levels: poor knowledge is (25 and less). moderate knowledge from (26-38). good knowledge (above 38). a pilot study was conducted on (10) caregivers selected from the specialized neurological center in Al- Dewanyia teaching hospital from 3rd to 6th June. to determine the reliability, which was calculated through the internal consistency by using: Alpha Cronbach. content validity of the questionnaire is determined through the panel of (15) experts. from different specialties related to the field of the study. Data are analyzed through the use of SPSS (Statistical Process for Social Sciences) version 20.0 application Statistical analysis system and Excel the implementation of test and retest technique on thirty persons.

Results and Discusion

The finding of table (1) indicated that the most of the caregivers (39%) they were (31-35) yrs old. Table (2) shows that the knowledge of caregivers about psychosocial problems of epilepsy is (95%) of them had poor knowledge about psychosocial problems of epilepsy and (5%) of them had moderate knowledge , there is no one had a good knowledge among caregivers. Table (3) reveals that there are no significant difference (F=1.7) between the age groups of the caregivers and their level of knowledge towards psychosocial problems of epilepsy at $p \leq 0.05$**.** Table (4) The results of this table reveals has reported that the level of knowledge of caregivers had no significant relationship at $P>0.05$ with their basis information and socio-demographic characteristics variables such as their gender as well as their economic status but there is a significant relationship between their level of education and the level of knowledge. The results of this study shows that the most of the caregivers (39%) are between 31-35 years old (table 1). This result of the study is congruent with the study of Nayak et al., (2014). They found the majority of family caregivers age was 31-39 years old also the study of Mahmoud and Abd Elaziz (2015). They found the mean age of parent caregivers was 34 years old. This result indicate that the caregivers were middle age, they ability to perform complex tasks remains intact. In regard to assessment knowledge of caregivers about psychosocial problems of epilepsy, the result of table (2) indicate that the majority of them (95%) of the caregivers had poor knowledge about psychosocial problems of epilepsy as well as there is no one has good knowledge, explanation of this result refer to all of caregivers they are spend most of their time on management of seizure not on its complication, so there is no previous education program or seminaries give attention to the effect of epilepsy on psychological and social aspect of their children. In regard to gender, through the data analysis, it has been emerged that gender had no significant difference between the age groups of the caregivers and their level of knowledge (Table 3). This result is congruent with the study of Sharma et al. (2013). They found no association between level of knowledge and their age. Also the result of study reveals that no significant relationship between the gender and economic status of the caregivers with their level of knowledge (table 4), this study is supported by the study of Aliasgharpour et al. (2013) they found no

significant differences between the intervention group with respect to any personal characteristic.

Table (1) Distribution of caregivers according to their age groups.

Age group	Frequency	Percentage
20---------25	9	16%
26---------30	15	27%
31---------35	22	39%
36---------40	7	13%
41---------45	3	5%
Total	56	100%

Table (2) Assessment knowledge of caregivers about psychosocial problems of epilepsy.

Level of knowledge	Frequency	Percent
Poor (≤ 25)	53	95%
Moderate (26 – 38)	3	5%
Good (≥ 38)	0	0
Total	56	100%

Table (3) Significant Variance between the age of caregivers and their level of knowledge .

Age	Source of variance	Sum of Squares (SS)	D.F	Mean Squares (MS)	F	P≤ 0.05
20-25 26-30 31-35 36-40 41-45 46-50 >50	Between Groups	353.8	18	19.6	1.7	0.22 N.S
	Within Groups	78	7	11.1		
	Total	431.8	25			

Table (4) Comparison significant of demographic variables, (gender, level of education and economic status with their level of knowledge.

Gender	Frequency	Percent	D.F	C. S.	P-value
Male	8	30.7%	2	χ^2= 0.37	0.54 NS
Female	18	69.3%			
Total	26	100%			
Level of education	Frequency	Percent	D.F	C. S.	P-value
Illiterate	0	0%	8	χ^2=5.88	0.05 S
Primary	4	15%			
Secondary	15	58%			
Institute or collage	7	27%			
Post graduate	0	0%			
Total	26	100%			
Economic Status	Frequency	Percent	D.F	C. S.	P-value
Sufficient	9	35%	4	χ^2= 2.95	0.22 NS
Insufficient	6	23%			
Barely Sufficient	11	42%			
Total	26	100%			

Conclusion

Most of the caregivers were mid-age, females, living in urban area and have secondary level of education. Most of the caregivers were mothers of the patients with epilepsy. All the caregivers have poor knowledge about psychosocial problems of epilepsy.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Psychiatric Nursing, College of Nursing, University of AL-Qadisiyah, Iraq and all experiments were carried out in accordance with approved guidelines.

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DOI Number: 10.5958/0973-9130.2019.00139.7

Depression among Secondary Schools Students in Tikrit District

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Abstract

The aim of the study is to evaluate the prevalence rate of depression in secondary schools students in Tikrit district. The study was conducted at secondary schools in Tikrit district. A representative sample of 1334 students aged (12-18) where assessed and asked to answer the questionnaire that include a demographic information, family history of depression and if they are displaced and using the Columbia depression scale (DISC) of -22- items. The study sample has been divided into two groups I and II as (highly risk) to have depression and (low risk) to have depression respectively depending on the Columbia depression scale. The overall prevalence of depression as measured by this scale among secondary schools students was (14.9%) with a female to male ratio (1.3:1). Among the studied socio-demographic variables has been found that urban student especially of high social level and those of poor school performance were associated with a higher risk of depression, generally the highest prevalence rate of depression was found in displaced peoples (52%).

Keywords: *depression in secondary school, depression in Tikrit-Iraq .*

Introduction

Depression is one of important and common diseases all countries [1]. Depression may be chronic or recurrent and the interfere daily life activities and social and personal responsibilities and unfortunately may cause suicide. Depression appeared as the first cause of disability and as second factor to the global burden of disease by 2020. Depression affect human beings of all gender, ages, and ethical backgrounds [2]. Depression affects the entire person's body, starting from moods, thinking, thoughts, and behaviors [3]. Depression affects about 5% of population at any given time[(4)]. The disease affects girls twice as boys in adolescence [5]. Adolescent's depression carry an important aspect that it occur at period of great personal change when both sexes are forming an identity distinct separated from their parents, appearance of gender issues and sexuality, and its co-occurrence with early decisions making with other diseases [6]. This study aims at evaluating the prevalence of depression in secondary schools students in Tikrit city.

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Materials and Method

Formal administrative approval sheet was taken to conduct the study from the ministry of education, department of education in Tikrit Education Directorate. The study was carried out in the secondary schools in Tikrit District This a descriptive study with analytic component carried out on secondary schools, students in Tikrit district. Questionnaire were presented to all students in the schools that day, in the classroom, depending on the help and cooperation of the school's administration and teachers during spare time. The students filled out the questionnaires after explanation of each item by the researcher in about 35 minutes and returned them to researcher at the end of the session.

The sample of the study:

The total population of the secondary schools students (12-18) in Tikrit district was 13047 students. The representative sample is 9.94% of population in P-value less than 0.05 [(9)] A (10.22%) sample was chosen [(10)], and the number of students included in the study

was (1334), (767) of them were male and a (567) were female.

The total number of student was 1334 that represent a 10.2% of total number of students in Tikrit district and the final male to female student ratio in this study was (1.35) to (1), while the world rate male to female was (1.02) to (1) [11],which mean that the ratio in the study sample was representative.

Results and Discusion

The study results showed that from a 1334 students who where interviewed there is a 767 male in a percent of (57.5%), and there is a 567 female representing a percent of (42.5%). Analysis of the residency of the students revealed that there is a 1028 (77.06%) students in urban area, and a 306 (22.94%) students in the rural area. The distribution of depression in relation to the residency in this study shows that from a 1028 students in urban area there is a 167 (16.25%) are group (I), and from a 306 students in the rural area there is a 33 (10.78%) are group (II).Table-1- From a 1334 students there are a 137 (10.27%) found to be displaced, and the rest 1197 (89.73%) not displaced. The results from this table shows that from a 137 displaced students there is a 72 (52.55%) group (I) and a 65 (47.45%) group (II), while from a 1197 students not displaced there are a 128 (10.69%) are group (I) and a 1069 (89.31%) are group (II). Table (2). In this study it was found that social levels of the students is classified into three categories as follow: 942 (70.615%) of the students of low social level, and 269 (20.165%) students of middle social level ,and a 123 (9.220%) of high social level. From the data showing in this table, it was found that from a 942 students in the low level there is a 121 (12.85%) are group (I), and a 821 (87.15%) are group (II), while from a 269 students in middle level there is a 26 (9.67%) are group (I) and a 243 (90.33%) group (II), whereas from a 123 students in high level there is a 53 (43.09%) are group (I) and a 70 (56.91%) are group (II). Table (3). The distribution of family factors in the study sample, it was found that there is a positive (present) family factors in a 316 (23.688%) students, and a negative (not present) family factors in a 1018 (76.311%) students. In this study, it was found that from a 316 students with positive family factors there is a 133 (42.088%) are group (I), and a 183 (57.911%) group (II), while from a 1018 student with negative family factors there is a 67 (6.58%) are group (I), and a 951 (93.418%) are group(II). The distribution of depression in relation to single and multiple family factors, reveals that from a 163 students with a single factors there is a 36 (22.088%) group (I) and a 127(77.914%) are group (II), while from a 153 students with a multiple factors there are a 97 (63.398) group (I) and a 56 (36.601%) are group (II). Table (5). The distribution of each family factors in the study sample, it shows that from 390 family factors there are 114 (29.230%) death, 44 (11.282%) murdered , 41 (10.512%) divorce, 50 (12.820%) detainee , 94 (24.10%) psychological diseases and 47 (12.051%) others factors. Analysis of school performance of each students in the study sample, it was found that 214 (16.041%) students are in the weak performance level, 174 (13.043%) students in the accepted level, 483 (36.206%) students in the medium level, 293 (21.964%) students in the good level, 106 (7.964%) student in the very good level and a 64 (4.797%) students are in the excellent level. Analysis of school performance of Group (I) were as follows: weak (27.57%), accepted (22.41%), medium (16.14%), good (3.75%), very good (8.49%), excellent (6.25%). Analysis of school performance of Group (II) were as follows: weak (72.42%), accepted (77.58%), medium (83.85%), good (96.24%), very good (91.5%), excellent (93.74%). It was found that from a 214 students of weak performance there are 59 (27.570%) was group (I) and 155 (72.429%) was group (II), while from a 174 students of accepted level there are 39 (22.413%) in group (I) and 135 (77.586%) are group (II), and from a 483 students of medium performance there are a 78 (16.149%) found to be group (I) and 405 (83.850%) group (II), and from 293 students of good level there was 11 (3.754%) group (I) and 282 (96.245%) was group (II). From 106 students of a very good level, there was 9 (8.490%) in group (I) and 97 (91.509%) group (II). while from a 64 students of excellent level of school performance there are 4 (6.25%) found to be group (I) and the rest are group (II) .For more than 20 years, Iraq suffer from wars and sanctions and displacement which affect all aspects life especially health of children, adolescents and women [12]. In this study, the male to female students ratio was 1.35:1,which is more than the M:F ratio found in a similar study carried out in Europe and USA in which the ratio was 1.02:1 [13] and more than the study done by Asma A AL-Jawadi,and Shatha Abdul-Rhman ,in which the ratio was 1.22:1[12]. In another study done by Mohammed Kh. Abdulwahd in Al-haweeja , the ratio was 2.12:1 [11] which more than the ratio in this study. This difference may be related to the area because

Al-haweeja people prefer their boys to complete their education while in Mosul and here in Tikrit district the completion of education is more accepted for both genders and the ratio is close to that in Europe and in USA[13]. *A. Al Riyami found in Oman that* to be a girl is a risk factor to have depression by 19.4%[14] ,which near to our results. In this study the ratio of female to male in the prevalence of depression was 1.3:1which may be explained by bad security circumstances as a whole, especially female making them more depressed about their life and feeling of a gloomy future waiting them. Another factor contribute to the female predominance is stage of great hormonal changes and greater feelings of helplessness, perhaps due to these changes.

Residencey:

In this study the ratio of urban to rural students was 3.3:1which is greater than ratio mention in a study done by Mohammad KH .Abdulwahd where it was 2.42.:1 possibly due to large number of students in a relatively small district [11]. Janice found that the prevalence of depression was significantly higher among rural (6.11%) than among urban (5.16%) populations [15], which is greatly different and reverse from the result in this study where the depression was more in urban area (16.24%) than rural (10.78%), while result of Mohammad Kh. Abdulwahd, which showed that the prevalence of psychosocial problems and one of them is depression is more in urban than rural areas in a percent of 15.6% versus 9.8% [11] respectively and this agree with the current study results it is probably due to difficulties in life, more complex, more needs, close communities, in addition to that center of the city is more affected by occupation, conflicts and bad security than in rural area. Our study disagree with what found by Janice C, that the prevalence of depression was significantly higher among rural than urban populations *(*6.1% versus 5.2%) [16] and that was explained as the rural residents commonly have less access to primary health care, specialists, and other health and social services than persons in urban areas [17] and also in those countries rural residents are live in poverty which associated with the occurrence of depression [18].

Displacement: High percent of them 52.5% are depressed, this agree with Mirela Grgić study which conducted after five years since they had experienced war traumas, 17.9% of displaced children age 12-15 manifested clinically significant depression [19]. Kinzie et al found that 50% of the children 6 and 12 years of age Cambodian refugee children showed developed a depressive disorder after 4 years of displacement [20]. Harvard USA program in Refugee Trauma found that two thirds of disabling depression among Bosnian refugees [21]. The results of the current study is agree with a study carried out in randomly selected sample of Turkish immigrants, which revealed a prevalence rate of depression (36.1% in females, 27.9% in males) [22].

Social levels:

Depression affect all socio-economic level. High prevalence of depression in the high social level students in our study may be due to the bad general situation in Iraq like insecurity and loss of occupation. Poverty is a major risk factor for depression in anyone and also impairs access to good medical care [(23)]. Lorant *et al*, and Sandro Galea support the finding of high depression rate in low socioeconomic status (SES). Poverty also has bad consequence on depression like powerlessness and emotional stress.

Family factors: Complexity of depression lies in that may develop for a different reasons. It may follow major life change (a loved one death, a divorce, the loss of a job, or a move [(27)].

Table (1): The distribution of depression in relation of residency.

Chance of Depression / Residence	Group (I)		Group (II)		Total
	No.	%	No.	%	
Urban	167	16.25	861	83.75	1028
Rural	33	10.78	273	89.22	306
Total	200		1134		1134

Table (2): The distribution of depression in relation to displacement

Chance of Depression Displaced	Group (I)		Group (II)		Total
	No.	%	No.	%	
Yes	72	52.55	65	47.45	137
No	128	10.69	1069	89.31	1197
Total	200		1134		1134

Table (3): Distribution of depression in relation to the social levels.

Chance of Depression Social level Social level	Group (I)		Group (II)		Total
	NO.	%	NO.	%	
Low	121	12.85	821	87.15	942
Middle	26	9.67	243	90.33	269
High	53	43.09	70	56.91	123
Total	200		1134		1134

Table (4): Depression &positive and negative family factors.

Chance of Depression Family Factors	Group (I)		Group (II)		Total
	NO.	%	NO.	%	
Positive	133	42.088	183	57.911	316
Negative	57	6.581	951	93.418	1018
Total	200		1134		1134

Table (5): The relation between depression and family factors:

Chance of Depression Family factors	Group (I)		Group (II)		Total
	NO.	%	NO.	%	
Single Factors	36	22.088	127	77.914	163
Multiple Factors	97	63.398	56	36.601	153
Total	133		183		316

Conclusion

The current study has found that the prevalence of depression by using the Columbia scale among secondary schools students aged (12-18) in Tikrit district was 14.9%. Gender of the students has a significant effect on the occurrence of depression which is more in female.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Tikrit Medical College, Iraq and all experiments were carried out in accordance with approved guidelines.

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DOI Number: 10.5958/0973-9130.2019.00140.3

Effects of Dietary Grape Seed Extract on Physiological Parameters, Antioxidant Activity and Immunological Status of Broiler Chicks Exposed to Aflatoxin

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Abstract

Major target of the study was inspection of the protecting role of grape seed extract (GSE) in alleviating the physiological changes of broiler chicks during exposure to aflatoxins in contaminated feed. One hundred &twenty five broiler chicks '' Ross'' 308 (1d-old) were used, Birds were randomly divided into 5 groups,(25 birds for each group). Birds in group1fed on normal diet as a control. Birds in group 2 fed on normal diet with (200mg/kg GSE). Birds in groups 3 fed on contaminated diet (AF+200mg/kg GSE). Birds in group 4 fed on contaminated diet (AF+100mg/kg Mycofix).Birds in group 5 fed on contaminated diet(AF only)without any treated. the results showed the addition of (G S E) lead to a significant rise (P≤0.05)in antioxidant rates(GPx) &in the levels of antibodies against (N D & I B D),as well which exposed a significant reduction (P ≤ 0 . 0 5) of the physiological indicators (AST,ALT) & in MAD, in group 3 while the result in treated (AF only) in group 5 there are converse all the results in the same parameters.

Keywords: *G S E, Aflatoxin, Antioxidant, Immunity, Broilers.*

Introduction

Dietary curiosity in poly-phenolic composites has enlarged greatly duo to their antioxidant action [1]. As the major collection of grape poly-phenols, flavonoids are the main nominees considered to have biological possessions, counting but not tapered to antioxidant, anti-cancer, anti-inflammatory , antiviral, antimicrobial, neuroprotective, cardioprotective, & hepatoprotective activities[2]. In this meaning, the clinical information revealed that the antioxidant feature of grape seed [3]. Grape seed proantho-cyanidin extract can withdraw free radicals, keep the all over -Oxidative destruction produced by the free radicals, [4,5] &avoid a variety of illnesses initiated by free radicals, like , atherosclerosis, myocardial-infarction, drug made liver & kidney damage; moreover, it has functions of anti-thrombotic, anti-radiation anti-tumor, anti-fatigue, anti-tumor, &anti-mutagenic [6,7]. Previous experiments in laboratory [8,9] have revealed an rise in the antioxidant action of broiler intake. The F D A has set controlling heights for domestic animal foods for 20 p p b A F [10]. like wise in another types , the liver is the most badly affected organ in domestic animal, main alarms being hepatotoxicity &carcinogenicity [11]. Aflatoxins have been shown to cause Immunosuppression [12,13] From a general point of view &the importance of poultry production, the purpose of these study was to show the efficacy of grape seed extract in alleviating the deleterious of aflatoxin in broilers with respect to (Some physiological parameters,antioxidant &the immunological status.

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Materials and Method

Animals & Management

One day chicks '' R o s s 3 0 8 '' were bought from a local hatchery, the chicks were reared according to routine management practice. Basal scientific diet of broiler chicks was supplied. All nurturing counting water were supplied *ad libitum* to meet [14].Normal diet

obtained from local factory for supplied poultry diet in Karbala,The Aflatoxin diet were supplied through a fungal-contaminated feed (Broiler diet) that was detected by the ELISA, The feed contained aflatoxin (76 P P b) [15].

Preparation of the (GSE)

Grape fruits as big bunches were bought from the local market in holly Karbala. Seeds were separate from the grape, air dry in shadow for one week &powdered to get good powder (electrical grinder).The seeds powder was soaked in 70% ethanol (25% W/V) for 72 hr at room temp. & was motivated three times aday. The mix filtered with cheesecloth &dry at room temp. (25 - 30 Cº) to remove ethanol extract & obtain G S E as a powder (yield 25-30%). According to [16] ,&analysis of compounds of phenolic in grape seed extract by HPLC.

