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Indian Journal of Forensic Medicine and Pathology

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A 3year Retrospective Histopathological Study of Autopsy Findings

P.N. Kadam*, Santosh Pawar**, Nida Patel***, Vidya Menon***

Abstract

An autopsy consists of a post-mortem examination to discover the cause of death or the extent of disease. And a thorough examination of a corpse to determine the cause and manner of death and to evaluate any disease or injury. *Aims:* To determine the histopathological findings related or unrelated to the cause of death and to highlight various incidental and interesting microscopic findings in autopsies. *Methods and Material:* Retrospective study for three year was carried out. Organs of total of 389 autopsies were received. Various his-topathological findings were observed in 183 cases. *Results:* Out of the various organ received for histopathological examination, pulmonary edema, Atherosclerosis, Pneumonia Chronic venous congestion of liver, Cloudy change in kidney lesions were commoly observed few incidental malignancies like case of renal cell carcinoma, meninigioma, nonhodgkins lymphoma etc. were observed. *Conclusions:* pulmonary edema is commonest finding followed by atherosclerosis. Incidental histopathological findings may or may be not be contributing to cause of death ,but they help in academics and research purpose.

Keyword: AUTOPSY.

Introduction

The term "autopsy" derives from the Ancient Greek autopsia, "to see for oneself", derived from autos ("one-self") and opsis ("eye"autopsy means making a personal inspection. Usage of this word is however restricted to pathological sense i.e dissection of dead body to determine through observation the cause of death or nature of disease.

Despite the decline in autopsy numbers, autopsy data continues to embellish the medical literature.

Many organs such as those of CNS are not available by other means accounting for importance of autopsy in research field of neuropathology and academic purpose.

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There are Two Main Types of Autopsy

1. Clinical Autopsy.
2. Medicolegal autopsy.

Aims and Objective

1. To study histopathological spectrum of lesions encountered in autopsy .
2. To highlight various incidental and interesting microscopic findings.

Material and Method

Retrospective study of histopathological lesions encountered in autopsies which include both clinical and medicolegal from year 2013-2015.

The organs relevant to case which were sent for histopathological examination. In most of the cases we received lungs, heart, liver, spleen, kidney,brain.

Grossing of organs and tissue processing was done in routine manner, gross and microscopic finding were taken into consideration.

All sections were stained with Hematoxylin & Eosin, at time special stains were applied.

Results

The results obtained as follows the study population ranges from 04 months upto 90 years with 226 males and 163 females. Significant finding were found in 183 cases out of 389 cases studied.

Table 1: Sex wise distribution of cases

Gender	No. of cases
Male	226
Female	163

Table 2: Age wise distribution of cases

Age group(years)	No. of cases
0-10	9
11-20	45
21-30	80
31-40	56
41-50	62
51-60	56
61-70	40
71-80	29
81-90	12
Total	389

Table 3: All histopathological findings in autopsies

Sr. No.	Microscopic findings	No. of cases
1	Pulmonary oedema	40
2	Atherosclerosis	31
3	Pneumonia	24
4	cvc lung	15
5	Cloudy change kidney	14
6	CVC liver	12
7	Steatohepatitis	8
8	Left ventricular hypertrophy	8
9	Alveolar hemorrhages	4
10	Chronic pyelonephritis	4
11	Cirrhosis	8
11	Pulmonary tuberculosis	6
12	Myocardial infarction	5
13	Encephalitis	2
14	Cerebral infarct	2

Table 4: Incidental finding in cases

Sr. No	Incidental Findings	No. of cases
1	Renal cell carcinoma(sarcomatoid variant)	1
2	Adenocarcinoma of lung	1
3	Meningioma	1
4	Squamous cell carcinoma of cervix	1
5	Hepatocellular carcinoma of liver	1
6	Non hodgkins lymphoma	1

Table 5: Incidental malignancies encountered in cases:

Sr. No.	Incidental findings	No. of Cases
1	Atherosclerosis of coronaries and aorta	33
2.	cirrhosis	9
3	Myocardial infarction	9
4	Chronic pyelonephritis	8
5	Miliary tuberculosis	2
6	Aspergillosis invading brain tissue	1
7	Placenta accreta	1
8	Cerebral malaria	1
9	Hydatid cyst in liver	1

Result

The present study consisted of 389 autopsies sent for histopathological examination from year 2013 to 2015, amongst 389 autopsies studied 183 autopsies showed significant finding.

Pulmonary edema was the most common finding encountered followed by interstitial pneumonitis, and atherosclerosis .

In respiratory system most common finding was pulmonary edema, followed by pneumonia ,others lesions encountered were CVC lung, interstitial pneumonitis, emphysema, tuberculosis, cases of snake bite showed alveolar hemorrhages. one case of adenocarcinoma in noted non hodgkins lymphoma nodule metastatic deposit was noted incidentally in lung with mets in liver and kidney (Figures 1 to 21).

In hepatobiliary system most common finding was Cvc liver followed by steatohepatitis, 9 cases of cirrhosis were noted, other lesions were hepatitis, malaria. Hepatocellular carcinoma was diagnosed in HbsAg positive 62yr old male. CVC spleen was most common finding in spleen.

In urinary system most common finding was cloudy change in kidney, followed by chronic pyelonephritis.

A 75 yrs old unknown male brought unconscious to hospital and died within one hour.

Histopathologicalexamination finding of Sarcomatoid renal cell carcinoma with distant metastasis in lungs .

Immunohistochemistry confirmed the Sarcomatoid variant of Renal Cell Carcinoma (Figures 1 to 10).

Fig. 1: Lt.Kidney with attached tumor mass at lowerpole
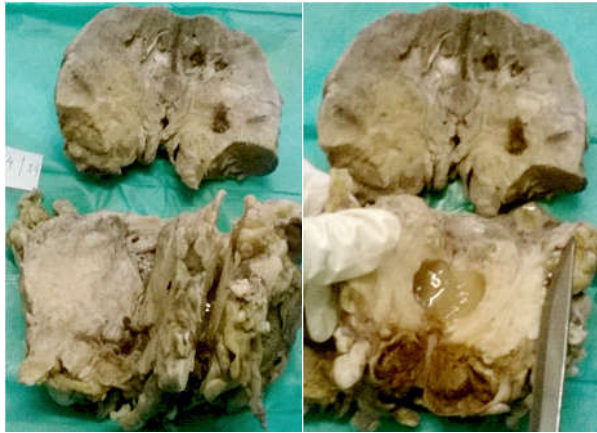
Fig. 2,3: C/S of kidney showing mucin filled cystic area and grayish white tumor mass

Cut section of kidney (Figure 2, 3):

Shows grayish white tumor mass of size 6x5x4 cms along with cystic area of size 2x2 cms filled with mucinous material. At places areas of hemorrhages and necrosis seen.

Fig. 4: Lung pieces showing nodular metastatic deposits
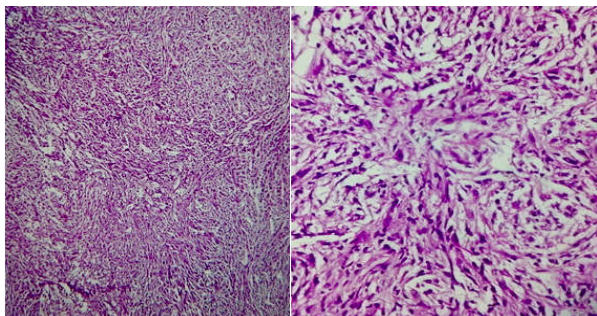
Fig. 5(10X) H&E & Fig. 6(40X) H&E: Section shows spindle shaped tumor cells with pleomorphic nuclei and prominent nucleoli arranged in sheets, bundles
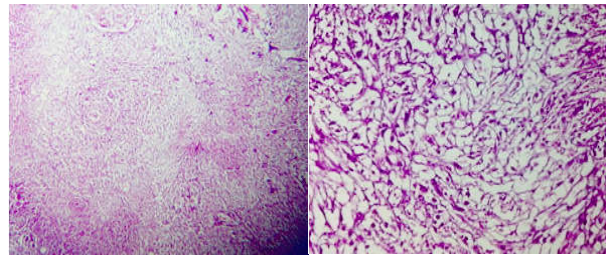
Fig. 7(10X)H&E, Fig. 8 (40X)H&E: Section shows conventional renal cell carcinoma
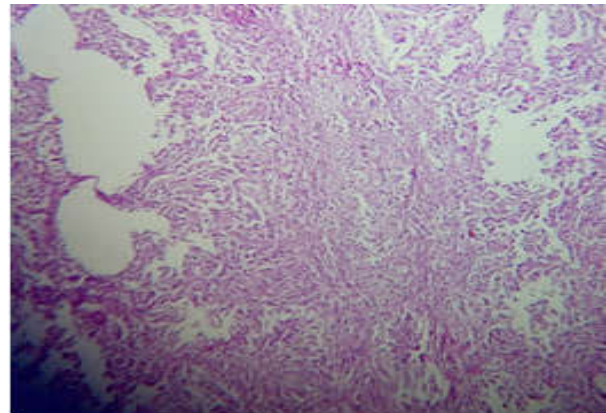
Fig. 9: Lung section showing foci of spindle Shaped tumor cells

V. Immunohistochemistry

The tumor cells are immunoreactive for EMA,Vimentin,CD10.

And immunonegative for pancytokeratin AE1/AE3,PAX8,GATA3.

- EMA immunoreactivity indicates epithelial nature of tumor cells.
- Vimentin immunoreactivity indicates mesenchymal origin.
- CD10 is strongly and diffusely expressed by Renal cell carcinoma.

Fig. 10: Stain for vimentin shows Immunoreactivity
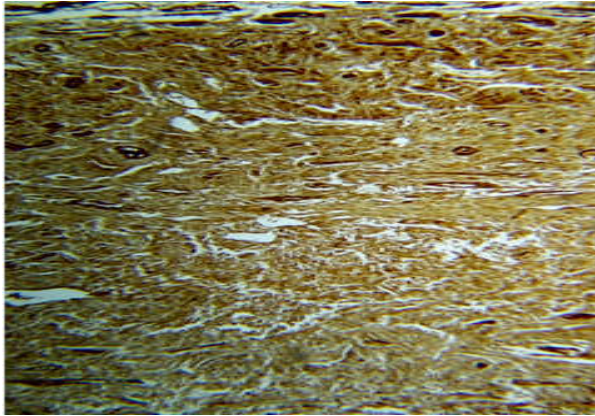
Fig. 11: Stain for EMA shows strong immunoreactivity

Fig. 12: Stain for CD10 shows strong immunoreactivity

Fig. 13: Gross-nodule of 0.5x0.5cm in Rt. lobe, pleura shiny
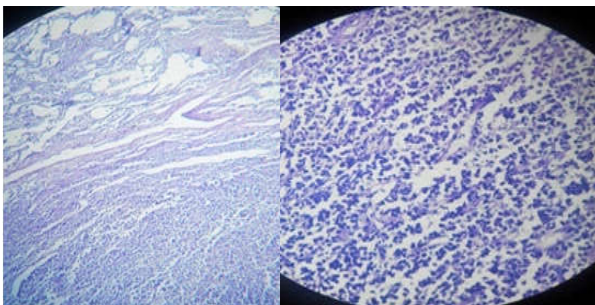
Fig. 14(10x), Fig. 15(40x): tumor cells comprising of lymphocytes, histocyte and few plasma cells arranged in diffuse sheets. Tumor cells have hyperchromatic nuclei with prominent nucleoli having scanty blue cytoplasm

Fig. 16: Liver Gross showing ,multiple nodule of varying size large of 1.5x1.5cm
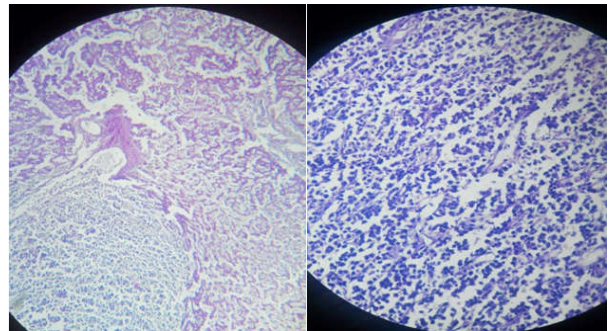
Fig: 17(10x) Fig. 18(40x): Section shows dilated, congested hepatic sinusoids arraged in chords showing focal inflammatory infiltrate with few areas showing hemorrhages & congested blood vessels along with infiltration of tumor tissue

Fig. 19: KIDNEY
Gross-multiple nodule
of 0.5X0.5cm at capsule
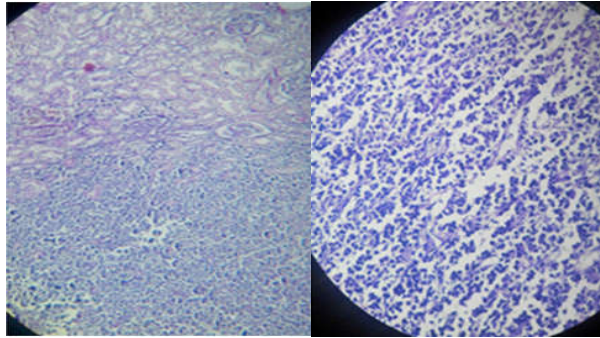
Fig. 20: Scanner view   **Fig. 21:** High power view

Shows glomeruli and tubules cut across in various planes. There is Presence of tumore cells comprising of lymphocytes, histiocytes And few plasma cells arranged in diffuse sheets

Discussion

Advances in diagnostic technology have not reduced the value of autopsy and goal directed autopsy remains a vital component for the study and evaluation of disease process and serves as tool for quality assurance. Histopathological examination of autopsies quite often reveal some natural diseases, the presence of which may trigger issues association of with trauma, work, crime etc.and its relative contribution towards death especially in cases of sudden death [7].