Experimental Design

One hundred &twenty five broiler chicks ‘‘ Ross 308 ’’ (1- d-old) were distributed random to 5 groups, 25 birds for every group:(Group 1) birds in this group fed from first day to end of experimental on normal diet without any addition as a control group. (Group 2) birds in this group fed from first day to end of experimental on normal diet with addition grape seed extract (200mg/kg GSE). [17].(Group 3) birds in this group fed from first day to end of experimental on contaminated diet (Aflatoxin 76 ppb)) [15] supplemented with grape seed extract(200mg/kg GSE). (Group 4) birds in this group fed from first day to end to experimental on contaminated diet (Aflatoxin 76 ppb) supplemented with (100mg/kg Mycofix) [18]. (Group 5) birds in this group fed from first day to end to experimental on contaminated diet (Aflatoxin 76 ppb) only without any treated).

Data collection &parameters

At day 35th of age, were collected blood samples from 5 chickens in every group from the jugular vein in a test tube without anti-coagulant, The serum was disconnected by centrifugation for ten minutes at 3 0 0 0 rpm &stored in a deep freeze (-20) until analysis to determine the physiological parameters (AST & ALT). Measuring of Serum Glutathione Peroxidase (G P x) done by using a sandwich enzyme immunoassay Elisa kit. [19], measurement of Malondialdehyde (MDA)was determined by a altered routine that described by [20] & determination immunity of Newcastle disease (N D) &Infectious bursal disease (I B D) E L I S A Kit (Synbiotics–USA) [21].

Statistical Analyses

The data was examined with S P S S Ver. 16.0 by a one - way analysis of variance (A NOVA). Variances among means were observed using Tukey’s test in which the significance level was designated at $P \leq 0.05$ [22].

Results and Discusion

In present experiments,the significant increase in (AST &ALT) in (table 1) in group five that broilers exposed to contaminated diet with aflatoxin which may be attributed the improved serum heights of A S T & A L T were liked to injured constitution integrity of the liver, duo to they are cytoplasmic in position &consequently freed into blood stream later of the cellular injuries [23,24] stated that AST was raised in aflatoxin - intoxicated birds contrasted to controls.On the other h&the results showed significant decease in (AST &ALT) in group fed on (GSE+AF) which may be due to The hepatoprotective activity of proanthocyanidin included in grape may perhaps due to the antioxidant &free radical sifting features or enhanced antioxidant capacity of the liver [25]. Resveratrol initiated significant reduce in levels of ALT and/or AST in animal models (mice &rats) which induced by different factors causing hepatotoxicity or hepatitis (lipopolysaccharide, naphthalene, & acetaminophen) [27,28]. The significant rise in (MDA) &significant reduction in (Gpx) enzymes in (table 2) in group five that broilers exposed to contaminated diet with aflatoxin which may perhaps attributed to the point that AFB1 is break down by the cytochrome P 4 5 0 enzyme system to form the quick to respond intermediary, AFB1 - 8 , 9 - epoxide, that reacts with macro-molecules like the lipid & DNA [28], This bespeak to lipid per-oxidation & cellular damage & DNA abducts formation [29] likewise might be due to important drop-off in the actions of enzymatic antioxidants like glutathione peroxidase (Gpx) in level which is too detected in present study. On the other hand,the results showed significant decreased in (MAD) level &increase in (GPx) enzymes in group fed on (GSE &AF) which may be due to the phyto-chemicals that present in grapes hold an antioxidant action & the action in the G S E is associated with whole phenolic contented. The GSE rich in poly-phenols might be an

effective origin of antioxidant in the chicken food.The rise in the antioxidant action of grape polyphenols in the excretory product proposes that part of extract able poly-phenols are degraded by intestinal micro-flora [8,9] Antioxidant action is the most important bio-activity of phenolic composites from GP [2].The antioxidant action of grape seed poly-phenols is twenty-times advanced than vitamin E & fifty-times advanced than vitamin C . In addition the results in (table 3) showed that the (ND &IBD) antibody titer level was significant decrease in group five, A F have the ability to stops the growth of the thymus gland or influence the relation weight of the bursa of Fabricius, which may result in serious insufficiencies in both cellular & antibody receptivity of the poultry immune system. In this way, contact to AF has been established to destroy the immune response in chicken. A F grades in vaccine disappointment or pathogen perseverance, as example in many readings by reduction immuno-globulin making. A variation of reasons like the vaccination letdown, contagion by immune suppression diseases, &misuse of antibiotics can make immune-competence.On the other hand, the result in the same table showed that the in (ND &IBD) antibody titer level was significant increased in group three that broilers fed on (GSE & AF) compared with AF group. Herbaceous plant that are wealthy in flavonoid s range the action of vitamin C , play role as anti-oxidants, &can thence improve immune roles.This is in agreement with the previous reports of improving antibody response caused by herbal depravities. In poultry production, it is more effective to use immune stimulators to improve immunity &decrease susceptibility to infectious disease. The attachment of grape polyphenol in instead of vitamin E in the broiler nutrient caused in enhanced antibody titers against N D & I B D virus.

Celik I, Oguz H, Demet O, Donmez HH. Efficacy of polyvinylpolypyrrolidone in reducing the immunotoxicity of aflatoxin in growing broilers. British Poultry Science. 2000; 41(4): 430-439.

Table 1. The effect of grape seed extract AST [U/L] and ALT [U/L].

Parameters Groups	AST [U/L]	ALT [U/L]
Group1 (Control)	169 ± 2.73 B	3.06 ± 0.20 B
Group2 (GSE)	164 ± 3.39 B	3.04 ± 0.20 B
Group3 (AF + GSE)	169 ± 1.22 B	3.24 ± 0.24 B
Group4 (AF +Mycofix)	168 ± 2.12 B	3.34 ± 0.45 B
Group5 (AF)	256 ± 3.89 A	7.04 ± 0.76 A

Table 2. The effect of grape seed extract Gpx [U/L] and ALT MAD [µ/M].

Parameters Groups	Gpx [U/L]	MAD[µ/M]
Group1 (Control)	65.40 ±2.88 A	5.26 ± 0.26 B
Group2 (GSE)	66.00 ±1.87 A	5.14 ± 0.15 B
Group3 (AF + GSE)	62.80 ±2.28 A	5.58 ± 0.39 B
Group4 (AF +Mycofix)	62.20 ±1.48 A	4.34 ± 0.32 B
Group5 (AF)	41.20 ±1.92 B	7.18 ± 0.33 A

Table 3. The effect of grape seed extract on Newcastle disease (ND) plus Infectious Bursal disease (IBD) antibody titer in broilers.

Parameters Groups	ND [35d]	IBD[35d]
Group1 (Control)	3057.20±640.59 A	12771±914.59 A
Group2 (GSE)	3358.00±960.86 A	12624±1155.12 A
Group3 (AF + GSE)	2907.60±596.38 A	11685±805.62 A
Group4 (AF +Mycofix)	2984.60±125.25 A	11594±830.18 A
Group5 (AF)	877.60 ±80.41 B	3193.20±414.21 B

Conclusion

It was considered that (GSE 200 mg/kg) be able to addition as a nutrient enhancement in broiler chickens from 1 to 35 d a y s eld to improve the physiological condition of them , antioxidant activity &the immune reactions.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Biochemistry and Pharmacology Department / College Of Veterinary Medicine / University of Kerbala, Iraq and all experiments were carried out in accordance with approved guidelines.

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DOI Number: 10.5958/0973-9130.2019.00141.5

Emotional Distress among Close Relatives Caring for Clients with Cancers Undergoing Chemotherapy

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Abstract

Emotional distress is a mental disorder of a repulsive experience of expressions, different perception or behavioral. Emotional distress influences are coping with the disease. The nature of the disease and its unpredictability in the future of the patients' health lead to significant emotional distress among patients and their close relatives. **Aims:** To assess the emotional distress among close relatives caring for cancer patients undergoing chemotherapy. To find out the correlation between the relatives emotional distress and their demographic characteristics. A descriptive study was conducted on 108 close relatives caring for patients with cancer. Results: The results of the study suggest that (84%) of the study sample had moderate to severe level of emotional distress. Participants' gender and educational level were found to have a significant relationship with emotional distress ($p=< 0.05$). Close relatives who care for patients with cancers are highly vulnerable to emotional distress. Female and relatives with low educational level are more likely to have emotional distress than other close relatives are. To provide an educational program about stress reduction strategies.

Keywords: *emotional distress, close relatives, cancer, chemotherapy as chemo*

Introduction

Both external and internal factors cause cancer. Cancers are caused by abnormal growth and spread of cells over a long period. Example of external factors causing cancer are; tobacco, ionization, infectious organisms, and exposure to chemicals, and internal factors, such as hormones, weak immune systems, and inherited genetic mutations [1]. Some of the treatments for cancer include surgery, radiations, and different types of therapies (e.g., hormone, immune, and chemotherapy). Facing challenges associated with the cancer diagnosis and subsequent phases and treatment routines of the disease may cause emotional distress to both the patient and the family. According to Health Sock Work (1983), refers these families to as psychologically affected families. The primary possible cause of distress is the transition points for the patient and the family, in curing cancer [2]. Due to advanced modern treatment methods, there has been an increased number of cancer survivors. Furthermore, more care to a cancer patient is provided at home. The increasing in caregiving differs according to different stages of cancer [3]. The family members are, therefore, the primary caregivers to the patient's everyday tasks lasting more than 14 months, affecting the caregiver's daily routines. According to Western studies, approximately 20% of family members experience some form of psychiatric disorders such as emotional distress. Research shows that caregivers are affected with both physical and mental health while providing care to their terminally ill loved ones. Besides, it may as well cause social stigma to both the patient and the caregiving family. Cancer is a family disease. It causes several emotional reactions to the family due to the great adjustments in the family caused by the disease. Some of these mentally severe effects include fury, guiltiness, and regulation of pain. These psychological disorders may lead to approval or denial of cancer as part of their lives [4]. However, most family and partner caregivers cope with the caregiving, but a minority, especially female caregivers and

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those with a history of psychiatric disorders, become highly distressed or develop psychological disorders. According to Pitceathly et al. 2003, due to lack of the social network, caregivers are also more at risk for these emotional disorders. The disease's emotional effects on patients have been a significant element for wellbeing specialized involvement in the completely healing procedure.

Importance of study: Due to limited information on psychiatric disorders by caregivers, the study investigates the psychological distress, suffering, and pain of the patient's family depend on indication lists like the Hamilton emotional disorders and nervousness. These procedures do not provide the satisfactory conclusions used in making clinical decisions sensitive to particular statistical mental disorders like moods and apprehension disorders. In connection with this, DSM Fourth Edition (DSM-IV) has been used in few studies to administer structured interviews to caregivers. Through these studies, the rates of emotional disorders using mental analytic procedures have not been recognized. Likewise, there is an inadequate publication on information concerning exploitation of psychological health services by some complex cancer patients such as Iraqis cancer's caregivers. The objective of the study: Firstly, assessing emotional distress among close relative's caregivers undergoing chemotherapy. Secondly, to find out the relationship between the relative's emotional distress and their demographic characteristics of gender, age, education, and economic level. According to research, cancer occurs when there is abnormal growth of the cells causing a lump called a tumour except for leukaemia. Through the circulatory system, tumors can spread to other body parts. Untreated tumors can grow and spread into adjacent organs. This spread can cause infection to other body systems [5]. According to researchers, cancer is similar, but they are different in their growth and spreading characteristics. According to the National Cancer Institute 2013, Benign tumors rarely threaten life and are not cancerous. Benign tumors are slow-growing tumors, but they don't extend to other body parts. Their cells are like normal cells. They increase in size, becoming bumpy and even exerting pressure on adjusted organ tissues [6]. Malignant tumors, on the other hand, develop quicker compared to benign tumors, spreading and destroying adjacent organs. Through metastasis, malignant tumor cells divide and spread to other body parts. While in the healthy tissue, the tumor continues to divide and grow to cause metastatic cancer. These secondary sites are known as metastases. Chemotherapy is the treatment of cancer with strong drugs through ingestion or injection into the bloodstream. Chemotherapy involves more than one chemo drug. Unlike, other forms of cancer treatments, chemotherapy medicines are used to cure spreading cancer (American Cancer Society, 2015). Chemotherapy is used to cure cancer, prevent its spread, slowing cancer's growth, relieving symptoms, shrinking a tumour before the operation, and lower the risk of cancer coming back. Depending on different types of drugs, patients experience different side effects. This also depends on the amount of drug taken, and the length of the treatment. Some common side effects of these medicines are vomiting, temporary hair loss, higher chances of illness, and fatigue. Most side effects are controllable with medications, compassionate care, and by altering the healing plan. The caregivers should be aware of the side effects some of them, require immediate treatment.

Close relatives or Family in the caregiving role and emotional effects

According to the US (1997) statistics, about 25 million adults were caregivers to a family member with chronic, disabling, and either terminal illness [7]. 1996 Canada statistics survey report suggests that about 2.6 million adults, were caregivers. Similarly, women (45 to 65) also provided care towards their loved ones (cancer patient), this number increased to 1 in 5 [8]. There have been elevated emotional distress amongst family caregivers resulting from the disease experience. In connection with this, current studies suggest that disruption to routine as a major cause of psychological disorders. Giving care disrupts the routines of the caregiver. The disruption to lifestyle can result in emotional distress in caregivers. Moreover, sources suggest that emotional distress amongst caregivers are not directly associated with the amount of care provided but is caused by other factors such as perception of the burden [10]. In the Family Caregiver Model, reactions of the caregiver are in multiple forms; they include; routine interference, monetary worries, lack of support from the family support, fatigue, and low confidence (Nijboer, C.et al.1999). Devins's routine interferences construct a division in this construct,(Devin, GM. 1994). In comparisons, Devin's construct is inclusive than Nijboer's construct. The construct includes significant

factors to values of life. Therefore, Devin's routine disruption technique to caregiving provides a detailed evaluation of the effects of routine disruption on caregiver's mental health. High levels of distress have been observed in the patient's family. This condition worsens with families whose patients suffer from the adverse side effects of cancer. Due to patient activity restriction, it was predicted later institutionalization of the patient as a remedy.

Methodology

Design of the Study: His quantitative descriptive, analytical study was carried out between 8 October 2017; to 20 June 2017.

Administrative Arrangements: An official permission is obtained from the Karbala health directorate/department of training and development to perform data collecting. Last, of all, the topic accord was acquired from the affected families to involve in the interrogation or interview

Place of Study: It was conducted at Imam Hussein Medical City, Al-Zahra oncology centre.

The Sample of the Study: A sample of 108 patients treated with chemotherapy at Imam Hussein medical city, Al-Zahra oncology centre.

Inclusion criteria: The samples were selected according to the following system:

Men and women treated by chemotherapy.

Age between 18-60years and above.

Data Collection: The data were collected from the period of 8th March 2017 through interviewing approach to the subjects interrogated in the chemotherapy unit at Imam Hussein medical city, Al-Zahra oncology center, by the using the Arabic version of the questionnaire, and they were questioned similarly, in the same place.

The instrument of the study: Researchers formulated a questionnaire to measure the study variables. The construction of the questionnaire was formulated based on case studies and published information. The questionnaire consisted of two parts of the following: *Part one:* Include Demographic information (4 items) age, gender, educational level, and economic status. *Part two:* Concerns with Robertson Measurement of emotional distress among close relatives caring for cancer patients and consists of 10 questions.

Rating and scoring: Some question consists of (2) alternative responses, and only one of these alternative responses was considered a correct response. To achieve the results of the study, the responses of emotional distress questionnaire were scored as (3) never and (2) sometimes, and (1) as always.

(Cut of the point) x100 / (No. of scale). Low = (less than 66.6), Moderate = (66.7-83.3), High = (83.4-100), these calculated according to the following formula (100-66.6) /2 =16.7, then this score was added to (66.6+ 16.7=83.3) moderate level, (83.3+16.7=100) high. level (Al-Maliki, 2010).

The validity of the instrument: The validity of assessment questionnaire was determined through the panel of (9) experts in the field of:

Six professionals were department members from the College of Nursing/University of Karbala, one of Babylon college of nursing, and one of Al-Kufa University/ College of Nursing.

One physician, working in the chemotherapy unit.

Results from experts indicated the questionnaire was well formulated to determine the caregiver's levels of emotional distress. Additionally, the professional recommendations to the questionnaire construct are considered in the formulation of the final copy of the questionnaire.

Data analysis: Statistical analysis was conducted via the statistical analysis software SPSS 15.0. Statistical evaluation was employed through statistical procedures to calculate and produce the summary of the information.

Results and Discusion

This chapter present results of the study with correspondence to the study objectives. Table 1 reveals that (61.1%) of the study sample are male. Regarding age groups, results indicate that the (31.5%) are within fourth age groups (40-49) years old. Concerning level of education, most of the study sample are primary education and constituted (59.3%) out total number of the study sample. This table also reveals that (47.2%) of participant's reported that they had not enough monthly income. Table 2 explains the overall levels of

emotional distress among close relatives. It shows that about (53.7%) of the study sample had moderate level of emotional distress; followed by (24.1%) had severe level of emotional distress. Table 3 presents that there is a significant association between emotional distress and gender group; male was at higher risk for emotional distress than female. A significant correlation was also found between emotional distress and educational level in which that people with less educational level experience higher distress emotional level. Result shows that the highest percentage (61.1%) of the sample close relatives caring for cancer patients was male. (Bigattit SM, et al. 2011) Also, note the results showed that due to activity interference, young male caregivers more negative impact. The results also show females provided care that is more delicate and domestic responsibilities than males. More problems that are psychological were observed amongst males' caregivers. They showed a variety of physical, psychological, and cognitive problems along with fulfillment while caring for their spouses. Due to different needs from male caregivers, they haven't been involved in cancer literature. Male caregivers need additional support from friends and family members while providing care to their patients. We also find that the highest percentage (31.5%) of the sample close relatives caring for cancer patients was within the age group (40-49).

Table (1): Distribution of participant's demographic data

Demographic data	Rating	Frequency	Percent
Gender	Male	66	61.1
	Female	42	38.9
	Total	108	100
Age	<20	14	13.0
	20-29	21	19.4
	30-39	29	26.9
	40-49	34	31.5
	50-59	5	4.6
	>60	5	4.6
	Total	108	100
Education Level	Primary	64	59.3
	Secondary	17	15.7
	Institute	8	7.4
	Bachelor's	18	16.7
	Post-Graduation	1	0.9
	Total	108	100
Income	Enough	19	17.6
	Enough to limit	38	35.2
	Not enough	51	47.2
	Total	108	100

Table (2): Overall Assessment of levels of Emotional Distress among study participant's

Emotional Distress	frequency	percent	Valid Percent
Sever Emotional Distress	26	24.1	24.1
Moderate Emotional Distress	58	53.7	53.7
Mild Emotional Distress	24	22.2	22.2
Total	108	100.0	100.0

Table (3): Statistical Association between the Emotional Distress of Close Relatives Caring and their Demographic Characteristics

Demographic information		Age	gender	Education level	Monthly income
Emotional distress	Pearson Correlation	.063-	-.205-*	-.236-*	-.089-
	Sig.(2tailed)	.516	.033	.014	.362
	N	108	108	108	108
*. Correlation is significant at the 0.05 level (2-tailed).					
**. Correlation is significant at the 0.01 level (2-tailed).					

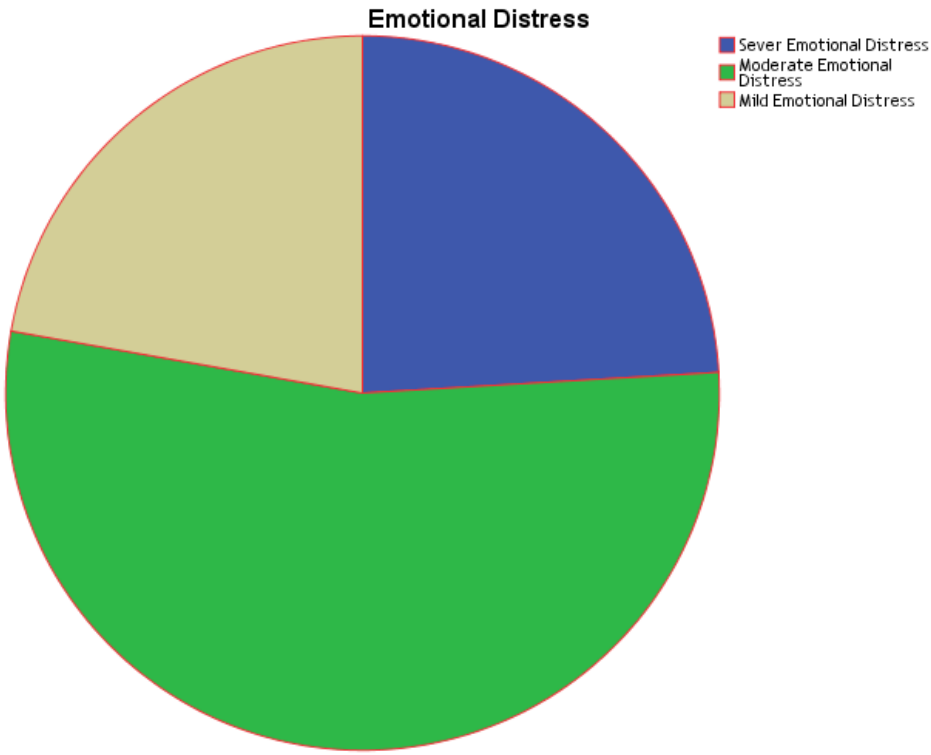

Figure (1): Overall levels of emotional distress among study participants

Conclusion

Close relatives are vulnerable to emotional distress due to a negative health outcome. There are adverse health and economic outcomes that are imposed on patients and their families. Therefore, there is a need for closed attention and psychological support for close relative caregivers.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Nursing, University of Kerbala, Kerbala City, Iraq and all experiments were carried out in accordance with approved guidelines.

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DOI Number: 10.5958/0973-9130.2019.00142.7

Eosinophils Count among Asthmatic Children in Tikrit

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Abstract

To evaluate of eosinophils count in asthmatic patients in comparison to control in School age group, determine the prevalence of asthma in relation to age, family history and gander, clarify the relationship between increased eosinophils level And asthma. This study was carried on pediatric patients visiting pediatric outpatient clinic allergy and asthma center in Tikrit Teaching Hospital, 40 children with mild Intermitted asthma of both genders included in this study, divided into 3 age groups (6-8, 8-10, 10-12) years in comparison with 40 children as control submitted a questionnaire with evaluation of eosinophils count in comparison to control and in regard to asthma presentation. Male children were 26 (65%) 14 (35%) were female children 22 (55%) them live in rural area while only 18 (45%) live in urban area, the positive history of asthma in children were (35.3%), this study found that the eosinophils level are high in asthmatic children especially in acute attack, (34%).

Keywords: *Eosinophils Count in Asthma, Eosinophils Count in Asthma in Tikrit.*

Introduction

In asthma blood eosinophil counts have for several decades been viewed as available tool for indicating disease severity as they reflect the degree and extent of inflammation in asthmatic lung[1,2]. It has been determined that the degree of eosinophilia is proportional to the severity of asthma, as measured by clinical grading or pulmonary function. Two thirds of people with mild to moderate asthma are reported to have been increased sputum eosinophilia and eosinophil's have been considered to play an important role in the pathogenesis of virus- induced asthma exacerbations[3-4]. Eosinophil's may contribute to airway hyper-responsiveness in asthma through the effects bronchial epithelium[5]. Eosinophils are a source of cytokines within the airway of asthmatic individuals that may exert an immune regulatory influence, they are a potential source of IL-12 which may contribute and modulate the local allergic inflammatory responses in asthma[6, 7].When eosinophils are activated they undergo degranulation causing epithelial damage in the airway, desquamation and increased airway hypersensitivity. The mechanisms leading to eosinophil degranulation are not well understood. At least there discrete processes have been defined that result in the release of granule contents from eosinophils secretion piecemeal degranulation and cytolysis[8]. This study aims at evaluating the benefit of the peripheral eosinophils count estimation in asthmatic patients in comparison to control.

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Materials and Method

This study was carried on pediatric patients visiting pediatric outpatient clinic allergy and asthma center in Tikrit Teaching Hospital, 40 children with mild Intermitted asthma of both genders included in this study, divided into 3 age groups (6-8, 8-10, 10-12) years in comparison with 40 children as control submitted a questionnaire with evaluation of eosinophils count in comparison to control and in regard to asthma presentation.

Results and Discusion

Regarding the distribution of patients according to age: Table (1) reveals that the most frequent cases were among male 65% and the most prominent genders was 57.5%.

Regarding the distribution of patients according to residency: this study found that the asthmatic children are more frequent in Rural area 22 (55%) in comparison to 18 (45%) in urban. **Regarding the distribution** of patients **distribution of patients according to social status:** There is a significant relationship between the social status of family and the incidence of asthma in children as most of the cases were in the illiterate parents 21, 52.5% as in table 2.

Regarding the distribution of patients according to frequency of the clinical presentation; this study found that the most asthmatic children are complaining from cough during examination 35 (87.5%), S.O.B 29 (72.5%), and tightness 14 (35). Regarding the distribution of patients according to the type of attack: the most frequent asthmatic children presented with acute attack 35 (87.5%) than the cases who presented for follow up 5 (12.5%). Regarding the **distribution of patients according to hospital admission; t**his study found that the most asthmatic children admitted to hospital for less than one day 19, 47.5 % as in table 4. Cases admitted to hospital for less than **< 1 day**, was 19 (**47.5%**), for 1-3 days 10 (25%), for 3-4 days was 7 (**17.5%**), & for more than 7 days was 4 (**10%).** Regarding the distribution of patients according to seasonal attack: this study found that the attack of asthma is most prominent during winter (67.5%), autumn (25%), and spring (7.5%). Regarding the distribution of patient's according to the type of family history of atopy: there is significant relationship between of asthmatic children in relation to family history as shown in table (3). Regarding the **distribution of patients according to exacerbating factor:** this study found that the most exacerbating factor in asthmatic children is the infection 90% and it's clear in table (4). Regarding the **distribution of patients according to other diseases:** This study found that there is no other associated diseases i.e T.B, D.M, H.T and H.F in asthmatic children. Regarding the **distribution of patients according to clinical examination:** This study Found that the most clinical finding in patients with asthma is rhonchi 39(97.5%), crepitation 28 (70%). Distribution of patients according to peak flow meter result: there is a significant relationship between asthmatic children when do for them peak flow meter examination about 75% of asthmatic children were below 300 ml/min and 25%above 300 ml/min. Regarding the **distribution of cases according to eosinophils count in comparison to control:** this study found the eosinophils count high in asthmatic children count in comparison to control 38 (95%) and this go with p value <0.05 was accepted as statically significant as it is clear. Regarding the distribution of cases according to eosinophils count in regard to asthma presentation: this study found the eosinophils count is high during acute attack of asthma 34 (97.2%) and it is clear in table (6). Asthma reported prevalence is 3% to 30%. This study showed that most of cases were reported between the age of 10-12 years. Other studies in united states and Australia, showed the same results, this may be due to that most of cases were a chronic cases with repeated admission. Most of cases of asthma develop before the age of 6 years old but minority of them persist wheezing later in life, there are many factors that increase persistent asthma later in childhood of them are parental asthma, history of allergy , male gender, low birth weight and smoke exposure [12,13]. This study showed that the highly incidence were reported in illustrated families than other type of other social state, similar study were reported in Iraq which reported that asthma prevalence increase in low educated families[14], Social class had a significant response gradient with more asthma symptoms in lower social class levels. These associations have been observed in other studies[15-20], and could be explained by high susceptibility and exposure to risk factors of asthma in low social class: inferior environmental and living conditions with increasing outdoor and indoor air pollution, less healthy behavior, such as more smoking prevalence, more psychosocial stress and less access to quality medical care.[21] This study demonstrate that most of cases present with cough, in compare with other studies which shows similar results. Intermittent dry coughing and/or expiratory wheezing are the most common chronic symptoms of asthma, respiratory symptoms can be worse at night, especially during prolonged exacerbations triggered by respiratory infections or inhalant allergens older children and adults will report associated shortness of breath and chest tightness; younger children are more likely to report intermittent, non-focal chest pain[22, 23]. Other asthma symptoms in children can be subtle and nonspecific, including self-imposed limitation of physical activities, general fatigue (possibly due to sleep disturbance), and difficulty keeping up with peers in physical activities [24]. This study showed that most of cases were admitted below one day this is similar to other that most of asthma admission is below one day [25,

[27]. This may be explained by rapid response of asthmatic Patients to treatment and home management by the family, asthma exacerbations, although characteristically different between individuals, tend to be similar in the same patient [28]. The results showed that most of cases were with positive family history of asthma or other allergic disorders, similar results were obtained in many other studies. Having a biological parent or family member with asthma and/or allergies remains the foremost risk factor for the development of asthma in children. Stronger associations have been reported for maternal asthma compared to paternal asthma. If both parents have asthma, the risk is even greater [29]. This study showed that most of cases were in children whose exposed to chest infection other studies [30]. Also support our findings. The association between asthma exacerbations and respiratory infection has been reported both clinically and experimentally in many articles, and it has been shown that the immune response against pathogens such as bacteria or viruses, notably the release of cytokines and chemokines from host cells such as inflammatory epithelial and smooth muscle cells, may contribute to the complex pathogenesis of asthma [31]. The study reveal that most of patient were among males this result were similar to other studies which also showed the same findings [32]. Previous studies show a higher incidence of atopy in boys compared with that in girls, but there is no satisfactory data could explain this findings. The study reveal most of the study were that cases more common present with acute attack, this was also supported by other studies [32]. This may be due to that most of patients attained the hospital during the attack and come rarely for follow-up. Episodic asthma was more common among young's and chronic and mixed asthma in older age group. This is in keeping with the fact that younger patients tend to have extrinsic asthma with intermittent symptoms and older people have intrinsic asthma with perennial symptoms [33]. The study showed that rural areas are more prevalence of asthmatic patients than urban, However, most of other studies showed that asthma prevalence was in urban areas [33]. this can be explained in the way that most of the study have been collected in area at the north refineries company is present which may increase the risk of attack of asthma. The result showed that most of cases occur in winter months this is similar to the results seen in other studies which also support this result. The pattern of monthly asthma prevalence was lower in warm months and higher in cold months. This pattern was similar to the asthma related hospitalization and intensive care unit admissions [34]. Increased asthma prevalence in cold season may be attributable to climate factors, air pollutants, and/or housing environments. Cold air has been known to be a precipitating factor, which exacerbates asthma occurrence. Higher concentration of house dust mites in the winter months has also been suggested, The increase of outdoor activities and higher temperatures may account for some of the reduction of asthma occurrence in the warm months. This study showed that most patient had peak flow meter below result 300ml/min. other studies also showed that most of the cases were have peak flow meter below 300ml/min. this is because most of our cases were presented with acute asthmatic attack[33-34]. Peak expiratory flow rate (PEFR) is the maximum flow rate generated during a forceful exhalation, starting from full lung inflation. Peak flow rate primarily reflects large airway flow and depends on the voluntary effort and muscular strength of the patient and it is regarded as a means of following the degree of airway obstruction in patients with asthma [33-34]. This study found that eosinophil count increase in acute asthma more than of chronic asthma. other studies also found that in acute asthma there is an increase of eosinophil count. The differences in peripheral blood eosinophil counts in acute and chronic asthma are of great interest. Many studies state that the eosinopenia accompanying acute asthmatic attacks may be implicated in the pathogenesis of the attack, studies of peripheral blood eosinophil counts had suggested a correlation with lung function both in clinical diseaseii4 and after allergen challenges. An alternative interpretation of their results, however, could be that changes in eosinophil counts with exacerbations of asthma are secondary to the release of inflammatory mediators. The study revealed that most of cases were having eosinophil count level increase, many other studies showed that eosinophil level were elevated in asthmatic children [35,1]. Eosinophil mediated damage to the respiratory epithelium is the major pathological mechanism in asthma and the disease is associated with blood and lung eosinophilia[23, 24]. It has been determined that the degree of eosiophilia is proportionally related to the severity of asthma, and it is considered to play an important role in the pathogenesis of virus induced asthma exacerbations.[2-4]

Table (1): Distribution of the cases according to age.

Age group	Cases		Control	
	No.	%	No.	%
6- 8	**13**	**32.50%**	**13**	**32.50%**
8 -10	**4**	**10%**	**4**	**10%**
10- 12	23	**57.50%**	23	
Total	**40**	**100%**	**40**	**100%**

Table (2): Distribution of cases according to social status of the family.

Social status	Cases		Control	
	No.	%	No.	%
High	4	10%	2	5%
Middle	21	52.5%	18	45%
Low	15	37.5%	20	50%
Total	40	100%	40	100%

Table (3): Distribution of cases according to the type of disease of atopy.

Positive family history of atopy	No.	%
Asthma	6	35.3%
Rhinitis	5	29.5%
Eczema	1	5.8%
Urticaria	3	17.6%
Food Allergy	2	11.8%
Total	17	100%

Table (4): Distribution of cases according to exacerbating factor.

Exacerbating Factor	No.	%
Cold	**34**	**85%**
Dust	**16**	**40%**
Humidity	**5**	**12.5%**
Infection	**36**	**90%**
Drugs	**2**	**5%**

Table (5): Distribution of cases according to eosinophils count in comparison to control.

Eosinophils count	Patients	Control
Normal	2	35
	(5%)	(87.5%)
High	38 (95%)	5 (12.5%)
Total	40	40
	(100%)	(100%)

Table (6): Distribution of cases according to eosinophils count against asthma presentation.

Presentation	Eosinophils		Total
Type	High	normal	
Acute	34	1	35
Attack	(97.2%)	(2.8%)	(100%)
chronic	4	1	5
	(80%)	(20%)	(100%)
Total	38	2	40
	(95%)	(5%)	(100%)

Conclusion

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Tikrit Medical College, Iraq and all experiments were carried out in accordance with approved guidelines.

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DOI Number: 10.5958/0973-9130.2019.00143.9

Oral thrush among Infants admitted at Tikrit Teaching Hospital

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Abstract

A cross sectional descriptive study was conducted at Tikrit Teaching Hospital in Salahaddin Governorate during a period 15th January-1st May 2014. Total cases were (462) infants (23.6%) had oral thrush, (84%) were from rural areas, no significant difference in occurrence between male and female (23.3% and 23.8%) respectively. Highest affected age was those of infants below 6 months, those were bottle fed and those were using pacifier had highest risk factor association (63.3%, 46.7% respectively). Breast feeding infants were the least to be associated with oral thrush. Neonates admitted to septic ward were affected with as double as those admitted to aseptic wards (25.77%, 12.96 % respectively) with insignificant difference (P value:0.064) while was statistically highly significant between breast and bottle fed (13.25%, 27.38%; P value:0.009). Meanwhile, the difference between mixed fed and exclusive bottle fed babies was statistically insignificant (22.8%, 27.38%; P value :0.341). In relation to use of pacifier, was statistically highly significant (49.04%; P value: 0.00001).

Keywords: *oral thrush in infant, oral candidiasis, oral thrush in infant in iraq.*

Introduction

Oral thrush is the most common opportunistic yeast infection of *Candida* species on the mouth's mucous membranes [1] and represents a common treatable human fungal infection, known as oral candidiasis [2] Oral thrush affects approximately 2-5% of normal newborns. *C. albicans* is the most commonly isolated species and it can develop as early as 7-10 days of age. It is uncommon after 1 yr of age but can occur in older children treated with antibiotics.[5] The overall incidence of fungal infection in infants is about (1--4%) but the risk of infection is inversely related to gestational age and birth weight where extremely preterm or extremely low birth weight (ELBW) infants, reported incidences are between about (2- 8%) [6] Prevalence of *Candida* carriage varies with geographic location and many other factors with higher carriage was reported during the summer months, in hospitalized individuals and in blood group O persons.[7]

Methodology

An informed consent was obtained from child's parent before inclusion in the study and a detailed information's were be taken from the mother. Official approval was obtained from Iraqi Board council for Pediatric Medicine. A cross sectional descriptive study was conducted at Tikrit Teaching Hospital in Salahalddin Governorate& all admitted infants during specified period were collected regardless the cause of admission to the hospital.

The study sample was subdivided according to their ages into 3 groups:

(Group A) was included neonates of 7-28 days from aseptic and Septic NCU

Group B) included those who were > 1-6 months.

(Group C) included those who were > 6-12 months.

Physical examination included general condition, examination of: oral cavity, napkin, nutritional assessment & anthropometric measures. Oral cavity inspected for thrush then the involved area was rubbed by a piece of sterile gauze to differentiate thrush from other causes of whitish color of the mouth that may follow milk feeding where the later is so easily removed without leaving erythematous area or bleeding as, in sometimes, in case of oral thrush. A swab obtained

from the lesion by gently rubbing a sterile cotton swab over the lesional tissue and subsequently inoculated to a primary isolation medium (Sabouraud's dextrose agar "SDA" . SDA is incubated aerobically at 37°C for 48 hrs the positive for Candida developed as cream, smooth, pasty convex colonies on culture media. Those considered positive if had oral thrush and the others named negative.

Results and Discusion

From (462) infants, the positive cases regardless the age and associated risk factors were 109 (23.6%) infants and negative cases were 353 (76.4%) infants. Furthermore, there were (13) cases clinically diagnosed with oral thrush but the culture was negative. The males included in the study were 223 (48.27%) infants and 52 (23.32%) of them were had oral thrush, while 239 (51.73%) infant females and 57 (23.85%) of them were positive as in Table (1). Regarding residency; 76 (16%) of the infants from urban area and 386 (84%) children from rural area. The most age group affected was Group B: 47 (30.92%) infants. Group C 30 infants affected (18.87%; P value: 0.014) was significantly the least while Group A (32 represented 21.19% ; P value: 0.054) non significantly was in between, as in Table (2).

Regarding r**isk factors for oral thrush**, results revealed that they were as follows: 1st was bottle feeding 69 (63.3%) infants. However the use of pacifier was the 2nd highest percentage represented (46.7%) then prolong use of AB (34.8%), followed by malnourished, those having associated napkin candidiasis and recurrent oral thrush (21.1%, 11.9 % and 9.17 %) respectively. Noteworthy, some infants who having oral thrush were had 2 or more associated factors. As shown in Table (3).

Occurrence of oral thrush between septic and aseptic NCU

Concerning Group A, It were subdivided according to their location at the hospital whether septic or aseptic NCU. The total cases of aseptic were (54) neonates among them (7) were positive (represented 12.96%) while those of septic ward (97) neonates (25 ; represented 25.77%) were positive. After statistical analysis, the septic ward was not significantly with high risk for getting oral thrush than septic (P value: 0.064). As shown in Table (5).

Results study revealed that bottle fed infants were (252) from the total number of infants, and 69 (27.4%) of them had oral thrush. The breast fed infants were 83 from the total infants number, and11 (13.2%) of them were positive and was highly significant lowest risk association of oral thrush (P value:0.0089).. Mixed feeding infants with oral thrush 29 (22.8%) out of (127) infants and were highly non significant association (P value:0.341). The total of pacifier user was 104 infants, regardless their age, 51 (49.04%)) of them had oral thrush. On the other hand, those who were non pacifier users were (358) infants 58 (16.2%) of them had oral thrush. P value was (0.00001; < 0.05) so the pacifier is a significant risk factor for oral thrush. In compare to the total positive case (109) infants it represented (46.78%). Oral thrush is the most common opportunistic yeast infection of *Candida* species on the oral mucous membranes[1] and represents a common treatable human fungal infection.[2] This study was conducted to reveal the real occurrence of oral thrush among infants admitted to Tikrit Teaching Hospital at specified study period. Out of (462) infants admitted to the hospital, (109) infants were had oral thrush (23.6%) while those who oral thrush free were (353) infants (76.4%). In regardless to the age and associated factors as shown in the figure (1), this result of who were had oral thrush was higher than what was reported in Ankara (10.7%) [8] but less than what was reported from Jordan (35.4%). [9] The study also showed that infants lived in rural areas had the highest occurrence rate of oral thrush compared to infants from urban areas (84%, 16%; respectively). This might be explained by that Salahaddin Province was consisted of large rural areas, in addition to deficient health facilities at these areas so most of cases consult Tikrit Teaching Hospital were from rural areas.