In our study we found the most common histopathological finding was Pulmonary edema which is similar to result with study of Sulegoan R et al 2015 , and second most common finding was atherosclerosis which is most common finding in study of Sarvaiya et al 2014.

We retrospectively reviewed histopathological findings of four major viscera (Heart, Lungs,Liver and kidneys) and noted the most common finding in them , in lung most common finding was which is similar to finding by soiero AM et al 2011. Pneumonia constitute second most common histopathological pattern close to findings of Hjorn et al 1995.

In liver the circulatory disturbances in the form of chronic venous congestion and acute sinusoidal congestion was the most common lesion, followed by steatohepatitis second most common finding similar to study of Smita SP et al 2014, steatosis of liver was most common finding in study Amarapurkar et al 2007 and sarita nibhoria et al 2013. In kidney most common finding was cloudy change of kidney.In heart most common finding was atherosclerosis of coronaries and aorta similar with finding of study of sulegoan R et al 2015,Nada et al 2015.

Conclusion

Histopathology is an important and time proven way to find out lesions of internal viscera often asymptomatic and obscured on gross examination of organs. Incidental histopathologic and Gross findings in autopsies may not be found to influence the cause of death but nonetheless reveal many interesting facts related to epidiemiology of a disease as well as influence of gender and age related factors in causation of certain pathological changes e.g., atherosclerosis.

A detailed and both prospective as well as retrospectives stud-ies on prevalence of certain diseases in the community might help to find out actual prevalence figures as well as a useful data in controlling/monitoring certain disease processes.

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Stature Estimation from Foot Length of School Age Group Children

Perugu Vanishri*, Nishat Ahmed Sheikh**

Abstract

Background: Stature estimation of an individual from the skeletal material or the mutilated or parts of limbs has obvious significance in the forensic identification analysis. Estimation of stature is considered as one of the main parameters of personal identification. Establishing personal identity is one of the main concerns in forensic investigations. *Objective:* The current study dealt with developing a regression equation for stature estimation from foot length. *Study Design:* Cross Sectional study. *Place of Study:* Department of Forensic medicine, Gandhi Medical College, Secunderabad. *Methods:* The present study was carried out to establish the regression equation and correlation co-efficient between individual's height and foot length. It was conducted on the children of age group 9 years to 17 years. 239 subjects were selected irrespective of their caste, religion, dietary habits & socio-economic status. *Observation:* The mean ($\pm$SD) Stature of 239 students was 134.61 $\pm$ 21.05 cm. The right foot length showed a significant positive correlation (r= .017, p=0.0001s) with the stature. The left foot length also showed a significant positive correlation (r= .024, p= 0.0001s) with the stature. The constant and regression co-efficient value regarding right foot length was 143.97 and 0.123 respectively and left foot length was 144.93 and 0.172 respectively for estimating the stature. *Conclusion:* The present study has established definite correlation between stature and foot-length and also regression equations have been established. Foot measurements have a strong relationship with stature; hence, the stature of an individual can be successfully estimated from the foot length regression model derived in the study.

Keywords: Foot Length; Stature; Regression Equation.

Introduction

Stature estimation of an individual from the skeletal material or the mutilated or parts of limbs has obvious significance in the forensic identification analysis. Estimation of stature is considered as one of the main parameters of personal identification [1, 2]. It is well accepted that skeletal dimensions vary among different geographical regions, populations and ethnicities, and that standards for one population might not be appropriate for another population [3,4].

Sex determination from different bones [5,6] and stature reconstruction from femur, tibia, talus, calcaneus, metatarsal, skull, mandible, clavicle, radius, ulna, and sternum have all been previously reported [7,8]. Furthermore, stature estimation has also been calculated from hand and feet dimensions [9,10,11].

Forensic identification from the foot and its parts is important as there is an increased likelihood of the recovery of feet (often enclosed in shoes), separated from the body, in mass disasters such as high power explosions and bomb blasts, air plane crashes and other high impact transportation accidents [12]. The significance of the human foot and its bones, and foot prints in identification has been successfully reported in the past [13]. Published literature on estimation of sex from foot bones and foot dimensions [14-15], individualistic and unique features of the foot and footprints [15-16], and the

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use of radiographic comparisons of the foot [17-18] confirms the importance of the foot in identification.

Stature estimation is commonly reported in forensic case work pertaining to adult populations and less commonly in sub-adult cases. Even the earlier studies on estimation of stature from foot measurements were conducted on adult populations [19-20]. Studies to establish standards for stature estimation in a sub-adult population are essential as the formula derived for stature estimation in the adult population cannot be applied to sub-adults. In the case of growing individuals, it is probably more useful to estimate age than stature. Once the age is established, estimation of stature can reduce the pool of possible victim matches even further.

The reliability of prediction of stature from foot length is as high as that from long bones. Ossification of the bones of the foot occurs earlier than the long bones of the lower extremity. Therefore even during adolescence, stature can be predicted more accurately from the foot length than that from the long bones of the lower limb [21]. In this study, it was aimed to evaluate the predictive role of foot dimensions in stature estimation.

Aim and Objective

The present study is conducted on the children in the secondary school, who are aged between 09 and 17 years to establish the relation between the foot length and height and to get regression formula in this relation.

Material and Method

The study is made on the school going children's who are studying in Sixth standard to Tenth standard in the Govt. High Schools at Musheerabad, Secunderabad, Hyderabad. 239 subjects were selected irrespective of their caste, religion, dietary habits & socio-economic status. Sufficient permissions and consents are procured before the measurements of the children are taken and clearance from the Institutional Ethical committee is obtained in advance. Stature; using the stadio-meter, the subject was made to stand barefoot in the standard standing position on its baseboard. Both feet are in close contact with each other and head oriented in Frankfurt's plane. The height was then recorded in centimeter from the standing surface to the vertex in the weight bearing position of foot. The length of the foot was measured by a foot caliper. It was measured by making the

subject sitting in a relaxed position with equal weight on both foot, ankle was perpendicular to the foot, after taking off the shoes and the stockings. The fixed jaw of the caliper was placed on pternion (most posterior and prominent point of the heel) and the sliding jaw was fixed on acropodion (tip of the most protruded first or second toe). Caliper was kept parallel to the long axis of the foot. Length of both right and left foot were measured. The measurement of height and foot length was carried out at a particular period of time 10am to 1pm to avoid diurnal variations.

In vernier caliper, Length = reading of the main scale + vernier coincidence x vernier constant + mechanical error. (Here vernier constant = 0.01 and mechanical error = 0) Calculation of stature using regression equation: Stature = value of constant + regression coefficient x foot length. Value of the constant and regression coefficient was calculated using SPSS Version 19 program.

Inclusion Criteria

All students, both boys and girls studying in sixth to tenth classes from the government high school Musheerabad were selected, irrespective of their socio-economic standards. The ages of these children are falling between 09 years and 17 years.

Exclusion Criteria

Children morphologically showing the congenital malformations, Dwarfism/Achondroplasia, features of nutritional deficiencies and injuries to extremities are not included in the present study.

Data Analysis

Data thus collected was analyzed using SPSS version 19. The mean values and the standard deviations were calculated for stature and foot length. Correlation of the foot length with the stature was assessed. Regression co-efficient and constant was calculated for estimating stature through regression equation from foot length. The effectiveness of regression equation was tested by significance Z test.

Observation

Total 239 children were measured in various age groups starting from 09 years to 17 years who were school going children. Girls are 118 and Boys are 121 among them. Heights of individual are varying irrespective of age and sex.
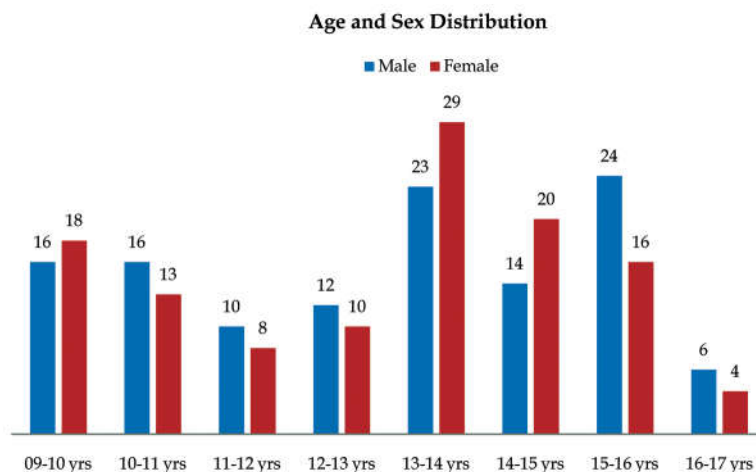
Fig. 1: Age and Sex Distribution of the Students
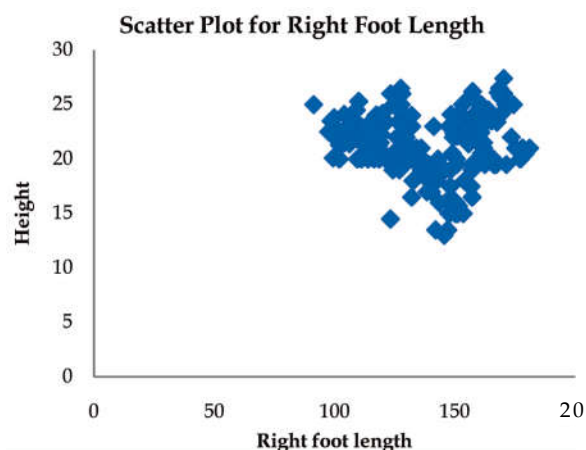
Fig. 2: Scatter diagram with regression analysis showing significant positive correlation between the stature and right foot length (r= 0.017 and p=0.0001s) stature (cm).
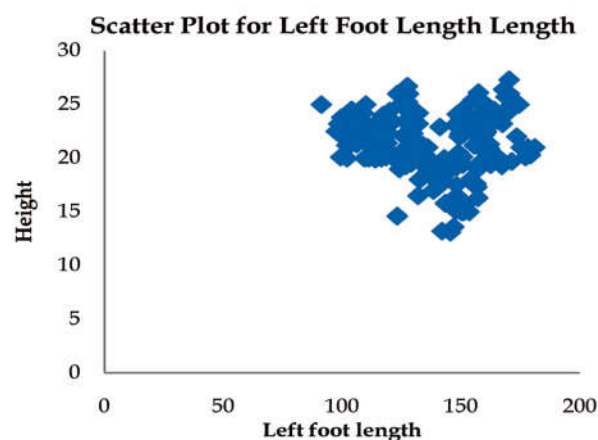
Fig. 3: Scatter diagram with regression analysis showing significant positive correlation between the stature and right foot length (r= 0.024 and p=0.0001s) stature (cm)

Table 1: Stature and length of the foot with corresponding constant and regression co-efficient

Variables	Measurement in cm		Constant	Regression Coefficient	Correlations with stature	
	Range	Mean $\pm$ SD			r	p-value
Stature	91.3 – 181.1	134.61 $\pm$ 21.05.5				
Right Foot Length	13- 27.4	21.56 $\pm$ 2.81	143.97	0.123	0.01798*	0.0001[s]
Left Foot Length	13.1 – 27.3	21.58 $\pm$ 2.82	144.93	0.172	0.02489*	0.0001[s]

*= Correlation is significant at the 0.01 level (2 tailed), S= Significant, r = Pearson's correlation stature (cm)

Table 2: Comparison between calculated stature and measured stature

Variables from which stature was estimated	Measured in cm		Estimated stature in cm		Significance of difference
	Range	Mean $\pm$SD	Range	Mean $\pm$SD	
Stature	91.3 – 181.1	134.61 $\pm$ 21.05	100.86 – 173.18	133.59 $\pm$ 18.59	0.0006[NS]

The mean ($\pm$SD) Stature of 239 students was 134.61 $\pm$ 21.05.5 cm. The stature showed significant positive correlation with foot length as shown in Table No1. Table 1 shows the range and mean ($\pm$SD) of foot length, constant, regression co-efficient and r (Correlation co-efficient) value with level of significance. The length of the foot of the respondents of right side ranged between 13 and 27.4 cm where as the length of the left side ranged between 13.1 and 27.3 cm. The right foot length showed a significant positive correlation (r= .017, p=0.0001s) with the stature (Figure 2). The left foot length also showed a

significant positive correlation (r= .024, p= 0.0001s) with the stature (Figure 3). The constant and regression co-efficient value regarding right foot length was 143.97 and 0.123 respectively and left foot length was 144.93 and 0.172 respectively for estimating the stature. The regression equations for estimation of stature from right foot length (RFL) and left foot length (LFL) were 143.97+0.123 x RFL and 144.93 + 0.172 x LFL respectively.

Table II shows the range and mean of calculated stature (+SD) from foot length with the difference with the measured stature with level of significance. Significance of difference was tested using the two sample Z test at 5% level of significance (p=0.05). No significant difference was found between the measured and calculated stature from the foot length. The result indicated the effectiveness of the regression equation of estimating stature from foot length.

Discussion

Our study was conducted on a population group where students studying in Govt. High School at Musheerabad Hyderabad, belonging to various religious and regions were studied. We devised the linear regression equations as well as multiplication factors for estimation of stature from foot length in both the genders. In this study foot length is found to be good parameter for predicting stature in both the genders. The linear regression equation derived from foot length for estimation of stature showed a statistically significant relationship in both the genders.

Qamra et al [22] computed linear regression equations for estimating stature from either foot length or foot breadth of 1015 subjects between the ages of 17-32 years. After testing validity of equations, foot length was found to be more suitable. The variability in multiplication factors derived in our study could be due to the former study being conducted on a particular region whereas our study involved a diverse group.

Jasuja et al [23] derived multiplication factors for Punjabi Jat males for estimation of stature; 6.88 and 6.44 for right and left foot length respectively. In our study, they were 7.26 for right foot length and 7.23 for males for left foot length. The difference in multiplication factors between these two studies could be due to the former study being undertaken for a particular regional group whereas our study involves a diverse population group.

Giles et al [24] also suggested that foot length displays a biological correlation with height and the

latter can be estimated from foot length. Nishat Ahmed Sheikh et.al [25] estimated stature from forearm length, the ratio fall between 3.49 and 3.88 for boys with a mean of 3.67 and SD + 0.090; and between 3.45 and 3.88 for girls with a mean of 3.68 and SD 0.093.

Grivas et al [26] evaluated the relationship between foot length and stature in a large sample of 5093 juveniles in Greece, average age being 11.47+/-2.71 years. It was suggested that foot length can estimate the stature and weight of a juvenile, especially after adjusting for age and sex.

Sanli et al [27] established the relationship between hand length, foot length and stature using multiple linear regression analyses. Their study sample included 155 adult (80 male, 75 female) Turks residing in Adana. They found multiple linear regression model for both genders together to be the best model with the highest values for the coefficients of determination $R2 = 0.861$ and $R2$ adjusted = 0.859, and multiple correlation coefficient R = 0.928.

The stature had been found to have significant positive correlation with the length of right and left foot. Whether the regression equation was effective in estimating stature from the foot length, the estimated values were compared with the measured values. No significant difference was found between the measured and estimated stature. From this result inference could be drawn that the stature of an individual can be estimated from the right and left foot length.

This method of stature estimation can be used by law enforcement agencies and forensic scientists. The only precaution which must be taken into consideration is that these formulae are applicable to the population from which the data have been collected due to inherent population variations in these dimensions, which may be attributed to genetic and environmental factors like climate, nutrition etc. The results obtained in our study correlates with the previous studies.

Conclusion

The present study has established definite correlation between stature and foot-length and also regression equations have been established. It will help in medico legal cases in establishing stature and identity of an individual when only some remains of the body are found as in mass disasters, bomb explosions, accidents etc. There are lot of variations in estimating stature from limb

measurements among people of different region & race. Hence there is a need to conduct more studies among people of different regions & ethnicity so that stature estimation becomes more reliable & identity of an individual is easily established. Obtained formulas are specific to that study populations therefore application of these by the other populations might cause incorrect results. Thus necessity in creation of specific equations peculiar to populations should be taken into account by researchers.

Acknowledgements

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Profile of Fatal & Non-Fatal Poisoning in and Around Bijapur

Bhuyyar Chandrashekhar*, Shivanand Kadagoudar**, Anand Mugadlimath***

Abastract

Introduction: Acute poisoning is one of the most common causes of morbidity & mortality worldwide. As per WHO around 3 million poisoning cases with 220,000 deaths occur annually. Agriculture pesticides are used in Asian region for self-poisoning particularly in rural areas with high fatality and majority of pesticide exposure are seen more in middle and low income countries. *Methodology*: Study was conducted at Shri B M Patil Medical College, Hospital and Research Centre, Bijapur, Karnataka from 1st Jan 2013 to 31st Dec 2013. Data was collected from all the poisoning cases admitted & treated in the emergency department and medical ward. *Results*: In the present study total 494 cases included, maximum numbers of cases were due to poisoning by insecticides (41.3%) followed by snake bites (16%) & Lice powder contributed (11.7%). Maximum cases were found in the rainy season (37.4%). Suicidal poisoning was most common (70.6%) as compared other modes. Oral route was most commonly found for consumption of poison (72.5%). 61% of victims were Literates & 39% illiterates. Occupation wise, house wives contributed most (27.7%), followed by farmers (26.5). Married persons (53%) were found more than unmarried (47%). Hindus (87.9%) were more than other religion. Rural people (81.4%) were more as compared to urban. *Conclusions*: From the above study we can conclude that sociodemographic features of fatal and non-fatalpoisoning in Bijapur- Maximum numbers of cases were due to poisoning by insecticides, Suicidal manner of poisoning was commonest, males were more affected than females, House wives suffered more, maximum cases were in rainy season.

Keywords: Poisoning; Insecticides; Sociodemographic Features; Manner of Death; Non-Fatal Poisoning.

Introduction

Poison is defined as any substance that causes a harmful effects when administered, either by accident or designed to a living organism [1]. Its dose related adverse effects caused due to exposures to chemicals, drugs or other xenobiotic, are responsible for morbidity and mortality which vary from country to country [2,3]. Intentional poisoning worldwide is increasing day by day due to change in the life style and social behavior which are responsible for mortality and morbidity. Distress due to loss in the business, failure in love or differences with the intimate partner or relative, emotional disturbances, poverty, job security and chronic diseases are the common reasons for intentional poisoning. Acute pesticide poisoning is one of the most common causes of intentional deaths worldwide. The various bites and stings are responsible for accidental poisoning [4,5].

As per World Health Organization publication in 1990, around 3 million poisoning cases with 220,000 deaths occur annually. Recently some review articles reported that the number of intoxications with organophosphate pesticides was 3 million per year, and the number of deaths and casualties are 300,000 per year worldwide [4,6].

Agriculture pesticides are used in Asian region for self-poisoning particularly in rural areas with a fatality range of 10-20%. Majority of pesticide exposure are seen more in middle and low income

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countries due to increased use/accessibility of agrochemicals in agricultural sector [5]. There are no published studies regarding the trends of poisoning in and around Bijapur, hence this study is undertaken to throw light upon as to profile of poisoning cases in this region.

Methodology

Prospective study is to be conducted at Shri. B. M. Patil Medical College, Hospital and Research Centre, Bijapur, Karnataka from 1st Jan 2013 to 31st Dec 2013. Data was collected from all the poisoning cases admitted & treated in the emergency department and medical ward. Information was collected on a proforma, data was compiled and statistically analyzed.

Inclusion Criteria

All cases of acute poisoning reported to Shri. B. M. Patil Medical College, Hospital and Research Centre, Bijapur, Karnataka from 1st Jan 2013 to 31st Dec 2013.

Exclusion Criteria

All snake bite cases, scorpion sting , bees sting cases and where the diagnosis of poisoning was doubtful-(unconscious patient without proper history and signs of poisoning).

The final outcome in any case of poisoning will either be survival or death. So the material for this present study included two groups, they were, a group comprising of poisoning cases that were hospitalized and discharged and the other group comprising of poisoning cases that died in the hospital (both in casualty and wards) which were later subjected to medico legal autopsy in the same hospital. Ethical clearance for the present study was obtained from the Ethical Committee of the Medical College, Bijapur.

Results

In the present study total 494 cases were examined and treated during the study period at Shri. B. M. Patil Medical College, Hospital and Research Centre, Bijapur.

Table 1: Distribution of cases in relation to type of poison

Type of Poison	Frequency	Percent
Insecticides	204	41.30%
Snake bite	79	16.00%
Lice powder	58	11.70%
Unknown compound	48	9.70%
Medicinal tablets	32	6.50%
Scorpion Sting	24	4.90%
Unknown bites	20	4.00%
Kerosene	19	3.80%
Alcohol	7	1.40%
Good knight liquid	2	0.40%
Domex	1	0.20%
Total	494	100.00%

Out of 494 cases, maximum numbers of cases were due to poisoning by insecticides (41.3%) followed by snake bites (16%). Lice powder contributed (11.7%), medicinal tablets (6.5%), scorpion sting (4.9%), unknown bites(4.0%), alcohols (1.4%), good knight liquid (0.4%), and least one found was domex toilet cleaner (0.2%). Altogether animal bites(snake bite, scorpion sting, unknown bites) contributed (24.9%).

Table 2: Season wise distribution of cases

Season	Frequency	Percent
Winter	161	32.6 %
Summer	148	30.0%
Rainy	185	37.4%

Table 3: Distribution of cases in relation to manner of poisoning:

Manner	Frequency	Percent
Suicidal	349	70.60%
Accidental	145	29.40%
Total	494	100.00%

Out of 494 cases, maximum cases were found in the rainy season (37.4%), winter contributed (32.6%) and summer (30.0%).

Out of 494 cases, suicidal poisoning was maximum (70.6%) as compared to accidental poisoning (29.4%). No homicidal poisoning was reported in the study.

Out of 494 cases, oral route was most commonly found for consumption of poison (72.5%) followed by animal bites (24.9%) and inhalational route (2.6%).

Out of 494 cases, literates (61%) contributed more than illiterates (39%).

Out of 494 cases, house wives contributed most (27.7%), followed by farmers (26.5) and students (24.7%). The least common found occupation was government job holders.

Table 4: Distribution of cases in relation to mode:

Mode	Frequency	Percent
Oral	358	72.50%
Bites	123	24.90%
Inhalational	13	2.60%
Total	494	100.00%

Table 5: Distribution of cases in relation to literacy:

Literacy	Frequency	Percent
Illiterates	193	39.10%
Literates	301	60.90%

Table 6: Distribution of cases in relation to occupation:

Occupation	Frequency	Percent
Farmers	131	26.50%
Govt job holders	25	5.10%
House wives	137	27.70%
Not working	39	7.90%
Private job	40	8.10%
Students	122	24.70%
Total	494	100.00%

Table 7: Distribution of cases in relation to marital status

Marital status	Frequency	Percent
Married	261	52.80%
Unmarried	233	47.20%
Total	494	100.00%

Table 8: Distribution of cases in relation to religion:

Religion	Frequency	Percent
Hindu	434	87.9%
Muslim	60	12.1%
Total	494	100.0%

Table 9: Distribution of cases in relation to habitat:

Habitat	Frequency	Percent
Rural	402	81.4%
Urban	92	18.6%
Total	494	100.0%

Out of 494 cases, married persons (53%) were found more than unmarried (47%).

Out of 494 cases, Hindus (87.9%) were more than the Muslims (12.1%). Sikh and Buddha religion case was not reported in the study.

Out of 494 cases, rural people (81.4%) contributed more as compared to urban people (18.6%).

Discussion

The findings of the present study are similar to study conducted by government medical college Jammu where majority of (34.5%) poisoning cases were due to insecticides [7], all India institutes of medical sciences Delhi it was (25.7%) [8], M.P. Shah

Medical College, Jamnagar it was (64.39%) [9], In a study conducted at Jinnah post-graduate medical Centre it was (39.7%) [10], study at office of the Judicial Medical Officer, Colombo it was (81%) [11], studty conducted in a southern district of Sri Lanka it was (84.4%) [12], a study conducted at University Medical Unit in central Sri Lanka it was (65.3%) [13], a study conducted at the Department of Forensic Medicine and Toxicology, ShriVasantaraoNaik Government Medical College, Yavatmal it was (55.4%) [14].

The findings of the present study are in contrast with study conducted by Nehru hospital PIME and research Centre, Chandigarh where barbiturate poisoning was dominant (19.33%) [15]. It is also in contrast with study conducted by B. k. Hospital Faridabad, where aluminum phosphides were most dominant poisoning (70.73%) [16], study conducted at khonkaen hospital ,Thailand where animal poison was commonest (28.2%) [17].

Rohtaak medical college, where aluminum phosphides were most dominant poisoning (67.7%) [18], the emergency department of S.N. Hospital, Agra where celphos was most common [19], department of Forensic Medicine and Toxicology at Government Medical College, Chandigarh where aluminium phosphide was most common (54.35%) [20]. Leeds department of forensic medicine, revealed with 90% of males preferring carbon monoxide and 70% of females preferring barbiturates [21] and many other studies had the result in contrast with our study [22,23].

In our study the most common age group of poisoning was between 21-30 yrs(72.5%). The findings of the present study are similar to study conducted by Nehru hospital PIME and research Centre, Chandigarh [15], Similar to study conducted at government medical college Jammu [7], A study was conducted at Berhampur, Orissa it was (40.5%) [24], Kasturba Hospital, Manipal, Karnataka [25] in a study conducted at Civil Hospital, Belgaum it was (40%) [26].

In our study majority of patients were males (55.7%).The findings of the present study are similar to study conducted by by Nehru hospital PIME and research Centre, Chandigarh (67.9%) [15], similar to government medical college Jammu(67.23%) [7], B. K. Hospital, Faridabad where male to female ratio was(3:1) [21], Rohtaak medical college, where male to female ratio was (2:1) [18], all india institutes of medical sciences where male to female ratio was(1.6 to 1)8, The emergency department of S.N. Hospital, Agra it was (70%) [19], department of Forensic Medicine and Toxicology at Government Medical

College, Chandigarh where male to female ratio was(2.5:1) [20], in a study conducted at Rohtak during the year 1995 it was (68.62%) [27], in a study was conducted at Berhampur, Orissa it was (53.3%) [24], Government Wenlock Hospital, Mangalore it was (69.12%) [28], Kasturba Hospital, Manipal, Karnataka (75.1%) [25] and many other studies had the result of favor of our studywith varying percentages [29,11,26,14].

The findings of the present study are in contrast with study conducted by khonkaen hospital, Thailand where male to female ratio was (1:1.2) [17], rural hospital, study conducted at Leeds department of forensic medicine females outnumbered males [21].

Though no appreciable difference was found in seasonal variation, inn our study it was found that in rainy season maximum cases (37.40%) as compared to winter (32.60%) and summer (30%). The findings of our study are in contrast to study conducted at Berhampur; Orissa maximum cases were seen in summer (31.7%) [24].