Occurrence rate of oral thrush among females was slightly higher than that of males (23.85% versus 23.32%) with (P value: 0.893). Similar difference, but much lower rates in regards to gender, was reported from Turkey where females were slightly higher than males (11.7%, 9.7%; respectively).[8] However, another study conducted in Jordan showed opposite and lower results regarding the gender (females; 11%, males; 13.7%) with non significant results despite it was depended on oral / rectal or both specimen.[9] Regarding the ages, the most affected age group was Group B (30.92%) followed by Group A (21.19%) then Group C (18.87%). The difference between Group C and B

was statistically significant (P value: 0.014). while the difference between Group A and B was statistically not significant (P value: 0.054), however Darwazeh AM, al-Bashir study suggested that there was no significant relationship to age. [10] In comparison to other study from Al. Mosul showed slightly lower rate of oral thrush concerning the age group less than 6 months (55% versus 52.11%),[11] while in Jordan the percent of infants more than one month who had oral thrush was highly lower than in this study (15.3% versus 49.79%). [9] The most frequent factor that might be related to oral thrush, was bottle feeding (63.3%) followed by the use of pacifier (46.7%) and prolong use of antibiotics (34.8%). While the lowest rate of occurrence was related with mother's nipple candidiasis (2.75%), however (63.3%) occurrence rate of oral thrush with bottle feeding in the study was higher than the reported rate by Al. Mosul study (53%).[11] Meanwhile, the study showed (10.09%) occurrence rate associated with breast feeding which was lower than (15%) reported by Al. Mosul [11] on the other hand, It was higher than breastfeeding occurrence percentage (0%) reported by Kadir study.[12] This can be explained by the fact that human milk is the ideal nourishment for infants providing them with energy, protection and the necessary elements for their proper growth and development and worthily the breast feeding had not been the true risk factor but is accidently inserted between the nipple thrush and the baby. Regarding pacifier use, the occurrence percentage (46.7%) was lower than what was reported among Brazilian infants (58.3%).[(13)] The infants who had recurrent oral thrush represented (9.17%) in the study and those with recurrence need further evaluation as usually have a debilitating factors as any cause leading to low immunity like HIV infection, sever untreated malnutrition or chronic systemic disease. [(14)] In Tanzania, a study showed the percentage of oral thrush among malnourished was (90%) [15] compared to (21.1%) in this study, this high percent in Tanzania might be related to high HIV prevalence at that country in addition to malnutrition.[16] While the percentage was compatible with the study of Iran (20.47%) [17] Regarding the occurrence of oral thrush with diaper candidiasis, the percentage was (11.9%) and this was much less than what was recorded Darwazeh AM, al-Bashir study (24.4%).[10] Moreover prolong use of antibiotics especially double or broad spectrum antibiotics, was related with (34.8%) oral thrush occurrence and this was slightly higher than that of Indonesia study (33.2%).[18] and was lower than that reported by Sofia study (41.2%).[19] In the study, the neonates admitted to septic ward were affected with oral thrush as double as those admitted to aseptic wards (25.77%, 12.96 %; respectively) with insignificant difference (P value:0.064). This can be explained by presence of other associated risk factor as prematurity, birth asphyxia or congenital malformation, instrumentation, prolong use of antibiotic or steroid in addition to poor neonatal care. [5] Concerning the type of feeding, exclusively breast fed babies were affected less in comparison to those who where bottle fed or even mixed fed babies (13.25% , 27.38% and 22.8% respectively) and the difference was statistically highly significant when comparison done between the breast and bottle fed (P value:0.009). this was comparable with a study from Al. Mosul (15%) [11] but was less than the result of a study from Brazil despite significant difference (34.05%; P vale < 0.05). Another higher percentage of oral thrush with statistical significance was reported by Jorge and Zöllner (P value < 0.005; 34.5% breast fed and 66.7% bottle fed).[(20)] these values despite being higher than the result in this study, might support that bottle feeding predisposes the infant to greater probability of oral thrush. Meanwhile, the difference between mixed fed and exclusive bottle fed babies was statistically insignificant (P value :0.341).Generally, other result from Bulgaria suggested absence of any relationship between the frequency of *Candida* infection and the feeding (P value > 0.05).[(19)] This might be explained by: hygiene and good care are one of the most important factor against developing oral thrush where some mothers careless about sterilization and preservation of the bottle and exert wrong habits such as shacking the bottle with her finger on the tip of the teat, cleaning it with her mouth by sucking before give to her baby, shared with another baby or careless about falling down to ground in contrast to another area with high health education level and follow up, the occurrence rate may be low or not significant. The occurrence of oral thrush in relation to use of pacifier was statistically highly significant (49.04%; P value: 0.00001), but is lower than what was reported in Brazil (58.3% ; P value < 0.05)[12] and (70% ; P value <0.001).[21] This could be explained as: the pacifier is in close contact with the environment and lead to colonization by micro organisms and act as a vehicle to transport it to oral cavity this usually associated with poor family, low health education level of the mother, by unconcern after dropping of pacifier to floor, may be accidently used by

nearby infants or sometime the mother suck it before used by her baby believing to be away of cleaning.

Table (1): the gender distribution

	Total		Positive		Negative	
	No	%	No	%	No	%
Male	223	48.27	52	23.32	171	76.68
Female	239	51.73	57	23.85	182	76.15
Total	462		109		353	

Table (2): age distribution

	Total	Positive		Negative		P value
		No	%	No	%	
7- ≤ 30 days	151	32	21.19	119	78.81	0.05
> 1 – 6 months	152	47	39.92	105	69.08	Ref
> 6 -12 months	159	30	18.87	129	81.13	0.014
Total	462	109	23.6	353	76.4	

Table (3): Frequency distribution of risk factors associated with oral thrush

Risk factors	Positive	
	No	%
Pacifier use	51	46.7
Exclusive Bottle feeding	69	63.3
Exclusive breast feeding	11	10.09
Mother's nipple candidiasis	3	2.75
Recurrent oral thrush	10	9.17
Malnourished	23	21.1
Napkin candidiasis	13	11.9
Prolonged antibiotic use	38	34.8

Table (4): Occurrence of oral thrush in relation to the type of feeding

	Total	Positive		Negative		P value
		No	%	No	%	
Breast feeding	83	11	13.2	72	86.8	0.0089
Bottle feeding	252	69	27.4	183	72.6	Ref
Mixed feeding	127	29	22.8	98	77.2	0.341
Total	462	109		353		

Table (5): the difference in occurrence of oral thrush in septic and aseptic NCU

	Total	Positive		Negative	
		No	%	No	%
Aseptic	54	7	12.96	47	87.04
Septic	97	25	25.77	72	74.23
Total	151	32	38.73	119	61.27

Conclusion

Infant affected with oral thrush were (23.6%). Highest affected age group was those of 6 month and below. Aseptic wards had highly occurrence rate as compared to aseptic wards (25.77%, 12.96%; respectively) and pacifier had highly significant association with oral thrush.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Tikrit Medical College, Iraq and all experiments were carried out in accordance with approved guidelines.

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DOI Number: 10.5958/0973-9130.2019.00144.0

Relating Body Image and Psychological Distress among Clients Seeking Cosmetic Surgery in Baghdad City

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Abstract

The study aimed to assess Relating Body Image and psychological Distress among Clients seeking cosmetic Surgery in Baghdad City**. A** descriptive - analytic study was conducted at the cosmetic Units at AL-Wasiti Teaching Hospital and Ghazi Alhariri Teaching Hospital, and two beauty centers, Barbie beauty center, Arido Beauty Center in Baghdad city. The study was carried out through the period of 2017.Which consist of 154 participant to assess Relating Body Image and psychological Distress among Clients seeking cosmetic Surgery both gender (male and female). The questionnaire was consisted of three parts: the first part is concerned demographic characteristics of the clients that included (age of client, level of education, monthly income, type of surgery employment status, marital status). The finding of the study showed that the highest percentage is located within the age group of twenties (46.8%) (130%) the of the sample was female and represents 84.8% aged 20-29 years. distribution of participants within the levels of Body Image Disorder and distributes as 29.9% having extremely severe level. The study concluded that Clients seeking cosmetic Surgery have moderate and severe level of Body Image and psychological Distress.

Keywords: *Body image, psychological distress, cosmetic surgery*

Introduction

Body image is a multidimensional, personal and energetic concept that includes a person's sensitivities, views, and feelings about his or her body [1]. Body image is not partial to the aesthetic features of the person, taking also into respect his or her state of health, skills, and sexuality [2] Body image is the lively perception of one's body-how it appearances, feels, and moves. It can alteration with physical experience, mood, and situation [3]. There are many different influences body image, including, media, gender, parental relationships and adolescence, as well as weight and popularity [4] Body image is closely linked to psychological well-being during puberty and can have negative effects when a child is dissatisfied with his/her body. Also, the importance of body-image dissatisfaction is rising due to its inference as a risk factor for the development of depression, eating disorders, emotional distress, self-mutilation, low self-esteem, appearance rumination and unnecessary cosmetic surgery [5] Well body image is more than merely tolerating what you look like or "not disliking" yourself. A healthy body image means that you really accept and like the way you look exact now, and are not trying to change your body to fit the way you think you should look. It means knowing the individual qualities and strengths that make you feel good about yourself beyond weight, form or appearance, and struggling the pressure to endeavor for the myth of the "perfect" body that you see in the media, connected, in your communities. Cosmetic procedures performed in the United States rose from 1.7 million in 1997 to 10.7 million in 2014. As increasing numbers of persons search for actions to change features of their appearance and improve psychosocial wellbeing, it is important that physicians confirm their clients have truthful expectations about the results that can realize. Pre-treatment consultations deliver physicians with an occasion to identify and address any misapprehensions their patient might have about likely treatment outcomes. Cosmetic surgery refers to the sub-specialty concerned, primarily with the maintenance, restoration or enhancement of the physical

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appearance of the individual [6] In studying the issues of cosmetic surgery, body image and attitudes between men and women in life, people interested in cosmetic surgery had less body image than those who were not interested in cosmetic surgery [7] An Unwanted body image reduces self-confidence. Therefore, the feeling of dissatisfaction in people is the reason to change the image of the body until their true image of the body is close to a perfect image of the body [8]

Methodology

Design of the study: A descriptive study was conducted at the cosmetic Units at AL Wasiti Teaching Hospital and Ghazi Alhariri Teaching Hospital, and two beauty centers, Barbie beauty center, Arido Beauty Center in Baghdad city. The study was carried out through the period of November 2017- Agusat 2018. Which consist of 154 participant .To assess Relating Body Image and psychological Distress among Clients seeking cosmetic Surgery both gender (male and female). The questionnaire consists of three parts; the first part is concerned demographic characteristics of the clients that included (age of client, level of education, monthly income, type of surgery employment status, marital status); the second one the body image Questionnaire which consists of 27 items which is a used as a screening measure of body image of clients; and the third one psychological distress questionnaire consists of 10 items concerning with the which provides indices of the number of intended to yield a global measure of distress based on questions about anxiety and depressive symptoms. The validity and reliability of the instrument was determined by using through the panel of experts, and internal consistency through the computation of Alpha Correlation Coefficient. The data have been collected through the utilization of the interview. Data were analyzed through the application of descriptive statistical (frequencies and percentages). and inferential analysis chi by applying the Statistical Package for Social Science version 24.0 (SPSS)

Sample of the Study: A purposive (non- probability) sample is selected for the study which includes (154) clients, which located in Baghdad city.

Data collection: Data was collected by using interview technique with the participant's ofcosmetic and who kindly accepted to participate in the study. Data was collected from February, 18th to March 7th (2018). Each interview session took approximately (20-25) minutes.

Instrument of the Study: Assessment questionnaire consists of three parts:

Part I: contains demographic characteristics which included: demographic characteristics Part II: body image questionnaires. Consisted of (27) item which are measured on 3 points likert scale, the 3 points are rated as, always, sometimes, and never, .And scored as 3, 2, and 1respectively. Part III: psychological distress questionnaire consists of 10 items concerned with the provides indices of the number of intended to yield a global measure of distress based on questions about anxiety and depressive symptoms. Reliability and validity of this tool is determined through application of a pilot study and panel of 13 experts.

Statistical Methods: Data were analyzed through the application of descriptive statistical (Frequencies and percentages) and inferential analysis chi2.

Results and Discusion

Table 1 shows that the age range of the participants was varied from 19 to 50; 130 (84.4%) age ranged from more and equal 19 years to more and equal than 50 years. The highest percentage is located within the age group of twenties (46.8%). Table 1 indicates also that the majority of participants of the study is female and represents 84.8%. The participants with the level of college and more represent the majority (61.6%) and the rest are scattered as with secondary.73 (47.4%) and 13 (8.4%) are with secondary levels. Most of cosmetic clients are house keepers73 (48.7%); about half of them are married;, 81(52.6%) of participants have a monthly income of one million and more Iraqi dinars; and in regard to type of surgery 82 (53.2%) are with facial procedures; 58(37.7%) are with rhinoplasty;,10 (6.5%) are with liposuction and 4 (2,6%) are with eyelid surgery. while most of the clients lives in city 146 (94.8%)**.** Distribution in levels of Body image disorder, levels of Self-esteem and psychological Distress on the baseline sample (Phase one). Table 2 gives the details regarding the distribution of participants within the levels of Body Image Disorder and distributes as 29.9% having extremely severe level; 31.2% having severe level; 24.0% having moderate level and 14.9 having mild level. Distribution in levels of Body image disorder according to demographic characteristics

(table 3). Table 3 presents the distribution of levels of Body Image Disorder within the subcategories of demographic characteristics of the sample; about half of the female participants (49.3%); 31.8% of twenties of age; 28.5% of unmarried; 46.7% with college and higher levels of education; 24.6% of housekeepers; 28.5% of participants have less than million-Iraqi-dinar income; 56.5% who living in city; and finally, 32.4% with face procedures have Extremely severe and severe levels of Body Image Disorder. Table 4 gives the details regarding the distribution of participants within the levels of psychological distress and distributes as 26.6% having extremely severe level; 31.2% having severe level; 27.3% having moderate level and 14.9% having mild level**.** Table 5 presents the distribution of levels of psychological distress within the subcategories of demographic characteristics of the sample; about half of the female participants (49.3%); 31.8% of twenties of age; 28.5% of unmarried; 46.7% with college and higher levels of education; 24.6% of housekeepers; 28.5% of participants have less than million-Iraqi-dinar income; 56.5% who living in city; and finally, 32.4% with face procedures have Extremely severe and severe levels of psychological distress. Regarding the association among studied variables and demographic characteristics of the sample table 6 indicates that significant association between gender and psychological distress (x2= 9.7, p-value= 0.02); level of education and body image (x2= 32.2, p-value= 0.01); and occupation and psychological distress (x2= 21.4, p-value= 0.05)**.** The results of the present study indicate that the majority of participants of the study are female and represents 84.8%. This is consistent with the previous studies including those of [(9)] .While the other study have indicated that most of the cosmetic surgeries were for female [10].

Table 1. Demographic Characteristics of the sample.

Gender			**Marital Status**		
	No.	%		No.	%
Female	130	84.4%	Married	75	48.7%
Male	24	15.6%	Single	65	42.2%
Total	154	100.0%	Divorced	5	3.2%
Total 154			Widowed	9	5.8%
			100.0%		
Age			**Level of Education**		
	No.	%		No.	%
≤19	13	8.4%	Illiterate	1	.6
20-29	72	46.8%	Read &Write+ Primary	13	8.4
30-39	35	22.7%	Secondary	45	29.2
40-41	28	18.2%	Collage &above	95	61.7
≥50	6	3.9%	Total	154	100.0
Total	154	100.0%			
Occupation			**Income**		
	No.	%		No.	%
House Keeper	73	47.4%	≤Half Million	33	21.4%
Students	37	24.0%	≤ Million	81	52.6%
Employee	39	25.3%	≥ Million	38	24.7%
Retired	1	0.6%	≥5 Million	2	1.3%
Free work	4	2.6%	Total	154	100.0%
Total	154	100.0%			

Table 2. Distribution of the Sample according to the levels of Body Image at Baseline

Levels of Body Image Disorder									
Ext. Severe		**Severe**		**Moderate**		**Mild**		**Total**	
No.	%	No.	%	No.	%	No.	%	No.	%
46	29.9%	48	31.2%	37	24.0%	23	14.9%	154	100.0%

Table 3: Distribution in levels of Body Image Disorder according to demographic characteristics of the sample at Baseline

		Levels of Body Image Disorder									
Demographics No.		**Ext. Severe**		**Severe**		**Moderate**		**Mild**		**Total**	
		%	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**	
Gender	Female	37	24.0	39	25.3	34	22.1%	20	13.0%	130	84.4%
	Male	9	5.8	9	5.8	3	1.9%	3	1.9%	24	15.6%
	Total	46	29.9%	48	31.2%	37	24.0%	23	14.9%	154	100.0%
Age	≤19	2	1.3	3	1.9%	6	3.9%	2	1.3%	13	8.4%
	20-29	23	14.9	26	16.9%	13	8.4%	10	6.5%	72	46.9%
	30-39	11	7.1	10	6.5%	10	6.5%	4	2.6%	35	22.7%
	40-41	8	5.2	7	4.5%	8	5.2%	5	3.2%	28	18.1%
	≥50	2	1.3	2	1.3%	0	0.0%	2	1.3%	6	13.9%
	Total	46	29.9%	48	31.2%	37	24.0%	23	14.9%	154	100.0%
Marital Status	Married	21	13.6%	20	13.0%	23	14.9%	11	7.1%	75	48.7%
	Single	21	13.6%	23	14.9%	13	8.4%	8	5.2%	65	42.2%
	Divorced	2	1.3%	1	0.6%	0	0.0%	2	1.3%	5	3.2%
	Widowed	2	1.3%	4	2.6%	1	0.6%	2	1.3%	9	5.8%
	Total	46	29.9%	48	31.2%	37	24.0%	23	14.9%	154	100.0%
Level of Education	Illiterate	0	0.0%	0	0.0%	0	0.0%	1	0.6%	1	0.6%
	Primary	3	1.9%	1	0.6%	4	2.6%	5	3.2%	13	8.4%
	Secondary	6	3.9%	12	7.8%	18	11.7%	9	5.8%	45	29.2%
	Collage↑	37	24.0%	35	22.7%	15	9.7%	8	5.2%	95	61.7%
	Total	46	29.9%	48	31.2%	37	24.0%	23	14.9%	154	100.0%

Table 4. Distribution of the Sample according to the levels of psychological Distress at Baseline

Levels of psychological Distress									
Ext. Severe		**Severe**		**Moderate**		**Mild**		**Total**	
No.	%	No.	%	No.	%	No.	%	No.	%
41	26.6%	48	31.2%	42	27.3%	23	14.9%	154	100.0%

Table 5. Distribution in levels of psychological Distress according to demographic characteristics of the sample at Baseline.