In our study out of 494 cases, rural people (81.4%) contributed more as compared to urban people (18.6%). The findings of our study are similar to a study conducted at the Department of Forensic Medicine and Toxicology, ShriVasantaraoNaik Government Medical College, Yavatmal, where rural cases were dominant(83%) [14].

In our study out of 494 poisoning cases 20 deaths have occurred. Mortality rate remains 4%. The findings of our study does not correlate with most of the studies like Study conducted by Nehru hospital PIME and research Centre, Chandigarh showed mortality rate of (17.30%) [15], study conducted in Rohtak medical College showed mortality rate of(35.82%) [18], the emergency department of S.N. Hospital, Agra showed mortality rate of (11%) [19], a study was conducted at Berhampur, Orissashowed mortality rate of (20%) [24], study conducted at Civil Hospital, Belgaum showed mortality rate of (30.69%) [26], study conducted at University Medical Unit in central Sri Lanka showed mortality of (16%) [13].

Out of 494 cases, house wives contributed most (27.7%), followed by farmers (26.5%) and students (24.7%). No appreciable difference was found between house wives, farmers and students. In this region insecticides are equally accessible house wives as to farmers. The reason being most of families stay in the farm house where house wives too work in the farm. That's why insecticides remain first in both house wives and farmers. In contrast to our

study, study conducted at Civil Hospital, Belgaum showed agriculturists dominated among all the occupation (63.6%) [26].

Conclusion

From the above study we can conclude that sociodemographic features of poisoning in Bijapur- Maximum numbers of cases were due to poisoning by insecticides, Suicidal manner of poisoning was commonest , Males were more affected than females, House wives suffered more, maximum cases were in rainy season.

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Special Note!

Assessment of Pattern and Profile of Substance Abuse among Children in Slum Areas of Ahmednagar

Kadu Sandeep S.*, Chhajed Neel A.**, Mehta Rahul J.**, Arve Rutvik N.**, Upadhyay Prabhakar I.**, Mustafa Saad**

Abstract

Background: We have been facing a frightening rise of substance abuse among the youngsters in recent years. Further, the problem is seen across all socioeconomic groups, from urban areas to small towns. However new substances are being abused which have also been documented. Substance abuse primarily amongst youth has been a matter of concern throughout the world. *Study Design:* It's a descriptive cross sectional study, done in collaboration with NGO (Balbhavan Project) working in slum areas of Ahmednagar. *Duration of Study*: 6 months from January 2016 to June 2016. *Material and Methods*: Considering the time frame for the study, Research was carried out with the help of NGO working in slum areas of Ahmednagar and children fulfilling the inclusion and exclusion criteria. Data was collected with the help of pre-designed questionnaire. It was estimated that the total sample size will be about 246 children who are using substances. (Calculated by open Epi Software). *Observation:* The Result obtained at the end of our study was quite shocking. It was found that in slum area 87% children were drug abusers, among which 83% were boys and 17% were girls. A high correlation of substance abuse was found with increasing age. Most abused substance among them was Tobacco, Alcohol, Inhalants, Sedative and opium.

Keywords: Substance Abuse; Tobacco; Craving; Slum Area; Children etc.

Introduction

We have been facing a shocking rise of substance abuse among the youngsters. Recent times have witnessed a steady increase in drug abuse among younger population, with more children starting substance use from an early age. Further, the delinquent is seen across all socioeconomic groups, from cities to small towns and rural areas, with new and multiple substance use also being recognized [1, 2].

Speedy industrial development with changing lifestyles have left the youth harassed for their survival; compelling many to seek defense in the dark world of substance abuse. India too, is fronting a similar condition that has been paying attention of policy makers and researchers [3]. Not only the child, but the family and society as a whole are likely to be disturbed as a result of early onset substance use. Thus, this matter is of nationwide interest and significance. This phase of life is characterized by growth and maturation of brain and body, which potentially affects responses to drugs and treatment.

World Health Organization (WHO) estimates that globally 25 to 90 % of children and adolescents have consumed at least one substance of abuse [4]. In India approximately 5500 children and adolescents start using tobacco products daily, some as young as 10 years old. A large number of them have ûrst used tobacco prior to the age of 18 years [5]. Research on substance abuse among children and adolescents presents its own distinctive challenges. But the main question is that why the Indian society is facing such a quandary where more of the teenagers and youths are indulging in immoral and unproductive activities like substance abuse. The present study has the aim of analyzing the biosocial profile and pattern of

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substance abusers. The study is indicative for the need of fostering a supportive environment comprising of both parents and teachers so that adolescents can adopt and sustain with the right choices for a healthy life.

Aims and Objective

1. To assess the pattern and prevalence of substance abuse among Children in slum areas of Ahmednagar.

2. To find out demographic profile of children using substances for abuse.

3. To find out association of family history, peer pressure, educational status of family and children associated with substance use among children.

Methodology

It's a descriptive cross sectional study done in collaboration with NGO (Balbhavan Project) working in slum areas of Ahmednagar. They were evaluated according to pre designed questionnaire in given time frame with the help of NGO (Balbhavan project) working in that area. All the children satisfying the following inclusion and exclusion criteria were enrolled in the study.

Inclusion Criteria

1. Children with age group 18 years or less of either sex were included in study.

2. Children who were willing to participate in research work.

3. Patients / Parent / relative/NGO who were ready to give informed consent.

4. Informed written consent was taken from the child or adolescent and the parent or NGO staff counselor (as a surrogate guardian, in case the parents are not available).

Exclusion Criteria

1. Children with age group below 5 and above 18 years of either sex were not included.

2. A child who was Unable to provide information was not included in the study.

Sampling

During meetings of the study group, it was decided that the non-governmental agencies would be involved in the collection of data. The NGO involved in collection of data included those working with slum children and substance use. The NGO working with slum children already had a presence in the community. They had established a belief with slum children, as most children reached them when in need and they would be in a helpful position. The NGO working with substance use were acquainted with the process involved in reaching out to substance users and already had many substance users under their treatment. Substance using children also pursued their help from time to time, although the percentage of treatment seekers who were children was less.

Sample Size

Considering the time frame of the research, study was carried out with the help of NGO working in slum areas of Ahmednagar and children fulfilling the inclusion and exclusion criteria which were mentioned above. It was estimated that the total sample size will be about 246 children who are using substances. (Calculated by open Epi Software)

Working Definition

Substance

The substances included in the study were tobacco chewing, cigarette, supari, gutkha, pan masala, solvents, alcohol, cannabis, opium, heroin, cocaine, LSD, etc.

Substance Abuser

In this study any participant who has accepted having used one or more mentioned substances during past 1 year and has been taking it at least once in a week or several times in the previous month was considered to be a substance abuser.

Statistical Analysis

The data was compiled and analyzed using suitable statistical tests as and when required. The information so collected was analyzed by using SPSS software. Chi-square test was used as per the requirement.

Observations

To know the present scenario of substance abuse, we conducted a descriptive cross sectional study,

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among 246 children of slum areas of Ahmednagar under the guidance of Snehalay balbhavan project. The result obtained at the end of the study was quit shocking. It was found that in slum areas 87% children were drug abusers, among which 83% were boys and 17% were girls. A high correlation of substance abuse was found with increasing age consisting of 6.1% drug abuser of age group 5-8 years, 15% drug abuser of age group 9-12 years and 78.9% drug abuser of age group 13-18 years. Most abused substance among them was Tobacco, Alcohol, Inhalants, Sedative and opium. When we inquired about the educational status of parents, it was found that 84.6% of mothers were illiterate and 60.2% of fathers were illiterate. A special emphasis was laid on education of children among which 52% were school going and remaining were engaged in unskilled labor like rag picking, hotel worker, street vending, dhabha and other work. About 77.6% of these children got addicted due to their friends and 17.3% from their family. At the end of our study only 46.3% of them were willing to quit. 50.9% of children were craving for the substances and 38.8% of children got addicted due to peer pressure.

Table 1: Demographic profile of participants

Sr. No.	Variable	Groups	No. of participants (N = 246)	Percentage
1	Sex	Male	191	77.6
		Female	55	22.4
2	Age	5 – 8 years	15	6.1
		9 – 12 years	37	15.0
		13 – 18 years	194	78.9
3	Living arrangement	Home (with family)	191	77.6
		Home (with friends/distant relatives)	55	22.4
4	Mother's literacy	Literate	38	15.4
		Illiterate	208	84.6
5	Father's literacy	Literate	98	39.8
		Illiterate	148	60.2
6	Drug abuse by mother	Yes	197	80.1
		No	49	19.9
7	Drug abuse by father	Yes	207	84.1
		No	39	15.9
8	Work	Student	128	52.0
		Rag picker/Kabadi	29	11.8
		Street level vending	9	3.7
		Dhaba/restaurant/waiter	5	2.0
		Unskilled worker/laborer	13	5.3
		Do not work	30	12.1
		Others	32	13.0

Table 2: Association between age and drug abuse

Age groups	Drug abuse (%)	No drug abuse (%)	Total	Chi-square value	p value
5 – 8 years	6 (2.8)	9 (28.1)	15 (6.1)	41.517	0.000
9 – 12 years	27 (12.6)	10 (31.2)	37 (15.0)		
13 – 18 years	181 (84.6)	13 (40.6)	194 (78.9)		
Total	214 (100.0)	32 (100.0)	246 (100.0)		

As p < 0.05, there is significant association between age and drug abuse.
Children in the age of 13 – 18 years are more likely to get involved in drug abuse.

Table 3: Association between Mothers involved in drug abuse and drug abuse by the children

Drug abuse by mother	Drug abuse by Children (%)	No drug abuse by Children (%)	Total	Chi-square value	P value
Yes	178 (90.4)	19 (9.6)	197 (100.0)	9.887	0.004
No	36 (73.5)	13 (26.5)	49 (100.0)		
Total	214 (87.0)	32 (13.0)	246 (100.0)		

As p < 0.05, there is significant association between mother involved in drug abuse and drug abuse by the children.
If the mother is using drugs, there are 90.4% chances of children getting involved in drug abuse.

Table 4: Association between Fathers involved in drug abuse and drug abuse by the children

Drug abuse by father	Drug abuse by Children (%)	No drug abuse by Children (%)	Total	Chi-square value	P value
Yes	188 (90.8)	19 (9.2)	207 (100.0)	16.920	0.000
No	26 (66.7)	13 (33.3)	39 (100.0)		
Total	214 (87.0)	32 (13.0)	246 (100.0)		

As p < 0.05, there is significant association between father involved in drug abuse and drug abuse by the children. If the father is using drugs, there are 90.8% chances of children getting involved in drug abuse.

Table 5: Drug abuse & related parameters

Sr. No.	Variable	Groups	No. of participants	Percentage
1	Substance abuse (N = 246)	Tobacco	140	56.9
		Alcohol	41	16.7
		Inhalant	23	9.3
		Sedative	6	2.4
		Opium	4	1.6
		No substance abuse	32	13.0
2	Want to quit the habit (N = 214)	Yes	99	46.3
		No	115	53.7
3	Procurement of the drug (N = 214)	Friends	166	77.6
		Family	37	17.3
		Itself	11	5.1
4	Difficulty in quitting (N = 214)	Craving	109	50.9
		Peer pressure	83	38.8
		Easily available	17	7.9
		Withdrawal symptoms	5	2.4
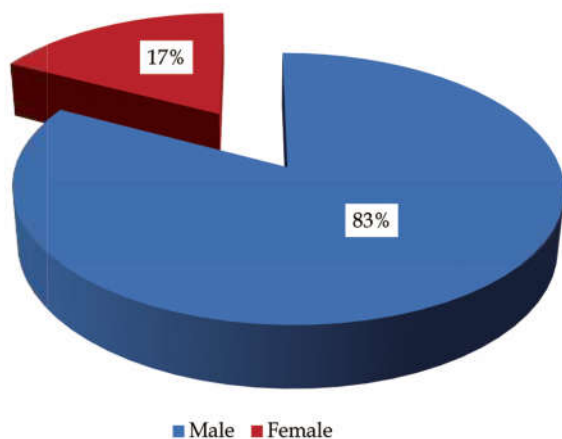
Graph 1: Sex distribution among abusers
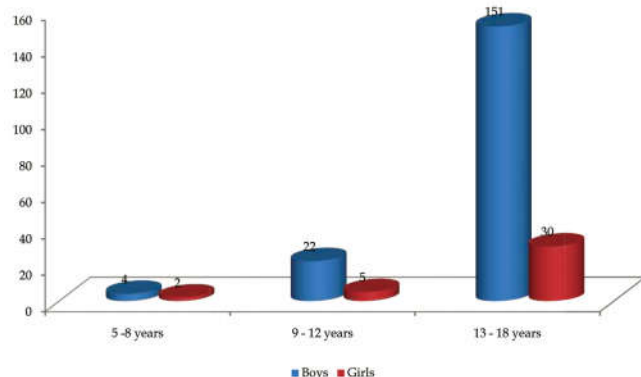
Graph 2: Age and sex distribution of abusers

Discussion

Substance abuse refers to the harmful or hazardous use of psychoactive substance including alcohol and illicit drugs [6]. The present study reveals the prevalence of substance abuse among children to be 87%, which is higher than that reported by Lisa Sarangi et al [7] where the prevalence was 43.4%. The main route cause for such high prevalence is low socioeconomic group and easy availability of substances.

This study also revealed that the most common substance being abused is the widely available Tobacco (56.9%) which is supporting, the findings of Dhirendra N. Sinha et al [8]. Peer pressure, easy availability and affordability were important reasons associated with tobacco initiation and its use.

Prevalence of tobacco use was higher among boys than girls. As boys are involved more in outdoor activities and are subjected to substance abuse. Adolescents reported using tobacco in multiple forms, chewing tobacco being the most popular. The alcohol intake rate was about 16.7% which is lower as compared to the study of Padhy G K et.al [9], where alcohol (68.25%) was the second mostly abused substance.

A WHO study group on youth and drugs (1973) indicated that most of the experimentation and

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initiation of dependence-producing drugs takes place during adolescence. Though they had some knowledge about the harmful effects of substances, this was not sufficient to motivate them to quit, in our study only 46.3% were willing to quit. Craving (50.9%) was the most common cause to abstain substance abuse.

Conclusion

The study has emphasized the escalating incidence of substance abuse among slum children in Ahmednagar, pressing need of initiating programs for prevention and treatment in slum areas. The subject needs to be dealt in a comprehensive manner. There is need for availability of specialized treatment services for children who are using substances. These facilities should be available in government hospitals. The settings in which the facilities are delivered should be child sensitive and safe. Treatment programs must attempt to include the family in treatment and address the family issues as a part of the remedy. Rehabilitation of children should focus on skill building and vocational training. Substance abuse by children has detrimental impact on their physical, psychological, social and mental well-being hence needs immediate intervention. Rehabilitation of children abusing illicit substances is the necessity of the hour.

Acknowledgement

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Erratum

Article Titled "**Plasma Cell Leukemia: Clinicopathological Profile of Five Cases**"

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The published version of this Article contained errors in the type of the article mentioned.

Type of Article is Original Research Article

Now read as,

Original Research Article

Plasma Cell Leukemia: Clinicopathological Profile of Five Cases

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Mistake is regretted.

Editor-in-Chief

Unknown and Unclaimed Descendents: A Silent Mass Disaster

Nitin S Ninal*, Kailash U. Zine**

Abstract

Autopsy of an unknown descendent is always a challenging task for the forensic experts, unfortunately which often brings no significant results. The reasons may be reluctant investigating authority, lack of proper history, decomposed, skeletonized or mutilated body etc. Unfortunately, much desired interest is not shown by investigating authority as well as forensic experts, unless and until there is suspicion of foul play or any obvious prima facie evidence suggestive of homicidal manner of death. As a result most of the time actual cause and manner of death remains a mystery. Here we have studied 104 cases of such unknown and unclaimed descendents with respect to their incidence, identification and cause of death. Incidence of unknown cases was found to be 4.17% of total cases.19% of the total cases was identified successfully by means of different parameters of identification. 58% deceased died due to unnatural cause. Cause of death in most of the cases was found to be multiple injuries (27%), followed by head injury (14%), whereas pulmonary TB was the leading culprit among natural deaths.

Keywords: Unknown; Identification; Medico Legal Autopsy; Death; Cause of Death.

Introduction

Identification denotes establishment of individuality of a person living or dead. It implies "fixation of personality of the individual from absolute view point by noting the place exactly occupied by him or her in the community". It may be complete or partial when certain facts as to identity of an individual have been determined while others required for complete identification have been left out un-explored and unknown[1]. Unidentified bodies are people who die and have no identification on them & it's either unknown or uncertain as to who they are [2].The number is increasing with time due to increase in population and urbanization. Unclaimed body – Body of person who dies in hospital, prison or public place or a place to which members of public have got access and which has not been claimed by any person [3]. Autopsy of an unknown descendent is always a challenging task for the forensic experts, unfortunately which often brings no significant results. The reasons may be reluctant investigating authority, lack of proper history, decomposed, skeletonized or mutilated body etc. Most of the previous studies on this topic were carried out by foreign authors and they were directed to individual body identification or identification of victims of mass disasters. The prime objective of this study was to assess the status of unknown descendents in our region and problems associated with them, which has never been discussed before.

Material and Methods

This was a cross-sectional study carried out for the period of 1 year. All unknown cases brought to the mortuary at our institute for post mortem examination during study period were included. All known cases and unknown cases donated to dept of

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Anatomy for academic purpose were excluded from the present study. Specially prepared proforma has been filled by information obtained from the police inquest, post mortem examination and interview of investigating officer. Parameters with respect to identification of deceased were noted like clothes, moles, scars, tattoo, malformations, occupational marks, implants, belongings, photographs, fingerprints etc. Follow up has been taken for the period of three months in each & every case as to the identity of deceased with the help of investigating officer.

Results

The incidence of unknown cases is shown in Table 1 which ranged from 4 - 5% of total cases for the last 4 years. Before starting this study, yearly load of such unknown cases for the last three years was calculated by using the data available at the department of forensic medicine at our institute. During the study period of one year 104 (i.e. 4.17%) cases of unknown descendents have been encountered out of 2490 cases of total autopsy load at our institute and we got the constant graph for the last 4 years.

Table 2 comprises different identifying features from which identity of the deceased was established. Identifying features like clothes, belongings, tattoo marks, scars, moles, photographs etc were noted in 78 cases, whereas in 22 cases no any specific identifying feature was appreciated due to limiting factors like decomposition, skeletonisation etc. It shows that out of 19 (18.26%) identified deceased, in most of the cases identification was made by means of clothes & visual features.

Cause of death is shown in Table 3. It reveals that 52 (50%) deaths were unnatural and 26 (i.e. 25%) deaths were natural. Among unnatural deaths multiple injuries and head injury was the leading causes. Among natural deaths, tuberculosis was the leading culprit in 12 (11.54%) cases. In 14 (13.46%) cases opinion as to the cause of death was kept 'Reserved' due to non availability of reports of viscera and histopath etc, whereas in 8 cases despite of through investigation cause of death remained obscured.

Table 1: Year wise Incidence of Unknown Cases

Sr. No.	Yr	Total Autopsies	Unknown cases	%
1	2009	2037	91	4.46%
2	2010	2363	96	4.06%
3	2011	2420	98	4.04%
4	2012	2490	104	4.17%

Table 2: Parameters of Identification and Cases Identified

Sr. No.	Identifying features	No. of cases	%
1	Visual features	3	15.79%
2	Clothes & belongings	6	31.58%
3	Tattoo	2	10.53%
4	Implant device	1	5.26%
5	Combined	7	36.84%
	Total	19	

Table 3: Cause of death

Sr. No.	Cause of Death	No. of cases	Percentage %
1	Multiple injuries	27	25.96
2	Head Injury	14	13.46
3	Pulmonary Tuberculosis	12	11.54
4	Violent asphyxial deaths	09	8.65
5	Coronary Artery Insufficiency	06	5.77
6	Septicemia	06	5.77
7	Non viable foetus	04	3.85
8	Shock due to burns	01	0.96
9	Poisoning	01	0.96
10	Hepatic encephalopathy	01	0.96
11	Cerebral malaria	01	0.96
12	Opinion Reserved	14	13.46
13	Undetermined	08	7.69
	TOTAL	**104**	
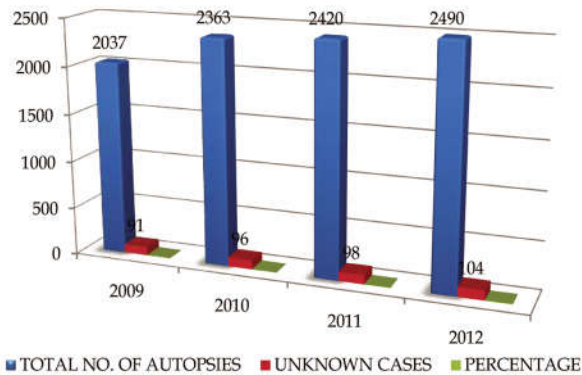
Graph 1: Incidence of Unknown Cases

Image 1: Unknown descendent died due to Tuberculosis

Image 2: Tattoo mark revealing the identity of a person

Image 3: Putrefied body identified due to implant device

Discussion

Many a times, in case of people like beggars, destitute etc involved in fatal accidents leads to the extensive damage to the body and makes them unidentifiable. Sometimes, factors like inadequate history, decomposition etc poses difficulty in identification. Unfortunately, much desired interest is not shown by investigating authority as well as forensic experts, unless there is suspicion of foul play or any obvious prima facie evidence suggestive of homicidal manner of death. As a result most of the times, actual cause and manner of death remains a mystery. More studies have also shown that such groups of people are more vulnerable to many preventable causes of deaths, which are usually overlooked by public health authorities.

There are many legal as well as social problems that may arise from the unidentified bodies. Deliberate refusal by the relatives of the dead due to socioeconomic conditions like poverty, drug addiction, Psychological disorders, bad character etc, accidental exchange of unknown dead bodies are the usual problems faced by relatives, investigating authorities as well as autopsy surgeons [4]. As far as the global scenario is concerned many people had observed that trend of such cases is increasing over the time. Therefore, it is high time for to make an extensive research into this matter of subject and set a standard protocol in order to solve the problems associated with unknown descendents.

In this study the incidence of unknown descendents was found to be 4.17% of the total autopsy load. More studies have observed somewhat similar incidence as that of present study [5,6,7]. Whereas Riepert T et al had observed ascending graph of unknown cases over a period of 10 years i.e.5% - 10% of total autopsies. He hypothesized that the increase in the number of unknown corpses since 1985 from 5% to nearly 10% of the total number of autopsies may be caused by increasing mobility and anonymity of the population[8].

In present study only 18.26% of unknown individuals were identified which closely correlates with one of the Indian studies conducted in Kolkata where the rate of identification was found to be17.8% [9]. Whereas in studies that are carried out abroad, authors had been able to identify much higher percentage of descendents (>50%), which might be due to easy availability of advanced techniques of identification as well as ante mortem records like fingerprinting, DNA analysis, dental records, etc at their centres[5,6]. To be mentioned specifically, out

of the 19 cases that were identified, medical implant device in thigh have revealed identity in a case, which was found in advanced putrefied state. Similar case was reported by Zanjad et al [10]

More studies have shown that most of the deaths of unknown descendents were unnatural [8, 11]. In study of 1577 cases author came across with 60 unidentified cases in which it was observed that most of the deaths were attributed to (30%) cranio-cerebral damage, similarly in our study almost 50% deaths were unnatural, attributed to multiple injuries(27%) & head injury (14%)[7].

Kumar A et al in a study of 735 cases of homeless, unclaimed persons in South Delhi found that most of the victims (n = 451, 61.36%) died from natural causes [12]. Saurabh Chattopadhyay et al also reported that out of total of 614 unidentified, half (48.3%) of the cases were natural deaths due to some diseases, pathological conditions or old age [9]. We found that most of the natural deaths were due to infections, among which tuberculosis (TB) was most common (i.e. 50% of all natural deaths). This could be due to the factors like homelessness, malnutrition and old age, which make these people more vulnerable to such natural diseases due to low immunity. It also reflects the high prevalence of tuberculosis in Indian community. Unfortunately TB is still considered as a social stigma among the rural population of India and it was noticed that many times these patients are exiled from the community & eventually no one is there to claim such descendents. Similarly HIV has also become a social stigma of the recent time, unfortunately which was not worked out in this study.

Conclusion

To get maximum output from such cases, people working as investigating authority should be properly trained and strengthened. Also we can recommend that nationwide projects of preservation of ante mortem records of DNA sample, Fingerprints, Dental records should be run by the government authorities e.g. DNA banking; which may help us in future, for identification purpose in case of emergencies like disasters. Moreover, disposal of such descendents should be carried out in a dignified way. Lastly, this is the high time for to establish the standard protocol for autopsy of unknown descendents so that they will get the justice in real sense..

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Profile of Fatal Road Traffic Accidents Due to Drunken Driving

Vijay Kumar A.G.*, Kumar U.*

Abstract

Road Traffic Accident is an event that occurs on a street resulting in one or more persons being injured or killed, where at least one moving vehicle is involved. According to a study conducted by Alcohol & drug Information Centre (AIDC), India showed that around 40% of the road accidents have occurred under the influence of alcohol. Young male drivers are at a greater risk of such accidents. The use of alcohol before driving was a significant contributing factor in fatal road traffic accidents, mainly in single vehicle accidents, and particularly among young male drivers. Alcohol was the most significant intoxicant, but multi-substance use was also significantly prevalent. The majority of the drivers with alcohol were strongly impaired judgmentally with decreased attention span leading to increased roadside casualties and mortalities particularly among the youth and middle-aged persons.

Keywords: Alcohol; Road Traffic Accidents; Death; Prevention.

Introduction

Road Traffic Accident is an event that occurs on a street resulting in one or more persons being injured or killed, where at least one moving vehicle is involved. Thus RTA is a collision between vehicles; between vehicles and pedestrians; between vehicles and animals; or between vehicles and geographical or architectural obstacles. They involve high human injuries and socioeconomic costs in terms of early deaths, injuries, disability [1].

According to 'World Road Statistics 2015' released by International Road Federation, Geneva, India has the second highest number of road traffic accident resulting in high fatalities per 100,000 populations. Russian Federation was in the first list at 19 per 100,000. India is signatory to the 'Brasilia Declaration'

and has committed to reduce road accidents by 50% by 2020 – just four years from now.[2]

Road traffic accidents due to drunken driving are a serious problem in India. According to a study conducted by Alcohol & drug Information Centre (AIDC), India showed that around 40% of the road accidents have occurred under the influence of alcohol. Young male drivers are at a greater risk of such accidents. Alcohol causes decrease in attention even at low levels and the chances of accidents increases with rising blood alcohol concentration levels. Alcohol needs no digestion and is absorbed rapidly into the blood and about 10%-15% of alcohol users develop alcohol dependence and become chronic alcoholics. After having alcohol, the judgment power of the driver gets impaired which increases threat to road safety. Due to its ill effects, driver tends to take more risks, becomes more aggressive and takes a longer reaction time. It has been well established that the relative probability of causing accidents increases with the rising blood alcohol concentration levels keeping road safety at stake [3].