Demographics No.		Levels of psychological Distress									
		Ext. Severe		Severe		Moderate		Mild		Total	
		%	No.	%	No.	%	No.	%	No.	%	
Gender	Female	30	19.5	39	25.3	38	24.7	23	14.9	130	84.4
	Male	11	7.1	9	5.8	4	2.6	0	0.0	24	15.6
	Total	41	26.6%	48	31.2%	42	27.3%	23	14.9%	154	100.0%
Age	≤19	2	1.3	3	1.9	6	3.9	2	1.3	13	8.4
	20-29	23	14.9	26	16.9	13	8.4	10	6.5	72	46.8
	30-39	11	7.1	10	6.5	10	6.5	4	2.6	35	22.7
	40-41	8	5.2	7	4.5	8	5.2	5	3.2	28	18.2
	≥50	2	1.3	2	1.3	0	0.0	2	1.3	6	3.9
	Total	41	26.6%	48	31.2%	42	27.3%	23	14.9%	154	100.0%
Marital Status	Married	18	11.7	26	16.9	20	13.0	11	7.1	75	48.7
	Single	16	10.4	20	13.0	22	14.3	7	4.5	65	42.2
	Divorced	2	1.3	1	0.6	0	0.0	2	1.3	5	3.2
	Widowed	5	3.2	1	0.6	0	0.0	3	1.9	9	5.8
	Total	41	26.6%	48	31.2%	42	27.3%	23	14.9%	154	100.0%
Level of Education	Illiterate	1	0.6	0	0.0	0	0.0	0	0.0	1	0.6
	Primary	2	1.3	4	2.6	3	1.9	4	2.6	13	8.4
	Secondary	9	5.8	20	13.0	9	5.8	7	4.5	45	29.2
	Collage↑	29	18.8	24	15.6	30	19.5	12	7.8	95	61.7
	Total	41	26.6%	48	31.2%	42	27.3%	23	14.9%	154	100.0%
Occupation	House Keeper	12	7.8	26	16.9	19	12.3	16	10.4	73	47.4
	Students	17	11.0	8	5.2	9	5.8	3	1.9	37	24.4
	Employee	12	7.8	10	6.5	13	8.4	4	2.6	39	25.3
	Retired	0	0.0	1	0.6	0	0.0	0	0.0	1	0.6
	Free work	0	0.0	3	1.9	1	0.6	0	0.0	4	2.6
	Total	41	26.6%	48	31.2%	42	27.3%	23	14.9%	154	100.0%

Table 6. Association between demographic characteristics and levels of body image and psychological distress

Domains	Body Image			Psychological Distress		
Demographics	$^2\times$	**df**	***p-value***	$^2\times$	**df**	***p-value***
Gender	2.6	1	0.5	9.7	1	0.02
Age	9.9	4	0.6	8.3	4	0.8
Marital Status	8.5	3	0.5	14.9	3	0.09
Level of Education	32.2	3	0.01	12.4	3	0.2
Occupation	14.1	4	0.3	21.4	4	0.05
Income	14.1	3	0.1	12.3	3	0.2
Type of Surgery	8.4	3	0.5	4.8	3	0.9
Residency	3.0	1	0.4	6.8	1	0.1

Conclusion

The study concluded that Clients seeking cosmetic Surgery have moderate and severe level of Body Image and psychological Distress**.** A significant association was found between body image and psychological distress , also the study indicated that significant association with level of education and body image , occupation and psychological distress (p-value= 0.05).

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Nursing/ University of Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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DOI Number: 10.5958/0973-9130.2019.00145.2

The Spatial Variation Study of Spread the Lupus Erythematous Disease in Najaf and Babylon Governorates

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Abstract

In this study, it was found that the disease affects females more than males, there are 38 cases in Najaf and 145 case in Babylon. There were also significant differences (P <0.05) between the age and infection, as the youth (14-40) years were more likely to be infected than the elderly (41-70) years. The infection was significantly different (P <0.05) between housewives and the unemployed, on the one hand, and wage earners and employees on the other, where in the first was higher than the second. While the Interference between Living and (gender, age and occupation factors) did not show significant differences (P <0.05). It was observed that when the disease affects the female, it affects pregnant women more than non-pregnant women. Study of statistical data for four years found that Babylon province is more vulnerable to infection of (SLE) compared to Najaf province. It was found that the infection rate of (8.40), (3.51) per hundred thousand people , Respectively . This may be attributed to population density, lack of health services, municipal and low level of infrastructure as well as the spread of factories and industrial neighborhoods within the basic design of city such as textile factory.

Key words : *Najaf province, Babylon province, Lupus erythematous diseases (SLE), Immunological diseases.*

Introduction

Latin Systemic Lupus Erythematous (SLE) .A chronic disease known since the beginning of twentieth century results in changes in the face, which is somewhat similar to the spots in wolf face and it is red [1]. The disease is characterized by tissues damage in several organs at same time, the presence of several types of bodies and presence of complex immune structures circulating in circulatory system, and spread the disease extensively causing various tissue damage to the body. There are facts about genetic factor disease (although it is not a genetic disease) and that it is obtained in twins resulting from vaccination of one egg, [2]. One of disease causes is genetic deficiency of one genes, or presence of an increase in one of the genetics and there are other facts include increased exposure to the sun , use of some drugs, the effects of estrogen used to treat other diseases, and that The disease is more likely in pregnant or postpartum women, or in sterile women or those who use birth control pills, and various hormonal changes [2]. In 1948 Hargraves described the Lupus Erythematosus cell (LE cell) are immune disease , Which was observed in the peripheral blood bronchus of patients at 37 ° C for 30 to 60 minutes. The lymphocytes are swollen, then decomposed, and their nuclear substances are dislodged. These substances are then swallowed by the neutrophil cells [3,4]. The causes of (SLE) are unknown, but infection may be affected by several factors, including genetic factors, as many studies confirm increased risk of developing disease among family members and twins, and ranged between 25-60% [5]. In addition, the studies showed different rates of infection according to ethnic differences. Study indicated that ratio of infection in black women was 1: 250 while in white women was 1: 4300 [5]. There may be certain legacies that determine the genetic predisposition of the disease, such as: the presence of human leukocyte antigen complex such as HLA DR3 and HLA DR2 [4], and the early genetic deficiency of complement components in some SLE patients [5]. Infection factors may play a role in occurrence of SLE. Study has indicated that prevalence of Epstein

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Barr Virus among SLE patients is more comparable to healthy people, which may prove the importance of infection in the development of disease[6]. Sexual hormones may play a role in the occurrence of this disease and are more prevalent in women than men. The increased effectiveness of the disease in women during pregnancy is evident [7]. Exposure to ultraviolet radiation and certain chemicals and other environmental factors may have a significant role in the spread of this disease [8]. Common symptoms of arthritis include arthritic pain (90%), butterfly fly rash (nose and throat), early signs of the disease, On the nose and mouth with vacuities [4], [12] . The disease also affects the immune system and inflammation of the urinary tract (inflammation of the kidney) and affects the nervous system (headache) as well as the heart and blood vessels (inflammation of the heart muscle) and affects the lungs. The importance of research appears with increase in the number of people infected with (SLE), which necessitates the definition and determine the areas of spread in an attempt to study the environmental causes of the disease, because the main causes of the disease has not been determined by therapeutic medicine so far despite the technical progress and health in this area, resulting in the lack of detection of treatment for this disease accurately.

Material and method

Study Areas:

1- Najaf Governorate

It is one of 18 Iraq provinces of the Middle Euphrates and located in the line of length 44 and latitude 32.The center is Najaf city. A province of great religious and historical character because of the presence of many Shiite Muslim shrines, The Valley of Peace Cemetery and the Kufa Mosque. The population of the province is 1,500,522, according to the 2017 census [10]. There are four districts and seven township (Najaf district, including Al-Haidariyah, Al-Shabab and Al-Radawiya townships), (Kufa district, and Abasiya and Al-Hurriya townships) , (Al-Manathrah district includes Al-Hira and Qadisiyah townships), (Mashkhab district).

2- Babylon Governorate

It is one of 18 Iraq provinces of the Middle Euphrates and located in the line of length 44 and latitude 32.The center is Hilla. The governorate has a population of 2,000,000,000 [11]. There are six districts and eighteen township (Hilla, Mahawil district, Musayyib, Hashemite, and Western Hamzah (al-Qasim), Alkafil, Nile and Ajbalh districts).

Study procedures and design of the statistical form

The study was conducted in the governorates of Najaf and Babylon in all there administrative units (map 1 and 2) for a period of four years (2013-2014-2015-2016). Data were collected in hospitals for both governorates. These data included only hospital admissions and registered data. Or diagnosed as lupus erythematous. A statistical questionnaire was prepared for this study, including the name of the patient, gender, age, occupation, address, date of admission to the hospital, date of discharge from hospital, and case result . The aim of this form is to reveal the numbers of patients with this immunodeficiency disease and its prevalence in the study area.

Statistical analysis

Statistical forms collected within four years and for both governorates. Statistical analysis were taken according to SPSS (Version 20). Where the data were analyzed to find the least significant difference of LSD. And find the relationship between the disease and the studied factors.

Results and Discusion

Statistical data on Lupus erythematosus (SLE), shown in Tables 1 and 2, show that there is a variation in the areas of disease spread by time and place. The results of Table 1 show the number of cases in Najaf province of has reached 46 cases in four years (2013, 2014, 2015 and 2016). The rates of infection were vary. Najaf district (Najaf city , Haidariyah and Shabaka) the highest incidence of the disease. With 26 cases and in the Kufa district 8 cases and in the Manathrah district and its surroundings 6 cases. In the Al-Mashkhab district and its surroundings , it has 5 cases. 15 cases emerged outside the province of Najaf were excluded from the tables. It was also found that the disease affects females more than males, there are 38 female cases compared to 8 cases among males. There were also significant differences ($P < 0.05$) between the age of the patients. The youth group (14-40 years) was more likely to be infected than the elderly (41-70) years, reaching (38) and (8) cases, respectively. (31 females and 7 males) improved while the not improvement was (8 females and

0 males). The occupation factor in table 1 showed that the housewives and the unemployed were significantly (P <0.05) higher infected than the wage earners and employees, with (33 and 13) cases , respectively. Of which (28 improved and 5 not improved) in the category of housewives and unemployed. Of which 10 improved and 3 not improved) in the grading and staff category. The interaction between living with gender, age and occupation did not show significant differences (P <0.05) in table (1). The number of infection with this disease in Babylon province has reached 153 cases in four years (2013, 2014, 2015 and 2016) Table (2). The infection rates were spatially different, with Hilla district scoring 76 cases, Musayyib 19, Al-Mahawil 18, Al-Qasim 12, Al-Nile 9, Ajbalh 8, Hashimiya 7 and Al-Kafil 4 cases respectively. It was also found that the disease affects females more than males, there are 145 cases of females compared to 8 cases among males. There were also significant differences (P <0.05) between the age of the infected persons. The youth group (14-40 years) was more likely to be infected than the elderly (41-70) years. The number of infection was (116) and (38) cases, respectively. (107 improvement and 9 improvement) in the youth group and (23 improvement and 15 improvement) in the elderly population. In Table 1, the lack of improvement was higher among the elderly than among youth (15 and 9), respectively. As for housework, the housewives and the unemployed are more likely to be affected (46) than the wage and the employees (108). The interaction between living with gender, age and occupation did not show significant differences (P <0.05) in table (2). When comparing the province of Babylon with Najaf province,in number of cases. It was found that the rate of infection of (SLE) in Babylon province reached (8.40) cases per hundred thousand people. Which is high when compared to the province of Najaf, which has a rate of infection (3.51) per hundred thousand people. Figure (3 and 4). This may be attributed to population density, lack of health services, municipal and low level of infrastructure as well as the spread of factories and industrial neighborhoods within the basic design of the city such as textile factory. It was also found that the complications caused by lupus erythema according to statistical data is inflammation of the heart and blood pressure disorders and kidney failure. It was observed that when the disease occurs in females, it affects pregnant women more than non-pregnant women.

Table (1) The number of cases of (SLE) in Najaf Governorate for years (2013, 2014, 2015 and 2016) divided by gender, age, occupation, patient condition and living.

		gender		**age**		**occupation**		**total**
		male	**female**	**14-40**	**41-70**	**wage earner and employees**	**housewives and unemployed**	
patient's condition	Improvement	7	31*	30*	8	10	28*	38
	Lack of improvement	0	8*	8*	0	3	5	8
Living	Najaf district	5	21*	22*	4	10	16*	26
	Kufa district	0	8*	6	2	3	5	8
	Manathrah district	1	5	5	1	3	3	6
	Mashkhab district	1	4	4	1	3	2	5
total		7	39	38	8	13	33	46

Table (2) The number of cases of (SLE) in Babylon Governorate for years (2013, 2014, 2015 and 2016) divided by gender, age, occupation, patient condition and living.

		gender		age		occupation		total
		male	female	14-40	41-70	housewives and unemployed	housewives and unemployed	
patient's condition	Improvement	5	125*	107*	23	39	91*	130
	Lack of improve-ment	3	21*	9*	15	7	17*	24
Living	Hilla district	4	72*	61*	15	26	50*	76
	Musayyib district	0	19*	15*	4	5	14*	19
	Mahawil district	1	17*	16*	2	6	12*	18
	Qasim district	1	11*	10*	2	2	10*	12
	Nile District	0	9*	8*	1	2	7*	9
	Ajbalh district	1	7*	6	2	2	6	8
	Hashemite district	1	6*	5	2	2	5	7
	Alkifl district	0	4*	3	1	0	4	4
total		8	145	116	38	46	108	

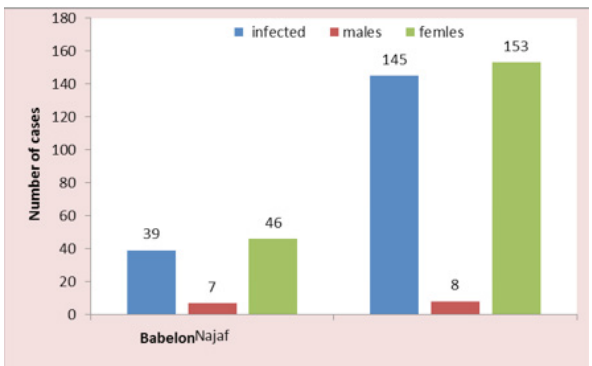

Figure 1. Comparison between Babylon and najaf province for the same years of study.

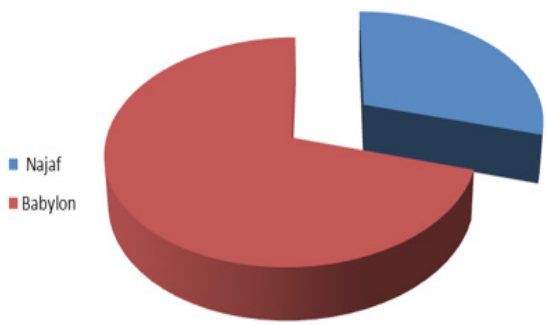

Figure 2. Compares the rates of infection between the provinces of Najaf and Babylon

Conclusion

The disease causes inflammation of the membranes of the lung and arthritis, blood pressure and heart desire. When the disease increases, it causes disorders in the function of the kidneys. (SLE) disease affects females more than males and also affects children**.** Affects pregnant women more than the other pregnant women**.** The disease of (SLE) does not know the limits so the infection is attributed to unknown causes.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Ecology, College of Science, University of Kufa, Najaf, Iraq and all experiments were carried out in accordance with approved guidelines.

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DOI Number: 10.5958/0973-9130.2019.00146.4

Correlation of A G to A Nucleotide Substitution in Upstream Region of Leptin with Breast Cancer Susceptibility

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Abstract

Single nucleotide polymorphisms in leptin gene may increase the risk of breast cancer. The aim of this study was to investigate the association of leptin G-2548A gene polymorphism with breast cancer risk in an Iranian population. In a case-control study, 98 subjects including 45 women with breast cancer and 53 healthy women were recruited. The genotypes of G-2548A polymorphism were detected by polymerase chain reaction-restriction fragment length polymorphism. Our data revealed that there is a significant association between AG homozygote genotype and breast cancer risk (OR= 2.41, 95%CI= 1.05-5.52, p= 0.037). Also, we observed that G allele marginally increases the breast cancer risk (OR= 1.92, 95%CI= 1.00-3.70, p= 0.049). Based on our preliminary study, leptin G-2548A gene polymorphism may be a genetic risk factor for breast cancer and further studies with larger sample size are required to obtain more accurate results.

Keywords: *Breast cancer: Leptin gene; G-2548A variety.*

Introduction

Breast cancer is one of the common malignancy among women around the world[1, 2]. The breast cancer is a heterogenic disease and many environmental and genetic factors are involved in the development of it[3, 4]. Single nucleotide polymorphisms (SNPs) as genetic variations could be involved in susceptibility and development of diseases including breast cancer[5, 6, 7]. Genes such as BRCA-1, BRCA-2, and P53 are most well-known genes in breast cancer. Women with mutations in these genes are diagnosed with breast cancer during their lifetimes which most of them can be recognized at a young age before menopause[8, 9]. Leptin gene is another gene which may have an important role in breast cancer risk[10].

Leptin as an adipocytokine, encodes by the human LEP gene and it secrets by adipocytes[11]. Some studies revealed that this protein and its receptor have an increased expression in breast cancer, particularly in high-grade tumors. Also, it is associated with development of breast cancer[12]. Leptin is essential for the growth of tumor cells and its effects arises from discerning binding to the receptor. The receptor of this protein is expressed in various tissues, such as the mammary gland[13].

The LEP gene is located on chromosome 7 (7q32.1) with three exons. There are many polymorphisms in this gene that the rs7799039 is one of the common polymorphisms of this gene. This polymorphism is located at the upstream of LEP gene, and it results in G to A nucleotide at -2548 position (G-2548A). The aim of this study was to investigate the association of aforementioned polymorphism with breast cancer risk in an Iranian population.

Materials and method

Subjects

In a case-control study, we employed 98 subjects (including 45 women with breast cancer and 53 age-matched healthy women) from Shahid Beheshti Hospital (Kashan, Iran). The breast cancer was approved by pathology tests. The control subjects were healthy women without any familial history of malignancy. After obtaining signed informed consent form, we collected 2 ml peripheral blood samples from each subjects into sterile tubes containing EDTA anticoagulant agent.

DNA extraction and SNP genotyping

The genomic DNA was extracted from blood samples by a general salting out procedure[14]. The G-2548A SNP genotyping was performed by polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP) method. The primers sequences were obtained from previous study[15]. For primer checking, at first the whole genomic sequence of LEP gene was deduced from national center for biotechnology information (NCBI) databank. The primer sequences were analyzed around the G-2548A polymorphism position by Oligo7 software. The forward and reverse primers sequences were 5'-TTTCCTGTAATTTTCCCATGAG-3' and 5'-AAAGCAAAGACAGGCATAAAA-3', respectively. PCR was carried out in 25µl total volume containing 2.5µl 10X PCR buffer, 0.75µl of each primer (10pm/µl), 0.75µl $MgCl_2$ (50 mM), 0.5 µl dNTP (10 mM), 0.3U Taq DNA polymerase, and 60 ng template DNA. The PCR was performed in a Peqlab thermal cycler system with the following program: initial denaturation at 95°C for 5 min, followed by 35 repetitive cycles including denaturation at 95°C for 45 secs, annealing at 51°C for 45 secs, and extension at 72°C for 1min and a final extension at 72°C for 10 min. The 242bp amplified fragments were treated by *Hha*I restriction enzyme (Fermentas CO., Germany) according to the manufacturer protocol. The digested fragments were separated by 3% agarose gel electrophoresis which stained by ethidium bromide and visualized in UV light. It should be noted that the presence of G nucleotide at G-2548A position created *Hha*I restriction site.

Statistical analysis

The Hardy-Weinberg equilibrium (HWE) was evaluated by Chi-square test in both case and control groups. Also, the similar test was used to assess the differences in the distribution of alleles and genotypes between case and control groups. The association of G-2548A polymorphism with breast cancer risk was also was evaluated by odds ratios (ORs) with 95% confidence intervals (CIs). A p value less than 0.05 was considered statistically significant. SPSS software version 19.0 (SPSS, Inc., Chicago IL, USA) was used for the all statistical analyses.