The total number of road traffic accidents increased by 2.5 per cent from 4,89,400 in 2014 to 5,01,423 in 2015. The total number of death of persons in road traffic accidents increased by 4.6 per cent from 1,39,671 in 2014 to 1,46,133 in 2015. The injuries

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due to accident have also increased by 1.4 percent from 4,93,474 in 2014 to 5,00,279 in 2015. The severity of road traffic accidents has increased from 28.5 deaths in 2014 to 29.1 in 2015. Accidents and deaths caused due to Intake of alcohol within the category of drivers fault accounted for 4.2 per cent (16,298 out of 3,86,481 accidents) and 6.4 per cent (6,755 out of 1,06,021 deaths) [4].

In 2015, one person dies every 4 minutes in roads accidents in India, according to NGO 'Indians for Road Safety'. India stands out miserably in the latest World Health Organisation's (WHO) "Global Road Safety Report-2015" with an estimated 207,551 deaths on roads [5].

The "GlobStatus Report on Road Safety" lished by the World Health Organization (WHO) identified the major causes of traffic collisions as driving over the speed limit, driving under the influence, and not using helmets and seat belts. Failure to maintain lane or yield to oncoming traffic when turning are prime causes of accidents on four lane, non-access controlled National Highways. The report noted users of motorcycles and motor-powered three-wheelers constitute the second largest group of traffic collision deaths [6,7].

Material and Methods

In this retrospective study, 60 fatal road traffic accident cases autopsied during the period January to December 2015 were analyzed at the Department of Forensic Medicine & Toxicology, AIMS, BG Nagar, and Karnataka. Since the medical college is besides the national highway, the admission of road traffic accident cases to medical college is high. Every case of RTA is subjected to routine postmortem to find out the cause of death along with dispatch of stomach and contents, liver and kidney, blood with preservatives to Forensic science laboratory for evaluation of the alcohol content.

Selection Criteria

Death due to road traffic accident

Results

Table 1: Total number autopsied cases in 2015 were 167. Out of 60 RTA cases, FSL report of 9 cases came positive for alcohol.

Total number AUTOSPIED cases	167
Total number of RTA cases	60
Alcohol positive cases	9

Table 2: The alcohol concentration in the report ranges from 20 mg/dl to 148mg/dl

Post Mortem Number	No. of Cases
12/15	88 mg/dl
27/15	61 mg/dl
33/15	101 mg/dl
40/15	20 mg/dl
61/15	56 mg/dl
63/15	148 mg/dl
77/15	140 mg/dl
104/15	111 mg/dl
112/15	56 mg/dl
TOTAL	9

Table 3: The prevalence of alcohol alone was highest among drivers under the age of 30. The highest prevalence of alcohol was found among drivers killed in single-vehicle accidents on weeknights (70%) and on weekend nights (80%)

Age (Years)	No. of Cases
<20 Years	1
21 -30 Years	4
31-40 Years	2
41-50 Years	1
> 50 Years	1
Total	9

Table 4: The proportions of male to female drivers with Blood alcohol concentration above the permissible limit were 89% vs 11%

Male	8
Female	1
Total	9

Discussion

According to Community Against Drunken Driving (CADD), nearly 70% of all deaths are due to drunken driving, with the number ranging between 44% to 67% in cities. Even after rising penalty for drunken drive about seven times in Delhi and 16 times in Mumbai since 2001, there has been no decrease in accidents and deaths. Prince Singhal of CADD noted that "24 hour availability of alcohol along National and State highways results in more buying of alcohol and about 72 per cent of road traffic accidents on National Highways". Stating that "the World Day for Remembrance of Road Accident Victims needs to be observed as a significant day especially in the Indian context as we record the highest road fatalities at 134,000 annually", he said it should not be forgotten that "road deaths and injuries are sudden, violent, traumatic events, and their impact is long-lasting, often permanent" [8].

According to Times of India, Indian roads which account for the highest deaths in the world became more dangerous in 2015 with the number of fatalities rising nearly 5% to 1.46 lakh. This translates to 400

deaths a day or one life snuffed out every 3.6 minutes, in what an expert described as a "daily massacre on our roads". According to police data given by states, Uttar Pradesh recorded the maximum number of road deaths (17,666), then Tamil Nadu (15,642), Maharashtra (13,212), Karnataka (10,856) and Rajasthan (10,510). While the number of road fatalities increased in most of big states, 10 smaller cities including Delhi and Chandigarh, reported a decrease in death. Assam registered the highest decrease of 115 deaths in 2015 in comparison to the previous year, while death decreased by 49 in Delhi [9].

India's have the world's most unsafe roads and the situation seems to be getting worse by the year. Over 400 people were killed in road accidents every day in 2015, government data reveals. Fresh data submitted by the Ministry of Road Transport and Highways in the Rajya Sabha this week indicates just how alarming the situation is 1,46,133 people were killed in road accidents in India in 2015, a 4.6% rise over 2014 when 1,39,671 people were killed. In the past one decade, over 1.3 million people have been killed in road accidents but there is still no comprehensive road safety legislation in the country. According to the 234th report of the Standing Committee on Transport, Tourism and Culture which has recently been tabled in Parliament, there are several stumbling blocks for replacing the existing Motor Vehicles Act with a proposed Road Transport and Safety Bill, 2015.

Coclusion

The use of alcohol before driving was a significant contributing factor in fatal road traffic accidents, mainly in single vehicle accidents, and particularly among young male drivers. Alcohol was the most significant intoxicant, but multi-substance use was also significantly prevalent. The majority of the drivers with alcohol were strongly impaired judgmentally with decreased attention span leading to increased roadside casualties and mortalities particularly among the youth and middle-aged persons. Most of the times alcohol related accidents will result in collateral damage including death to nearby pedestrians or vehicles for no fault of their's. To curb alcohol related RTA's, the government should evolve a policy for stringent checks of drunken driving at all Toll-plazas along national highways along with hefty fines and cancellation of driving licenses of the caught drunken driver.

Consent: obtained from institutional ethical committee

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Estimation of Stature from Foot Length in Population of Rajkot Region, Gujarat

Chauhan Viral N.*, Doshi Sunil M.**, Mangal H.M.***, Aghera Viral J.****, Manvar Prince J.****, Vaghela Raghurajsinh D.*****

Abstract

Context: The use of anthropology has increased day by day by forensic experts for identification. With increasing frequency of mass disasters due to nature and man, the numbers of deaths are increasing which pose a threat for identification due to mutilation. Similar situation is encountered in cases of murder, where there is destruction of identity. Such situations give rise to studies which estimate the stature from different body parts. *Aims:* The present study was carried out with the aim to evaluate the anthropometric relationship of foot length with the stature of an individual in study population and to derive regression formulae and multiplication factor to estimate stature from these dimensions. *Settings and Design:* The present is an observational study wherein total of 208 individuals were selected for study, 105 males and 103 females, from 10 to 60 years of age. The measurements were carried out in the department for a fixed duration to avoid diurnal variation. *Methods and Material:* The parameters were measured after excluding any disease or deformity. Stature was measured with the subjects barefoot, standing erect, the feet pointed outward at 60 degree angle and head oriented in the Frankfurt plane. Foot length (FL) was taken on left foot as a straight distance between the most posteriorly projecting points of the heel (Pternion) to the most anteriorly projecting point (Acropodion) of the first or second toe whichever was bigger when the foot was fully stretched. After proper positioning measurements was taken. *Statistical Analysis used:* Statistical programme for social science and Microsoft excel. *Results:* The measured foot length showed significant correlation (p<0.05) with the stature of the individual. *Conclusion:* Linear regression equation and multiplication factor for estimating stature from foot length was derived for males, females and either sex. The regression equation gives more accurate results than multiplication factor for estimation of stature.

Keywords: Stature; Foot Length; Regression Equation.

Introduction

For medicolegal studies, examination of human skeleton has an utmost importance for the identification purpose, which is the prime component of *Corpus Delicti*. Personal identification is an integral part of the investigation and the stature estimation occupies relatively a central position in the identification necessitated by the medico-legal experts [1].

Mass disasters like earthquake, cyclone, landslide, floods, high impact transportation injuries, explosions etc where disintegrated and amputated parts are found very frequently, reconstruction of living stature from skeletal remains is useful to the forensic experts [1,2]. Similar scenario also applies in case of murder as the mutilation of dead body is done by a criminal who wants to destroy all traces of identity and thus facilitate the disposal of the dead [3].

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It is an established fact that stature bears a direct relation to the length of various bones, be it a child or adult. However, intact long bones may not be present in every instance. So, establishment of alternative methodologies for personal height estimation is important. In such a situation, measurements of various remains of body like torso, pelvis or available portion of limbs provide useful data to estimate the stature. With this view the present study was carried out to evaluate the anthropometric relationship of length of left sole with the stature of an individual in study population of Rajkot region and to derive regression formulae and multiplication factor to estimate stature from these dimensions.

Material and Methods

The present study was conducted in the Department of Forensic Medicine and Toxicology during the period of March, 2011 to July, 2012. This is an observational study which included total of 208 individuals, 105 males and 103 females. Age group selected for the study was 10-60 years of age. The individuals for the study were normal healthy volunteers from Rajkot region. Measurements were taken at a fixed time of the day (2:00 pm to 4:00 pm) to avoid errors in relation to diurnal variation. The aim and procedure of examination were explained before measurements.

None of the individuals had any injury or deformity of the body that might have had an inûuence on the measurements of the foot length or stature. History of dietary habits and any hormonal or metabolic disorder was also taken to rule out any dietary deficiencies. Stature was measured with the subjects barefoot, standing erect, the feet pointed outward at 60 degree angle and head oriented in the Frankfurt plane. Foot length (FL) was taken on left foot [4] as a straight distance between the most posteriorly projecting points of the heel (Pternion)[5] to the most anteriorly projecting point (Acropodion)[5] of the first or second toe whichever was bigger when the foot was fully stretched. For measurement, the foot was placed on the measuring board. The foot taken for measurement was placed on this board in such a way that the heel was in contact with the surface of the board. This would confirm the position of the foot and it would not move while taking the measurement. This was further supported with the hand at the ankle region during the examination. After proper positioning measurements was taken. The data obtained was analyzed statistically to find out the mean and standard deviation for each of the above measurements in both the sexes using Microsoft Excel and Statistical programme for social science (SPSS) Version 17 to derive a linear regression equation and multiplication factor for stature estimation.

Results

Table 1: Sex wise distribution of subjects

Sex	No. of Subjects
Male	105 (50.49%)
Female	103(49.51%)
Total	208 (100%)

Table 2: Stature and sex wise Mean and Standard Deviation (SD) of Foot length (FL)

Stature (cm)	Foot length (cm)		
	Either sex*	Male	Female
120-130	16.45 ± 0.36	16.53±0.50	16.40±0.28
130-140	16.88 ± 0.40	17.02±0.29	16.60±0.57
140-150	21.12 ± 1.03	21.56±0.35	21.05±1.08
150-160	21.58 ± 0.79	22.02±0.64	21.53±0.80
160-170	23.35 ± 1.07	23.69±1.06	22.62±0.63
170-180	25.10 ± 1.23	25.20±1.23	23.96±0.15

* → Both male and female

The difference between stature and foot length among male and female is evident from the Table 2. The foot length increases as the stature increases but the foot length in case of male is always more than in female.

Table 3: Descriptive statistics of the study sample according to sex

Parameter	Either sex Mean ± SD	Male Mean ± SD	Female Mean ± SD
Age (years)	33.04 ± 14.37	32.84 ± 14.02	33.25 ± 14.78
Stature (cm)	159.88 ± 11.60	165.01 ± 11.21	154.65 ± 9.50
FL (cm)	22.54 ± 2.25	23.57 ± 2.30	21.49 ± 1.63

The average stature and foot length for male are greater than female subjects as evident form Table 3. The average foot length is more in male than that of female.

Dig. 1 shows scatter distribution of Stature v/s Foot length. Maximum number of subjects are within 95% confidence interval indicating significant correlation between the two parameters (r^2=0.806).
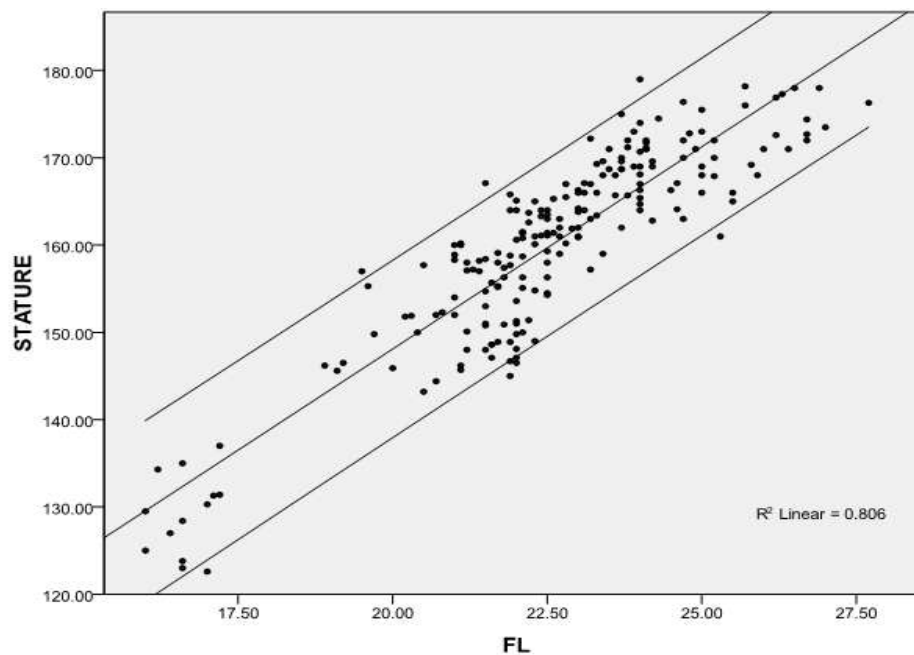
Diagram 1: Scatter distribution of Stature v/s Foot length

Table 4: Level of significance of different measurements of foot length and linear regression formula for estimation of stature

Parameter	N	PCC	R²	SEE	Regression formula
Either sex	208	0.898	0.806	5.126	S = 55.427 + 4.633 x FL
Male	105	0.893	0.798	5.060	S = 62.170 + 4.363 x FL
Female	103	0.848	0.719	5.113	S = 49.356 + 4.906 x FL

N – Number of cases
PCC – Pearson's correlation coefficient
SEE = Standard Error of Estimate

Table 5: Mean multiplication factor for estimating stature from foot length

Parameter	Mean multiplication factor		
	Either sex	Male	Female
Foot length	7.118	7.028	7.210

The mean multiplication factor for estimation stature for either sex as well as male and female separately is given in Table 5. It is calculated as the ratio of the stature to foot length.

Multiplication factor = Actual Stature / Foot length

Discussion

Table 6: Comparison of mean stature and foot length in either sex

| | Stature (cm) | | Foot length (cm) | |
	Male (Mean ± SD)	Female (Mean ± SD)	Male (Mean ± SD)	Female (Mean ± SD)
Krishan et al[5]	168.20 ± 6.50	155.70 ± 5.20	24.7 ± 1.20	22.60 ± 1.10
Patel et al[4]	170.96 ± 5.13	156.14 ± 5.15	24.44 ± 0.99	22.34 ± 1.12
Nachiket et al[7]	172.82 ± 5.65	156.70 ± 6.24	25.67 ± 3.62	23.27 ± 1.04
Present study	165.01 ± 11.21	154.65 ± 9.50	23.57 ± 2.30	21.49 ± 1.63

In present study, the mean stature and foot length for male subjects is 165.01 cm (±11.21) and 23.57 cm (±2.30) respectively and for female subjects it is 154.65 cm (±9.50) and 21.49 cm (±1.63). Mean stature and foot length in male subjects are more than female subjects in present study which is comparable with other studies. The findings in present study are comparable with the findings of Krishan et al.

Table 7: Comparison of multiplication factor in either sex

| | Mean multiplication factor | |
	Male	Female
Krishan et al[5]	06.82	06.89
Rani et al[3]	7.227	7.710
Jasuja et al[8]	6.44	-
Jain (brahmin) et al[9]	7.23	-
Nath (rajput) et al[10]	6.87	6.73
Nath (brahmin) et al[10]	6.64	6.68
Jain (jats) et al[11]	-	6.59
Present study	07.03	07.21

The mean multiplication factor for estimation of stature is compared with the studies conducted by different workers. In present study, mean multiplication factor is 7.03 for males and 7.21 for females. The value of factor is more in female than in males in the studies conducted in both male and female.

Table 8a: Comparison of Actual stature from mean multiplication factor and regression formula in either sex

| Parameter | Male (Reg) | | | Male (M.F.) | | |
| | Min | Max | Mean ± SD | Min | Max | Mean ± SD |
			n=105			
Stature (cm)	122.60	179.00	165.01 ± 11.21	122.60	179.00	165.01 ±11.21
FL (ES)	131.98	183.03	165.02 ± 10.02	112.48	194.73	165.71 ±16.14

Table 8b: Comparison of actual stature with estimated stature from mean multiplication factor and regression formula in male

| Parameter | Either Sex (Reg.) | | | Either Sex (M.F.) | | |
| | Min | Max | Mean ± SD | Min | Max | Mean ± SD |
			n = 208			
Stature (cm)	122.60	179.00	159.88 ± 11.60	122.60	179.00	159.88 ± 11.60
FL (ES)	129.56	183.76	159.87 ± 10.41	113.92	197.22	160.51 ± 16.00

Table 8c: Comparison of actual stature with estimated stature from mean multiplication factor and regression formula in female

| Parameter | Female (Reg.) | | | Female (M.F.) | | |
| | Min | Max | Mean ± SD | Min | Max | Mean ± SD |
			n=103			
Stature (cm)	123.00	171.20	154.65 ± 9.50	123.00	171.20	154.65 ± 9.50
FL (ES)	127.85	167.59	154.81 ± 8.02	115.36	173.76	154.97 ± 11.79

n → Number of subjects
FL (ES) → Estimated Stature from foot length in cm.
M.F. → Mean Multiplication Factor
Reg → Regression Equation

Actual stature and stature estimated from multiplication factor and regression analysis are compared in Table 9A, 9B and 9C. Mean actual stature and stature derived from multiplication factor and regression equation did not show significant differences between them. However, the standard deviation of estimated stature from the multiplication factor exceeds the standard deviation of actual stature, whereas the estimates from regression equation have standard deviation lower than the actual stature.

The above data shows that stature can be estimated from the foot length with the help of regression equation and multiplication factor. However, regional, ethnic, dietary and other variations exist and different data set is required to derive equations for different study population. The other parameters like percutaneous tibial length, hand length etc can also be studied for estimation of stature, either singular or in conjunction with foot length for more accurate results.

Conclusion

- Mean foot length in male was 23.57 cm with SD of 2.30 while that of female was 21.49 cm with SD of 1.63 and for either sex, it is 22.54 cm with SD of 2.25.

- Regression equation derived for either sex "Stature=55.427 + 4.633 x FL", with Standard Error → 5.126 cm and strength of association → 0.806.

- Regression equation derived for male sex "Stature=62.170 + (4.363 x FL)", with Standard Error → 5.060 cm and strength of association → 0.798.

- Regression equation derived for female sex "Stature=49.356 + (4.906 x FL)", with Standard Error → 5.113 cm and strength of association → 0.719.

- Mean multiplication factor for estimation of stature from foot length for either sex, male and female is 7.118, 7.028 and 7.210 respectively.

- In case of mean multiplication factor, the standard deviation of estimation of stature is more than that of regression equation, hence giving less accurate results than regression equation.

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Profile of Fatal Thoracic Injuries in and around Vijayapur, Karnataka

Ramesh C. Patil*, Ashok Kumar Rajaput**, Mohammed Arifulla K.***, E.S. Goudar****

Abstract

Introduction: Trauma is one of the leading preventable causes of death in developing countries, and is posing a major social health an health problem. Trauma affects generally the young people, and accounts for loss of more years of life, than lost due to cancer and heart diseases put together. *Material and Methods:* The present study was done for one year retrospective and two years prospective study from July 2014 to July 2016 at Al-Amen Medical College and District Hospital Mortuary, Vijayapur. *Results:* In the victims of chest injuries 63.0% were due to RTA, 16.35% due to railway accidents, and least is from due to sports injury in 0.92% of cases. Young adults between 21 to 30 years (36.54%) are more vulnerable to the fatal chest injuries. More number of victims died on the spot. In road traffic accidents maximum number of victims were pedestrians i.e, 27 cases (40.90%), followed by motor cyclists in 15cases (22.70%) and least in bicycle riders. *Conclusion:* In the victims of chest injuries 63.0% were due to RTA, 16.35% due to railway accidents. Young adults between 21 to 30 years (36.54%) are more vulnerable. Manner of death was commonly accidental in nature in 83 cases followed by homicidal and suicidal in 12 and 9 cases respectively. Peak time of occurrence chest injuries is between 6pm to 12 midnight and least between 12 midnight to morning 6am. More number of victims died on the spot. In road traffic accidents maximum number of victims were pedestrians i.e, 27 cases (40.90%), followed by motor cyclists.

Keywords: Chest Injuries; Blunt Trauma; Manner of Death; Visceral Injury.

Introduction

Trauma is one of the leading preventable causes of death in developing countries and is posing major health and social problem. Death related trauma rank third after cardiovascular diseases and cancer [1]. Trauma may lead to short or long-term disability. Since chest cavity contains the vital organs like lungs, heart, great vessels and supporting tissue, trauma to this region challenges the integrity and even the viability of the individual. Because of its size and anatomical position it is a major site of trauma in road accidents, railway accidents, fall from height and in sports injuries etc. Thoracic trauma causes 10-15% of all mortalities [2].

In case of thorax, blunt trauma can produce a wide spectrum of injuries extending from the fracture of bones like ribs, sternum and thoracic vertebrae and injuries of thoracic organs like contusions, lacerations and sometimes causing haemothorax, pneumothorax. Hence the presence of intrathorasic involvement may be overlooked. Chest injuries encountered with different manner (suicide, homicide, accident). Sometimes homicidal chest injuries are pleaded or disguised as suicide and even accidental chest injuries are disguised as homicidal to bring false charge of offence on enemies. With the growth in the population and modern needs the incidence of homicide is on increase in India.

Over all, road traffic accident is the major cause of blunt chest trauma in all over the world. Road traffic accident is an unplanned event occurring suddenly unexpectedly as unforeseen circumstance. The exponentially increasing number of automobile

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vehicles, poor adherence to traffic rules and regulations, abuse of alcohol are the cause of accidents. Accidents tragically are not often due to ignorance, but are due to carelessness, thoughtlessness and due to over confidence. Incidence of road traffic accidents has been increasing at the alarming rate throughout the world. Road traffic accidents are the third most preventable causes of death. In India over 1,45000 persons die annually due to traffic accidents,1.6 millions injured seriously and 4 lakhs disabled permanently. Every day there are 3300 deaths and 6600 serious injuries on the road in the world. Due to narrow roads and excess motor vehicles road traffic accidents result leading to blunt thoracic trauma. Chest injuries are the leading causes of death despite optimal use of available treatment facilities [2].

Homicides are also on rise because of increasing population, unemployment, industrialization, easy availability of the weapons and stressful living conditions.

Injuries of the chest are not always isolated but often associated with injuries to the other parts, viz, head, abdomen, pelvis, spine, extremities etc.

Material and Methods

The present study was done for one year retrospective and two years prospective study from July 2014 to July 2016 at Al-Amen medical college and district hospital mortuary, Vijayapur.

All the cases that are autopsied were screened for chest injuries resulting from deaths due to road traffic accidents, railway accidents, assault, firearm injuries and fall from height. A detailed information and data pertaining to the cases were collected. After receiving the details, post-mortem examination was conducted.

Information pertaining to the time and manner of death was sought from the police personnel investigating the case. Some of the particulars of the victim were also obtained from the direct interrogation with relatives, friends and others along with the police. Following points were noted with respect to age, sex, cause or mode and manner of injury sustained, object causing the injury, frequency of organs involved, period of survival of the victim following the incident and the cause of death. All the findings thus obtained were noted down in a separate proforma for each case. Then the master chart is prepared. The statistical analysis of the data collected was done and presented results in the tabular forms, bar diagrams and pie charts.

Photographs and x-rays taken whenever necessary. The results are analyzed, discussed and concluded.

Observations and Results

During the period of study 104 cases were due to chest injuries, in which 75 were males and 29 were females. The mortality rate is 13.61%.The male and female ratio is M:F=2.59:1.The mean average age is 35.97 years.

Table 1 describes that male preponderance over females noted in this study with males constituting 75 cases (72.12%) and females 29 cases (27.88%).

Table 2 shows age wise analysis of the victims of chest injuries showed a maximum number of deaths in the age group of 21-30 years(36.54%)followed by 31-40 (24.04%) and minimum deaths in the age group of 0-10 (0.96%) and above 60 years (5.76%).The average mean age is 35.97 years.

Table 3 reveals that blunt force is the most common agent causing the chest injuries in 96 cases (92.31%) and least is penetrating in 8 cases (7.69%). Blunt force trauma commonly associated with road traffic accidents.

The maximum number of cases were reported between 6pm to 12am 48 cases (46.15%), followed by the time interval of 12pm to 6pm, 35 cases (33.65%) and least is seen between 12 am to 6am of 2 cases (1.92%).

Table 5 shows that deceased died at the spot in 48 cases (46.15%) followed by succumbed on the way to the hospital in 33 cases(31.73%), in 21 cases (20.19%) died in the hospital and least in others, 2cases(1.92%).

External injuries on the chest were seen in 80 cases of which 42 cases are due to abrasions (52.50%), contusions in 20 cases (25%), lacerations in 13 cases (16.25%) and contused abrasions in 5 cases (6.25%).

Above Table shows that lung is the most common organ involved in 55 cases (53.40%). Contusion of lungs seen in 23 cases, laceration of lung in 31 cases and rupture in 1 case. Heart is injured in 31 cases (30.10%). Injuries to heart consist of contusion in 9 cases, laceration in 14 and rupture in 8 cases. And major blood vessels are involved in 17 (16.50%) cases. Aorta lacerated in 6 and ruptured in 8 cases. Superior vena cava lacerated in 2 cases and inferior vena cava in 1 case.

Table 8 shows that the injuries to the respiratory system were contusion of the trachea in 3cases, laceration in 2 cases followed by contusion of the bronchus in 2 cases, laceration in 7 cases. Laceration

of pleura seen in 51cases. Haemothorax was more common and seen in 61cases. Pneumothorax found in 9 cases. Contusion of pericardium in 2cases, laceration in 4 cases, and rupture in 1 case. Cardiac tamponade is seen in 4 cases (3.85%). Injuries to the oesophagus consists contusion seen in 4 cases and laceration in 3 cases. Injuries to the diaphragm seen in 8 cases. Contusion is seen over right diaphragm in 3 cases, laceration seen 2 on right side and 3 on left side.