Results

The distribution of allele and genotype frequencies is presented in table 1. The genotype distribution showed that control group was at Hardy-Weinberg equilibrium ($p > 0.05$). Our data revealed that there is a significant association between AG genotype and breast cancer risk (OR= 2.41, 95%CI= 1.05-5.52, p= 0.037), whereas there was no significant association between GG genotype and breast cancer risk (OR= 3.67, 95%CI= 0.31-43.27, p= 0.302). Also, carriers of G allele (AG+GG) were at a high risk for breast cancer risk (OR= 2.48, 95%CI= 1.10-5.59, p= 0.029). Allele analysis showed that the frequency of A allele is 67.78% and 80.19% for case and control groups, respectively. Therefore, the frequency of G allele was 32.22% and 19.81% for cases and controls, respectively. Thereby, we observed a marginal significant association between G allele and breast cancer risk (OR= 1.92, 95%CI= 1.00-3.70, p= 0.049).

Table 1. Genotype and allele frequencies of G-2548A in cases and controls

Genotype	No. and Percentage		OR (95% CI)	*p*-value
	Control (n=53)	Case (n=45)		
AA	33 (62.26%)	18 (40.00%)	-	-
AG	19 (35.85%)	25 (55.56%)	2.41 (1.05-5.52)	**0.037**
GG	1 (01.89%)	2 (04.44%)	3.67 (0.31-43.27)	0.302
AG+GG	20 (37.74%)	27 (60.00%)	2.48 (1.10-5.59)	**0.029**
Allele				
A	85 (80.19%)	61 (67.78%)	-	-
G	21 (19.81%)	29 (32.22%)	1.92 (1.00-3.70)	**0.049**

OR: odds ratio, CI: confidence interval

Significant differences between the case and control groups are bolded

Discussion

In this study we evaluated the association of LEP G-2548A gene transition with risk of breast cancer in an Iranian population. Our data revealed that there are significant associations between AG genotype and G allele and risk of breast cancer. Also, we observed that carriers of G allele (AG+GG) were at a high risk for breast cancer. Some previous studies showed similar results. For example[15] reported that AG, GG and G varieties are associated with risk of breast cancer in population of south of Iran. In addition[16] reported that GG genotype and G allele are associated with breast cancer risk in north of Iran. While[17] reported that there is no significant association between LEP G-2548A polymorphism and risk of breast cancer in a population from center of Iran. The different results in aforementioned studies may result in environmental and ethnic factors[18].

Leptin is considered as an important protein for the human mammary gland growth, as far as latest studies have revealed that the protein might play a pivotal role in breast cancer[19]. Expression of leptin gene in cell lines of breast cancer, solid tumors, and normal breast tissue have been reported. Overexpression of leptin in the most breast cancers was reported whereas this overexpression has not been reported in cell of healthy Moreover, leptin can cause breast cancer cells to become malignant forms[20, 21]. Also, it is reported that leptin and leptin receptor overexpress tumorous tissues[19]. Leptin plays some roles such as growth of cells, cell differentiation, and angiogenesis. Also, it could increase some products of endothelial cells including nitric oxide and overexpression of VEGFR-2, FGF2, and VEGF[22]. In some cells such as malignant or normal epithelial cells, the leptin can act as a migration and mitogenic factor[23]. Leptin also could induce cancer cells growth in breast cancer epithelium via aromatase expression and estrogen production or activation[24]. Evidences show overexpression of leptin and leptin receptor in initial breast cancer with metastases[25].

Single nucleotide polymorphisms are a group of genetic variations that could happen in every region of genes. The influence of SNPs is dependent on the location of them on genes[26, 27]. SNPs in promoter region of genes could affect the gene expression[28]. LEP G-2548A transition as an upstream polymorphism may alter gene expression. In silico analysis is a useful tool for evaluation of effects of SNPs[29, 30, 31]. Therefore, it is suggested that further studies are focused on the molecular effects of LEP G-2548A by computational analysis.

Finally, there are some limitations in our study that we should be mentioned in this section. At first, we don't evaluate gene-gene and gene-environment interactions. Also, the sample size of our study was very small.

Conclusion

Leptin G-2548A gene transition may be a genetic risk factor for breast cancer, but further studies with larger sample size with regard to mentioned interactions are need to obtain more accurate results.

Ethical Clearance- All the participants' informed written consent and this study confirmed by the principles outlined in the Declaration of Helsinki and approved by the Shahid Beheshti Hospital's Ethics Committee.

Source of Funding- This study was performed by a personal expense.

Conflict of Interest- The authors report no conflicts of interest.

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DOI Number: 10.5958/0973-9130.2019.00147.6

Contamination of Portable Phones with Pathogenic Bacteria, A Comparative Study between Staff at Al Hussain Teaching Hospital and Staff at Samawa Technical Institute

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Abstract

The study was conducted to identify the key role of mobile phones in transmitting bacterial infection to users of these devices. Bacteria on the surface of mobile devices were isolated to diagnose and to know the damage and effects on the health of users of these devices. The study samples included 40 samples, divided into 20 swabs of mobile phones from Al Hussain Teaching Hospital employees and 20 swabs of mobile phones from employees and students at the Samawa Technical Institute. Worms from these samples have been grown for study and identification in cultural media. Biochemical tests were performed to determine species. Bacillus spp., Pseudomonas spp. have been isolated. spp Enterobacter. Staphylococcus aureus, epidermidis Staphylococcus, sp.. Staphylococcus aureus, Staphylococcus epidermidis and Pseudomonas spp are the most common bacterial species. And that's Bacillus spp. The main objective of the current study was to verify bacterial pathogens contamination on mobile phones and also to verify the role of the mobile phone in the transport of pathogens from person to person.

Key words: *Bacteria, portable phones, contamination, transmission.*

Introduction

Portable telephone is an electrical portable elongated device for individual communication. The massive mobile phone mainstream by finger. My research has shown in less than 30 years that a mobile phone can pose a health hazard with tens of thousands of microbes living on every square inch of the phone. Due to the basic need for mobile phones, mobile phones can be used by individuals who may be from someone who is unhealthy to someone else. The relentless handling of the telephone by different users therefore presents a group of microorganisms. Because dealing with a dissimilar person makes the carrier good for microbes, expressly those accompanying with the skin, which lead to the banquet of various germs from person to person. Most pathogens are pathogenic, in particular from hospital staff, as the number of illnesses with a dissimilar illness is available [1]. The mobile phone can spread communicable diseases by repeated hand contact [2]. Staphy. Staphy. Aur., a communal bacteria which creates up to 25 percent of vigorous societies and animals on the membrane and even in the nose, can cause sicknesses from irritations and carbuncles to pneumonia and meningitis. The main lake S. Aureus is the hand from which the food is prepared. [3] Finger helps to spread many microbes containing intestinal species as an important way.[4] Proteus Mirabilis Proteus mirabilis is one of the greatest frequently found cancer pathogens in medical sampling. It can cause a assortment of contaminants acquired in the community or hospital containing urinary tract, respiratory tract, wounds, burns, bacteremia, meningitis, neonatal brain, peptic edema and bone. [5] Following Escherichia coli,P. Mirabilis, an enterobacteriaceae member most frequently isolated from European clinical microscopy.[6] Hospital contamination accounts for~3 percent in the USA.[7] The metastatic met-proatile Pseudomonas aeruginosa inhabits worldly, aquatic, animal, human and animal environments.[8]

Materials and Method

Samples of mobile phones were serene from 40 devices, 20 Al Hussain Teaching Hospital employees and 20 Samawah Technical Institute employees during

a three-week period of 20 April 2017 and 11 May 2017 in Samawah, Iraq, with sterile cotton swabs. Each swab spot is immediately placed on three plates of nutrient media, Macarkey media and blood media. The dishes were hatched at 37°C for 48 hours and the progress and expatriate portrayal of segregates were observed. Colonial morphological descriptions, gram dye.[1,8] mobility tests and key identification [9,10] were used for bacterial identification.

Results and Discussions

For strong living, microbiological ethics in sterility are essential. However, monitoring applications that differ from the natural hygiene ethics of both developing and industrialized countries is not unusual. This test confirms this difference, because a variety of bacteria have been found on cell phones. The results indicate that Staphylococcus aureus epidermidis, Pseudomonas aeruginosa, Bacillus sp., Proteus sp. Enterobacter aerogenes are the principal infectious insulates typically accompanying with mobile phones as seen in the Table 1. These creatures can have entered the telephone via the membrane and from hand to hand. This is since inaccessible germs are a subcategory of the natural skin microorganisms that previous researchers have progressively developed. [11] The recurrent handling of different users may result in dissimilar hygiene profiles resulting in stable skin, frequency and degree of insulation. This has many things to do with health. Staphylococcus aureus is known to cause illnesses ranging from pimples and boils to pneumonia and meningitis, a scenario supported by the colony's high population.

Table (1) : Percentage of bacterial insulates from the samples collected from portable phones

No.	Bacteria	Percentage (%)
1	Staphylococcus aureus	39%
2	Staphylococcus epidermidis	16%
3	Pseudomonas aerogenosa	14%
4	Bacillus sp.	12%
5	Proteus sp.	11%
6	Enterobacter aerogenes	8%
SUM.		100%

Table (2) : Comparative between Percentage of bacterial insulates from staff at Al Hussain Teaching Hospital and Staff at Samawa Technical Institute.

No.	Bacteria	Staff at Al-Hussain teaching hospital (%)	Staff at samawa technical institute(%)	SUM. Of Percentage (%)
1	Staphylococcus aureus	23 %	16%	39%
2	Staphylococcus epidermidis	9%	7%	16%
3	Pseudomonas aerogenosa	8%	6%	14%
4	Bacillus sp.	8%	4%	12%
5	Proteus sp.	7%	4%	11%
6	Enterobacter aerogenes	6%	2%	8%
SUM.		61%	39%	100%

The existence of a gram-negative rod, the coli affiliate Aerobacter aerogenes, indicates the potential for fecal contamination on the mobile phone. Gambian sepsis occurs mainly as a result of Pseudomonas aeruginosa and Enterobacter spp. [12] It was also suggested that the atomic toxin or lipid sclerosis (LPS) produced by affiliates of this group was considered to be a key factor in septic shock. Sp. Bacillus. The frequency of 100% of the occurrence of a significant living organism in food waste was determined. [13] This certainly contributes significantly to the damage to nutrition and to food contamination if nutrition is ready or annoyed

with infested hands. The general consequences of these findings are that portable telephones that sort communications relaxed and reachable also provide good vector pathogens for the transmission of illness. If care is not taken, vehicles can transport biological armaments. Karabay and colleagues [14] conveyed that portable telephones could be contaminated with bacteria such as Escherichia coli, Pseudomonas aeruginosa and Klebsiella pneumoniae, which cause sanatorium infections and could attend as a means of spreading pathogens acquired in hospitals. There are portable phone users everywhere: on the market, at home, in hospitals and in schools. It can be the cause of infection spreading in society. Our discoveries show that isolates are linked to dissimilar strata of mankind. Today, cellphones are important to doctors and other health care professionals. Subsequently boundaries on the use of portable telephones by HP are not a concrete elucidation, various scientists advise adherence to anti-infection protection measures such as individual sterility requirements. It should also be conversant that these campaigns can be a foundation of sanatorium infections to and from the municipal. Further studies on possible means of decontamination from mobile phones should be found, For example, the use of alcohol and/or tissue cleansing and for use in hospitals with large bed capacity and comprehensive care facilities. The situation in hospitals plays an important role in the transportation of living organisms with hospital infections. Microorganisms can be transferred from person to person or from importable objects (e.g. medical speakers, bronchoscopes, pagers, dry styles, hospital codes, computer keyboards, mobile phones and fixed phones) to hands and vice versa [15-18]. Oh, Karabay et coll. 2007)[14] found the majority of isolated organisms to be plants of the skin. Conversely, 16.7% of the illustrations were constructive for pathogens notorious to be linked to sanatorium transfusions, such as Enterococci spp, S. Aureus, K. Pneumonia. Pneumonia. Intestinal staphylococcus (VRE) and staphylococcus aureus (MRSA)vancomycin have not been inaccessible. Other detectives have reported that phones, intercoms, dictators and mattress flushes may be adulterated with pathogenic bacteria. [17,19-20] . Jeske et al [21], It was also reported that bacteria were contaminated by personal portable telephones from the hands of anesthesiologists (38/40) doctors, 4/40 In the operating room with human pathogenic bacteria. The use of portable telephones by people treated in intensive care units, burning wings and operating rooms can be more hygienic because mobile phones are often used near illness, unlike fixed phones. ICU diseases and burn illnesses are highly susceptible to infectious illnesses, Therefore, the risk of transmission of living organisms accompanying with sanatorium infections is increasing. [20-22]. Extra than half of the British populace have portable telephones and increased industrial presentations have augmented the use of these campaigns to connect health workers (HCWs) and illnesses more effectively. [23] Innovations in portable communications have improved patient illness control; however, augmented use of portable headphones with a higher background in the hospital contamination rate is observed. Since restricting the use of portable headphones by health workers is not effective in preventing the spread of contamination in hospitals, Effective prevention strategies, including environmental pollution, manual hygiene, monitoring and adhesive insulation, need to be developed to prevent them. [24,25] Unpretentious cleaning of 70% isopropyl computers and telephones can reduce bacterial loads. [25,26]. The control measures are very unpretentious and can include engineering changes such as the use of hands-free cell phones and exteriors that the right staff can easily clean, disinfect, wash their fingers and wear gloves. [20,26] Contamination control staff who reside in a medical facility can generally advise on routine medical checks. These unpretentious control dealings can reduce indisposition and transience and thus reduce medical care costs for health centers and other care providers [26].

Conflict of Interest: The author has no disclosures to report.

Source of Funding: Self.

Ethical Clearance: Not required.

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DOI Number: 10.5958/0973-9130.2019.00148.8

Effect Dusts Phenomena on Health

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Abstract

Background and objective: In this study investigated the effects some elements and dusts phenomena on health. Dusts phenomena in recent years has been made very environmental and economic.

Method: The average particle as a set of jerks pushed forward, mentioned particles rise in the air and usually pushed forward four times the height of which rise into the air. But very small particles like silt and clay particles rise from the ground and because of their light weights remained suspended in the air, then sit down over long distances.

Results: These phenomena are studied accurately as an environmental parameter in environmental assessment studies of this phenomenon in the world and because of direct and important effects of dust phenomena on soils of different areas, rains fell, ocean biochemistry, lakes, ecosystems and also environmental damaging effects on organisms, chemical composition of particles forming dust has always been considered.

Conclusion: Dust storms are one of the significant phenomena in the desert areas of the world. Mentioned studies on upside consequences general recognition of these phenomena and can ease this phenomena's environmental assessment.

Key-words: *Elements, Dusts phenomena, health.*

Introduction

Aerosol phenomena include the serious environmental problems in different areas in the world. However, most dusts in the atmosphere originated from aerosols particles and these little aerosols have higher frequency in arid and semi-arid regions. In fact, creation of dusts can be one type of response to vegetation change of earth which in this respect the role of human activities on the natural geographical environments should be considered. Of course, man can adjustment negative effects of environmental and aerosol phenomena with big engineering schemas and mitigate the frequency of occurrence, severity and duration. Dust phenomena effects are continuing to 4000 kilometers away from the original source and cause undesirable biological effects and great damages in agricultural, industrial transportation and communication systems. One of the most important conditions of dust creation along with unstable weather condition are the presence or absence of moisture so that if unstable weather has humidity, creates rainfall, storms, lightning, otherwise creates dust storms. Iran is under undesirable effects of this phenomenon due to this problem and its adjacency to desert zone. South East deserts of Syria and North Africa are the next priority. [1,2,3]

Dust forming process: The average particle as a set of jerks pushed forward, mentioned particles rise in the air and usually pushed forward four times the height of which rise into the air. But very small particles like silt and clay particles rise from the ground and because of their light weights remained suspended in the air, then sit down over long distances.[4]

Dust geochemistry: These phenomena are studied accurately as an environmental parameter in environmental assessment studies of this phenomenon

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in the world and because of direct and important effects of dust phenomena on soils of different areas, rains fell, ocean biochemistry, lakes, ecosystems and also environmental damaging effects on organisms, chemical composition of particles forming dust has always been considered. Beside, particles geochemical data such as major and rare elements concentration and especially rare earth elements can be helpful to determine the origin of these particles. The latest information has been presented about the geochemistry of dust storms in 2006 is in Table 1.

Table 1: Composition of dust storms geochemistry in the world

	Harmattan Dust					Saharan Dust				Harmattan Mean	Europe Mean	China Mean	World Mean
	(Southern sahara)					Over Europe							
	1	2	3	4	5	6	7	8	9				
CO2	-	4.99	5.47	6.38	4.18	-	-	-	-	5.26	-	-	-
P2O5	0.17	0.25	0.22	0.18	0.18	0.18	0.42	0.13	-	0.2	0.24	0.19	-
K2O	2.04	2.95	2.087	3.26	2.95	3.26	3.26	2.18	1.8	2.81	2.63	2.13	2.35
TiO2	0.73	0.83	0.81	0.82	0.92	0.74	1.01	1.22	1.2	0.82	1.04	0.65	-
MnO	0.1	0.08	0.08	0.09	0.08	-	-	0.05	1.6	0.09	-	-	-
SiO2	66.03	57.19	59.05	57.45	65.04	61.33	51.79	54.83	58	60.95	56.49	60.26	59.9
SO3	-	-	-	-	-	-	-	-	-	-	-	0.2	-
H2O	-	9.74	8.94	9	7.3	-	-	-	-	8.75	-	0.8	-
CaO	0.13	3.61	3.01	2.88	1.9	3.47	12.19	10.15	8.6	2.31	8.6	-	3.94
MgO	0.82	0.81	0.75	0.81	0.62	2.84	3.86	2.9	2.7	0.76	3.08	-	2.6
Na2O	0.91	1.46	1.3	2.14	1.12	0.81	1.16	0.98	1.6	1.39	1.14	1.72	-
FeO	-	-	-	-	-	-	-	-	-	-	-	1.37	-
Fe2O3	4.45	5.3	4.63	4.34	3.78	8.06	5.32	6.09	6	4.5	6.37	2.91	6.85
Al2O3	11.08	12.11	11.32	10.64	9.97	15.52	12.79	16.33	11	11.02	13.91	11.4	14.13
Total	86.46	99.32	98.45	97.99	98.04	-	-	-	-	-	-	-	-

Centers forming dust in the world

Most dusts in the world originate from the restricted areas like the Sahara desert, the Middle East and Southwest Asia, Australia, Mongolia and parts of the America and Europe continent and global distribution. Study of dust storms global distribution determines the areas of dust caused by dust belts. These belts are mainly "in the northern hemisphere and are spread from North Africa to China.

Aerosols chemical composition:

Chemical composition of pollutant suspended particles is variable in wide area which was discussed in last chapter and in this chapter will be discussed only as an introduction. Practically, we can find inorganic compounds as well as organic compounds in suspend particles if sample air large volumes and use quite sensitive analytical methods. The actual suspend particulate composition is completely dependent on its source. Polluted soil particles that contain calcium,

aluminum and silica are common in the soils and minerals. Fumes resulting from coal, wood oil and waste burning contain a lot of organic compounds. Organic compounds can be found also in pesticides pollen and some of the products that were placed in the food industry and chemical plants results. Subsidiary suspended particles in the atmosphere which contains gaseous components often contain ammonium, sulfate or nitrate mineral salts. Difference of suspend particles compounds is showed well with pollutant suspend particles by the gathered information.