The skeletal injuries are fracture of ribs in 77cases (64.71%), sternum in 26 cases (21.85%), clavicle in 11 cases (9.24%) and least in thoracic vertebra of 5 cases (4.2%).

Table 1: Sex-wise distribution of the victims

Sex	No. of victims	Percentage
Male	75	72.12
Female	29	27.88
Total	104	100

Table 2: Age-wise distribution of the victims

Age group (years)	No. of Victims		Total	Percentage
	Male	Female		
0 – 10	1	0	1	0.96
11 – 20	6	2	8	7.69
21 – 30	30	8	38	36.54
31 – 40	16	9	25	24.04
41 – 50	10	6	16	15.38
51 – 60	8	2	10	9.61
>60	4	2	6	5.76
Total	75	29	104	100

Table 3: Agent causing injuries

Agent	No. of cases	Percentage
Blunt force	96	92.31
Penetrating force	08	7.69
Total	104	100

Table 4: Diurnal variations

Time interval	No. of cases	Percentage
6am to12pm	19	18.27
12pm to 6pm	35	33.65
6pm to 12pm	48	46.15
12am to 6am	2	1.92
Total	104	100

Table 5: Place of death

Place	No. of cases	Percentage
Spot deaths	48	46.15
Brought dead	33	31.73
Hospital deaths	21	20.19
Others	2	1.92
Total	104	100

Table 6: Pattern of External Injuries

Type of injury	Chest wall	
	No. of cases	Percent
Abrasion	42	52.50
Contusion	20	25.00
Laceration	13	16.25
contused Abrasion	5	6.25
Total	80	100

Table 7: Type of organ involved

Type of organ involved	No. of cases	Percentage
Lung	55	53.40
Heart	31	30.10
Major blood vessels	17	16.50
Total	103	100

Table 8: Injuries to the chest

Tissue	Contusion	Laceration	Rupture	Total
Trachea	3	2	0	5
Bronchus	2	7	0	9
Pleura	0	51	0	51
Haemothorax	0	0	0	61
Pneumothorax	0	0	0	9
Pericardium	2	4	1	7
Oesophagus	4	3	0	7
Right diaphragm	3	2	0	5
Left diaphragm	0	3	0	3

Table 9: Involvement of Skeleton

Bone	Right	Left	Both	Total No. of cases	Percentage
Clavicle	6	5	00	11	9.24
Ribs	19	17	41	77	64.71
Sternum	00	00	00	26	21.85
Thoracic vertebrae	00	00	00	05	4.20
Total	00	00	00	119	100

Table 10: Associated injuries

Associated Injury	No. of victims	Percentage
Head injury	32	30.76
Abdomen	21	20.19
Long bone fractures	21	20.19
Pelvic fracture	3	2.88

Table 11: Pattern of multiple organs involved:

Number of organs injured	No. of cases	Percentage
One organ	24	27.59
Two organs	36	41.38
Three organs	16	18.40
Four organs	11	12.64
Total	87	100

Table 12: Mode of death:

Mode	No. of Victims Male	Female	Total	Percent
Road traffic accidents	45	21	66	63.50
Railway accidents	12	5	17	16.35
Homicide	8	2	10	9.62
Fall from height	7	1	8	7.70
Firearm injury	2	0	2	1.92
Sports injury	1	0	1	0.96
Total	75	29	104	100

Table 13: Status of victims in RTA:

Type of road user	No. of cases	Percentage
Pedestrians	27	40.90
Two wheeler rider	15	22.70
Passenger	10	15.15
Two wheeler pillion rider	9	13.64
Driver	4	6.06
Bicycle rider	1	1.51
Total	66	100

Table 14: Relationship with fall from height:

Height in feet	No. of cases	Percentage
<10 ft	05	62.50
11-20 ft	02	25.00
20-30 ft	00	0.0
30-40 ft	01	12.50
Total	08	100

Table 15: Manner of death:

Circumstances	No. of Victims		Total	Percent
	Male	Female		
Accidental	58	25	83	79.80
Homicidal	10	2	12	11.54
Suicidal	7	2	9	8.65
Total	75	29	104	100

Table 16: Cause of death:

Cause	No. of victims	Percentage
Hemorrhage and shock	49	47.12
Combined Hemorrhagic shock and coma	25	24.03
coma	17	16.35
Respiratory failure	6	5.77
Cardiac tamponade	4	3.85
Cardiac Rupture	2	1.92
Septicemia	1	0.96
Total	104	100

Table 10 reveals that head injuries seen in 32 cases (30.76%), followed by abdomen injuries in21 cases (20.19%), 21 cases (20.19%) due to long bone fractures and pelvic fractures in 3 cases (2.88%). Injury to the chest alone was found in 28 cases (26.92%).

Above table shows that two organs are involved more commonly in 36 cases (41.38%) followed by one organ involvement in 24 cases (27.59%) and least involvement in four organs 11 cases (12.64%)

Table 12 reveals that most common circumstance causing chest injuries are road traffic accidents in 66 cases(63.50%) followed by railway accidents in 17 cases (16.35%), homicide in 12 cases (11.54%), 8 cases (7.70%) due to fall from height and 1 case due to sports injury(0.96%).

Table 13 shows that in road traffic accidents it was observed that pedestrians were involved in 27 cases (40.90%) formed the major victims of chest injuries followed by the two wheeler riders in 15 cases (22.70%) and least in bicycle riders 1 case (1.51%)

The Table 14 shows that chest trauma due to fall from height were seen maximum in cases of fall from height of less than 10 feet in 05 cases(62.50%), followed by fall from height of 11 to 20 feet in 02 cases(25%) and in 30 to 40 feet height, 01 case (12.50%). Most of victims are young adult males within age group of 21 to 40 years. Fall from height constitutes 7.69% of total chest trauma.

The manner of death is maximum in accidents in 83 cases (79.80%) followed by homicidal in 12 cases (11.54%) and suicidal in 9 cases (8.65%).

Death was due to severe bleeding in 49 cases (47.12%) followed by combination of coma and hemorrhagic shock in 25(24.03%) cases and least is septicemia in 1 case (0.96%).

Discussion

In the present study of chest injury it was observed that majority of the victims were in the age group of 21 to 30 years in 36.54% cases, followed by the age group 31 to 40 years 24.04% cases. Early and late ages show minimum cases.

Firas Yazigi et al documents in his study that until age 40 chest trauma constitutes 20-25% of causes of deaths due to trauma and our studies are consistent with their study [1]. J.J. Moar observed that 46.2% of the victims are in the age group of 21 to 30 years and their results are in agreement with our studies [3]. Husaini Numan et al revealed in his study that 82.6% of the victims are males and mostly in the age group of 21 to 40 years. Their results are comparable with our studies [4]. The present study is consistent with the results of Dean T. Mason et al [5], Amit Sharma [6], B. Suresh Kumar Shetty et al [7].

In the present study, it was observed that males dominated females in the ratio of 2.59:1. This dominance of the males has also been reported by various workers- Ibrahim Al-Koudmani et al have opined that chest trauma is a major health problem especially among the young males as it is associated with high mortality [8]. Dean T. Mason et l has include 86% males are associated with chest injury [5].

In the present study it is found that agent responsible for majority of chest injuries is the blunt force in 96(92.31%) cases and penetrating force is least in 8(7.69%) of cases.

Mohamed Fouad Ismail et al conducted study over a period of 10 years involving 472 victims. They states that causes of penetrating chest trauma in 2.1% and blunt chest trauma in 97.9% of cases. This study is comparable with our study [9].

In 104 cases of deaths due to chest injuries it was found that 48 cases (46.15%) have died on the spot and 33cases (31.73%) were succumbed to their injuries on their way to the hospital and 21cases (20.19%) were died while undergoing treatment in the hospital.

This is near to the studies done by C.R.Vasudeva Murthy et al. In their study they have noticed that in 57.69% cases victims died on the spot [10]. MeeraTh et al mentions in their study that 59 victims (47.2%) died on the spot [11].

In the present study it is observed that lung is the most common organ involved in the majority of the victims i.e., 55 cases(53.40%), followed by heart in 31cases(30.10%). In our studies contusion of lungs seen in 23 cases and laceration in 31 cases and rupture in 1 case. Injuries to heart consist of contusion in 9 cases, laceration in 14 and rupture in 8 cases.

B.Suresh Kumar Shetty et al mentions in their study that lungs(61%) is the most common organ involved in the chest trauma and is consistent with our studies [7]. Present study is partial in agreement to the studies conducted by Mohamed Fouad Ismail et al as they mentions that pulmonary contusions seen in 27.1%, lacerations in 6.9% of cases [9]. Our results are contrast with the study done by K. Moghissi in which he finds only 4.4% of lung lacerated due to blunt chest trauma [12].

Injuries to the bronchus is seen in 9 cases (8.65%) consisting of contusion in 2 cases and laceration in 7cases. Injury to the trachea is seen in 5 cases. They are commonly seen in road traffic accidents and in railway accidents. Majdi Ibrahim et al states in their study that tracheobronchial injury is a rare injury and usually occurs after blunt chest trauma and is

consistent with our study.1[3] Our study is also in accordance with observations of B.T.Stewart et al [14].

In present study it is observed that rib bone fracture is the most common skeletal injury in the chest region i.e, 77 (64.71%) cases followed by the injury to the sternum in 26(21.85%) cases, clavicle is injured in 11(9.24%) cases and thoracic vertebra is injured in 5(4.20%) cases.

Husaini Numan et al mentions in their study that Pattern of thoraco-abdominal injuries shows that the commonest injury of thoracic region was fracture of ribs and is in accordance with present studies [4]. It is also consistent with the studies of K. Moghissi [12], C. R. Vasudeva Murthy et al [15], Colin Bane [16].

In the present study injury to the chest alone was found in 28 cases (26.92%). Associated injuries to two and more body parts i.e., head, abdomen and limbs were found in majority (70%) of the cases. Long bone fractures are seen in 21 cases (20.19%).

Present study is comparable with the studies of Sangeet Dhillon et al [17] where they have noticed head injuries in 31 victims and 23 cases associated with long bone factures.

In the present study deaths due to chest injuries caused by road traffic accidents were seen in 66 cases (63.50%). It is in accordance with the studies of Recep Demirhan et al [18] as they have documented that in 65% of cases blunt injury mostly related to the traffic accidents was the cause of chest trauma. It is to nearer to the studies of K.K.Aggarwal et al as they mentions in their observations that road traffic accident deaths accounted for 55.48% [19] .

In the present study it is observed that the maximum number of victims were pedestrians i.e., 27(40.90%) cases, followed by two wheeler riders in 15 cases (22.70%) and least were found in bicycle riders.Mohamed Fouad Ismail et al have noticed that pedestrian injuries is seen in 38.3% of cases and is near to our studies [9].

The chest injuries due to fall from height were less than 10 feet is seen in 5 cases followed by fall from height of 11-20 feet in 2 cases and 30-40 feet in 1 case. Manner of deaths in fall from height is due to accidental fall. It accounts for 7.69% of total thoracic traumas.Our finding is near to the studies of Mohamed Fouad Ismail et al where they documented that fall from height constitutes 6.7% of total thoracic traumas [9].

In the present study fire arm injury over the chest is seen in two cases. In our study it is found that

fracture of ribs and penetrating injury to heart and lungs were seen. Our study is similar to the study conducted by the Mahmut Tokur et al studied two cases and mentions that penetrating heart injuries were produced by fire arm injuries and penetrating trauma resulting from the free ends of fractured sternum and ribs [20]. Present study results are consistent with the studies of Ira A.Ferguson [21].

In the present study it was noted that the main cause of death was hemorrhagic shock in 49 cases (47.12%), followed by combination of coma and hemorrhagic shock in 25cases (24.03%), coma in 17 cases (16.35%) and least is septicemia in 1 case (0.96%). Sangeet Dhillon et al noticed in their studies that hemorrhagic shock was the cause of death in majority of the victims [17]. Meera Th et al States that the commonest cause of death was hemorrhagic shock as a result of intra thoracic and abdominal bleeding in 44% of the cases [11].

Conclusion

In the victims of chest injuries 63.0% were due to RTA, 16.35% due to railway accidents, and least is from due to sports injury in 0.92% of cases. Young adults between 21 to 30 years (36.54%) are more vulnerable to the fatal chest injuries. Manner of death is commonly accidental in nature in 83 cases followed by homicidal and suicidal in 12 and 9 cases respectively. Peak time of occurrence chest injuries is between 6pm to 12 midnight and least between 12 midnight to morning 6am. More number of victims died on the spot. In road traffic accidents maximum number of victims were pedestrians i.e, 27 cases (40.90%), followed by motor cyclists in 15cases (22.70%) and least in bicycle riders.

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Indian Journal of Agriculture Business	2	5000	4500	500	450
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Indian Journal of Preventive Medicine	2	6500	6000	464	410
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International Journal of Pediatric Nursing	3	5000	4500	357	300
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Journal of Practical Biochemistry and Biophysics	2	5500	5000	393	340
Journal of Social Welfare and Management	3	5000	4500	357	300
New Indian Journal of Surgery	4	7500	7000	536	480
New Journal of Psychiatric Nursing	3	5000	4500	357	300
Ophthalmology and Allied Sciences	2	5500	5000	393	340
Otolaryngology International	2	5000	4500	357	300
Pediatric Education and Research	3	7000	6500	500	450
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