Some different elements existing in dusts and their effects on human health:

Lead

This element is the most wide heavy and toxic element in environmental from the diffusion point that has a very wide transmittal in the world especially when it was used in gasoline.Lead compounds mainly enter the environment as a result of the mines operation (in the form of sulfide, carbonate, lead sulfate) battery industry (lead oxide and lead), fossil fuels(lead tetraethyl and tetramethyl), paint (carbonateand chromate of lead) and glass and sourindustries (lead silicate), so that an increase in polar ice is about 2,000 times higher than normal amount. As mentioned, unlike other heavy elements, breathing is the major sources entry of lead in the human body. The most important effects of lead can be named peripheral and central nervous system disorders, reduction in neural and behavioral problems. Lead can enter fetusthrough the placenta, hence existing liquid in placental is roughly equal to the amount of lead in the mother blood. In addition, lead tends to link up with the mitochondria and interfere in oxygen regulation and energy transferring. [5]

Lead effects on environmental:

Huge amounts of lead enter into the atmosphere by the fuel process. There is major difference between urban and rural areas of concentration. Lead compounds may be transported to considerable distances, depending on the speed, wind direction, rainfall and humidity. However, lead more sticks to dust particles and lands on vegetation and soils. Lead is more absorbed through nutrition than drinking. Approximately 50-30 percent of respiratory lead remainsin lung. Fifteen percent oflead enters the human body through the air. [5]

Lead effects on human:

Lead poisoning first sign is neurologic symptoms, neurologic disorders increase in children and blood pressure increase in adults. Complicationsrelated to fetusespecially during development of the fetal nervous system are very important. 30 micrograms per deciliter ofLead level or less is associated with the nervous system and red blood cells disorder. High lead levels in blood cause problems in the central nervous system, kidney damage, impotence and also anemia. [5,6]

Mercury:

Mercury is an element, silvery liquid, fluid, volatile, unstable and variable at room temperature that does not have fragility and is seen as a gas, liquid or solid. Mercury is highly toxic elements in the environment. [7]

Mercury activity:

Mercury doesn't do any beneficial physiological function for humans. Due to various chemical and physical modes (metallic, inorganic and organic compounds) mercurymeasurementcarry out, independently.Absorption of mercury inorganic compounds from food is about 7 to 8 percent of the total amount of mercury. Absorbed methyl mercury quickly appears in the blood. About 80 to 90 percent of methylmercury in human red blood cells is limited. Methylation of mercury takes place to inorganic compounds, slowly. Highly toxicity of methyl mercury in comparison to inorganic compounds is because of lipid solubility; these compounds are able to move to the brain, spinal cord, peripheral nervous system and around the placenta. [7]

Mercury effects on environment:

The mercury effects on human health through occupational exposure are known, but considering mercury as an environmental pollutant is a new subject. Continuous studies indicate mercury increase in sediments and fisheswhich are in area polluted from chemical waste dump through contaminated mercury compounds that have adverse effects on health and the environment.

The most common complications of mercury toxicity are neurological and renal disorders appear by organic and inorganic mercury compounds effects. Beside general toxicity effects of mercury, this element causes

mutagenesis and disorders in cholesterolmetabolism. Mercury general effectsin humansis nearly close to lead such that obvious complications of lead are effects on the central and peripheral nervous system, brain, hearing and smell damage in humans have been reported. So far three methyl mercury toxicities through consumption of contaminant foods have been identified. The impact on the central nervous system includes visual damage and cerebral symptoms, senses reduction and nervous attacks and death in high concentrations. Mercury effects can be very significant, adults who have been exposed to large amounts of methyl mercury maybe experience tremors and numbness, itching and tingling in the lips, tongue, fingers and toes. [7]

Chrome:

The most common chrome ore are chromite or trivalent chromium. Chrome stable condition is in three valences. Hexavalent chromium easily can be revived by various factors. Chrome solubility in water is low about 10 micrograms per liter, but in polluted areas, combined three and six valences can be find such soluble salts with suspend particles in higher concentrations. There is restricted information regarding the chromium pollution in the respiratory air. The most amount of chrome in the body is stored in the skin, muscles and fat which is a function of factors such as age, gender and geographical conditions. Chromium is essential for glucose and lipid metabolism, its prevention fromminor diabetes and atherosclerosis in humans is important. Hexavalent chrome causes necrosis of the liver, inflammation of the kidneys and eventually death in human. Chromium toxicity preliminary effects are irritation and itching in the gastric mucosa. Studies results have shownthat inhalation of high levels of hexavalent chromium compounds increase in respiratory tract cancer. [8,9]

Arsenic:

Arsenic is widely distributed in nature. Arsenic compounds type is effective in its absorption, it is rarely absorbed. Arsenic toxicity depends on physical and chemical properties, entering ways to the body, consumption dosage, duration of exposure and its amount in the diet and age. Acute poisoning with arsenic encompasses the central nervous system and makes comatose state. Other effects can be chronic poisoning, causing general weakness in the muscles,loss of appetite, nausea, inflammation of the mucous membranes of the eyes, nose and throat and skin lesions. [5, 9]

Uranium:

It is not a rare elements; it is more abundant than mercury, nytmvan, silver, cadmium, molybdenum and arsenic. Uranium is a heavy silvery-white element and when fragment it to very small pieces is flammable. It is slightly softer than steel. The element is covered with an oxide layer in air.

Man always contact with a certain amount of uranium by food, air, soil and water and this element exists naturally in all this material.Foods such as plant roots and water have a small amount of natural uranium and with breathing air a small amount of uraniumenters the body. Uranium concentrations in marine foods are usually so low that it can be overlooked. Because uranium is a radioactive substance, studies have been conducted about its effects on health. After absorbing some uranium, chemical effects arevisible and create uranium complications such as kidney disease. When people are exposed to uranium radionuclides caused by the uranium radioactive fission that is created in a long time will get cancer. When people are exposed to enriched uranium, it will be more likely toget cancer because enriched uranium is more radioactive. This form of uranium emits harmful radiation that people will get cancer within a few years. Enriched uranium enters into the environment accidentally and through the nuclear and military activities. [10, 11, 12, 13, 14]

Conclusion

Dusts phenomena in recent years has been made very environmental and economic problems for west and south west inhabitants that lack of knowledge and general recognition of this phenomena increased reasons. Mentioned studies on upside consequences general recognition of these phenomena and can ease this phenomena's environmental assessment.

There are many methods which have been used to reduce the amount of dust which is raised up in the air by strong winds.

Acknowledgement: The authors express their appreciation to the Abadan School of Medical Sciences for financial support of this work (Project ID: 93 u-063 and code of ethics: IR. AbADANUMS. RES.1394.37).

Ethical Clearance: This paper clearly delimits the

scope of work for which ethics clearance is awarded and this delimitation is deliberately conservative to protect research participants and researchers.

Conflict of Interest: No conflict of interest.

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DOI Number: 10.5958/0973-9130.2019.00149.X

Study of Knowledge and Attitude Towards Professionalism and Ethics in Medical Practice among Medical Students

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Abstract

This research is on 'Study the knowledge and attitude of professionalism in medical practice among medical students in MSU". The cause of their poor professionalism will be found out. Next is, why professionalism is not taught as a subject in the medical curriculum. In this research, how can professionalism be induced in students and taking professionalism as a compulsory subject will be discussed. A cross-sectional study was conducted among 384 respondents from year three to year five MBBS students. The questionnaires have four parts which included regarding demographic profile, assessing the knowledge; evaluate attitude and lastly how professionalism is implemented in university and how students want it to be implemented. The data were analysed by using Statistical Package for Social Sciences (SPSS) version 19.0 via descriptive statistics and correlation. The p-value in correlation must less than 0.05. In overall, the data have shown that students have high knowledge and attitude in professionalism and the direction of the relationship is positive as knowledge and attitude are positively correlated where the p-value is 0.002 and its less than 0.05. So, as the knowledge increases, the attitude increases as well. Besides that, the majority of the students where 149 of them with the percentage of 38.8% wants professionalism to be implemented by having more campaigns on how to develop professionalism. As a conclusion, knowledge and attitude of professionalism in medical practice is high among medical students and there is an association between knowledge and professionalism in medical practice among medical students. As knowledge increases, attitude will also increase.

Keywords : *Professionalism in medical practice, Ethics in the medical curriculum.*

Introduction

Medical professionalism is defined as "commitment to carrying out professional responsibilities, adherence to ethical principles and sensitivity to a diverse patient population" by the Accreditation Council for Graduate Medical Education, USA [1]. Among all these factors, knowledge and attitude of a medical student is the fundamental key to this research. In this research, level of knowledge and attitude of the medical students regarding professionalism will be assessed because it's the main element to an effective doctor-patient relationship and a successful diagnosis, treatment and prevention to gain the patient's trust on physicians. Besides that, as a result of this research, the university can seek their students' understanding about knowledge and attitude so that they can enhance the method of teaching professionalism throughout the journey of Bachelor of Medicine and Bachelor of Surgery (MBBS). During undergraduate medical studies, professionalism must be taught clearly by medical educationist. There is a considerable amount of scientific literature that proposes how to formally teach professionalism during pre-clinical as well as clinical years at medical school. Though teaching professionalism to the students of MBBS in MSU has

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been started, it is being less emphasised.This research will help the university to make the students more engaged to the subjects as professionalism is important characteristics that need to be polished in medical students. Due to lack of knowledge and attitude of professionalism, numerous medical students encounter the preparation of "patient-focused" counsels as a life challenging test that can bring about pain and, in the most pessimistic scenario, results in the rot of an at first humanistic state of mind .[2] Lack of communication with patients and where physicians are not communicating effectively, medical errors can occur.[3] Attitudes and knowledge can be strongly said that it plays important roles in the process that transforms a medical student's identity. Medical students exhibit poor professionalism and knowledge during their practical training. [4, 9] Medical professionalism is evolving from autonomy to accountability, from experts opinion to evidence based medicine, from self interest to teamwork and shared responsibility.[5] A study showed that there was an overall trend of decreasing positive attitude as the person progress through their training years and into clinical practice [6.]

There is need for faculty role models, tools for assessing professionalism, real incentives to behave professionally and also the goals of reforming the reality[7] .Improving behaviors and performances among medical professionals requires adequate training on the concepts of medical professionalism and consequently the assessment of the levels of professionalism achieved by medical professionals.[8]

Method

Study Design

This research will be designed by doing a cross-sectional study based on the topic given which is to study the knowledge and attitude of professionalism in medical practice among medical students.

Study Area

This study was conducted in Management and Science University, Shah Alam as this university has Bachelor of Medicine and Bachelor of Surgery (MBBS)

Study population

The study population for this research will be medical students from year three to year five of Bachelor of Medicine and Bachelor of Surgery (MBBS) from the faculty of International Medical School.

Data collection and research tools

Data will be collected in the form of a questionnaire. The questionnaire is designed based on the previous study. The questionnaire has four parts. Part A is the demographic section, Part B is to assess knowledge of professionalism, Part C is to evaluate the attitude of professionalism and lastly, Part D is as on how often knowledge and attitude being implemented in university and how do the students want professionalism to be implemented in medical.

Statistical analysis

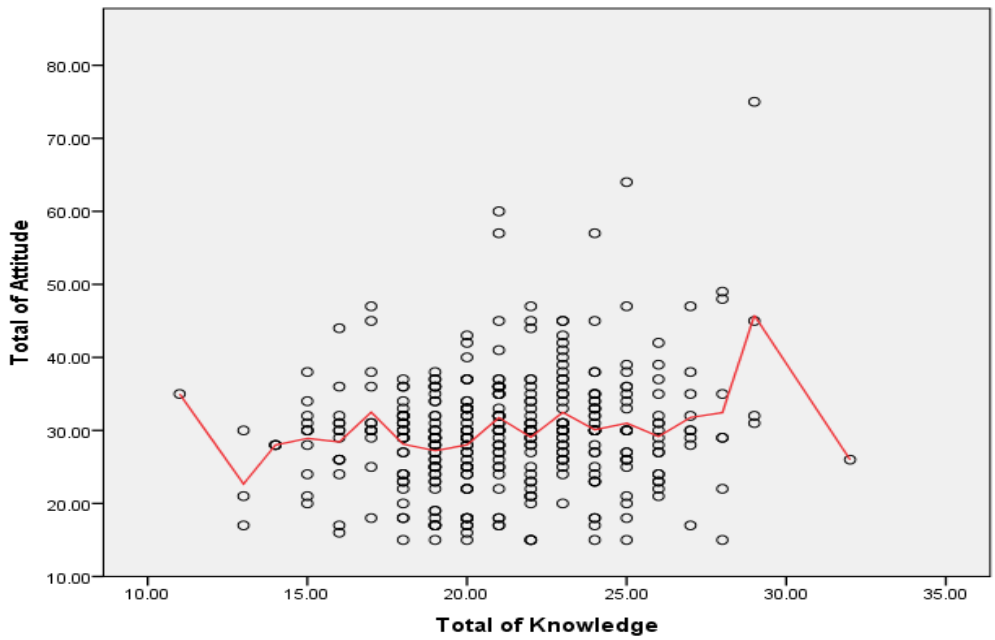
SPSS version 19.0is used for collecting data. Descriptive statistics and also correlation is used to get my result according to my objective.

Results

The medical students from MSU exhibit high knowledge of attitude of professionalism in medical practice this is because majority of the students have answered the correct answers for part B which is on assessing the knowledge while or part C where the questions are based on evaluating the attitude, most of the students answered agree and strongly agree for all the questions. Besides that, 279 students have stated that they were exposed to medical curriculum and the majority says that professionalism is taught one to two times in a month. Lastly, 149 students which are the majority of the students want to have more campaigns on developing self-professionalism, followed by 121 students who suggested in making medical professionalism as a compulsory subject and lastly 114 students want the university to have special classes on the end of the month to educate students on medical professionalism.

Correlation

		Total of Knowledge	Total of Attitude
Total of knowledge	Pearson correlation	1	0.161
	Sig(2 tailed)		0.002
	N	384	384
Total of Attitude	Pearson correlation	0.161	1
	Sig (2 tailed)	0.002	
	N	384	384



Pearson correlation of knowledge and attitude, r= 0.161

The p-value of my research is 0.002, $p<0.05$ .The null hypothesis is rejected

The direction of the relationship is positive as knowledge and attitude are positively correlated and has a very good strength of correlation. As the knowledge increases, the attitude increases as well.

Discussion

To assess the knowledge of professionalism in medical practice during the students the clinical year

The response rate for the present study is 100%. This research shows that knowledge of professionalism in clinical year students are high depending on the answers that they have given. Most of them answered correctly that behaviour of core humanistic value with the percentage of 49.0% is the attributes of professionalism in being caring and compassionate during their interaction with the patient. Ethical and moral standards with the next highest percentage which is 40.6% The practice of medicine involves trust between the patient and their doctor so physicians should endorse the highest standards of ethical and professional behavior in all their actions and activities[10]. Beneficence will be considered a humanistic value and it shows the highest percentage which 68.2% and that is the correct answer. Ethical and moral standards are the precise answer with percentage 35.9% being on the watch of potential conflicts of interest is an element which attributes of professionalism. Almost 52.0% who answered correctly stated that to prevent no harm is the principle of non-maleficence means. Almost 32.7% who answered accurately of them stated that long-term memory skill and ability to reason deductively requires effective clinical decision making. 58.3% which is 224 have affirmed that professionalism

attribute of evincing core humanistic value is based on the understanding of human interaction and that's the correct answer. Ethical and moral standards attributes which are the right answer with the percentage of 65.4% associated with the confidentiality of patient information. Conferences, symposium, and workshops, on health-care ethics, may act as a means of sensitizing doctors and thus will help to bridge this gap and protect the well-being and confidentiality of the patients. Such an effort may bring about harmonious change in the doctor-patient relationship. Besides that, in the previous research, majority medical and dental doctors disagreed to statement which says that confidentiality should be abandoned and cannot be maintained in the modern era[11].

Almost 63.8% stated that reporting an honour code violation in medical school is different than reporting a fellow physician who comes to rounds after drinking too much at lunch but the correct answer is actually false where 139 students (36.2%) have answered it correctly. Majority of 131 students (34.1%) considered that behaviour of beneficence which is the exact answer to be a core element of ethical and moral standards. The larger part of medical students where 195 of them (50.8%) proclaimed that action such as the accurate answer which addresses observed errors by the fellow student is not an example of accountability as a student or physician. Superiority number of students (89.1%) classified the medical professionalism is very important for the carrier where that's the precise answer stated that medical professionalism is not that important in the carrier.

To evaluate the attitude of professionalism in a medical student during their clinical years

A total of 131 (34.1%) students agreed that a physician should almost never doubt or second guess their decisions. Besides that, most of them which are 147 students stated that to be an effective physician, one must first be humanistic. The greater part of the medical students (47.1%) agreed that the practice of medicine requires that the physician subordinates his or her personal needs to the needs of the patient. Around 176 of students concur that adhering to high ethical standards is the first and most important attribute of professional medical practice. Majority of the students come out with neither agree nor disagree for reporting clinical errors of a fellow physician only undermines the public's confidence in the medical profession. 2/3 of the students agree that effective medical practice must begin with exercising sound diagnostic and clinical reasoning skill. Self-reflection about one's clinical decision is one of the most important ways to improve clinical skills which also where the larger part of students (53.9%) agreed with the statement. 49.2% of the students agreed that physicians are accountable not only for their patients but also for the healthcare system.166 students (43.2%) agrees that being caring and compassionate to the patient is something that is learned in medical school and refined during residency. As a student, it is as important to adhere to high ethical and moral standards all the time, not just when working with the patient and almost 162 of them strongly agrees and 179 agrees to the statement. Majority answers of half of the students agree that physicians must be accountable for their colleagues with the percentage of 50.5%. Besides that, showing respect or colleagues and staffs is as important as showing respect or your patients and 168 students with the highest reading agrees with the statement. Almost 149(38.8%) student agrees that maintaining a balance between one's personal and professional lives can only be accomplished by careful limiting clinical activities each day and 12(3.1%) students strongly disagree to the statement. 193 students agree it is essential that physicians exemplify humanism If the medical profession is to regain the trust of patients and only 3 students strongly disagree with the statement. Lastly, the ethical decision must be made relative to the needs of the patient and the needs of the healthcare system and almost 189(49.2%) students agree to the statement and 3(0.8%) of them strongly disagree to it.

Majority of the students stated that they were exposed to subjects related to professionalism during their medical curriculum with the percentage 72.7%. 146 (38.0%) students stated that they were exposed to thus subject 1-2 times a month. Lastly, most of the students wants the university to implement professionalism in medical students by having more campaigns on how to develop self professionalism with the reading of 149 students (38.8%), following by making medical professionalism as a compulsory subject with the frequency of 121 (31.5%) and lastly will be having special classes on the end of the month to educate students on medical professionalism.

Conclusion

In total 384 questionnaires were given out and everyone has answered it. This helped in my findings and tabulating my data and getting a clear result. Results were tabulated for each question in the questionnaires. This is done to get a precise data. From the questionnaires, there will be a positive impact on the attitude of professionalism in medical students. All the objective of this paperwork is fulfilled as expected. The first objective is to assess the knowledge of professionalism in medical practice during the student's clinical years. Knowledge of professionalism in medical practice among clinical year students are high hence the hypothesis is accepted. This is because the majority of the students answered the correct answer. The second objective is to evaluate the attitude of professionalism in a medical student during their clinical years. Even this objective is accepted because almost 2/3 of the students has answered correctly which is agreed and strongly agree to all the attitude related question.The last objective is to determine the association between knowledge and attitude of professionalism in medical practice among clinical year students. Correlation test is used to meet the objective. The p value=0.002, $p<0.05$. The null hypothesis is rejected therefore the alternative hypothesis is accepted. It is significant between knowledge and attitude of professionalism in medical practice among clinical year students.

Majority of the students stated that university must play its role in implementing professionalism among medical student by having more campaigns on how to develop professionalism, followed by making professionalism as a compulsory subject and lastly having special classes on the end of the month to educate students on medical professionalism.

Conflict of Interest Statement: We certify that there is no conflict of interest with any financial organization regarding the material discussed in the manuscript.

Source of Funding: Self

Ethical Clearance: No identifying details of the subjects reported here and all the data collected after informed consent.

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DOI Number: 10.5958/0973-9130.2019.00150.6

Association between Duration Working with Lung Disruption Condition using Pulmonary Vital Capacity (PVC) Test on Lathe Worker at Yogyakarta, Indonesia

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Abstract

Background: For the past decade, pulmonary fibrosis occurred due to excessive connective tissue in the lung caused by inflammation. Inhaled aluminum constantly has been thought as a key factor for pulmonary fibrosis for workers. Within the next few years, aluminum ash would become toxic inside the body and cause a hardening or fibrosis of the lungs. The present paper aims to analyze association between duration working with lung disruption condition on lathe workers in Z industry, Yogyakarta.

Method: The research used a cross-sectional design. The sample was 16 lathe workers at Z Industry, Yogyakarta. Independent variable were age, period employment, and duration of work. The dependent variable was lung disruption. Measurement of lung disruption used pulmonary vital capacity test. Data analysis was using *chi-square* test and Risk Prevalence (PR).

Result : Age and the period of employment had a quite weak association with lung disruption (p=0,158;0,279). While the duration of work has a strong association with lung disruption (p=0,729).

Conclusion: Duration of work has a strong association with lung disruption. This is caused by a worker which inhaled aluminum dust continuously, aluminum dust would be accumulated, becomes toxic and caused parenchyma tissues damaged in the lung.

Keywords: *duration working, lung discruption, PVC, lathe worker*

Introduction

Dust, steam, gases that surrounding the workers in the work environment would disrupt productivity and health of the workers. It can also lead to a reduction of comfort, eyesight, the impaired respiratory function of pulmonary disorders. The size, shape, concentration, solvency, chemical properties and long exposure to dust is the cause of the onset of the disorder pulmonary function[1].

Factors which influence substance toxicity are characteristics exposure in the form of an exposure dose and exposure duration. Working environment also has an impact on toxicity chemical substance such as temperature and humidity. A related hypothesis maintains that individual susceptibility such as age, gender, weight, nutritional status, a history of the disease also has relation with chemical toxicity in the body.

CV Z Yogyakarta is one of the companies in the field aluminum metal industry which produces household appliances made from aluminum. One of the processes that are has a risk for inhaling aluminum dust is lathing process. Previous study stated that 66.6% lathe workers have decline pulmonary vital capacity. Meanwhile, 40%

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of lathe workers have a misbehaving lungs disturbance in the form of restrictive disorders[2].

The purpose of this research is to analyze association between duration working, age, and period employment with lung disruption condition at lathe workers in Z Industry, Yogyakarta

Material and Method

This research was using a cross-sectional design. The research population was the workers on lathe section at Z Industry. The research sample was 16 lathe workers in X industry at Yogyakarta. Independent variables were sex, employment period, and working duration. The dependent variable was lung disruption. Dust total concentration is carried out by the gravimetric method with has dust EPAM is done on the second point lathe location[3] . Measurement of pulmonary vital capacity (FVC) measured with a spirometer. Analysis of test data using *chi-square* test and Risk Prevalence (PR) to know its association between variables.

Result

Age, Employment Period and Duration of Work

Table 1. Distribution of age on Lathe section Worker at Z Industry on October 2017

Variable	Frequency	Percentage (%)
Age		
26-45 years	8	50
>45 years	8	50
Employment Period		
5-10 years	4	25
>10 years	12	75
Duration of Work		
≤8 hours/day	16	100
>8 hours/day	0	0

Table 1 showed lathe worker with age range 26-45 has same percentage of workers whose has aged more than 45 years. The youngest age of lathe workers is 32 years old, while the oldest age is 53 years. 25% of lathe workers have employment period on 5-10 years. While working period over 10 years occurs with 12 people or 75% of the total lathe workers. The working time is less than 5 years is not written on the chart. This is because there are no a lathe part workers working less than 5 years. The working period at the shortest part of the lathe worker is 7 years old and the longest working period i.e. 30 years. All of lathe worker have duration work less than to 8 hours/ day.

Total Dust Level at Two Location on Lathe Workplace

Tabel 2. Distribution of Total Dust Levels on the Lathe Workplace in November 2017

Measurement Spot	Total Dust levels (mg/m^3)
East	0.459
West	0.652

Based on the results on table 2, measurement of total dust levels on the two lathe section on Z Industry still under threshold limit value (TLV) set by Permenakertrans RI numbers Per 13/ Download/X/2011 i.e. 10 (mg/m^3)[4].

Lung Disruption

The condition of lung disruption at lathe worker's differentiated into normal and abnormal based by the pulmonary vital capacity test. Distribution of lung disruption on lathe worker can be seen in the table below.

Tabel 3. Distribution of Lung Disruption on Lathe Worker at Z Industry October 2017

Lung Disruption	Frequency	Percentage (%)
Normal	13	81
Abnormal	3	19
Total	16	100

Based on the table above can be known by as much as 13 workers in the lathe section at X or 81% of workers had normal pulmonary vital capacity, while 3 person workers or 19% experienced disruption lung. The restriction is usual form which occurred from pulmonary impairment. Workers who experience mild restriction

has 65% FVC for lowest and highest FVC is 73%.

Association between Age, Employment Period and Duration of Work with Lung Disruption

Tabel 4. Association cross tabulation between Age with Lung Disruption Condition On Lathe Worker at Z Industry, Yogyakarta

Variable	Lung Disruption				Percentage		Coefficient Contingency	Risk Prevalence
	Normal		Abnormal		N	%		
	N	%	N	%				
Age								
26-45 years	7	87,5	1	12,5	8	100	0,158	-
>45 years	6	75	2	25	8	100		
5-10 year	4	100	0	0	4	100	0,267	-
>10 year	9	75	3	25	12	100		
Duration of Work								
≤ 8 hours/day	8	100,0	0	0,0	8	100,0	0.729	1.6
> 8 hours/day	5	62,0	3	37,5	6	100,0		

Based on table 4 worker who suffered a pulmonary function disruption as much as 1 person or of 12.5% of all workers aged 26-45 years. While 2 people or 25% of all workers aged more than 45 years experiencing disorders pulmonary function. Contingency coefficient based on the results obtained low association (p=0,158) between lung disruption and age lathe worker at Z Industry.

No worker who has 5-10 year working period has a misbehaving lung. As many as 10 people or 25% of workers who worked over 10 years suffering from pulmonary disruption. Based on the results of the contingency coefficient is 0.267. This means there is weak relationships between employment period with lung disruption condition on lathe workers in Industri X.

Based on cross tabulations between lung disruption conditions and duration working mentioned that there is a very strong relationship with coefficient contingency 0.729 while prevalence risk 1.6. This causes that someone who has a working duration more than 8 hours/day has risk 1.6 times will have abnormal lung condition than someone.

Discussion

Age

The age of workers based on the results of the questionnaire showed that workers in the lathe parts X Industry consist only of the age of 26-45 years and more than 45 year. No lathe worker aged 17-25 years. This is because all the workers began work at Z Industry since the age of 17-25 years.

Employment Period

The entire section of the lathe worker X Industry has a work period of more than 5 years. A small percentage of workers have a working period 1-5 years. While most of the workers have worked above 5 years. This is because during the last 5 years X industry has not made new labor recruitment in the lathe section.

Lung Disruption Condition

Examination of lung disruption condition on lathe parts workers in the form of examination of pulmonary vital capacity or using FEV1 and FVC. Examination of FEV1 and FVC is informative assessment and often meaningless in assessing the progress of the pulmonary

disease. Based on the results of examination of the lung using spirolab II obtained a fraction of workers misbehaving lung.

The presence of impaired pulmonary at the lathe parts workers, then in a long time will cause pulmonary disease. A pulmonary disease that can appear due to disorders of the lung parenchyma disease is a restriction or interstitial diffuse pulmonary fibrosis[4].

Association between Age and Lung Disruption Condition

Based on the test results cross-tabulations can be seen that a worker who has pulmonary disorders has age more 45 years. But still, many workers aged 45 years have conditions abnormal lung. It isn't similar to another research that capacity of the lungs will decrease along with the increase of age[5]. In addition, there is found a lathe part workers have impaired lung is in the age range 26-45 years.

Based on the results obtained by contingency coefficient value with 0,158, age has a weak association with lung conditions lathe workers in Z Industry. This is similar to other research which mentioned the age is'not related to lung disruption condition[6,7]. In addition, another research that there is no meaningful relationship between pulmonary function disturbances with worker age in PT. Tonasa unit[1].

Association Employment Period with Lung Disruption Condition

Based on cross-tabulated results, lathe workers who have working period 5-10 years, nobody has impaired pulmonary. While all workers who experience disrupted lung have more than ten years working period. This contrasts to other statements which mention that there is a meaningful relationship between pulmonary function disturbances with employment working[8]. Pulmonary disease form of fibrosis appears because of the incubation period of dust over years[9].

Results in coefficient of contingency coefficient with values 0.267. Then it can be inferred relationships among powerful working period with the condition of the worker in the lung disruption lathe worker. A weak association between working period with the condition of lung disruption on lathe workers because most of the workers that have a working period over 10 years of age have the condition of a normal lung.

Association Duration Working and Lung Disruption Condition

Duration working has a significant association with lung impaired condition lathe worker in Z Industry. The result was similar to research conducted by Armaeni et al stated that the old work or long exposure is a powerful variable to cause interference lung10. As many as 10 people experienced workers with lung disorders with working hours 8 hours a day. Based on this it can be concluded that lathe worker has a risk of experiencing disruptions due to long exposure to work environment.

Lung disorder can occur because duration of a person's exposure to dusty environments continuously and the existence of other internal factors such as age, gender, working period, nutritional status, the habit of smoking, long exposure, protective tools themselves 9,11. It means an association between duration working and lung impairment conditions on lathe workers could be due to other factors that also influence.

Conclusion

Age, employment period and duration working is associated with lung vital capacity of lathe workers. The thing that distinguishes is how strong association between two variables. On the variables of age and employment period with lung disruption condition have contingency coefficient value 0.158 and 0.279 meaning its have weak assosiation while duration working has contingency coefficient value 0.729 means its association is strong enough. Therefore, the higher of toxin substance, it will increased risk of damage to the lung function

Recommendation

Workers at lathe section are required to wear a protective mask in order to prevent or reduce the inhalation aluminum dust that will go into the lungs. Company parties also should always hold a medical check-up on a regular basis to check the health on lathe workers.

Conflict of Interest: All authors declare no potential conflicts of interest with respect to the research,

authorship, and/or publication of this article.

Source of Funding: This is an article "Association between Duration Working with Lung Disruption Condition using Pulmonary Vital Capacity test on Lathe Worker at Yogyakarta"was supported by Faculty of Public Health, Airlangga University, Indonesia, 2017.

Ethical Clearance: Ethical Clearance took from Faculty of Public Health, Airlangga University, Indonesia Committee

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DOI Number: 10.5958/0973-9130.2019.00151.8

Integrating Pre-Exposure Prophylaxis into HIV-AIDS Programme Management

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Abstract

The global HIV-AIDS epidemic has grown and continues to grow to alarming rates. The rate of new infections continues to soar in developing nations[1]. A combination of prevention initiatives is needed to halt its spread. Pre-exposure prophylaxis (PrEP) is a daily course of antiretroviral drugs (ARVs) taken by HIV-negative people to protect themselves from infection[5]. Clinical data thus far has shown that PrEP reduces the chances of HIV infection to near-zero. PrEP is cost effective, and there is growing demand for it from people at higher risk of HIV-AIDS infection, but the scale and coverage remains extremely limited. This paper reviews the current landscape of integrating Pre-exposure prophylaxis in HIV-AIDS programmes and proposes smart practices toward optimal patient management.

Key words: *HIV-AIDS, Pre-exposure prophylaxis*

Background

In 2016, an estimated 36.7 million people were living with HIV [1].In 2016; 1 million people died of AIDS-related illnesses[1]. The vast majority of people living with HIV are located in low- and middle- income countries, with an estimated 25.5 million living in sub-Saharan Africa. PrEP provides an additional prevention option for those who are at high risk for HIV[3]. According to the South African National AIDS Council, 12 clinical trials have tested the effectiveness of oral tablets for PrEP in Africa, Asia, Europe, South America and the United States[5]. Daily PrEP has been shown to lower a person's risk of sexually contracting HIV by more than 90 percent[5]. The efficacy and safety of Truvada as PrEP has been tested in 10 randomised clinical trials, according to the Southern African HIV Clinicians Society[5]. PrEP is one of a number of HIV prevention strategies for people who are HIV negative but who also have higher-than-average risk of contracting HIV, including sexually active adults at increased risk of HIV (e.g. men who have sex with men), people who engage in injection drug use (see drug injection), and serodiscordant sexually active couples[5].

Methodology

A retrospective data review was undertaken to ascertain the prevalence of integrated care in healthcare globally and specifically in the arena of HIV-AIDS and PrEP[4]. The aim of this review was to assess available data on the prevalence of integrated care in HIV-AIDS and PrEP in healthcare and identify gaps and smart practices towards recommendations for comprehensive global HIV-AIDS standards development.

Discussion

South Africa was the first country in sub-Saharan Africa to fully approve PrEP, which is now being made available to people at high risk of infection. South Africa has the largest ART programme in the world. In 2017, UNAIDS reported that 3.7 million people were receiving treatment in South Africa. However the uptake of PrEP has been minimal in the public sector. There has been minimal growth and uptake in the private sector HIV-AIDS fields only.

Conclusion

The introduction of PrEP into HIV-AIDS programmes globally and locally can help to decrease the burden of new infections of HIV-AIDS. This in itself will help to decrease the burden of new infections that need to be treated thus alleviating further strain on the burdened health system.

Conflict of Interest: Nil

Funding: Durban University of Technology as part of the primary author's doctoral thesis.

Ethics Clearance: Durban University of Technology as part of the primary author's doctoral thesis.

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DOI Number: 10.5958/0973-9130.2019.00152.X

Integrated Care and HIV-AIDS Programme Management

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Abstract

HIV-AIDS has a global and local presence with both developed and developing countries affected by this disease. South Africa has the largest HIV-AIDS epidemic in the world[1]. It has been almost 30 years since its discovery and significant gains have been made toward HIV-AIDS prevention, treatment and care. HIV-AIDS programmes have developed instantaneously across the globe in an attempt to assist state health programmes to care and treat for HIV-AIDS individuals. Key components of these programmes have focused on the pillars of HIV-AIDS care; prevention, treatment, wellness and care. However, new evidence is emerging to support a holistic, overarching approach to HIV-AIDS care, that being integrated care. This paper reviews the current landscape of integrated care in HIV-AIDS programmes and proposes smart practices toward optimal patient management.

Keywords: *HIV-AIDS, Integrated care*

Background

South Africa has the largest HIV epidemic in the world, with 19% of the global number of people living with HIV, 15% of new infections[6]. In 2016, South Africa had 270 000 new HIV infections and 110 000) AIDS-related deaths[6].The epidemic is not ending although it is showing signs of slowing down. Political and community leadership combined with sustained investments form private, parastatal and public healthcare have driven results. Efficiency gains, decreasing costs of medicines, smarter investments and advances in programmatic effectiveness have underpinned progress in the HIV-AIDS response[6].New efforts towards enhancing programme effectiveness and efficiencies have heralded the need for new approaches to healthcare in the HIV-AIDS arena[7].

Integrated care

Integrated care is a trend in health care reforms and new organizational arrangements focusing on more coordinated and integrated forms of care provision[2]. Integrated care may be seen as a response to the fragmented delivery of health and social services being an acknowledged problem in many health systems[4]. Distinction is also made between horizontal integration and vertical integration[4]. The integrated care literature distinguishes between different ways and degrees of working together and three central terms in this respect are autonomy, co-ordination, and integration[2].

Discussion

A retrospective data review was undertaken to ascertain the prevalence of integrated care in healthcare globally and specifically in the arena of HIV-AIDS. The aim of this review was to assess available data on the prevalence of integrated care in HIV-AIDS healthcare and identifies gaps and smart practices towards recommendations for comprehensive global HIV-AIDS standards development

Integrated health care is an approach characterized by a high degree of collaboration and communication among health professionals. What makes integrated health care unique is the sharing of information among team members related to patient care and the establishment of a comprehensive treatment plan to address the biological, psychological and social needs of the patient. Integration decreases the cost of healthcare delivery. Integration promotes better health outcomes.

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Conclusion

HIV-AIDS is a rapidly evolving area of medicine that requires novel and innovative approaches to curb the epidemic. Integrated care is one such approach. This approach to HIV-AIDS related care will result in increased communication and better coordinated care[5]. This approach to HIV-AIDS management will allow for evidence-based practices and policy development for optimal programme management[5]. Wellness stemming from holistic patient care is emphasised thus leading to a bio-pycho-social approach to HIV-AIDS programme management. Integrated care should be a compulsory component of all HIV-AIDS programmes locally and globally.

Conflict of Interest: Nil

Funding: Durban University of Technology as part of the primary author's doctoral thesis.

Ethics Clearance: Durban University of Technology as part of the primary author's doctoral thesis.

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DOI Number: 10.5958/0973-9130.2019.00153.1

Should HIV Related Point of Care Testing be included in HIV-AIDS Programme Management

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Abstract

HIV-AIDS is a large scale public health issue[1]. The WHO announced the Millennium Development goals in an attempt to reduce new HIV infections and AIDS related deaths by 90% by 2030, compared to 2010 levels[3]. To achieve this, the Fast Track strategy sets out targets for prevention and treatment, known as the 90-90-90 targets. The 90-90-90 targets refer to the pathway by which a person is tested, linked and retained in HIV care, and initiates and adheres to antiretroviral drugs (ARVs), also known as the treatment cascade, to achieve viral suppression[4]. In order to achieve these ambitious targets, it becomes imperative to review and explore point of care testing as a means to meet these goals and achieve optimal patient outcomes. This paper reviews the current landscape of point of care testing in HIV-AIDS programmes and proposes smart practices toward optimal patient management.

Keywords: *HIV-AIDS, point of care testing.*

Background

HIV-related point-of-care testing technologies have become widely available in last the few years and can potentially play a major role in achieving the UNAIDS 90–90–90 targets through increasing access to diagnostics in low- and middle-income countries[5]. Point-of-care (POC) products bring diagnostics out of the laboratory and closer to the patient, reducing the burden to receive testing, and allowing tasks to shift to lower cadres of healthcare workers[6]. Although POC devices are widely marketed and even available to the general public for personal testing purposes, the devices are not necessarily innocuous[5]. Point-of-care testing are: (1) testing is carried out at or near the person being tested, (2) the results are returned to the person being tested during the same visit and (3) the results of point-of-care testing can be used immediately for patient care and referral[6]. It is vital that all HIV-related testing programmes revise and strengthen their HIV programme plan given the evidence of misdiagnosis and errors and the need for strengthening quality assurance[5].

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Methodology

A retrospective data review was undertaken to ascertain the prevalence of point of care testing in HIV-AIDS programmes globally and locally. The aim of this review was to assess available data on the prevalence of point of care testing in HIV-AIDS healthcare and identifies gaps and smart practices towards recommendations for comprehensive global HIV-AIDS standards development and optimal programme management.

Discussion

Point of care testing has had little exposure in the developing world and hence a paucity of data exists. A strong commitment from the health management teams is essential for successfully establishing and strengthening relationships to enhance point of care capabilities in HIV-AIDS programmes. Point of care testing creates value in outcomes based monitoring of patients. This will assist with real time testing and treating of patients.

Conclusion

As new point-of-care technologies emerge, it is important for country programmes to stay abreast

of developments and implement a monitoring and evaluation programme to strengthen the overall objectives of the programme aimed at achieving the programme aims.

Conflict of Interest: Nil

Funding: Durban University of Technology as part of the primary author's doctoral thesis.

Ethics Clearance: Durban University of Technology as part of the primary author's doctoral thesis.

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Registered with Registrar of Newspapers for India
(Regd. No. DELENG/2007/21789)

Published, Printed and Owned : Dr. R.K. Sharma
Printed : Printpack Electrostat G-2, Eros Apartment, 56, Nehru Place, New Delhi-110019
Published at: Institute of Medico Legal Publications Pvt. Ltd., Logix Office Tower, Unit No. 1704, Logix City Centre Mall Sector- 32, Noida - 201 301 (Uttar Pradesh) Editor : Dr. R.K. Sharma, Mobile: + 91 9971888542, Ph. No: +91 120 429 4015